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THE FAMILY AS AN EXTERNALITY WITHIN A MARKET ECONOMY

Evidence from the Czech Republic

Doctoral Thesis

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The Family as an Externality within a Market Economy: Evidence from the Czech Republic

Abstract

The dissertation thesis deals with an issue of fertility decline in developed countries from a perspective of relationship between the family and the market economy. The family is perceived as an externality with respect to theoretical economic framework as well as to real economy of the Czech Republic in the period of economic transition. In other words, neither theory nor applied policy fully reflects contribution of the family for the whole society. The thesis goes into the family specification from distinct standpoints, its development within time, relationship to economy and briefly introduces economic approaches to the family at both micro and macro level. In addition, the thesis carries out analyses of Czech data in the period 1989-2010. While the macro analysis is focused on interaction between fertility and economy performance, the micro analysis is devoted to financial support provided by state to the family via the social scheme and the tax system.

Keywords: the family, fertility, economy, the Czech Republic, the social scheme, the tax system

Rodina jako externalita v tržní ekonomice: Poznatky z dat České republiky

Abstrakt

Dizertační práce je zaměřena na pokles plodnosti ve vyspělých zemích z perspektivy vztahu rodiny a tržní ekonomiky. Rodina je sice nezbytnou součástí teoretických konceptů a samotného hospodářství, neboť je primárním zdrojem pracovní síly a lidského a sociálního kapitálu, nicméně její přínos není plně zohledněn ani v jedené ze zmiňovaných oblastí. Proto je na rodinu nahlíženo jako na externalitu. Práce se zabývá vymezením pojmu rodina, jejím vývojem v čase a vztahem k ekonomice. Diskutována je i otázka začlenění rodiny do mikroekonomických a makroekonomických modelů, přičemž analytická část práce je zaměřena na data České republiky v období transformace. Zatímco makroanalýza studuje vztah plodnosti a ekonomické výkonnosti, mikroanalýza se zabývá finanční podporou rodin s dětmi v rámci sociálního a daňového systému České republiky v období 1989-2010.

Klíčová slova: rodina, plodnost, ekonomika, Česká republika, sociální systém, daňový systém

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Chapter 1

Introduction

"There is no doubt that it is around the family and the home that all the greatest virtues, the most dominating virtues of human society, are created, strengthened and maintained"

Winston Churchill

The 20th century has been characterised in comparison with the past as a period of unprecedented changes and development. On the one hand, the century is related to two major world war conflicts and a modified geopolitical arrangement of the world, on the other hand it is also described by progressive industrialization and expanding trade resulting in economically globalized world. Scientific research, engineering professionalization and technological development over the period significantly contributed to a major shift in the way how up to date people live on the Earth. For instance, airliners, motorways, radio, television, antibiotics, frozen food, computers, the Internet, and mobile telephones affect human every-day life profoundly. Apart from that, discoveries also weighed in extraordinary population growth. While 1.56 milliards people lived in all around the world in 1900, fifty years later world population counted more than 2.52 milliards people and after additional fifty years more than 6 milliards people inhabited the green planet (Population Reference Bureau, 2004, p.5). In addition, phenomenon of population ageing emerged in developed countries.

Population ageing, which is characterised by proportionally larger share of older individuals in population, is a result of extended human life span in combination with low level of fertility. While the life expectancy at birth equalled to 65.9 years and the total fertility rate 2.81 children per woman in more developed regions in 1950-1955, the figures corresponded to 76.9 years and 1.66 children per woman for the period 2005-2010 (World Population Prospects: The 2010 Revision). The increase in life expectancy and decline in fertility level are obvious. Besides that, population development in more developed regions has been specified by increasing share of children born outside marriage, increasing variety of family forms, relatively high age of mother at first birth, etc. Taking into account economic progress documented in the 20th century in combination with changes in population development, it is hypothesized that the low level of fertility is a result of unbalanced relationship between the family, as a basic social unit where demographic reproduction is realized, and economy based on a free market structure. More precisely, nowadays the market outbalances the family. Although economy can be

organized by other principles than the free market, the market structure is emphasized in the work, because it prevails over other forms worldwide.

While the family was somewhat self-reliant in the 19th century, in the next century it became highly dependent on the market as new advancements in technology were utilized in production. Alongside a variety of basic and new consumption goods and their sophisticated production which made them cheaper, people turned away from home production to their purchase in the market. In addition, the family/household and work became two independent realms of human life. People have obtained not only consumption goods and services in the market, but as well sources for their purchases. People have been owners of labour as a basic input factor of production. Therefore, they supply the market with labour and obtain sources for purchases of the output. Furthermore, to keep mechanism function and reflect demand side of the market additional production innovations have been necessary. Therefore, the market has looked for skilful labour with knowledge. But fulfilment of given market requirements needs time and additional investments, which can be obstacles for formation of a new family and reproduction.

On the one hand, the market needs the family because the family produces potential workforce and form human and social capital, on other hand it does not fully reflect how it is done. Therefore, the family has been in the position of externality. In general, externality refers to the side effect on an individual or entity due to the actions of another individual or entity. In other words, not just parents and broader family but as well whole society benefits of family care for children and their education, if they succeed. In a simplified way, children will be tax payers contributing to keep the systems running. Because the thesis utilizes framework of population economics, the family as an externality is perceived from two points of view, i.e. the family as an externality within the economic theory and the family as en externality within real economy. The population economics is an approach on the borderland of demography and economics. Demographic knowledge is utilized in economic framework.

Therefore, the thesis has basically two parts. The first part deals with an issue how the family, or in general demographic variable, has been incorporated into economic consideration at both micro and macro level. Taking into account the scope of the theme, the sections provide only the basic insights into economic frameworks and principles, which are utilized in analysis in a macro perspective. The second part of the thesis is devoted to analysis utilizing the real data of the Czech Republic in the period of economic transition from a command to market structure. The study examines how fertility was affected by economic performance generated by market mechanism and how the financial situation of the family was influenced by the direct and indirect financial state supports. Although support to the family can be provided in several distinct ways, the financial support belongs to the most important forms. Besides that, the financial situation of the family is a factor which influences individual's decision not only in case of family formation or additional child in the family, but also in case of individual's general attitude to the institution. The Czech data are utilized due to their quality and the fact, that they capture the possible effect of the market structure usage. In addition, the standard demographic and economic methods are utilized in the whole work.

The thesis is organized as follows. The subsequent second chapter is devoted to literature overview. Considering comprehensiveness of the topic the overview is narrowed to the relevant

literature with respect to the family as an externality and conducted analyses at macro and micro perspective. The channels of interactions between fertility and economy, as well as financial situation of Czech families are discussed with respect to available sources. The third chapter involves definition of the basic terms utilized in the work. Approaches of demography, anthropology, sociology, economics and law are employed to specify what the family is. Apart from that, development of the family in time is also studied, because although it seems that family has been unchanging institution, the reverse is true. The third chapter goes into the relationship between the family and economy. The distinct forms of economy organization, as well as foundations of the market structure are under investigation. Considering time aspect of the hypothesis, the world population, human and population development are briefly sketched to illustrate collateral expansion of economic and population growth and subsequent changes. The third chapter is closed by the theoretical approaches to the fertility decline and economic theories at micro and macro level. The theoretical concepts of fertility decline are useful not just for understanding of this change, but they provide background of analysis in a macro perspective. As mentioned above, microeconomic and macroeconomic theories are relevant to perception of the family as an externality in population economics approach and introduce the principles applied in economic framework utilized in further analysis.

The fourth chapter is focused on development in the Czech Republic since 1989, when the transition process from a command to market economy begun, and analysis at both macro and micro level. Before the analyses are conducted and obtained results discussed, the population and economic development are introduced. Both population and economic development in the Czech Republic since 1989 are placed into broad framework to at least partly capture comprehensiveness and complexity of the whole transition process. Therefore, besides the fertility and household structures development trends in mortality, abortion, nuptiality, divorce, and migration are discussed. In addition, initial circumstances of the transition as well as pattern of economic development are considered. These descriptive subchapters are followed by two analyses.

The analysis in a macro perspective studies the interaction of fertility with respect to change in money holdings, unemployment and output. The method of vector autoregression, which allows investigating not just correlation but mutual relationships among variables, is utilized. Apart from that, to fill a gap in literature, three models employing different approximation of fertility are built up. The analysis in a micro perspective deals with the financial support to families with dependent children provided by the state over the period 1989-2010. The direct support arising from the social scheme and the indirect support based on the tax system are taken into consideration. To understand the impact of changes in the systems fictitious families are constructed. The families are chosen based on knowledge obtained in population and economic development and are differentiated via income levels and number of children. The simulations illustrate for instance impact of the tax deductible item replacement, the common taxation of married couple, or effect of sickness or unemployment on family income. Further simulations are focused on an issue how to mitigate the fall in family income with additional child in given framework. Not surprisingly, the outcomes of the thesis are summarized in the last chapter devoted to conclusion.

Chapter 2

Literature overview

According title of the chapter it is clear that, the following paragraphs are devoted to literature, which has been relevant to the study. Due to scope of the work, the overview includes literature concerned with the family as an externality, relationship between fertility and economic performance, and financial situation of families in the Czech Republic. The literature overview is narrowed mainly to the sources providing the background for conducted analysis. Nevertheless, the last paragraph is focused on literature which provides general and detail knowledge of population and socio-economic development in the Czech Republic since 1989. Although this literature has not been necessarily directly utilized in the work, it was used to grasp complexity of changes generated in the period of the transformation process.

The family as en externality is studied from a multidisciplinary perspective which arose from a general interest in relationship between demographic and economic variables. Considering that, a crucial link between population/fertility growth and economic growth had been already stressed by Thomas Malthus (1798) and the classical economist Adam Smith (1796) in the eighteenth century. The law of the geometric growth in population in relation to the arithmetic growth in resources is well known. From the very beginning, the economic disputes over growth in output have integrated population into consideration. In spite the fact that, the fundamental growth theory in Solow tradition includes the parameter of population, it also assumes that decisions regarding children are unaffected by income, employment or any other macroeconomic variable. But common sense has indicated that economic decisions are made by human beings and that fertility itself has to be shaped by economic consideration.

In 1960, Gary S. Becker linked children to "durable goods". His approach assumes, that demand for children increases, when parents' income increases and "price" of children decreases. Afterwards, Razin and Ben-Zion (1975) analyzed an inter-generational model, which linked population and economic sources. They built up model of a small open economy, where children enter to parents' utility function as other goods. At the same year, 1975, Easterlin introduced the framework in which the economic and sociological approaches are combined. He formulated the supply side of fertility. Later on, he presented the hypothesis in which he assumes that economic and social fortunes of a birth cohort are a function of its relative size. This work was followed by Becker and Barro (1988), who based on the assumption, that wage rates and interest rates are specific for each family, introduced the economic theory of fertility. This theory connects fertility rates with capital accumulation over generations. By assumptions, that the technological progress is a function of population size and that the returns on education

are function of technological progress, Galor and Weil (2000) introduced a model resulting in an inverse U-shape pattern of fertility development. On the other hand, Myrskylä, Kohler and Billari (2009) documented the U-shape association between fertility and the human development index as an indicator of economic and social development. A broader angle of view is provided by Weber (2010), who studies in his work outcomes of standard growth theories with respect to demographic reproduction and practical economic policies. Weber's (2010) works in multidisciplinary perspective of economics, demography and system dynamics, which allowed him to develop a new model, which is capable to deal with changing population structure. Although this progress in the research into dependence of fertility or other demographic variable on economic development is remarkable, the clear mechanism of this relationship is still incomplete.

Since G. Becker published his breakthrough work *A Treatise on the Family* in 1981, a large amount of theoretical as well as empirical research in the area of family economics emerged. Cingo (1991) summarizes the basic information gained in the research as a household formation and dissolution, domestic division of labour, participation in the labour market, demand for children, the timing of births, etc. Cingo continues in formal economic analysis with respect to the family in Becker's tradition. Razin and Sadka (1995) also gather fundamental economics findings of the family at both micro and macro level. For instance, the growth theory in Rebelo's framework and Malthus hypothesis in economics formalism are included. In addition, their work covers link between children and "capital good". Ermisch's (2003) work is further following microeconomic knowledge related to family economics. This work involves additional information on economic theories of fertility, altruism in the family and household formation. Apart from that, the work is focused on conflict and cooperation in the family.

The most recent works issued in 2008 bring a modified perspective to formal economic approach. The first volume of the series *Frontiers of Family Economics* edited by P. Rupert (2008), which contains works of several authors, carries out an exploration of family decision making and its outcomes both in theoretical and empirical perspective. The analysis and models discuss fertility changes, female labour force participation, the effect on occupational mobility, poverty of families, etc. and combine traditional perspective with supplementary approaches and extensions. Besides that, Folbre (2008) introduced concept of reversed circular flows. While the conventional model emphasizes the household/family as a consumer with respect to government and business, in her approach the household/family is predominately a producer. More specifically, she focuses on the household/family as a producer of human and social capital, which creates and maintains the workers employed in business and government sectors. Folbre (2008) highlights importance of spillovers considering economics of the family, i.e. individuals preferences change over time, the range of individual choice is limited, parental decisions are influenced by their perceptions about decision of other parents, commitments are affected by the development of cultural norms and moral principles, etc. Therefore, in her point of view the total economy exceeds the market economy in conventional model, because several transfers and work are realised outside the market. Furthermore, the fertility decline is explained as a change in the circular flow of resources within families. The work moves away from rigid economics formalism and utilizes data from the USA.

Also Mlčoch (2007, 2008, 2009b) points out that the traditional economic framework with doctrine "more is better" is not capable to capture the family into consideration. Just as Folbre, Mlčoch considers the family as an externality in traditional approach, because while consumers buy produced goods, households supply labour to the market but without any explanation how it is done. He claims that the family is captured in two loops. The primary loop of reinforcing feedback of market pressure and temptations to increased consumption is based on an assumption that economic decision involves also, besides durable goods and services, number of children. In addition, higher family income and participation in the labour market contradict to care for children. Therefore, children have to compete with other goods in consumption basket, but with a broader and broader range of goods and services in the market, children are less preferred. In general, while income increases, fertility declines and subjective happiness stagnates or declines. Afterwards, lower level of subjective happiness generates additional demand for higher income and additional consumption. The secondary loop of reinforcing feedback of the family's addiction to the state help reflects the fact that, the relationship between partners has become more frequently without any formal commitments, either state or religious, but given family also demands state support. In other words, state intervention to private family life is not accepted, but provided state assistance is required. Mlčoch (2007, 2008, 2009b) is a representative of institutional approach to the family in economics. In addition, his further research deals with the typology of family policy and with an issue how to make the family more competitive within a market structure.

Regarding channels through which fertility and economic development interact, Wang at al. (1994) tested hypothesis that fertility is the endogenous variable to labour market conditions. They supposed that an employment shock causes a reallocation of time from children upbringing towards a higher labour effort. The fertility should decline and economic production should be stimulated. Another channel of interaction was introduced in the work of Petrucci (2003). He supposed that family is interested in number of children as well as in dynastic wealth. He documented, that demand for children depends also on household's real money holdings. The model shows that fertility increases with the higher growth rate of money. A combination of endogenous labour market conditions with the money holdings occurred in the work of Maksymenko (2009). She documented that more than a third of Ukraine fertility variation for the period 1996-2005 is explained by unemployment disturbances and monetary incentives. This approach is applied for the Czech data. It is assumed, that not just changes in the output growth, but also unemployment and households' savings shape fertility decision, while fertility shapes all given economic variables. As it will be explained later in macro analysis, the effect should be present in the short run, but not in the long run.

Taking into account the theme of financial situation of the Czech families, a broad range of literature is available. Vavrejová et al. (1997) focus on households within a beginning of the transformation process. Besides the shortcomings in official statistics, the work emphasizes risk of poverty for families with children. The analysis concentrates on families of employees, farmers, and pensioners. In addition, figures revealed that income from private business on total household's income as well as total amount of households' savings increased, except for low income households and some high income households of pensioners,

in the period 1989-1993. Furthermore, Garnerová et al. (1997) study differences in income and expenditure of Czech and Slovak households. Based on comparison of the years 1989 and 1992, the study highlights increased income inequality among households of workmen and high educated population and decreased income inequality in case of farmers, because agriculture production was substantially affected by the transformation process and therefore they got poorer. While income inequality differences were not present in 1989, in 1992 income inequality in the Slovak Republic was greater than in the Czech Republic. Šandera et al. (2005) based on statistical data inquire into socio-demographic situation of incomplete families with dependent children in the Czech Republic in the period 1991-2001. The data disclosed that share of incomplete families in structure of household increased over given period and that the majority of one-parent families had one dependent child. In addition, in more than three quarters of cases mother was a head of the family. Financial situation of the incomplete family was not as good as the complete family regardless of the fact whether a parent was employed or seeking for a job. In comparison with the previous study, Bartoňová (2005a, b, 2007) provides more detail overviews of changes and development trends with respect to the household and family structures in the Czech Republic. Besides that, Bartoňová et al. (2005) carried out household projection in a perspective to the year 2030 in the Czech Republic. Although the studies brought important insights into financial situation of the family in the Czech Republic, following authors go further.

Soukupová et al. (2006) analyse financial profitability of various forms of living arrangements considering state assistance via the social scheme and the tax system in the Czech Republic in the period 2004-2007. For the comparability, ideal types of family are constructed, i.e. the family with a single mother, the family with one working parent, the family with working parents, and the family with unemployed parents. The incomes with respect to one child at the age of 2.5 years or 7 years, two children at the age of 7 and 14 years, and three children at the age of 7, 14 and 17 years are calculated. In addition, employed adults are distinguished according amount earned with respect to the average gross monthly wage, i.e. 50 % or 100 % of the average gross monthly wage. The results reveal that the common taxation of married couple improved position of marriage in 2006, but even though the family with unemployed parents was better off in comparison with the family with one child and working parent in 2006. Apart from that, the analysis is a part of research focused on non-marital fertility in the Czech Republic since 1989. Therefore, additional pieces of information about the family are available in Hamplová et al. (2007).

The study carried out by Martinovský (2007), which is concentrated on the financial situation of families in the Czech Republic according to available data in the period 1989-2005, is divided into two parts. While the first part analyses statistical data as the Household Budget Survey, Microcensus 2002, and Survey of child upbringing and maintenance costs in 2003, the second part deals with a certain aspect of the financial situation of families, i.e. analysis focuses on costs of housing, the low income family, the single-parent family and the family with foster care. In comparison with study of Šandera et al. (2005), which utilizes similar data, the work provides more detail insight to general financial situation of the Czech families. Not only information about financial situation of families in the Czech Republic, but also general

knowledge about population and economic development are involved in work of Rychtaříková et al. (2008). The study analysis primarily data collected in the Generation and Gender Survey held in 2005, which has been focused on relations between generations as well as partners and their dynamics in time. Although findings do not necessarily hold for whole population, they provided valuable insight into family realms which are not captured by basic statistical sources. For instance, two thirds of households declared, based on the personal feelings, that they can hardly keep going with the monthly income. In this case the statement was directly connected with the total family income. While single parent households with unemployed adult pronounced the greatest difficulties, the reverse was true for families were both partners worked. In addition, difficulties with monthly income were more likely in households with dependent children. The survey also provided information about additional financial sources. Majority of additional income in the family came from gift rather than inheritance, which was nonrecurring and from respondent's parents or his/her partner's parents. But it is necessary to notice, that only 4 % from all households in the survey got money, assets or other valuable goods within the twelve months prior to questioning.

Höhne (2008) also deals with the issue of financial situation to the Czech families. The work has basically two parts. The first part studies the subjective perception of provided state support, whether the support is necessary and is of benefit to the family or not. The second part focuses on real amounts of provided state support with respect to certain family structure. The single-parent family and complete family are objects of the research. In addition, Höhne (2008) distinguishes between marriage and cohabitation. Furthermore, calculations reflect number and age of dependent children and changes of the social scheme and the tax system in the period 2005-2008. Based on obtained results Höhne (2008) points out that the common taxation of married couple was beneficial in the period 2005 and 2007 and that feigning to be a single-mother was also beneficial for some families. Apart from that, she claims that changes in the year 2008 made misappropriations less beneficial and harder. In comparison with Höhne, Hampl et al. (2009) study financial situation of the family from a different point of view. Their economic analysis is based on the assumption that all social relations can be understood, in a broad sense, as market transactions. Taking that into account, two major disproportions with respect to the family with children are generated. The first disproportion emerges between the family and the childless family. The second disproportion comes out from unequal sate approach to investment. While investments to companies' capital are broad due to expenses deductible from the tax base, investments to human capital are minor. They are not fully compensated. Therefore, authors calculate possible household financial loss due to taxation and social insurance payments from investments into human capital. With respect to scope of the work, the study has overlap to the family policy.

The financial support to the Czech family provided both by the social scheme and the tax system in European framework is studied in work of Mitchell (2010). Mitchell (2010) goes into the structure and level of provided financial assistance to the family with dependent children in the Czech Republic and sixteen other European countries in the year 2004. The work points up different development in the Czech and Slovak Republics and also involves information about changes which were done in the Czech system since 2004. According the state in 2004,

Mitchell (2010) claims that assistance to the family in the Czech Republic was more similar to support provided in Austria rather than in the Slovak Republic. The Czech approach had aspects of liberal, conservative as well as social-democratic regime of welfare state and none of them dominated over others. Matějcová et al. (2005) utilized similar international framework and provided summary overview of the family policy in the selected European countries, the Czech Republic including. The work focuses on the means of the family policy financing rather than deep analysis. Considering the Czech Republic, the issue of family policy is also involved in the following works: Kocourková et al. (2006), Kocourková (2007, 2008), Rabušic (2007), Křížová et al. (2008), and Mčoch (2010).

The last paragraph of the overview is devoted to literature which provides deep insight into socio-economic development in the Czech Republic in the period of the economic transition. Tuček et al. (2003) go into a broad range of changes, which occurred in the Czech society in the 90's of the 20th century. Therefore, based on a substantial background of data sources, changes in demographic reproduction both at state and regional level, in education structure, in economic activity, in life standard, in income and property distributions, in social inequalities and mobility are discussed. The study is valuable for understanding of widespread impacts and effects on the general public brought by the economic transition in the Czech Republic. Another work, Večerník et al. (2010) highlight demographic and socio-economic behaviour of individuals and households since 1989 in the Czech Republic. The analyses are placed into the international framework of Central Eastern Europe. Therefore, besides the basic trends in development in the Czech Republic the particularities can be detected due to contrast to other countries. For instance, the differences between the Czech and the Slovak Republic are as in the work of Mitchell (2010) emphasized.

An extensive body of literature related to the theme of the work exists. Therefore, not all utilized sources were involved into this overview. The overview went only into the literature which is associated to relationship between demographic and economic variables, because this literature contributes to perception of the family as an externality and detects possible channels of interactions between fertility and economy. The knowledge about these interactions is reflected in the analysis in a macro perspective. In addition, overview of literature focused on the financial situation of families in the Czech Republic since 1989 was also included, because it is highly relevant with respect to analysis in a micro perspective.

Chapter 3

Theoretical and empirical framework

This section of the thesis is devoted mainly to the specification of applied terms, definitions and expressions. The attention is also concentrated on their relationships and on the theoretical concepts and approaches currently relevant in the area of interest. The aim of this part is to understand a concept of the family and its development within time, as well as its dependence and relationship to economy. Theoretical approaches providing explanation to the fertility decline in developed economies as the Public Choice Theory, the Theory of Risk Averse, the Second Demographic Transition, the Postponement Transition, and the Hypothesis of economic crisis, and a summary of basic economic theories at micro and macro level are also included.

3.1 Institution of the family

Although the family has been used in our speech quite frequently, the meaning of this word is, in fact, enormously diverse. The family means something different for people in Europe in comparison with, for instance, people in Africa or Asia. It means also something different for various scientific disciplines. To complicate the situation even further, the term family had slightly different meaning for human beings in the 19th century and in the 20th century. To define and specify concept of the family from particular angles of demography, cultural anthropology, sociology, economics, law, and history, become a target of this part.

3.1.1 Specifications and definitions of the family concept

The cornerstone of this thesis is the term family. Therefore, it is necessary to consider, what family means, because it can be used in really broad sense. For instance, the American Heritage Dictionary of the English Language (2009), which is publicly available on the webpage of the Free Dictionary [1], provides ten miscellaneous definitions of the family. Family is understood as:

1. a. A fundamental social group in society typically consisting of one or two parents and their children.

[1] The FreeDictionary.com. 2011. [electronic resource]. Farlex, Inc.: <http://www.thefreedictionary.com/>.

b. Two or more people who share goals and values, have long-term commitments to one another, and reside usually in the same dwelling place.

2. All the members of a household under one roof.
3. A group of persons sharing common ancestry.
4. Lineage, especially distinguished lineage.
5. A locally independent organized crime unit, as of the Cosa Nostra.
6. a. A group of like things; a class.
   b. A group of individuals derived from a common stock: the family of human beings.
7. in Biology: A taxonomic category of related organisms ranking below an order and above a genus. A family usually consists of several genera.
8. in Linguistics: A group of languages descended from the same parent language, such as the Indo-European language family.
9. in Mathematics: A set of functions or surfaces that can be generated by varying the parameters of a general equation.
10. in Chemistry:
    a. A group of elements with similar chemical properties.
    b. A vertical column in the periodic table of elements.

In a brief survey, it is obvious that all definitions are unified by the fact that linkages among elements exist independently of a science unit. Demography, as a study of population structure and change, considers linkages among human beings. Based on the Multilingual Demographic Dictionary (1982), the family is rigorously distinguished from household and is defined primarily by reference to relationships which pertain to or arise from marriage, reproduction or adoption, all of which are regulated by law or custom.

The fundamental relationships correspond with the biological or nuclear family[2], which is determined by the linkages between married couple as parents and their children. In spite of the fact that, the biological family can be synonym for the nuclear family, it does not hold vice versa. The nuclear family may involve also adopted children. The extended family, composed family or joint family is understood as a family unit which is made up by combinations of several nuclear families. The extended family is a synonym for a consanguinal family or in societies with dominance of the conjugal family it refers to kindred who do not belong to the nuclear family. Therefore, in broad sense the extended family refers to all members of a kinship group.

From a statistical point of view, family is also a childless family, a married couple without children. Absence of children can be caused by several reasons. A couple cannot have a child due to biological infertility (childless), or it can be their decision reflecting wishes, preferences, socio-economic situation, etc. (childfree) (Hašková, 2009, p.13)[3]. Childlessness in statistics is also related to the stage of life cycle. A couple is young and plans to have a child, or is too old and grown children have already left parents' home. Although cohabitation[4], which refers to unmarried heterosexual couples living together in an intimate relationship, has become

[2] For a nuclear family the terms elementary family or conjugal family are also used.

[3] The terms voluntary and involuntary childlessness are also applied.

[4] The terms consensual union or de facto marriage are used as synonyms.

a predominantly current issue in European-American societies, it is also understood as a form of family in demography.

In spite of the fact that, demography strictly distinguishes family and household, family as a unit of demographic research presents a whole household or a part of a household. Household is a socio-economic unit of human individuals living together in the same dwelling and usually jointly running a home. The classification of household varies by country and society, but basically the private and institutional households are classified. Private household often overlaps with family households if their members are relatives. Based on relationship to head of the household[5], private household can be disaggregated into several families, the so called nuclei. Composite or complex private household is made up by primary nucleus and secondary nuclei. In general, the primary nucleus represents either a married couple without children, a married couple with one or more never-married children or one parent with one or more never-married children and the secondary nucleus can be illustrated by grandparents. The size of the household refers the number of household members. If an individual is living by himself, he forms a one-person household. The second type of household represents so called the institutional households, which are made up by individuals who reside in specifically designed institutions (e.g. hospitals, prisons, etc.). Although institutional households become more relevant in developed countries, the term household is commonly related just to the private household. To sum up this paragraph, demographic research related to family considers a statistical family, or census family, which corresponds to private household, specifically to the nuclei[6]. The statistical family cannot be wider than a household, although household can be composed by several families.

The majority of nowadays states define the family based on kinship which is specified in their legal code. Frequently, the kinship is proceeding from consanguinity or adoption. But the issue of kinship in human society, as cultural anthropology provides solid evidences, is even complicated. Family relationships are not conditioned only by biological reproduction, but also by given culture. Therefore, kinship is a cultural interpretation of intersection of biology and culture considering human reproduction, and may broadly differ. Family relationships are significant in human societies, because they are used as a mean of organization of social relationships in general (Skupnik, 2010, p.49). Based on kinship rules, human beings are integrated into given society and the social groups and their linkages in time and space are generated. The rules assist in differentiation and structuration of human society and induce predictable behaviour of their members. In a simplified way, a new born child has its relatively

[5] The head of a household is defined in methodology of a survey. It has to be taken into account that specification of a head of the household may vary from country to country. Frequently, a head of the household is a breadwinner, owner of a dwelling place, in nuclear family a husband, in single-parent family the parent, or it can be person written as a first in the list.

[6] In the Czech Demographic terminology the classification of census household, from which the family reflecting kinship is inferred, is following: complete family household consists of couple either married or unmarried with or without dependent children, single-parent household involves parent with a child or children, multi-member household without family relationships, and single-member household, where is a person living on his own or persons living together in one dwelling place, but running their own household independently (Pavlík, Kalibová, 2005).

permanent place within the family, parents know how to treat their parents and siblings, grandparents know their status to grandchildren, etc.

Maternity and paternity, in general parenthood, are the basic family relationships in the nuclear family, which is broadly accepted as an elemental family structure. The parenthood has been identified in all known cultures and because people reproduce themselves in a same way in the whole world, it could be supposed that concept of parenthood is universal. Although each individual has to have mother and father, the interpretation of human reproduction differs due to the distinct core of this process. While western cultures believe that core of human reproduction is in a fusion of two gametes, for instance in the Trobriand societies[7] people relate pregnancy with the spirit of the feminine ancestor, which incarnates into woman body (Skupnik, 2010, p.30-35)[8]. As a consequence, in the western cultures people do not differ between kinship from the mother's and father's side of the family, because their child has genes equally from both parents. On the other hand, the Trobriand societies believe, that kinship is related to the mother's side of the family, because just a mother provides all substance to her child. This concept of parenthood seems universal in our country, but in general it does not hold. Therefore it is necessary to take into account, that specification of the family relied on relationships is heavily culturally conditioned.

The conceptualization of paternity in western societies is based on consanguineous consubstantiality[9]. It stipulates, that father of a child is a man who fertilizes woman by sexual intercourse. To verified, who is real father, is relatively complicated. Therefore, the paternity is determined in a society via ideas regarding appropriate behaviour. Frequently, it is supposed that father is a man who is generally accepted as a partner of the woman. But a fact of life reveals, that man, who is designated as a biological father and he also believes in his paternity, actually does not have to be father of a child. The concept of paternity in western societies follows the knowledge of Roman law, which claims *pater semper incertus*[10]. Therefore, paternity composes of two elements, by genitor whose sperm fertilizes woman's ovum and pater who has social affinitive relationship to mother of a child. It is hard to determine, which father is more important for a child, if father, who supports him and raises him, or father who provides him a genetic blueprint. But due to western societies´ belief, that genes are more important the genitor is established, if he is known.

The aspect of biology in paternity is significant in western culture, but it does not necessarily hold for all cultures. For example, the Nuers, tribes residing in Southern Sudan and western Ethiopia, prescribe paternity in a special case also to women. For a Nuers's couple a prime value of a marriage is having progeny. In case, when husband dies without descendants and his wife is infertile, than a new woman gets marry with his wife. Therefore, children from this marriage have female father. In sum, biological father of children is a brother of died husband or any man who accepted a status of genitor, but paternity is prescribed to infertile wife

[7] The Trobriand Islands are archipelago of coral atolls off the eastern coast of New Guinea.

[8] The role of a man in reproduction is not so relevant for the Trobriands. They believe that man just help to spirit to open woman's body via intercourse. The similar appearance of a child with a biological father is explained by the fact that he had sex with a mother during pregnancy.

[9] The concept of who, how and what substance is transmitted to offspring.

[10] "The father is always uncertain".

(Skupnik, 2010, p.35). Also for Todas, community lives in Southern India, genitor is irrelevant. Paternity is granted to man, who declares his fatherhood before childbirth by given ritual.

For centuries, maternity has been defined unequivocally in comparison with paternity in western societies. Pregnancy and childbirth are attributes of maternity, which cannot be overlooked. It is established that mother is a woman who gave birth to a child. In this context, distinction between mother, who provides a genetic blueprint and who raises her child, seems unimportant[11]. But the reverse is true. Nowadays, maternity is not necessarily obvious due to adoption and artificial insemination. Adoption, which brings a child born to other parents into a new family, is a well-known institute for a long time. Adoption becomes more relevant in modern societies due to childlessness[12] and other social difficulties which cause separation of children from their biological family. Nevertheless, it should be mentioned that adoption for other cultures, for instance located in the area of Polynesia, is even ordinary.

In spite of the fact that, artificial insemination and new reproduction techniques can be understood as a progress in knowledge, they generate new questions and difficulties for modern societies. In the field of maternity, the chain fertilization-pregnancy-delivery is disrupted. The similar situation which was discussed regarding paternity occurred in the case of maternity. Woman who delivered a baby is not necessarily biological mother. In vitro fertilization allows carry a baby to term woman who is not donor of ovum. In this case, a baby can have two biological mothers or just one mother depending on interpretation, what is more significant for a baby development; genes or pregnancy, or it can have also just one formal mother who does not have any biological linkage to given baby. To complicate the situation even further, due to assisted reproduction it is also possible, that a baby can have three biological mothers. Ovum contains nuclear and mitochondrial DNA. In case of damage to nuclear DNA, this DNA can be removed from ovum and replaced by nuclear DNA of other woman. Therefore, two women are donors of one ovum and one woman is a donor of uterus. As stated above, new reproduction techniques make situation considering maternity even complicated and induces changes in given law.

Previous paragraphs introduced, in a nutshell, the issue of parenthood. But family relationships within nuclear family are not defined only by blood kinship. Parents are related via marriage, which is a concept important for majority of known civilizations. Marriage seems, at first sight, predominately cultural issue without essence of biology, because is frequently defined as a permanent relationship between partners which provides exclusively rights to the partner. Marriage is set up by law or custom and is often followed by given ceremony, which allows accepting declared form of a marriage. But again, ideas regarding human reproduction are also relevant. Marriage is stipulated, besides other things, as a mechanism of legal social reproduction. It means that experiences with a reproduction of progeny are used for specification of meaningful social relationships (Sokol, 2002, p.36-39; Skupnik, 2010, p.197). Broad family relationships arise from marriage by the potential reproduction of a married couple and therefore by potentially shared descendants.

[11] Genetrix = biological mother, mater = sociological mother.

[12] It is estimated that infertility, the inability to conceive a child, affects up to 15 % of reproductive-aged couples worldwide (WHO Bulletin, 2010). Fertility is negatively correlated with age, therefore the secondary childlessness is often caused by postponement parenthood to higher age or inability to find suitable partner.

Marriage is closely related with human sexuality. In general, it is assumed that sexual relationship is a part of married life. But sexual activities are in all known cultures limited. It is not allowed to have sex with anyone. Therefore, a man can marry just a person with whom he can have a sex. But, it does not mean that a man can marry with any potential sexual partner. The linkage between marriage, sexuality and reproduction is obvious and how much overlap each other depends on rigorousness of given rules. The most rigid state is, when marriage is necessary condition for sexual activities, while sexual activities are restricted just for reproduction.

Incest is a basic rule regarding sexual relationship, and consequently marriage. It is not permitted to have sex with an individual from relatives. Fundamental principle is related to parents and their children as well as to siblings independently of biological kinship (Murphy, 2008, p.77-81; Skupnik, 2010, p.204-210). Sometimes the taboo is extended to broad relatives[13]. In general, it is believed that abolition of incest lead to the punishment. In traditional cultures penalty comes from supreme power in a shape of natural disasters, in modern cultures in a shape of physical or mental disorder of progeny. Even if probability of disorder is relatively higher for a baby with parents of the same kinship, the rules of genetics are more comprehensive and therefore a possibility of having healthy descendant cannot be immediately excluded. For instance, Cleopatra VII Philopator, the last pharaoh of Ancient Egypt, who has been known for her famed beauty, was a child of sibling marriages in several generations (Murphy, 2008, p.77)[14]. Incest as a taboo is enforced for ages, but till now a clear explanation of its application does not exists[15].

Further rules regarding marriage are endogamy and exogamy. Endogamy insists on a marriage with a partner from the same group, exogamy the opposite. The cornerstone of the rules is a group. When the rule was determined, the group involves just relatives[16]. Therefore, the concept was established closely to the principle of incest. Later on, the group was extended to any group defined by human race, professions, religion, social, nations, age, etc. Well known examples are race segregation between the blacks and whites in the United States, when mixed marriages were not allowed in some countries of the union till the half of 20th century[17], and race segregation of the Nazis during the Second World War. By extension of the group definition, endogamy and exogamy became rules exclusively related

[13] Frequently, the rule of incest is extended to cousins, uncles and aunts, but this rule has varied a lot. For instance the Jews may marry cousins from both side of the family; on the other hand the Christians have to have permission for a marriage with a cousin three times removed. Also cultures, where the marriage of uncle with sister daughter is preferred, are known.

[14] The marriages of royal siblings were also allowed by Inca in Peru and culture in Hawaii, but information about their handicapped descendants have not been available. (Murphy, 2008)

[15] Cultural anthropology provides several explanations. Edward Westermarck (1891) claimed that people who are grown up together lose sexual attractiveness for each other. Bronislaw Malinowski (1931) stated that incest is necessary for stability and integrity of family. Sigmund Freud (1913) related incest to the desire to do so. Lévi-Strauss (1969) pointed out the necessity of alliances among groups for their survival. Therefore, a marriage with a partner from other group was preferred and supported by rule of incest. (Soukup, 2005; Murphy, 2008; Skupnik, 2010).

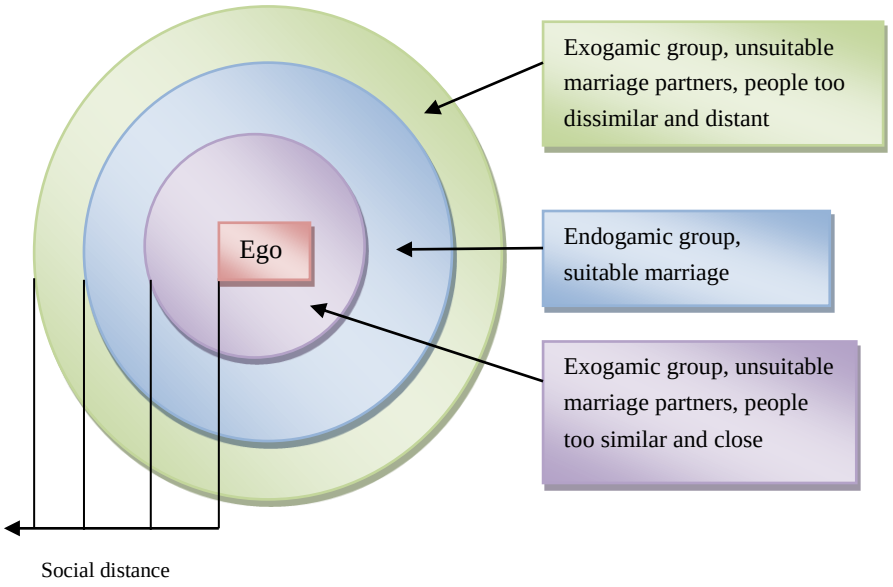
[16] Firstly exogamy and endogamy were determined by John McLennan in work *Primitive marriage* published by A. and C. Black in Edinburg, 1865.

[17] In 1883, the Supreme Court of the United Stated declared power of each state to decide about mixed marriages. This statement was valid till 1967, when the Supreme Court of the United Stated declared the right for free choice of a spouse as a basic human right.

to the marriage, because for instance people of different race could have sex, but they could not marry.

Based on the rules of endogamy and exogamy, cultural anthropology defines systems of partner exchange. The systems reflect the pattern of partner choice which has been applied for several generations. The basic rule, which has been frequently applied, is a marriage of cross-female cousin and cross-male cousin[18], while marriage of parallel-female cousin and parallel-male cousin is forbidden[19]. The main idea of these rules, which can broadly vary, is a creation of alliances among segments of society. The principles specify which partner is convenient for a marriage, what is particularly suitable strategy in small societies, where can be difficult to find a counterpart (Chart 3.1). The special cases of the rules are levirate and sororate. While levirate prescribes to widow a marriage with husband's brother, sororate orders to widower a marriage with a wife's sister. Levirate is more common and accepted by 70 % of known cultures (Broude in Skupnik, 2010, p.236). If a marriage is arranged between persons with certain basic social, physical or mental characteristics, it is called homogamy marriage; the opposite is called heterogamy marriage.

Chart 3.1: Suitable and unsuitable marriage partners and boundaries of exogamic and endogamic groups



Notes: Ego is a person to whom all relationships illustrated in the chart are related.
Source: Skupnik, 2010, p. 221

Concerning number of partners in a marriage, a union can be classified into polygamy and monogamy marriage. Polygamy is called a marriage with more than one partner, while monogamy is the opposite. Although western cultures are characterized as monogamous, majority of human societies accept polygamy as a part of their culture. Polygamy is not so spread as monogamy even if it is an accepted standard in the society, because polygamy has to follow demographic rule of sex ratio and the fact, that it can be relatively costly. Polygamy

[18] Cross-cousins are descendant of siblings of the opposite sex, while parallel-cousins are descendants of siblings of the same sex.

[19] A marriage of parallel-female cousin and parallel-male cousin is common in cultures influenced by Islam.

can be further classified into polygyny, polyandry and group marriage, which is their combination. Polygyny is marriage of one man with several women, while polyandry is the opposite. Polygyny is more common than polyandry.

Polygyny is the type of a marriage well known from African and Indian tribes and societies related to Islam, but as well from the USA.[20] Often, polygyny symbolizes the wealth of man, because is frequently connected to a price of a bride and the rule of even attention and support for all his wives and their children. But polygamy may be also an additional source of wealth for man and his family. Each extra wife is a new workforce, which has a potential to increase agriculture or handcraft production of the family. It could seem that a price of a bride is a poor business between families, but this institute is more related to an acknowledgement of bridegroom to a bride parents who raised her up. However the price of a bride can be demanded back due to e.g. infertility of a woman or her incorrect behaviour, usually a bride's family uses this gained estate for a marriage of their sons. A simplification is also a statement that woman loses her autonomy within a polygyny marriage. For instance, women living in the coast areas of western Africa have had right to decide about their financial issues from time immemorial. They have been able to earn money without obligation to share their income with husband or other wives. On the other hand, the same right got French married women in 1968 (Murphy, 2008, p.83). The autonomy of woman depends mainly on her economic autonomy rather than on type of a marriage. The cultural anthropologists documented huge number of examples, when polygyny is understood as a natural part of the life and it is demanded by women due to shared responsibility for a household[21].

In comparison with polygyny, polyandry, when one woman marries several men, is quite extraordinary kind of a union. Polyandry was documented in Tibet, Nepal, in the Marquesas Islands[22] and in some mountain tribes in India. In almost all cases, hard living conditions, characterized by a shortage of land and food, have resulted in permanent struggle for life and controlled fertility (Murphy, 2008, p.83). An idea behind is simple. Woman can have several sexual partners, but she can be pregnant approximately once a year. Therefore, human sexual needs, as well as production capacity of the environment are reflected for surviving. But polyandry is a not a solution to overpopulation and hardly any society under misery is applying polyandry to a fight for survival. For instance, polyandry is usually provisional form of a marriage in Tibet. When the oldest son in a given family gets married, his wife comes to a husband household. Husband's brothers treat her like their own wife till the moment of their own marriage. Husband's brothers have to own land and livestock, which demand time in the environment of Tibet. To establish a new household may take years, in the worst case they are members of brother's household forever. But in this perspective polyandry is a complement to monogamy, which is preferred.

[20] Although polygyny is not permitted by US law, a marriage of one man with several women is characteristic for the Mormons. It is estimated, that in the area of the Rocky Mountains (Utah, Arizona, Colorado) more than 50,000 people live in a polygyny marriage (Leeder, 2004).

[21] It is estimated, that 40 % married women in Africa live in a polygyny marriage. In the surveys women explained that polygyny is a natural form of a union, because man is biologically predetermined to have more women (Caldwell, 2000).

[22] The islands in the French Polynesia.

A group marriage is even exceptional in comparison with polyandry and in documented examples it is a temporal state leading to preferable form of a marriage. For instance, the Nyimba tribes of Nepal accept polyandry. But, if a wife is infertile than her sister joins the marriage. It is also possible, that one of the younger brothers brings woman, without any relationships to other members of the marriage, into the family. She is accepted as the second wife, but due to potential instability of an induced group marriage, a young couple can be forced by others to form their own family and household. Therefore a group marriage is split up into two monogamous marriages, or one polyandry and monogamous marriage. To identify group marriages is virtually issue of a terminology reflecting the customs in given culture. For example, in north Nigeria and Cameroon the so called second marriages, which have features of the group marriages, are observed. Man, as well as woman has a right to have the second wives and husbands. But they are living in monogamous marriage in reality with the possibility to get back to previous wife or husband. All unions are based on a rule till death us do part, but individuals may migrate among all their stipulated marriages (Skupnik, 2010, p.256-257). The difference is that members of the union, which is characterized as a group, are not running their household together at the same moment. Therefore it is questionable if it is a group marriage or not. In sum, a form of a group marriage exists in some cultures and customarily prefigures or results from polyandry and polygyny marriages. A group marriages as well as polygamy in general are exceptional types of union, although they are accepted by given society.

Aforementioned types of marriages are primarily influenced by the residential principles applied in a given society. In sum, a newly married couple has two possibilities. Firstly, they may live with their relatives. If a newly married couple lives with husband's father, the principle is patrilocal. On the other hand, if a newly married couple lives with wife's mother, the principle calls matrilocal. Bilocal principle is a combination of previous two rules, while the decision where a newly married couple is going to live depends on them. Cultural anthropology also provides solid evidence of avunculocal principle and duolocal principle. Avunculocation is a rule when a newly married couple lives with the husband's mother's brother and duolocation implies that a newly married couple live separately with their parents. Secondly, a newly married couple may live independently of their relatives and establishes their own household. Usually, a new location is in a reachable distance to their relatives. Neolocation, how the principle is called, is virtually the most complicated residential rule. To established a new household needs a lot of sources, which results in late marriages. The residential principle has a form of recommendation or command. Therefore, not in all given society just one rule is applied. The living conditions and capacity of the broad family are considered. Broadly speaking, patrilocal and matrilocal residential principles are characterized for the societies, where necessary foodstuff and substances are generated by men or women.

A marriage is also related with a transfer of property or services among families. Concerning polygyny, a brideprice[23] has been already discussed. A compensation for a bride

[23] In anthropologist literature, a brideprice is often replaced by the term bridewealth for its neutrality. Because, property transfers are not determined only on economic principles of demand and supply, where brides are understood as goods, but reflect comprehensive mechanism of relationships in a given culture.

in the form of livestock or property is characteristic for traditional agricultural societies, which allow, in comparison with hunter-gatherer communities, owning transferable estate. For example, the Nuer's marriage ceremony is in a shape of livestock transfer from bridegroom to bride's family (Skupnik, 2010, p.271-274). This transfer substitutes on the one hand, lost production of married daughter and her children, who will contribute to the bridegroom family, on the other hand property which should be generated for son's marriage. Due to a significant contribution of bride to brother's marriage, her position is strong in the former family. She may influence a choice of a brother's wife and require a return service. Frequently, it is demanded brother's daughter for a marriage with sister's son. It is a fundamental system of a partner exchange discussed above. The property transfers stabilize marriage. Newly married man assumes wife's behaviour, if it is not fulfilled, than he may complain to her parents and demand his transfer back. Therefore, it is in family interest to accommodate differences in the marriage of their daughter. In hunter-gatherer communities, a brideservice, an activity rendered by bridegroom to bride's or wife's family, is more common. For instance, a marriage for the Kung San people, living in the Kalahari Desert in Namibia, Botswana and in Angola, is related with a deep conviction of woman's parents that her potential husband is a good hunter (Skupnik, 2010, p.270-271). Therefore, a young man, who would like to get married and come of age within a community, he has to find a girl, who will accept his proposal. Then he starts to serve her parents and family. It can last several years, also after public acceptance of their marriage. In European-American culture, dowry, as a transfer from bride's family to bridegroom family, was in common use from ancient times to the 19th century (Goody, 2006, p.102). The transfer is in reverse order than previous institutes. Dowry was transferred to the daughter, and with marriage gift from husband, it became a safety belt for her and her children in case of spouse loss. Currently, dowry is not so common and is primarily understood as a parents support to a newly married couple for establishing their household, which is in our societies relatively costly. The support can be either financial or material form, or both.

Considering aforementioned paragraphs devoted to specification of relationships in the nuclear family, it is apparent that definition of the family is an issue. In general, people tend to specify family based on their own experiences. Therefore, the family may involve also persons who are close friends and children call them e.g. aunt and uncle. It is necessary to take into account that family is significantly culturally conditioned and what is the family for us, is not for the others.

The sociologists claim that existence of any human society depend on six prerequisites (Bennett and Tuman in Rosemberg, 1983, p.227):

1. Biological survival,
2. Biological, economic and societal reproduction,
3. Socialization[24],
4. Production and distribution of material goods and services,
5. Achievement of group cohesion to cope with internal and external attacks or threats of attacks,

[24] Giddens (2006) defines socialization as a process whereby the helpless infant gradually becomes a self-aware, knowledgeable person, skilled in the ways of the culture into which he or she was born.

6. Creation of a psycho-cultural framework capable of providing members with meaning and purpose of life.

The institution of the family certainly contributes to all listed prerequisites, but its domain, without doubts, is in the first three items. Therefore, sociology defines the family as a relatively permanent group of persons linked together in social roles by ties of blood, adoption, marriage or quasi-commitment and who live together and cooperate economically and in the rearing of children (Brinkerhoff et al., 2008, p.246). This specification takes into consideration a diversity of families' forms. Previous definitions were focused mainly on western societies, which determined family as a social unit[25] with one dwelling place, household, and reproduction function; a unit composed of at least two persons of the opposite sex, who live together in a socially accepted relationship and have a child or children either biological or adoptive, or both (Leeder, 2004, p.22). For a long time, sociology introduced the family as a static institution, which was an anchor for people and the research, but the reverse is true. However the family is an element of social stabilization [26], it also reflects undergone changes in the society, which is not necessarily of western type as the sociologist stipulated at the beginning of research[27].

The first attempt of sociologists to identified changes in the family appeared with Historical school in the 19th century, which inspected legal regulations and acts involving institution of the family. They supposed that legal code reflects the norms which the society accepts and therefore if a law regarding family was changed, the family itself had to be changed. The Critical theories are the second sociological approach focused, besides other things, on the family. The theories were based on examination and critique of society and culture drawing from knowledge of social sciences. The incentives came from rapid industrialization, urbanization and secularization, which transformed primarily patrilineal multigenerational rural families.

After the Second World War, the American sociology with Structural functionalism became considerable. Functionalism sets out society as a whole in terms of the function of its integral elements (norms, customs, traditions, institutions). Therefore, the family, as a basic institution in human society, performs tasks contributing to society's needs and helps to perpetuate social order (Možný, 2006, p.51-53; Giddens, 2006, p.238). The nuclear family is considered to be a suitable arrangement fulfilling all demands of industrial society. Talcott Parsons (1902-1979), as a major representative of Functionalism, defined two principal family functions; primary socialization and personality stabilisation. The first function identifies the process whereby a child learns social norms accepted in a given society. It is supposed that family is a crucial

[25] Social unit is a term used in Sociology and refers to social entity, which meets the following requirements:

1. It is composed of two or more participants who have complementary and mutually conditioned social roles.
2. It is consisted by parts characterised by its structural or functional substances. These substances distinguish them from individuals.
3. A group members communicate, share norms and expectations, and take part in group activities.

[26] The oldest normative and ethical works have pointed out that the society is losing its power, if people are not fulfilling their family commitments.

[27] Sociology has origins in the common stock of Western knowledge. It was established by its separation from the Philosophy in the 19th century.

element of moulding child's personality. The second function is associated to the role which the family has in assisting adult family members emotionally. Marriage between adult man and woman is seen as an arrangement through which their personalities are kept healthy (Možný, 2006, p.53; Giddens, 2006, p.238). Although Structural functionalism shed light on the issue of the family in sociology, it has not avoided criticism. The main weaknesses of the concept are in the prescribed division of labour within the family (Table 3.1) and the fact that is not able to reflect different family types apart from the nuclear family. Other relevant institutions in the society (state, government, etc.) are not considered either.

Table 3.1: The basic roles within the nuclear family

	Instrumental priority	Expressive priority
Superior	Father (Husband)	Mother (Wife)
Inferior	Son (Brother)	Daughter (Sister)

Notes: In this context, instrumental refers to coordination of group activities to fulfil given goals and expressive to ensuring emotional climate within group.

Source: Parsons, Bales, 1955 in Možný, 2006

Further influential approach to the family in sociology was introduced by feminism. Interesting is, that Feminism has the roots outside the academic sphere in a political movement. Feminism considering the family represents a fundamental turn since 1970. In comparison with previous study on family structures, historical development of the nuclear and extended family, and the relevance of family kinship, feminists declared the family as a harmonious and egalitarian realm (Giddens, 2006, p.239). They have carried out a research focused on women experiences in the domestic sphere and specified the family as a cooperative unit based on common interests and mutual support. The core of the family unit has been seen in balanced roles. Because, in case of unbalanced roles certain family member may benefit more than others. Feminists have gone into the domestic division of labour, the unequal power relationships, and the caring activities. A debate on the issue of the domestic division of labour has been already in sociology, but the issue of the unequal power relationships, which may result in gender oppression, was completely new. The domestic violence was omitted topic not only in sociology. Another feminist's contribution was in the question, how the family treats diseased family members or looks after the elderly over a long period of time. In general, they have been interested in "emotional work" which also involves emotional labour in maintaining personal relationships (Giddens, 2006, p.238).

Besides Feminism a broad range of theoretical approaches to the family in sociology exits. According to Možný (2006), the following concepts gained their relevance in the last forty years: the Social exchange theory, the Family system theory, the Symbolic interactionism theory, Social constructivism, the Conflict theory, and Socio-biology. In spite the fact that, some approaches come out from the ideas dated in the thirties or even later, their importance increased with an effort to understand and explain changes emerging in the family in the second half of the 20th century. The Social exchange theory is based on the assumption that people aim to maximize their utility. Because the concept is characterised by the methodological individualism, the agent considers in his decision the ratio between costs and rewards. Although the outcome can be negative, the agent takes action to minimize the loss. In addition, the agent is understood as a member of community, therefore aspects as social approval and disapproval

are taken in the concept into account too. The family is understood as a social group consisted of individual maximizing its utility. The main critique of the approach is that human behaviour is influenced more by social norms and values rather than ratio of costs and rewards. On the other hand, the Family system theory perceives the family as a system which is self-regulated, oriented towards goals and whose members make an effort to attain access to power and feelings. The extended approach places the family system in a lager framework of external relations. In the next concept, the Symbolic interactionism theory, the family is a social group being made up of members who must continually adjust their behaviour to the actions of other agents. Therefore, the attention is devoted to the way how members interact through symbols as words, gestures, rules, and roles, etc. in their environment and how the interactions are interpreted. In general, the concept of larger social structures and also of self-concept is based on interactions. Another concept, the Social constructivism is focused on the way how individuals and the family as a group participate in the construction of their perceived social reality. It is on-going and dynamic process therefore the aspects which are taken as granted within the time develop and form via knowledge and interactions a new social reality. The Conflict theory removes the family from a private realm to broad social framework and points out that conflict in the family is the normal state of affairs. Therefore, dynamics in the family can be studied via identification of conflict sources and sources of power. In general, the Conflict theory studies the ways in which groups of people disagree, struggle for power and compete for resources as wealth and prestige. The last approach, Socio-biology according the name assumes that social behaviour is conditioned by evolution. With respect to the family, Socio-biology assumes that basic ability of human being, which is incorporated into gens, is capability of individualized relationships formation. Considering that family formation, as well as general family relations are influenced by this ability. Apart from that, Socio-biology revealed that the basic relationship is between mother and her child.

Current sociology defines institution of the family in a broader perspective. It combines aforementioned approaches, Functionalism, Feminism, and others, and focus on new phenomena; formation and dissolution of families and households, reconstructed families, gay families, and cohabitation. Changes in families are investigated on the societal, but as well as global level. Therefore, the family is understood as a social unit consisted of people, who have certain roles via kinship, legal regulations or quasi-commitments, and who live and run the household together.

Although the family is a fundamental unit of production and consumption, economists have not paid a lot of attention to the family. The topic was marginal in economics for a long time.[28] It was emphasized that the family was an unchanged and permanent unit of economy, which was not ruled by poor economic principles of demand and supply. In addition to that, it was a private sphere for which economics simplifications were too radical. Therefore, the family was considered to be important in economics, but not the most important element generating economic growth. Nevertheless, economic functions of the family have been accepted and involved in further research. The family, in economics perspective, is an institution positioned on both sides of demand-supply law and specified with respect of market. In the economic

[28] This problem is explored in great depth in the following sections focused on economics theories.

theories, the family is a group of people with the same interest, the individuals are not considered independently, the family is a unit, or it is a group of people with certain bargain power, when each family member has his own position. The empirical economic studies do not distinguish between the family and household. In this respect, the family and household are synonyms. It has to be noted, that both economics and sociology has been primarily focused on western families and built up a typology which is beyond the scope of this section and is discussed in depth in following section.

In modern times, when the word is organized into the states, law with respect to the family cannot be omitted. Law is a system of rules commonly enforced through a set of institutions and is a basic social mediator of relations between people. On the one hand the law is influenced and shaped by knowledge of social sciences on the other hand the law has impact on the societal development. The family is defined on the base of rights and duties which have family members to each other. In general, family law deals with entry to the marriage, legal states similar to marriage (e.g. cohabitation, civil union, domestic partnership, and putative marriage), dissolution of marriage, issues affecting children (e.g. legitimacy, adoption, parenthood, etc.) and related areas as international child abduction. Specification of each norm depends on given state. The family may be defined either implicitly or explicitly. It is obvious, that simple and universal law definition cannot be stipulated, but it is necessary to take into account that legal regulations are significant aspect of the family concept. In addition to that, the legal system has considerable impact on the family/population policy applied in the state.

To sum up this section, the family is a group of human beings whose existence is characterised by specific interconnection and influence of biological, economical, moral, psychological, legal, and other processes, whereby the family functions are realised. The family is a social system, which is based on the culturally recognized biological and marital relationships. The basic family functions are: reproductive, economic, educational, socialisation, emotional, and protective. With regard to that, the family concept is culturally conditioned. The family is relatively stable but changeable institution with various structure forms in modern times. In addition, the nuclear family, as a family unit consisting of parents and their dependent children, is a basic form and relevant in all known cultures and societies regardless of a relationship specification.

3.1.2 The family within time

In spite of the fact that, the family was a static institution from researcher point of view for a long time, this section deals with development of the family forms. The main concern is focused on the family in the European-American culture and its typologies. With respect to that, it is not surprising that given typologies partly overlap each other however they are built up on different assumptions.

Collins (1985) specifies five general stages of the family development (Možný, 2006, p.17). The first stage is related to establishment of the couple family ca. milliard years ago. The heterosexual partners, who collaborate regarding progeny care, are the core element of the family. Their cooperation seems highly relevant, because it made childcare, which is in case of human beings in comparison with other animal species long-term, more effective.

Therefore, it is supposed that survival probabilities of children improved and more complicated family structures with flourishing human population were able to form. The second stage of the family development is characterised by complicated kinship systems. They are dated ca. 8 000 before Christ and are specified by extended families with complex economic and wedding regulations concerning transfers among the family units. Collins (1985) assumes dominance of patrilocal and patrimonial rules with coexistence of other forms and supposes identity of family structures with general social organisations. To this stage, he also dates the establishment of incest taboo. The third stage of the family development involves emergence of unrelated relationships, collapse of the complicated family exchanges systems, and dominance of patrimonial rules. Collins (1985) relates this step to formation of the states as social unit superior to the family. The stage corresponds with development in Mesopotamia and Egypt ca. 3 000 years before Christ and in Ancient Greece and China ca. 600 years before Christ. In this perspective, the extended kinship families are replaced by patrimonial households. The households are ruled by men who own all family property which includes slaves and servants. The fourth stage of family development in Collins (1985) concept is based on expansion of bureaucratic state and capitalistic economy structure in the 17th and the 18th century in Western Europe and North America. The family becomes a symbol of privacy. The state and municipality assume power over defensive family function. The nuclear family with clearly defined roles seems to be ideal family structure. The last stage of the family development by Collins (1985) is specified by diversification of the family, household and partnership forms, equality of sexes, and the emergence of singles as a significant social group. The stage coincides with the situation in developed countries since the half of the 20th century.

An influential work of J. Goody (2000, 2006) about European family provides slightly different perspective in comparison with Collins (1985). He dates the roots of the current European family into the 4th century and relates them to emergence of Christianity, and requirements of monogamy marriage till death do us part and incest taboo[29]. Until then, Goody (2000) assumes existence of an oriental type of the family, which is characterised by patrilineal clan, acceptance of marriage between relatives, and inheritance for both man and woman, even though the poor cultural and social position of woman is maintained. He supposes that the position of kin weakened by development in the Ancient Rome and Christianity became more influential with respect to family formation. The Church has a significant position in his concept. Therefore, it is not surprising, that the Reformation is considered as another turn in the family structure. The Reformation was a movement in the 16th and the 17th century in Europe and aimed to reform the Roman Catholic Church. The Reformation emphasized individualism, secular asceticism, freedom of the will, and value of work. People should be responsible for their sins and redemption by indulgences became unaccepted. The changes in contributions to the Church induced also changes in regulations regarding the family. The shift was apparent in case of marriage, when the rules set up by Church were moderated. For instance, M. Luther, a leader of the reformist movement

[29]The ancient Romans were highly permissive to any marriage, divorce, remarriage, and adoption. The incest taboo was applied in really narrow sense. On the other hand, Christianity imposed strict rules on incest taboo. The rule included also ecclesiastic relatives which was build up via godparents. The canon law prohibited levirate, sororate as well as marriage between cousins. The Church attained to weaken kin power.

in Germany, promoted regulations involved in Leviticus, while J. Calvin, a principal figure of Switzerland reformation, supported rules in Leviticus as a divine expression of natural law and argued against custom law of marriages between first cousins. Regarding levirate his approach was ambivalent, once he agreed, secondly he was against. That time no agreement on marriage regulation emerged. Afterwards, new regulations reflecting circumstances in a given society were set up.

Goody (2000, 2006) also emphasizes significance of the Industrial Revolution on the family. The Industrial Revolution brought substantial changes in agriculture, manufacturing, mining, transportation, and technology in the 18th and the 19th century. The turn was fundamental and had a profound effect on the socioeconomic and cultural conditions. Higher mobility of people, division of labour, and new position of woman, as well as reduction in family size are basic characteristics of the period. The attributes of creativity and rationality became superior and admired. In spite the fact that, the nuclear family have revealed to be the most suitable family structure for a new social organisation, Goody (2000, 2006) assumes meaningfulness of extended family relationships, especially with respect to urbanisation. He also claims that due to industrialization the economic independence of woman was lost. Women participated in the family production from everlasting, but by its separation from household they became dependent on their husbands. The idea of "moral motherhood", which ascribes full-time care for children to wives, emerged with increasing real wages per head.

Table 3.2: Basic characteristics of the traditional, modern and postmodern family in sociology

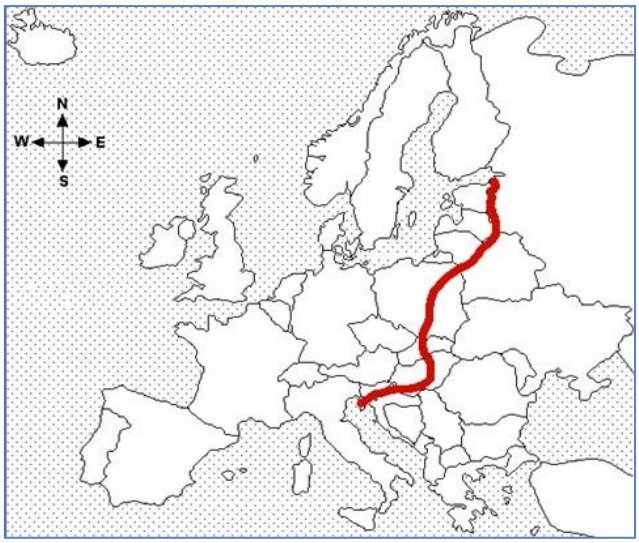
	Traditional	Modern	Postmodern
Structure	Extended, relations between generations	Nuclear, conjugal	Variable, individualistic
Capital	Economic	Economic, social, cultural	Social, cultural
Legitimization	Sex, children	children	No legitimization
Role	Complementary, hierarchized	Segregate, complementary	Individualistic
Function	Universal	Nursing, status, emotional	Emotional
Authority	Father	Father-mother: functionally segregated	Individualistic, weak
Representation of discourse	Religious	Civil	Mass media
Transfer between generations	Patrilineal, authoritative	Democratic, mixed	Weak

Source: Možný, 2006, p. 23

The traditional family has had an important position within a family classification, because dissolution of traditional family has been discussed frequently. The traditional family was, from sociological point of view, based on bond of marriage and it was characterised by extended family structure with broad social network in the period of the Industrial Revolution. The traditional family involved both parents with children and their siblings and grandparents, but as well as servants without blood relationship. The decisive factor in this family was not kinship, but dining at the communal table. The traditional family posed basic economic and social unit with hierarchical structure and commitments to following generations. In nowadays terminology, the traditional family corresponds with the term household.

In modern times, two types of traditional families are distinguished: north-western and south-eastern type. They differ in demographic pattern and geographically, they can be delimited by the Hajnal line from Saint Petersburg in Russia to Trieste in Italy (van de Walle, 2005, p.590). This line should not be recognized in a very strict way, but as a tool which assist us to draw comparison within Europe. The north-western type of the traditional family, which also includes the Czech lands, is described by small family size due to neolocation and by high age at marriage. An average family size is estimated 4-5 members. In this case, a formation of new family was conditioned by its economic self-sufficiency, but to attain private property demanded time. This resulted in high age at marriage ca. 25-26 years and high ratio of never-married ca. 10-15 % for both men and women. Father was a head of the family and inheritance took place from father to his oldest son who was responsible for giving parents full treatment at old age. In case of father's dead, the oldest son had to pay compensation to mother and his siblings for inheritance. The opposite is the south-eastern type of the traditional family with extended family structures and low age at marriage ca. 20-21 years. In spite the fact that, this typology is broadly accepted, it is assumed that extended families also resided in the Czech land. It is supposed that several family forms coexisted in the given area, but one type dominated.

Chart 3.2: The Hajnal line



Source: Demography Matters

D. S. Reher (1998) illustrates differences between north-western and south-eastern types of the traditional family in terms of attitudes to servants. He estimates that from 30 % to 50 % of people at the age of 15-24 years worked outside their family and household in north-western Europe. For south-eastern Europe, the ratio is assessed from 5 % to 20 % at the same age group (Reher, 1998, p.207). Workers hiring was common in north-western Europe in comparison with south-eastern Europe. The family in the South relied on broad kin relationships. Young people left their home mainly due to seasonal work. The nature of attitudes to servants influenced the way in which new households were formed. While in Spain, household formation was related to marriage, in England, new household was established already 2.5-5 year prior to marriage for men and 1.5 years for women (Reher, 1998, p.208). Reher (1998) also points out that the pattern of household formation with small changes preserved.

In modern times, young man is considered to be an adult with beginning of his university studies in North Europe and America. At that stage of life cycle, young man forms his first household and makes the effort to be independent of his parents. Frequently, he shares households with people at the same stage of life cycle. Therefore, marriage and subsequent household formation depends on permanent partner relationship and economic self-sufficiency. In South Europe, majority of young people do not form household prior to marriage and having permanent job (Reher, 1998, p.204-205). Even though, a lot of people continue to share household with parents due to shortage of housing or its tremendous price.

In addition to that, Reher (1998) pays attention to dependent family members in his work. In the past, the misery of people was highly correlated with mortality. The historical sources have provided us the evidences of significant level of mortality in the South. The numbers revealed high incidence of marriage dissolution and existence of one-parent families. While the life expectancy at birth in the South was between 25 and 30 years in the 17th and the 18th century, in the North the values corresponded with range between 33 and 40 years (Reher, 1998, p.223). In case of disability of family member or his death, the family became weaker and depended on external support. Therefore, it is supposed that misery and poverty contributed to existence of extended families in South Europe.

The relationship between the family and its dependent members is also included in the work of P. Laslett (1988). He assumes that in societies where neolocation was a superior to other forms of family formation, the nuclear family prevailed over other forms. The nuclear family has had, without any doubts, its pros and cons. But certainly, it has become substantially dependent on societal support, in comparison with extended family forms, in case of distress (illness, incapacity to work, agedness, death, husband desertion, etc.) (Blaikie, 2002, p.255). Therefore, it is not surprising, that for instance in England and Wales, where the nuclear families were common, the social legislation was fully established at the beginning of the 17th century[30]. The social net had already existed locally. Since the 16th century, parishes completed lists of the poor, magistrates collected contributions and the tax, from which the social policy was financed.

The issue of the traditional family in Europe discusses also L. Stone (1997), who specifies three stages of development in the period from the 16th to the 19th century. The first stage defines based on dominance of the nuclear family. Low life expectancy at birth represented mortality pattern which did not allow formation of multigenerational families. In spite that fact, Stone (1997) assumes substantial contacts with whole community. The family symbolised an economic unit guaranteeing survival. Therefore, the main motive behind marriage corresponded with acquisition of property. The second stage by Stone (1997), falling into the period of 17-18th century, involves also the nuclear family, but with profoundly apparent position of father and emotional background of the family in upper class. The last stage, the 19th century, emphasises attributes of individualism, free choice of partner and privacy. With respect to all typologies of the traditional family, they share the fact that fertility followed pattern of natural fertility, which refers to the level of fertility that would prevail in a population that makes no conscious effort to limit, regulate, or control fertility.

[30] Poor Law Act 1601.

The roots of a transformation of the traditional family into the modern family can be dated into the second half of the 19th century. But it has to be noted, the most profound changes have been observed in the second half of the 20th century. The family transformed in fundamental features. While life in accordance with the Christian principles had a monopoly over legitimacy of sexual activities in the traditional family, the modern family accepts pre-marital relationships and inquires about partners' monopoly on their sex life. The emergence of new contraceptive methods has separated sex and reproduction. Although the family legitimized new born children for a long time, the ratio of children born outside marriage has increased since 70's of the 20th century. Therefore, child legitimization relies on legal system more than religious norms.

The value of free choice and preference of individualism weakened parents' position in the process of partner choice in the modern family. The tradition family was an economic unit and therefore parents commonly chose suitable partner to their child with respect to economic and social position of bride/bridegroom's family. Parents aimed to ensure at least the same social position to former, but as well as to new formed family. It is reasonable to assume, that both the First and Second World Wars and the Great Depression contributed to this change. Having a property did not necessarily safeguard people against human misery and destitution. In addition to that, a partner choice was influenced by the fact, that marriage became a civil contract, which could be terminated in case of inconvenience. The binding commitment "till death us do part" imposed by Christian church disappeared. The divorce rate has increased and re-marriages came up to be new norm.

A significant impact on the transformation of the traditional family into the modern family had also profound division of labour, which separate place of residence and place of work, and establishment of new social institutions provided by state. The newly applied social policy partly took over safeguarding function of the family. The position of the family as a social unit was weakened. For instance, care for elderly, ill or disabled people, as well as children education have been broadly provided by state. With respect to division of labour, the second half of the 20th century has been characterised by high participation of women in paid-work. In spite of its significance, maternity has turned into a short episode in comparison with increasing life expectancy and fertility level. To make a career has become important for both men and women and the issue of family friendly policy emerged.

The postmodern family have occurred in terminology recently. Therefore, central concern of discussion has been an issue of its existence. The first approach claims, that the postmodern family does not exist and a new observed pattern in family structure has been a poor culmination of the modern family. The second statement claims legitimate existence of the term, because the postmodern family is a new independent type of the family which was transformed from preceding type of the modern family. The main fractures of the postmodern family are emotional background and substantial variability of its forms. Even specification of family relationships may be a great challenge in the postmodern family. The debate covers also the term patch-work family, which symbolised a complicated family structure with respect to members coming from different divorced marriages.

Table 3.3: Social transformation of the family within a historic retrospection

Family in traditional society	Family in industrial society	Family in late modernity
Rules: Oikos nomikos	Equivalence-Solidarity	Generalized equivalency
WE rationality	ME rationality + altruism	ME hyper-rationality
House-household-family	Household Firm	Firm Family economics
Farm or craftsmen shop	Family = externality	Production of children
Economic autarky	Hard budget constrain	Soft budget constrain
Occasional market	Economic dependency on market	Family indebtedness
Habits in consumption	Sovereignty of consumer	Consumer's manipulation
God governs the time	Time is money in production	Deficient time to consume
Market = externality	Market versus family	Market triumphans

Source: Mlčoch, 2008

The typology of the family in perspective of economics specified by Mlčoch (2007) does not essentially differ from sociological approach (Table 3.3). The apparent discrepancies between those conceptualizations are in the core of specification. Economics defines the family based on its relationship to the market. Therefore, in the traditional society characterised by religious belief the family was run by the rule "oikios nomikos". The family corresponded with the household and household was the main producer. The family unit was superior to individual. Household consumption contained all necessities for surviving and ensuring its future. The family was economically independent and market utilized occasionally. The market was at the position of externality and it could be of benefit or loss to the family. It has to be noted, that the family was defined by its economic function and consisted of all members who participated in family performance regardless the kinship. Therefore, family members were also servants and slaves.

The Industrial Revolution, without any doubts, changed the traditional society. The family as a unit superior to individual weakened. Individual needs became significant aspects in the family. But it has to be noted that individual remained altruistic. The distinctive feature of the industrial society has been in separation of the work and residence places. Therefore, individual worked outside home and the family became dependent on the market. The family was not self-sufficient anymore and had to obtain necessities in the market. The market exerted pressure on the family, because goods procurement demanded financial sources. Therefore, workers spent more time in paid-job and less at home with family members. The family turned into externality.

In comparison with industrial society, society of late modernity is characterised by self-interest individuals, who are fully dependent on the market. In addition to that, the market is powerful to manipulate the consumers in order to increase their consumption. Therefore, to ensure increase in consumption man has to work hardly and probably more hours or to take out a loan. But in this case he became even reliant on the market. The time spent with the family as well as with consumption is even more limited. Therefore, the family turns into item at list

of requirements which should be fulfilled during human life. It is supposed that the economic aspect of decision making considering children have become relevant.

3.2 Relationship between the family and economy

The following subdivision deals with an issue of the link between the family and economy. The conceptualization of the family institution is reviewed above, therefore the aim of succeeding paragraphs is to specify forms of economic structure and highlight a relationship of the family and the market economy, as well as to point out potential problems and consequences of this link. Subsequent section is focused on general interaction of the economy and population. The dissimilarity between economic and demographic development of developing and developed world are discussed. An issue of ageing is emphasized.

3.2.1 A free market economy and the family

At the moment, when human beings establish society, they cannot avoid economic issues; what, how and how much they are going to produce. Last but not least, they have to decide to whom they are going to produce the goods. These economic problems of resource allocation can be solved basically by three mechanisms; free market, command/controlled economy, and their combination, mixed-economy. However all three economic structures aim to answer the same questions, they utilize distinct tools, which considering observed development of world economy have led to different results.

A free market solves the problems "what, how and to whom" by comprehensive systems of markets, prices, profits and losses. Firms buy inputs, produce and sell goods to achieve profit. At the market they form supply of goods, which are demanded by people with respect to their preferences and financial constrains coming from their incomes. While factor of productions, especially capital, are in private ownership, exchange mechanism at the market provides environment of free competition. The mechanism is highlighted by price signals which contribute to profit gain. The free market is also defined as a market without economic interventions and regulations by the state, except to enforce private contracts and the ownership of property. Nevertheless, it has to be noted, that the market is not capable to solve all potential problems. Market failures, as monopoly, monopsony[31], imperfect competition, oligopoly etc., have formed an integral part of the economy.

The opposite of free market economy is a command or planned economy[32] where decision about production relies on government. The core of the production decision is a central plan, which should minimize losses from production and consumption. This type of economic structure has been applied mainly by socialist states. Socialist states have had economy subordinate to political aims and majority of production factors have been owned by states. But command economy may occur temporarily in case of great depression. The mechanism of allocation is the same, but ideas behind are considerably different.

[31] All market demand is formed by one economic subject.

[32] The term controlled economy is also used.

The last type of economic structure is a mixed-economy. It is a combination of free market economy and command economy. In spite of the fact that, majority of current economies are named free market economies, in reality they are mixed-economies[33]. Private and public institutions, fiscal stimulus as well as regulation measures contribute to their performance. A lively and fruitful discussion on the issue of state interventions and their scope has continued for decades, but general acceptance of particular state interventions was reached. The state is considered to be a significant supporter of effectiveness, justness and stability in case of market failures in the forms of production inefficiency, unaccepted disparities in incomes and wealth, instability presented by high inflation, unemployment and low rate of economic growth. State is an essential element of economy which establishes legal system of economic activities and transactions.

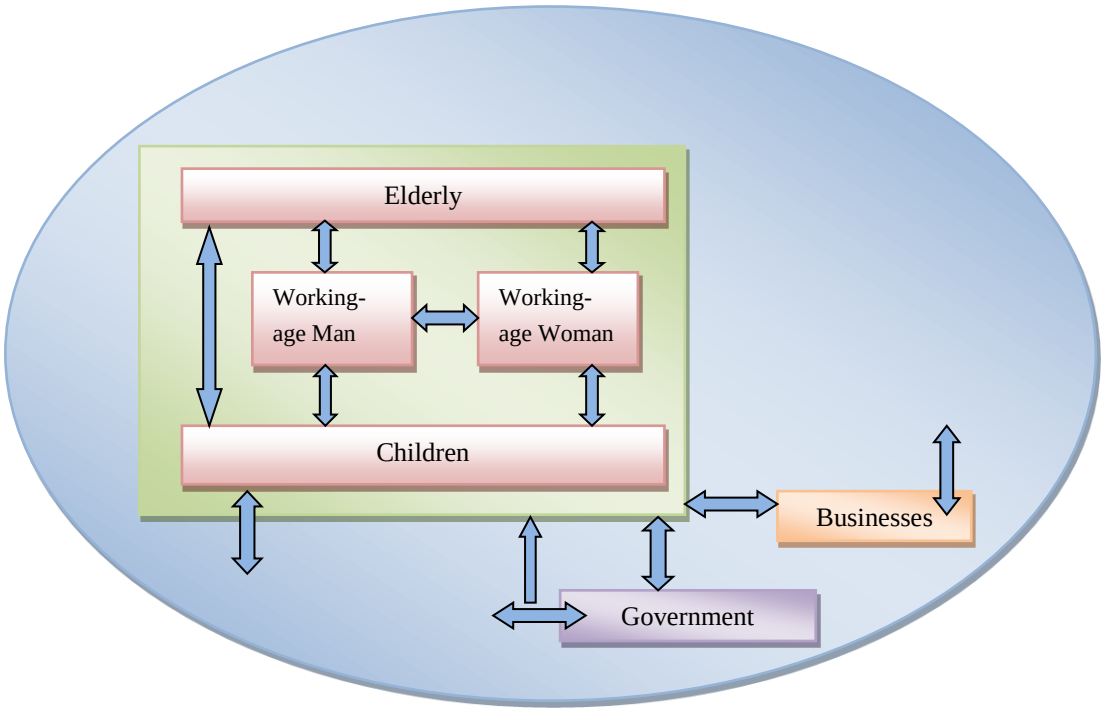
Regardless of how the allocation of scare resources is solved in society, the family is an inseparable part of economy. The family, in the form of household, is a fundamental economic subject of economy. Households for satisfaction of their needs demand goods produced by firms and supply their available production factors as capital, land, and labour. The uniqueness of the family is also in its potential capability of human reproduction, as well as reproduction of human and social capitals. Human capital[34] refers to the stock of competences, knowledge and personality attributes embodied in the ability to perform tasks. Given attributes are usually gained through education and experience. On the other hand, social capital[35] is ascribed to connections within and between social networks, as well as to shared values, and reciprocal trust, commitments and obligations to others. The commitments and obligations to others are considered as moral values, e.g. care for parents in case of illness or high age, assistance and support to siblings or other relatives, etc.

[33] A special case is the socialist market economy with Chinese characteristics.

[34] The term was firstly fully applied by Jacob Mincer (1958) in article "Investment in Human Capital and Personal Income Distribution" published in The Journal of Political Economy and Gary S. Becker (1965) in work titled "Human capital".

[35] The first conceptualization of social capital occurred in work of Pierre Bourdieu in 1980. He introduced social capital as a network of privileged. Approach of James Coleaman, who defines social capital as anything that facilitates individual or collective action, generated by networks of relationships, reciprocity, trust, and social norms, has become most influential since 1990. He emphasizes maximization of individual profit. Further conceptualization of social capital is involved in work of Robert Putman since 1995, who distinguishes two types of social capital: bonding and bridging. (Keller, 2010,).

Chart 3.3: Circular flows with spillovers



Source: Folbre, 2008, p.20

A tremendous development of market structure in Europe has been dated in the 19th century, when European economies have been characterised by doctrine "laissez-faire". This doctrine demands no state interventions into economy and defines state as an arbiter. That time market structure was within striking distance to free market. Even so, all requirements of liberalism were not fulfilled and state power became significant in all European countries approaching the end of the 19th century. Due to changes induced by industrialization, strengthening markets, and developed capitalism, the family, parishes and municipalities were not able to provide adequate social policy. The division of labour supported evolution of individual characteristic of man, but also limited collective consciousness. A broad range of social issues emerged and people asked for state assistance (Morawski, 2005. p.146; Dudová, Vohlídalová, 2007, p.17). Afterwards, a self-regulation of markets was restricted and the bases of a welfare state were built up.

In modern times, a welfare state is understood as a state which assumes social rights of its citizens (Morawski, 2005. p.145). But this approach relies on assumption of certain degree of human rights, which was not fulfilled at the beginning. The term "welfare state" was firstly used in Great Britain in 1939, but realization of given idea, in form of the general healthcare system, was postponed until the end of the Second World War. Shortly after that the ideas spread out over European states[36].

Gough (1989) defines three principal aims of the capitalist welfare state. The first aim relates to assurance of minimal income to any individual or family regardless owned possession.

[36] An idea with respect to welfare state can be noticed in the works of J. Locke, T. Hobbes, J. J. Rousseau, J.S Mill, in the concept of equality promoted in the French Revolution, and in Bismarck's and Beveridge's plans of social insurance.

The second aim refers to reduction of uncertainties. The welfare state should assist to individual or family to overcome difficulties caused by illness, unemployment, high age, etc., which could result into crisis. The last aim of the welfare state in Gough (1989) concept corresponds with provision of the best possible standard of living to all citizens, irrespective of social status (Gough in Morawski, 2005. p.147). It could seem that attempt to solve observed social problems via the welfare state has come up from effort to correct failures and consequences of a rapid capitalist development. However the aspect has been significant, it has not been unique. For instance, Otto von Bismarck, who introduced several innovations to social security scheme in Germany in the 80's of the 19th century, chose an approach with respect to the common good. He assumes, that substantial differences between the poor and the rich could threaten to state integrity. Therefore, one of the ideas behind the welfare state has been social integrity of citizens. In some countries, the interest in social issues has arisen from tradition of paternalism and Catholic social teaching.

An appraisal of work and innovations is definitely higher in the market economy in comparison with controlled economy, but in case of lose the penalisation is even higher. Due to a mistake, the private company may recognize prompt economic impact on capital outflow and individual may become unemployed and on the fringe of the society. Therefore, if an established social system is not strong enough, than people tend to avoid the risk, which consequently reduce labour productivity and progress in new technologies. The economic growth is limited. On the other hand, if an established social system is too generous, than people do not tend to avoid the risk, and their risk behaviour become substantial. The social system is abused and costs of social security scheme rapidly increase. Therefore, a signal of higher incomes and wealth provided by the market economy may disappear. The whole system turns to be economically inefficient.

With respect to the social difficulties of the first half of the 20th century in the whole world, the trust to market economy was re-established in the 80's of the 20th century. Before that, the welfare states and interventions into economy had expanded over developed countries. Economy had been more controlled than free. But, in the 80's the problems of developed economies were recognized and as a remedy the free market with minimum regulations and interventions was chosen. New mixed-economies should be characterised by small government, low taxes, free market and movement of capital, extended autonomy of employers and employees with respect to contract of employment, and welfare state reduction. Minimization of interventions and regulations should promote productive work force and innovations as a key factor of economic growth. In spite of the fact that, observed economic growth is not fully capable to provide us information about citizens' standard of living, the doctrine of economic growth came into force.

An emphasis on economic growth has come from the effort to avoid economic recession, which caused the Great Depression in the first half of the 20th century. Economic recession has been understood in highly negative sense. It has been related to income loss and unemployment, what has created discrepancies between imagined and real economic situation of individual. People tend to imagine economy as a device which provides them the best possible income to fulfil their needs and preferences (Hubinková, 2005, p.38). Therefore, the relationship

between a man and the free market economy is reciprocal. While economy influences human behaviour, human behaviour influences economy.

Specifically, the free market economy demands rational agent who pursues his own interests and participate in a market exchange on a quid pro quo basis. To satisfy all wishes and needs within an environment of free market, rational agent has to focus on gaining knowledge, skills, experiences, and reputation which can be sold at market with profit[37]. He should also be able to accumulate wealth which can be invested or used as a safety belt in case of failure. In addition to that, to stand up to competition, which is fundamental element of the free market economy, rational agent has to be flexible in time and space to maximize his utility[38] (Mlčoch, 2007; McDonald, 2002, p.430). In this perspective, it seems that rational agent should try to avoid family formation. To form a new family demands time, financial sources and altruism.[39] On the one hand, market signals irrationality of attempt to family formation, on the other hand market cannot be fully functioned without the family. The family is a fundamental element of market which participates in social and human capitals' reproductions and in consumption. The basic discrepancy between the family and market is in time horizon. While the reproduction of human and social capital is conducted in the long-run, market exchange and consumption is performed in the short-run. This statement is strengthened by observed development in the second half of the 20th century.

Since the 80's of the 20th century, restructured Western European economies have been focused on improvements in employment. Higher labour productivity via higher women participation in the market and application of new technologies has revealed as a source of economic growth. But substantial pressure on quality of labour was generated. Therefore, the period of studies, as well as economic dependence on parents was extended. The average family size became smaller due to later entrance on the market, independence and family formation. In sum, from economic point of view costs of upbringing and children education increased, in biological perspective the period for reproduction was shortened, and from social point of view a value system was changed. In an effort to maintain economic growth, traditional family patriarchal behavioural pattern was disintegrated and the social status of women within family was changed. For instance, labour force participation rate of women on the European labour market corresponded to value 57.2 % in 1984. Then years later, the value was equal to 66 % and in the following decade rate even increased by 3.6 percentage points (Bergemann, van den Berg, 2006. p.7). During the second half of the 20th century, the number of female secondary school students surpassed the number of male secondary school students. In addition, the proportional representation of female university students grew steadily over all period. In spite of the fact that, all economies struggled with the remains of former generous welfare state the statistics revealed improvements in employment and productivity over whole region.

[37] In this part of the work, a market exchange is understood as a repeated game, when relationships between participants (seller-buyer, employer-employee, etc.) are influenced by their previous experiences. In the case of long-term game, by repetition the relationships gain informal features as trust, distrust, reputation, etc.

[38] Equivalent to satisfaction from consumption of goods.

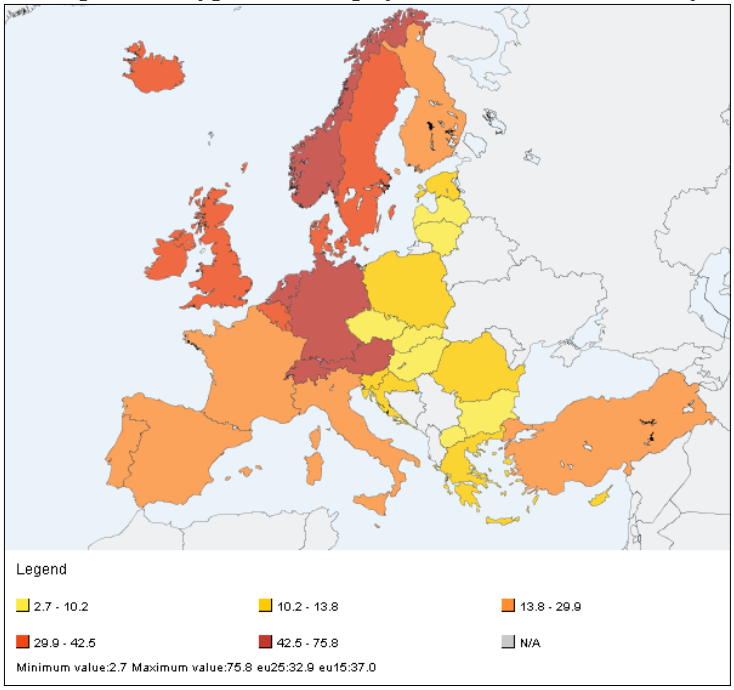
[39] Altruism is selfless concern for the welfare of others. It is behaviour or action which is absolutely unworldly, uninterested in money and possessions. Profit is not themain interest.

An established course of women participation in the labour market and additional requirements of their qualifications correspond with features of the free market economy emphasizing human capital. Therefore, family formation promptly after graduation seems irrational with regard to the free market, as well as women's preferences. Irrespective of difficulties in finding suitable job, their participation in the labour market is assumed and it is beneficial to both economy and women. While women's paid-work is involved to gross domestic product, they gain profit from accumulated capital and become economically independent. Therefore, the family turns from survival mechanism into subconscious desire and necessity. But women's participation in the labour market is not considered to be the cause for destabilization of the family. The recent research reveals that the family has been constantly respected institution regardless of age, gender and life style. The observed discrepancies between the family and free market economy results from persisting problems of the European labour market. The family is fully dependent on the market, because it is not capable to produce majority of consumed goods and needs financial sources for their purchase, which are obtain in the labour market.

A functioning labour market is important for the family also from psychological and sociological perspectives. The working attachments and relationships are sources of personal identity. Based on these attitudes, career and economic behaviour are shaped (Hubinková, 2005, p.57). Being employed determines social upturn, while being unemployed is related to loss of given social status, as well as potential job opportunities. In case of long-term unemployment, human capital considerably depreciates. Therefore, it is not surprising that mother, who invested in her education, does not want to lose the connection to her paid-work. A compromise solution is a part-time job, which maintains the link to her work, provides additional financial source to her and consequently to family, and contributes to her peace of mind, which is also relevant element in family life. A state of mind any family member may substantially influence others[40]. The advantage of part-time job is in its potential to combine the family and work. Woman is not forced to decide between the family and her carrier. In spite of the advantages of par-time jobs, they have not been utilized a lot in Europe. The apparent differences are by country, as well as by gender.

[40] The research proved that financial problems of parents with young children may cause depression of their descendants in adulthood (Hubinková, 2005).

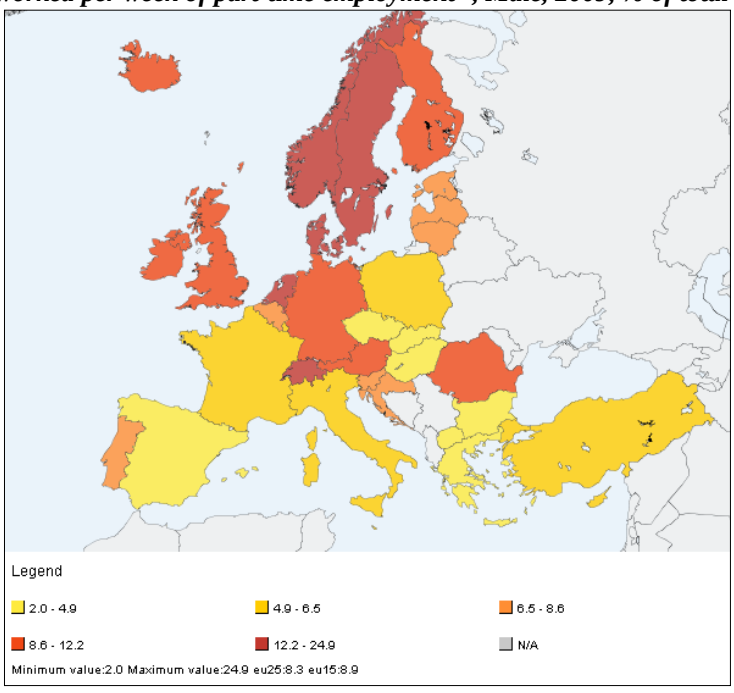
Chart 3.4: Hours worked per week of part-time employment[41], Female, 2009, % of total employment



Notes: Data from Labour Force Survey

Source: Eurostat

Chart 3.5: Hours worked per week of part-time employment[41], Male, 2009, % of total employment



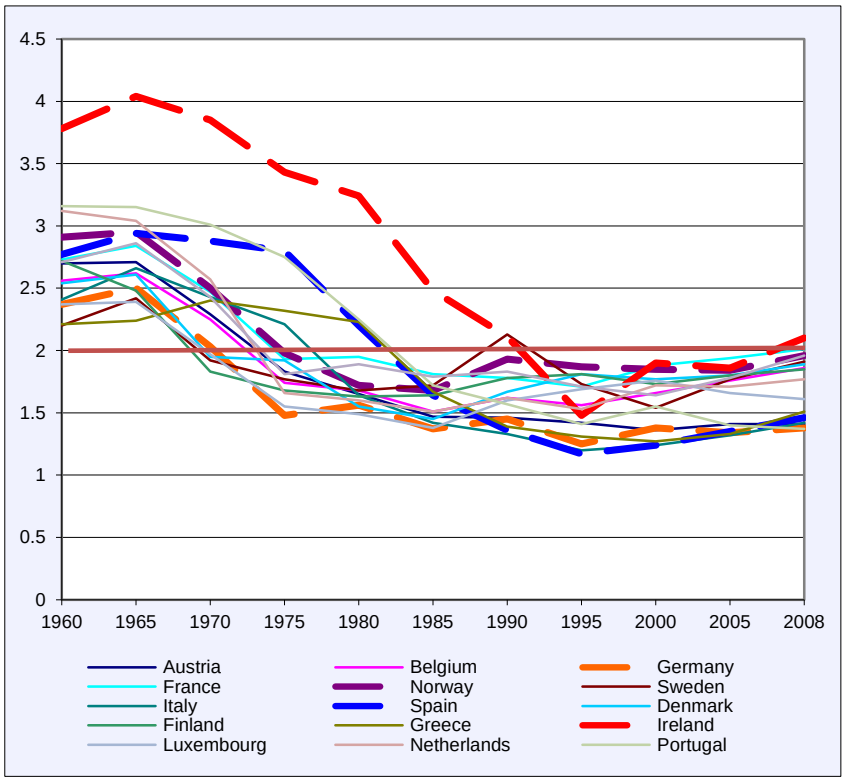
Notes: Data from Labour Force Survey

Source: Eurostat

[41] Persons in employment are those who, during the reference week, did any work for pay or profit for at least one hour, or were not working but had jobs from which they were temporarily absent. Family workers are included. The distinction between full-time and part-time work is made on the basis of a spontaneous answer given by the respondent. It is impossible to establish a more exact distinction between part-time and full-time work, due to variations in working hours between Member States and branches of industry.

All around civilized world, the tempo of the modern life constantly increases, but not always in favour of a man. It is becoming increasingly apparent that a man spends a steadily increasing amount of time in school and job. He also spends considerable amount of time by looking for useful goods, which could save his free time, but even so he does not have much time left for the other. The philosophy of life for many people overlaps with high material standard of living, which results in isolated life with indistinct relationships to former and future generations and changes in human reproduction (Hubinková, 2005, p.31). Therefore, an issue of systems based on solidarity between generations came into broad discussion since beginning of the 90's of the 20th century. Ageing, as a shift in the distribution of a country's population towards older ages, became a problem. In essence, increasing number of old people in population is not a problem. The considerable problem is in aforementioned systems of which financing depends on the productive population. Therefore, in case of decline in young and productive population the systems become instable and have to be reform in a way which is not sufficiently obvious. The fundamental element in recent discussion is a fertility level. The total fertility rate[42], the average number of births per woman as a basic indicator, was decreasing in Europe since the middle of the 60's in the 20th century (See Chart 3.6). The differences in pattern by country, as well as declining trend with stabilization below replacement level are apparent.

Chart 3.6: Total fertility rate, selected countries, Europe, 1960-2008



Source: Eurostat, Council of Europe, Recent demographic development in Europe 2004

[42] The total fertility rate refers to the average number of children that would be born to a woman over her lifetime if she was to experience the exact current age-specific fertility rates through her lifetime, and she was to survive from birth through the end of her reproductive life.

A profound turn in fertility level has been noticeable in case of post-communist countries since the beginning of 90's in the 20th century. Although, in total fewer children have been born, more frequently they have been extra-marital children. But it does mean that their mothers have been single at the time of birth. Quite the contrary, increasingly cohabitation has taken place in family formation. For instance, in the Czech Republic an increase in children born outside marriage correspond with decline in children born within marriage. But it has to be noticed, that it is simplification to assume that children are born into family with both parents but without formal commitments, and that in case of single mother she is emancipated woman who can fully supplant both parents (Hamplová, 2007. p.7-11). Czech data reveal that children born to single mothers have lower birth weight and higher risk of stillbirth (Zeman, 2007, p.17-27). Further analyses also point out, that marriages, with children born prior to marriage, are less stable (Polášek, 2006, p.57). The negative impact of extramarital fertility is emphasized in several studies, which show cohabitation as unstable family form which cannot substitute conjugal family (Hamplová, 2007, p.7-11). Therefore, it is probable that cohabitation may cause losses of human and social capitals. In sum, in the market economy the family has been weakened not only in reproduction but also in formation of human and social capitals.

In addition, during the modernization of society based on market mechanism a family domain became upbringing and education of a man capable of existence within complex and comprehensive society. [43] While education was institutionalized, primary upbringing was remained in the family. The family with full family ties provides to children sense of security and family background which cannot be substituted by any other institution (Hubinková, 2005, p.159-162; Sedláčková, 2006, p.30). But family ties[44] have been disrupted by market economy. A steadily increasing amount of leisure time activities are provided by market. Commercial amusement is often focused on distinct age groups and as a result, different generations spend free time separately. Therefore, the multigenerational ties, which contribute to natural transmission of values, knowledge, and skills, became weaker (Coleman in Sedláčková, 2006, p.29).

Changes in the family, in the course of the 20th century, have been increasingly recognized. In this regard, it is remarkable that majority of these changes are in the countries with the free market economy. Each social phenomenon includes social and economic aspects which mutually interact. Therefore, clear specification of all causes for given changes has been complicated and perhaps impossible. But, in the light of evidence assembled over recent years, the impact of economic structure on the family cannot be excluded. Quite the contrary, the economic anthropologists, who are focused on the market economy formation in developing countries, have recorded a trend of dislodging traditional family and economic systems based on reciprocity, distribution, and redistribution and formation of systems on a quid pro quo basis (Soukup, 2005, p.579). In sum, the market mechanism of economy and the family are in reciprocal relationship which should be balanced. But, in this regard observed pattern of development points out, that at the second half of the 19th century the family outweighed the market and recently, the market outweighed the family.

[43] Educational family function was second-rate in the traditional family (Coleman in Sedláčková, 2006, p.29).

[44] Ties between parents and children, grandparents and children, among children, children and other close relatives.

3.2.2 World population, human and economic development

This section presents a descriptive overview of trends in economic and population development in a world perspective without inferring any in-depth explanation. The main concern is devoted to differences between developing countries, where market economy formation is in progress, and developed countries, where market economy is well established. The free market economy is currently prevailing economic structure. In the 20th century, the principal shift from the command to market economy emerged. Therefore, pure command economy is declared only in North Korea and Cuba these days. Majority of states with experience of planned economy structure are labelled as transitional economies (See Chart A.1 in Appendix). The market economy got ample scope for its influence over the whole world in the last century. Therefore, this part of the thesis focuses on parallel economic and population development.

However, conceptualization of developed country based on economic criteria can be considered as a simplification due to potential problems of measurement, in this study developed country correspond with state conducting significant level at least in one of the following indicators: gross domestic product per capita[45], dominance of the tertiary and quaternary [46] sectors of industry, or the Human Development Index (HDI) [47] . Each of aforementioned indicators has pros and cons[48]. In essence, they are focused on the economy pulled by human capital and are not capable to reveal differences in wealth distributions over given population and unsustainability of current production. Even so, they are used for general approximation of living standard in country. Because they partly overlap each other, they have usually quite similar trend of development. The counterpart to developed country is developing country which refers to state with a low level of material well-being. The observed pattern of development is going to be described based on the Human Development Report 2010, which provides complex and sufficiently reliable data in a long-range for the purpose of the overview.

In the light of evidence assembled over recent decades for 135 countries[49], specifically between the years 1970 and 2010, the Human Development Index recorded substantial progress, as well as huge diversity across countries and time. Considerable advancement was documented in education and partly in health elements of the index. In case of income, the data revealed an ambiguous pattern. World average HDI was equal to 0.48 in 1970 and since then, increased to the value 0.68 in 2010. An improvement is significant, but it has to be noted, that China and India have had substantial impact. Nevertheless, data weighted by population also showed

[45] Gross domestic product per capita is the market value of all final goods and services produced within a country in a given period of time per head. It is specified based on the system of national accounts.

[46] The quaternary sector of the economy refers to knowledge-based part of the economy which typically includes services such as information generation and sharing, information technology, consultation, education, research and development, financial planning, and other knowledge-based services.

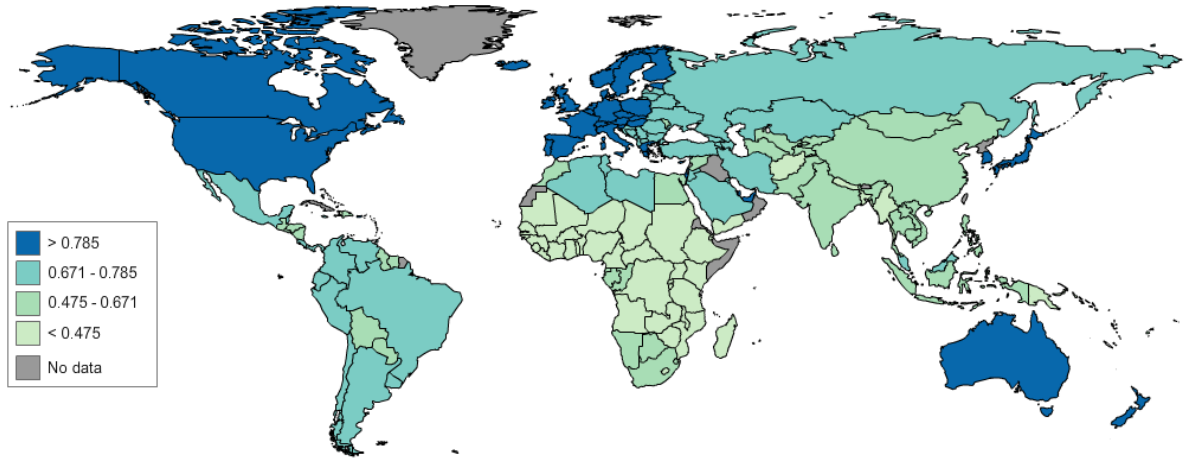
[47] The Human Development Index is a statistic measure originated in the United Nations Development Programme's, which up until 2009 combines three dimensions: 1) Life expectancy at birth, as an index of population health and longevity, 2) Knowledge and education, as measured by the adult literacy rate (with two-thirds weighting) and the combined primary, secondary, and tertiary gross enrolment ratio (with one-third weighting), 3) Standard of living, as indicated by the natural logarithm of gross domestic product per capita at purchasing power parity. Since 2010, the Human Development Index is composed from data on life expectancy, education and per-capita gross national income.

[48] For instance, one of the critiques to the Human Development Index points out, that this statistic combines factors with unclear causality among them.

[49] It covers 92 % of world population.

an improvement. Measuring the progress as the country's deviation from its expected improvement given its initial HDI and the improvement of countries at similar starting point, the fastest progress was documented in East Asia, the Pacific, South Asia, and the Arab States. Only three states, Democratic Republic of the Congo, Zambia and Zimbabwe, worsen in 2010 in comparison with 1970 (See Chart A.2 in Appendix). Remarkable is also the fact, that among 10 best performers only China got the place due to growth performance. While South Korea and Indonesia improved in all three elements, the others as Oman, the best performer, progressed in education and health component of the HDI. Strikingly, data of HDI between years 1970-2010 revealed convergence between developed and developing countries, although the divergence in incomes was large. The explanation provides the fact that HDI is bounded at one or more factors. For instance, the literacy rate has natural upper bound; the limits in respect to education and health are more questionable. Regardless of HDI appropriateness, the world distribution based on HDI corresponds with statements that developed countries have established market economy, while developing countries are characterised by market economy formation (See Chart 3.7).

Chart 3.7: The Human Development Index, 2010



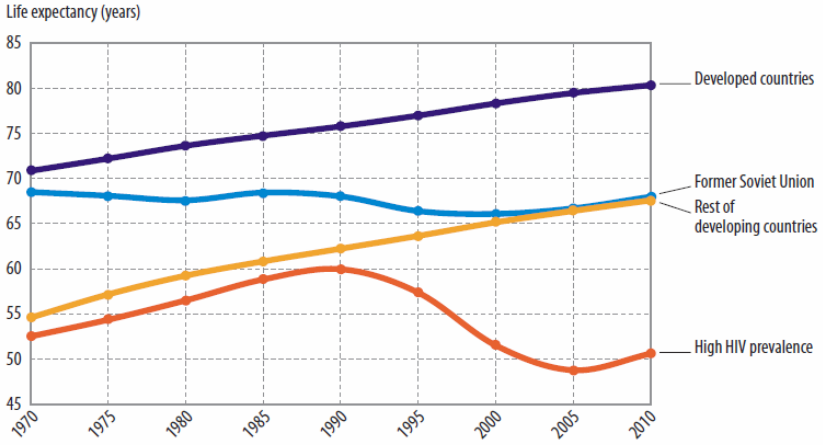
Source: The Human Development Reports, 2011, the United Nations

The Human Development Index composes by data about the life expectancy at birth as a proxy of population health and longevity. Data over period 1970-2010 pointed out that a baby born in almost any country these days may expect to live longer than at any time in history[50]. Remarkable improvement occurred in the Arabs States and especially in infant mortality. While in developing countries between years 1970 and 2005 infant mortality declined by 59 per 1000 births, in developed countries by 16 per 1000 births. In spite of the significant improvement, it is necessary to consider, that percentage decline continued to be faster in developed countries, 77 % versus 59 %. Infant mortality has remained considerably high in developing countries in comparison with developed countries. However, data about maternity mortality have been sparse, based on obtained pattern, it is reasonable to assume, that some improvement in maternal mortality was also achieved. Progress in adult mortality was less profound in comparison with infant mortality, but not only due to severe impact of HIV. Health and

[50] It does not hold for countries, where population is severely affected by HIV/AIDS.

subsequently life expectancy is also influenced by conflicts which may result in deaths, injuries, as well as in weak public health care systems and disintegration of infrastructure providing channels of drugs and knowledge transmission. In sum, with the exception of Sub-Saharan African countries, where the life expectancy has been harshly influenced by HIV, and the Russian Federation, where especially for men the life expectancy declined due to high alcohol consumption in the 90's of the 20th century, the life expectancy at birth increasingly improved over all region and period. The progress in mortality was even remarkable in developed countries. Therefore, Vaupel supposes that in case that the improvement in mortality continues in same pace as during last 170 years (2.5 years per decade or equivalently six hours per day), than children born since the year 2000 will celebrate their 100th birthday in following century (Vaupel, 2010, p.536-542).

Chart 3.8: Trends in life expectancy in the world, 1970-2010



Notes: A country is considered to have a high HIV prevalence if the rate exceeds 15 %, which is the case for seven countries in given sample (Botswana, Lesotho, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe).

Source: The Human Developed Report 2010, Chapter 2

The second element of the compound Human Developed Index is devoted to knowledge and education which are assumed to expand mans' possibilities, promotes their creativity and imagination, whereby higher productivity is performed. Although different measurement techniques were applied, data revealed that people around the world these days have much higher levels of education than ever before. In the period 1970-2010, no country documented decline in literacy or years of schooling. A proportion of people who attended school increased from 57 % in 1960 to ca. 85 % these days. The percentages can be even underestimated, because the measurement is a past dependent. However the gender gap in school enrolment has remained substantial in case of the Arab States, South Asia and Sub-Saharan Africa[51], the improvements were documented across entire region. With respect to given progress, the public spending on education expanded. The average 3.9 % of GDP in 1970 rose to 5.1 % of GDP in 2006, even though disparities are enormous. While the worldwide annual average per pupil is $4,611, in Sub-Saharan African countries average refers to value $184. In spite of data shortage it is reasonable to assume that substantial disparities are present also in quality of provided education, and that children in developed countries learn much more than children

[51] Ratio of female to male mean years of schooling in 2010 is approximately 0.6, while starting points in 1970 are within a range 0.1-0.35.

schooled for the same number of years in developing countries. However, described overall trend of development seems to be optimistic, a more in-depth discussion would probably reveal several abysmal issues, which are beyond the scope of this subchapter. For instance, it has been questionable, if an increasing university enrolment in developed counties is as beneficial for economy as it is stated.

Further component of HID is gross domestic product per capita at purchasing power parity. It is quite controversial indicator for its shortcomings, but even so it is frequently used as a proxy for standard of living. The Human Development Report 2010 states that 155 countries of the sample experienced increase in real per capita income since 1970 and that annual average income correspond recently to $10,760. The average is 1.5 times higher than twenty years ago, but the diversity in peace within regions is striking. The distribution of income across the world is much more unequal than that of education and health and the gap between developed and developing countries considerably widened. While Liechtenstein, the richest country these days, is three times richer than the richest country in 1970, Zimbabwe, the poorest country today, is ca. 25 % poorer than the poorest country in 1970. No doubts that a range of goods and services available to people these days is unprecedented, but the disparities among countries have to be taken into account. From this point of view, the observed progress is disputable.

Based on data provided by the Human Development Report 2010 the overall pattern of economic, and partly demographic development, was illustrated. With few exceptions, economic progress underlined in human capital was documented across the whole world in the last century. In addition, the growth was also noticed in case of population, especially, in the second half of the 20th century when the world's population grew substantially. While in 1850 the world population was approximately of 1.2 milliards, in 1900 the count corresponded to 1.6 milliards, in 1950 increased to 2.7 milliards, and in the year 2000 more than 6 milliards people have lived on the Earth. Based on recent projection, the world population is estimated to be ca. 9 milliards in 2050 (UNPD, World Population Prospects, 2009).

The world's population grew very slowly until about 1750 due to high death rates caused by the combined effects of plagues, famines, unsanitary living conditions, and general poverty. Afterwards, the mortality rate started to decline in the West, where the natural balance between births and deaths was altered by humans. It is assumed that improvements in food availability, housing, water cleanliness, personal hygiene, and public sanitation induced decline in mortality. Later on, in the twentieth century, medical advances, particularly vaccinations against infectious diseases, accelerated mortality decline. This trend of development is conceptualized in the Demographic Transition, which assumes transition from high birth and death rates to low birth and death rates as a country develops from a pre-industrial to an industrialized economic system[52]. Basically, three stages of transformation are defined[53]. The first is characterized

[52] Quantitatively, the crude birth rate declines from circa 40 ‰ to less than 20 ‰ and the crude death rate, which fluctuates more than the crude birth rate at the beginning of the transition, declines to the level lower than 15 ‰. In the end of the transition the crude birth and death rates converge and more vulnerable to the fluctuations is the crude birth rate. Further characteristics are substantially declining infant/child mortality and improvement in the life expectancy at birth from 25-30 years to the double. As an auxiliary indicator can be also used the total fertility rate which declines from ca. 5 children per woman to 2.5 children per woman at the end of transition.

by high level of fertility which is counterbalanced by high mortality, population grow is zero or low. The second stage corresponds with beginning of decline in mortality rates, which can be followed by prompt or postponed decline in fertility. At this stage, population growth can be either negligible or substantial depending on fertility pattern. The last stage is specified by completeness of the movement to low fertility and mortality rates resulting to marginal population growth. Therefore, while developed countries already experienced transition and are in a new phase of development characterised by low fertility levels and improvements in mortality, developing countries have been under transition these days. The world population absolutely increase due to population momentum[54], but with declining pace since 1970 (See Chart A.3 in Appendix).

The Demographic Transition concept has sparked a heat debate. The core of discussion has been the assumption that demographic experience of non-Western societies will inevitably follow that of the West and that sequence mortality-fertility decline cannot be in reverse order. The potential problem is, that the Demographic Transition describes development trend and does not specify both conditions under which the change starts up and mechanisms whereby the transition is conducted. The transition, from high birth and death rates to low birth and death rates, arises from comprehensive and complex set of conditions and circumstances which vary from context to context. However, in majority of cases mortality decline has been followed by fertility decline, due to unclear causality some researchers have assumed that the pattern can be reverse. For instance, the Demographic Transition in France is characterised by negligible population growth. Mortality and fertility declines were parallel. Therefore, fertility decline prior to mortality decline has been discussed (de Bruijn, 2006, p.552-553). Considering all assembled knowledge, it seems improbable that fertility and mortality declines started independently of each other. In spite of that fact, there is mounting evidence that the later demographic transition starts, the sooner ends. While the transition in developed countries lasted from a hundred to hundred and fifty years, in developing countries transition duration has been shortened by half. However the causality between population growth and economic growth has not been fully understood yet, the remarkable fact is, that as the market economy structure has been spread over the world, the similar overall trend of demographic development have occurred.

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[53] This tree stage approach was specified by Warren Thompson in 1929.

Thompson Warren S., 1929. Population, American Journal of Sociology, vol. 34(6), p. 959–975.

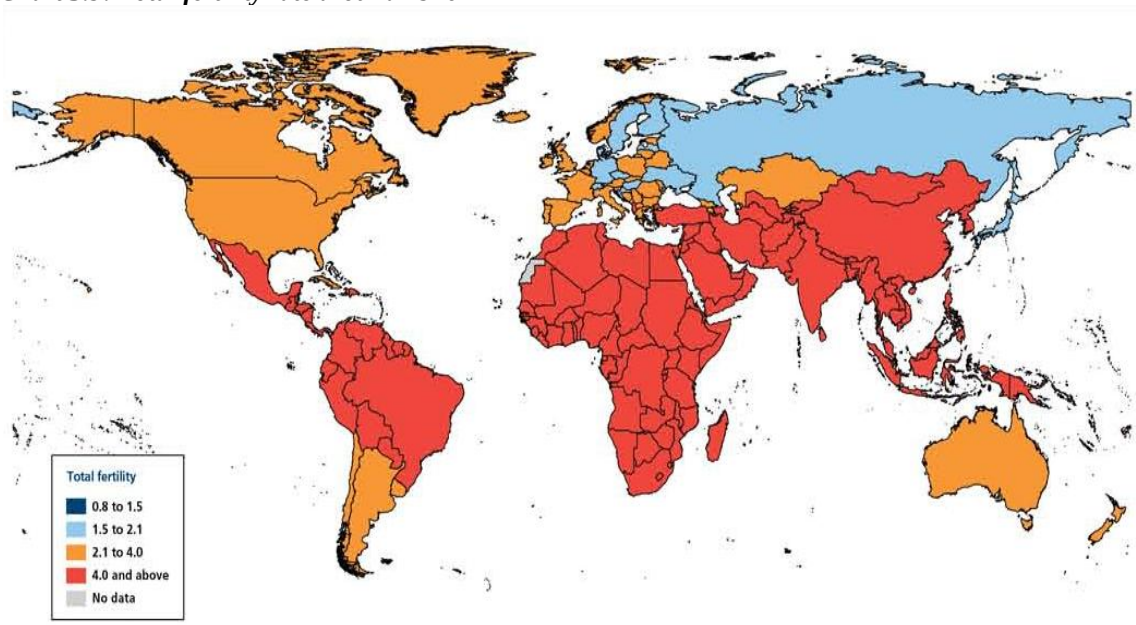
The concept of the Demographic Transition also involved in work:

- Landry Adolphe, 1934. La révolution démographique. Étude et essai sur les problèmes de la population. Paris, Sirey, 231 p.;
- Notestein Frank, 1945. Population, the long view, in: T. Schultz (ed.), Food for the world, p. 36–57. Chicago, University of Chicago Press, 367 p.,
- Coale Ansley J., 1973. The demographic transition. in: IUSSP (ed.) International Population Conference, Liége 1973, vol. 1, p. 53–73. Liège, Derouaux, 494 p.,
- Pavlík Zdeněk, Rychtaříková Jitka and Šubrtová Alena, 1986. Zaklady demografie. [The Principles of Demography]. Prague, Academia Praha, 732 p.

[54] Population momentum refers to the tendency of a population to continue to grow beyond the time when replacement levels of fertility are achieved.

A weak point of the Demographic Transition concept is also in predictability. The transition from high birth and death rates to low birth and death rates is assumed, but no knowledge about subsequent development is provided. The end of the transition is related to low level of fertility, but still high enough to ensure generations replacement. But, fertility in developed countries continued to decline below the replacement level which requires an average of 2.1 children per woman[55]. Whereas in 1970, developing countries were characterised by total fertility above 4 children per woman and developed countries, with few exceptions, by fertility levels in a range from 2.1 to 4 children per woman, in 2005 fertility levels in a majority of developing countries fell into the range from 2.1 to 4 children per woman and in developed countries below the replacement level of 2.1 children per woman (See Chart 3.9 and Chart 3.10). The fertility levels in developed counties have been so low, that a new terminology was established. Kohler et al. (2002) distinguish low and the lowest low fertility levels. While low fertility corresponds with the total fertility rate in the rage from 2.1 to 1.5 children per woman, the total fertility rate below 1.5 is labelled the lowest low fertility. The lowest low fertility emerged firstly in Italy and Spain at the beginning of 90's in the 20th century and afterwards the same pattern was noticed in Southern, Central and Eastern European countries. If the lowest low fertility in combination with low mortality level persists over long run, than annual number of birth is reduced by 50 % and a halving of the population size occurs in less than 45 years (Kohler et al., 2006, p.1). The potential implications of low fertility are abysmally.

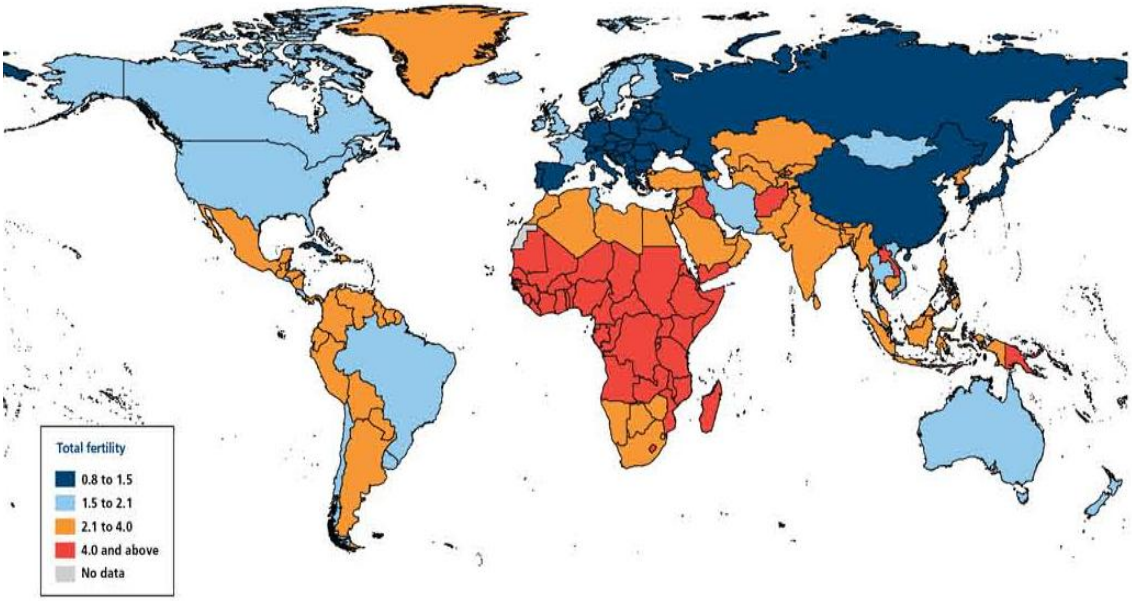
Chart 3.9: Total fertility rate around 1970



Source: World Fertility Patterns 2009, the United Nations Population Division

[55] In countries with high infant and child mortality rates, the average number of births per woman may need to be much higher.

Chart 3.10: Total fertility rate around 2005

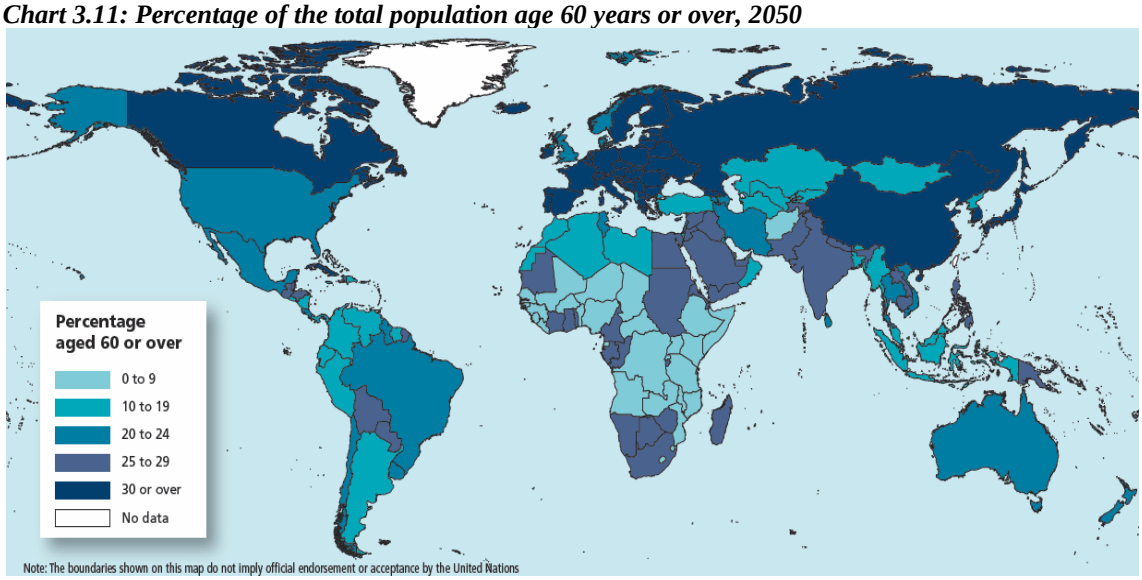


Source: World Fertility Patterns 2009, the United Nations Population Division

Improvements in mortality and declining fertility have resulted in ageing. Ageing refers to the process when the proportion of old people in a population increases due to increasing longevity and/or declining fertility[56]. Considering aforementioned population development in a world perspective, it is not surprising that in almost every country, the proportion of people aged over 60 years is growing faster than any other age group. On the one hand, aging can be understood as a success story for public health policies and for socioeconomic development, on the other hand aging can be seen as a considerable socioeconomic challenge. Population ageing has an impact on economic growth, savings, investments, consumption, labour market, pensions, taxation, and overall intergenerational transfers. Further, ageing also affects health and health care, family composition and living arrangements, housing, migration, as well as voting patterns and representation. Based on projection, it is assumed that by 2050 the number of older persons in the world will exceed the number of young for the first time in history (UNPD, 2010) (See Chart 3.11). In 2009, the number of persons age 65 and over was estimated to 737 million people worldwide. More than 35 % lived in developed countries and 64 % in developing countries. But it is assumed that the proportion of people to increase to 2 milliards in 2050. It has to be taken into account, that the percentage of older people is higher in developed countries these days. While in Europe one in five person is age 60 or over, in Asia, Latin America and Caribbean it is one in ten, and in Africa one in nineteen (UNPD, 2010). In 2010, three countries with the oldest population were Japan, Germany and Italy, where percentage of persons age 65 and over exceeded 20 %, and with the youngest population were Niger, Uganda, Burkina Faso, where percentage of persons younger than 15 years surpassed 46 % (Population Reference Bureau, 2010).

[56] Also migration can be considered as the cause or at least contributor.

Chart 3.11: Percentage of the total population age 60 years or over, 2050



Source: Population Ageing and Development 2009, the United Nations Population Division

In developed countries, ageing has provoked extensive debate regarding sustainability of transfers between generations. The potential inequity in welfare contributions, as well as in the distribution of benefits is labelled "generational conflict". Human life cycle is characterised by period of dependence on economically active family members and whole population. While in hunter-gatherers groups and agriculture societies a period of dependency was predominantly at young ages, because adults were net producer until near the time they died, in industrialized societies withdrawal from the labour force by the elderly has become substantial (Lee, 2007, p.17-43). The period, when they consume more than produce, has extended. The former population invested heavily in their children, because the number of dependent elderly was small in comparison with current situation. The direction of transfers was downturn. But, improvements in mortality in combination with established pensions and health care for the elderly and low age at retirement shifted the transfers' direction to upward. Population ageing contributes both extension of a dependency period and direction of transfers. Recent calculations suggest that increased proportion of elderly will increase spending roughly half as large (Lee, 2007, p.39). Lee (2007) assumes that total elderly benefits may rise while per capita benefits fall, and that additional government expenditures driven by demographic development come at the expense of other programs, especially those for children. On average, total old age public expenditures in OECD countries equalled to 6.4 % of GDP in 2007. The transfers to elderly were roughly three times higher than total expenditures on families in the OECD[57]. Even though it has to be noted that direction of private transfers within families has remind downward and unchanged for ages and that total transfers have had upward direction due to increasingly generosity of welfare provision.

It seems unreasonable for the state to cut expenditures on programs for children to handle issue of population ageing. Children are positive fiscal externalities. For instance, Lee and Miller (1997) calculated that a net fiscal present value[58] of a child born to parents who have

[57] Source: OECD statistics, available online: <http://stats.oecd.org/Index.aspx>.

[58] Net present value refers to the difference between the present value of cash inflows and the present value of cash outflows.

a high school education in the USA was $171,000 in 1996. The net fiscal present values of a child born parents who have basic education and university education equalled $92,000 and $245,000 in 1996 (Lee and Miller in Lee, 2007, p.17-49). On the one hand, children impose costs for health and education, as well as opportunity costs to their parents, but on the other hand they generate demand for goods and services, which contributes to GDP, and in future, they will be taxpayers who share the costs of public goods. The family does not benefit directly from support to the elderly at time of child birth, but society does. Therefore, if the state aims to cope with population ageing, the government should consider with respect to long-run fiscal net benefits from the birth of a child a pro-natalist policy (Lee, 2007, p.17-49). Improvements in fertility will not be able to solve recent pension crisis considering pay-as-you-go schemes, because it comes too late, but it will induced a permanent welfare improvements which may mitigate undesirable consequences of population ageing on recent social systems.

Even though the numbers of the elderly may be relatively small in developing countries these days, the speed at which the ageing process has been occurring is much higher than the one experienced by developed countries. But, developing countries have gone through demographic transition and virtually none of the counties has institutional settings capable to cope with population ageing. The shift in the population distribution towards older ages will take place in the context of weak economic performance, fragile institutions and changing intergenerational relations. Because developing countries will struggle with population ageing at different stage of development than developed countries, the elderly will be threatened not only with chronic diseases, but as well with infectious diseases and extreme poverty, which may induce additional inequality both in the country and between countries and undesirable conflicts. In this perspective it is reasonable to assume that governments will not have enough time to design suitable policies and that the family networks remain highly relevant element of survival strategy.

The development in the world population has not been kept only in check by fertility and mortality, but as well by migration. Migration is not a central topic of this overview, but it cannot be omitted. Migration may have a substantial and profound impact on population development. By significant outflow of young people a pace of ageing can be accelerated in given population, but it can be also mitigated by significant inflow of young people. Migration may also generate changes in family relationships and overwhelming both positive and negative economic impact. Everett S. Lee (1966) distinguishes pull factors of migration[59], which attract people to a new area, and push factors of migration[60], which drive people to leave their homes. In general, international migration has been induced by economic conditions or war conflicts. World mass migration stared up with advancements in transported technologies at the beginning of the 19th century. Since then, directions of migration flows from south to north and from east to west were kept over the world for long time. Population Division (2010) estimates that in 2009 the total number of people living in a country or area other than that

[59] Job opportunities, better living conditions, political and/or religious freedom, enjoyment, education, better medical care, attractive climates, security, family links, industry, better chances of marrying.

[60] Not enough jobs, few opportunities, primitive conditions, desertification, famine or drought, political fear or persecution, poor medical care, loss of wealth, natural disasters, death threats, lack of political or religious freedom, pollution, poor housing, discrimination, poor chances of marrying, war/civil war.

in which they were born was ca. 214 millions, it is equivalent to ca. 3 % of the world population. It has to be noticed that 7 % were refugees. Majority of migrants have lived in developed countries of Europe, North America, and Asia (Population Division, 2010). Considering population ageing in developed world, migration has not been a solution. Nevertheless, it should be taken into account, because educated young migrant has a positive net fiscal present values (Lee, 1997, p.38). Lee and Miller calculated that in 1996 the net present value of migrant at the age of 20 with university degree in USA equalled $288,000 (in Lee, 2007, p.38)[61]. However migration may have positive economic impact, an issue of integration and coexistence of people with different cultural background may generate additional costs.

This summary may provide an oversimplified image of comprehensive economic and population developments which are highly diversified in space and time. But, it is only aimed to documenting general trends and regional contrasts in order to shed light on the parallel progress in the market economic system and changes in population development. As the free market has spread over the world since the 19th century, standard of living has increased, but unprecedented changes in population were induced. While improvements in mortality have contributed to longevity, decline in fertility has exaggerated population ageing, which will take place in every country and region across the globe.

3.3 Relevant theories and theoretical approaches

The emphasis of this section is on the demographic and economic theories, frameworks, models, and concepts pertinent to the topic. The first part concerns theoretical approaches to the fertility decline. Theoretical foundations of fertility are in comparison with mortality and migration abundant and comprehensive therefore the main attention is devoted to frameworks, which are capable to cope with the fertility decline documented in developed countries in the second half of the 20th century. With respect to interdisciplinary nature of demography, it is hardly surprising that theoretical approaches to fertility decline are firmly grounded within other social sciences. The second part depicts relevant economic theories and theoretical frameworks to fertility and the family at micro and macro level. The section yields the insight into specificity of economic approaches to population issue.

3.3.1 Theoretical approaches to fertility decline

The theoretical landscape of fertility in demography is a colourful patchwork of ideas, which are not necessarily coherent. The basic classification of demographic approaches to fertility decline is based on the phase of the transition. While fertility trends in pre-industrial societies are framed in the model of natural fertility [62] and the model of proximate determinants [63],

[61] Discount rate equals 3 %. For the migrant of the same age but with basic and high school education the net present values equal to $33,000 and $146,000 in 1996.

[62] The author of the concept is Louis Henry. He defines natural fertility as fertility which exists in the absence of deliberate control through abortion or contraceptive practice. Therefore, reproductive behaviour does not depend on the number of children already born to a couple and it is determined by biological principles (age at menarche, fecundability, time required for gestation, etc.) and social-behavioural factors, which seems from a couple point of view unrelated to deliberate birth control (marriage pattern, rules for sexual abstinence in certain period, etc.).

in industrial societies the fertility decline is related to concepts considering ideational change and economic forces. In addition, the period between is associated with the diffusion[64] of ideas and technology both micro and macro level (de Bruijn, 2006, p.549-569). The scope is relatively broad therefore the focus is merely on the approaches related to industrial societies; the Rational Choice Theory, the Theory of Risk Averse, the Hypothesis of economic crisis, the Second Demographic Transition, the Postponement Transition, and the Theory of Gender Equity. Listed approaches do not deny each other, neither exclude. In spite of the fact that, they come from distinct assumptions, in some aspects they agree and overlap each other.

The Rational Choice Theory assumes that rational agent is able to consider all costs and benefits coming from childbearing and compare them. While costs are in money terms, benefits are virtually psychological. Coleman (1998) denotes benefits as immanent values[65], values per se. With this respect, rationality refers to ability to compare benefits, as a good feeling resulting from having a child, with psychological costs, as a fear of been a bad parent. Regarding benefits, the concept assumes imaginary threshold or net benefits which are known to agent at time of decision, and which compares with real pecuniary costs. The rule of decision making is simple. If real costs exceed net benefits than agent reaches a negative decision about childbearing.

The possible net benefits resulting from a child birth vary from individual to individual and are conditioned by birth order and age of mother (McDonald, 2002, p.423). A first child symbolizes the change in social status of a new parent and may live up expectations of surroundings or personal expectations regarding unfulfilled wishes to have someone who needs you and who loves you. McDonald (2002) supposes that decision about the second child arises from an idea of sibling necessity, from wish to have a child of the opposite sex, or from desire to have greater number of progeny. Therefore, a birth order is an integral element of decision making process regarding a child. In addition, it is reasonable to assume decreasing marginal benefits with any additional child. The age of mother is also considered to be relevant to decision about a child. Regardless biological constrains and with other things the same, woman at the age of 29 has higher probability to conceive a child in comparison with woman ten years older, because to accommodate a new life style related to a child is demanding at higher ages. The psychological costs increase or net benefits decrease, or both.

Pecuniary costs, which are compared with net benefits in the concept of the Rational Choice Theory, are classified into two types. Direct costs equal to difference between costs related

[63] John Bongaarts, the author of the concept, explains fertility changes as a direct result of changes in seven proximate determinants, which mediate the effect of changes in social, economic, and cultural conditions. The model states, that the total fertility rate composes of the index of proportion married, the index of noncontraception, the index of lactational infecundity, and the potential total fertility.

[64] Diffusion is understood as the process by which innovations spread from one locale, social group, or individual to another. The process respects socio-cultural forces, such as language, ethnicity, neighbourhood, workplace, and channels of communication and exchange.

[65] Expansion of the self – immortality by proxy, Primary group ties – children provide a close community in an impersonal world, and source of love, Novelty and fun – children as pets provide amusement, novelty and surprise, Creativity and accomplishment – children as indicator of adults status and creativity, Power over others – children as pupils, disciples to be led, taught and be influenced, Vicarious achievement possibilities – children as a second chance, replacement for own failure, Curiosity – one should always try everything at least once, Minimizing uncertainty in life's major areas (Hoffman and Hoffman, 1973; Friedman et al., 1994; Schoen et al., 1997, in Coleman 1998).

to basic necessities (e.g. education, food, housing, etc.) and benefits coming from state support (e.g. tax relief, tax bonus, child allowance, income supplement, services provided to children, etc.). Indirect costs correspond to the lost earnings due to pregnancy and childbearing. McDonald (2002) assumes that indirect costs are highly significant for decision about the first child and direct costs for the child of higher order. With this respect, indirect costs decrease with greater compatibility of professional and family life. The statement is underlined by the evidence from the Nordic countries, where participation of mothers with a child in the labour market is significant.

According to the Rational Choice Theory, state, which aims to affect decision making process related to children, should focus either on costs reduction or net benefits growth. With respect to psychological nature of benefits depending on human personality, it is reasonable to assume that any state action is inefficient in case of benefits. Nevertheless, a bit state support to family status within a society would not come amiss. On the other hand, state actions with respect to child costs are common. Coleman (1998) based on cost reduction distinguishes approaches of the market economy and welfare state. While the market economy reduces costs of production of child goods and services, the welfare state focuses on transfers, but this approach Coleman (1998) considers unsustainable. Further possibility, how to affect decision making process related to children in the frame of rationality, is timing of childbearing. For instance, Singapore introduced tax policy which favours women with a child before age of 28 (McDonald, 2002, p.423). In sum, the Rational Choice Theory frames the fertility decline in developed countries into rational decision making process and costs of children. Therefore, as the costs of childbearing and rearing have increased with economic progress and exceeded benefits, people have responded by lower number of children, in spite of the fact that desired number of children has been, based on surveys, substantially higher than number of children which they have already had. A weak point of the concept is the assumption of rationally. Rationality in economic sense assumes that economic agent is fully consciousness of all costs and benefits, but in reality it is hardly fulfilled.

The Theory of Risk Averse is a further concept which deals with the fertility decline in developed world. The main difference with respect to the Rational Choice Theory is time-dimension. The Theory of Risk Averse assumes that costs and benefits are realized in future, hence they are unknown. Therefore, decision regarding a child depends on expectations about development in economic, political, social, and personal sphere (McDonald, 2002, p.425). If individual is waiting for undesirable development, it is highly probable, that the statement regarding a child will be negative. Coleman (1998) assumes that declining fertility in developed countries is due to greater uncertainty in life. Workplace, as well as place of residence, has not been nevermore life-long. Probability of movement from place to place to find a job is higher. Also it is reasonable to assume greater variability interest rates in short-run, shorter economic cycles, and greater fluctuation of prices (McDonald, 2002, p.425). According to the Theory of Risk Averse it is better to invest in education, enter to market and create the financial reserves, rather than to form family, lose earnings, cope with greater uncertainty of employment, and be responsible for other person.

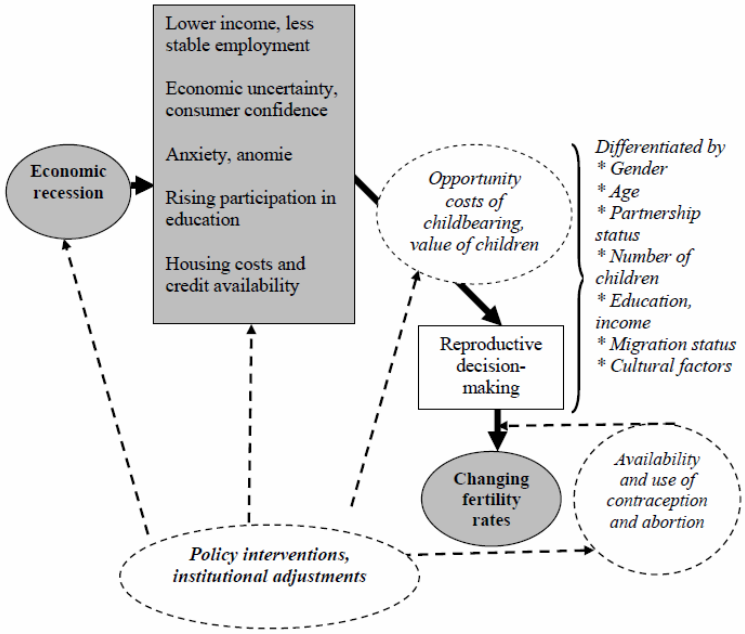
Risk-aversion behaviour is highly significant in personal attitudes regarding parenthood. Having a child induces a lot of changes in parents' life. There is a potential risk, that a new family member may cause disagreement between parents or differences in opinions within extended family. For instance, disagreement has been common in case of child education, as well as discrepancies in time devoted to family, work, and hobbies. In addition, these days divorce risk has been substantial. Therefore, the potential danger is also in a partner response which need not provide neither financial nor emotional support to a child after divorce whereby additional costs are generated. Misgivings about health have been also relatively prevalent, because probability of disease, as well as injury of a child can be minimized, but not eliminated. Wide range of hazards involves also general ideas regarding future ability of a child to cope with dangers of common life. Therefore one and simple way how to avoid risks regarding parenthood is decision about childlessness. If the idea of risk-averse behaviour as a major cause for the fertility decline is accepted, than the tools of welfare states which may mitigate given risks should be considered. The risks are usually solved in economy by insurance, but in the case of parenthood the strategy is not applicable. With this respect, the welfare state is legitimated and reasonable.

Further concepts, the Hypothesis of economic crisis comes from the empirical observations, as well as from the economic theory of fertility, which assumes that demand for children behaves in the same way as for normal goods[66]. The economic crisis hypothesis assumes that people do not just shift childbearing to higher ages, but reduce the number of their descendants as a securing material needs become crucial in their lives. The framework is predominantly focused on the fertility decline in transitional economies observed after the collapse of socialist regime.

The study of UN Economic Commission for Europe (2000) points out that decline in income pushed fertility down in ten post-communist countries in the period of 1989 to 1998. The economic downturn did not only make families poorer. In addition to that, the policies that kept the fertility at high levels during the socialist times were not sustainable. Therefore the transfers to families with children decreased not only in real terms, but also relatively to the wage rates. However, the consequences of the transition have been less severe in the Central European countries, the income inequality and poverty grew across the entire post-communist region (World Bank, 2000). The material needs became important in the decision making process. As a response to macro-economic uncertainty fertility has been postponed or limited at all. Zakhrov (2008) and other researchers as Frejka (2008), Sobotka (2008) consider the economic crisis hypothesis as a simplification and argue in favour to the Second Demographic Transition or the Postponement Transition. For instance, Frejka (2008) stresses the difficulties of separating the factors related to transition from those which operate in the standard market economy.

[66] The Demand theory is in-depth discussed in following section 3.3.1.

Chart 3.12: The effects of economic recession on fertility: Pathways of influences



Notes: Dashed arrows illustrate relationships which are often not easily observable.
Source: Sobotka, Skirbekk, and Philipov, 2010

The background for the studies regarding the ideational change is the concept of the Second Demographic Transition introduced by Lesthaeghe and van de Kaa in 1986. This concept is focused on a macro-level development of society and stresses the role of the individualism, which occurs with the additional economic development from a manufacturing production to a service based economy. The driving force of the demographic change is seen in transformation of individual values from an economic and physical security to a new set of post-materialist values emphasizing autonomy and self-expression (van de Kaa, 2002; Lesthaeghe, Surkyn, 2004).

Lesthaeghe and Surkyn (2004) claim, that the self-actualization could not have been predominant in individual values if three preconditions had not been fulfilled: a contraceptive revolution, a sexual revolution, and a gender revolution. The contraceptive revolution allows postponing childbearing to higher ages, the sexual revolution removed the boundaries keeping sexual activity within marriage, and the gender revolution allows equality between men and women. All three revolutions together in combination with economic development have promoted the switch in individual values, which in developed countries have resulted in small families. In addition to that, Lesthaeghe and Neidert (2006) stress that the change in values is not just the outcome of new socio-economic conditions and higher women's participation in the labour market, but the consequence of secular and anti-authoritarian sentiments of better educated population. However, the concept of the Second Demographic Transition is more focused on the symptoms, rather than causality, the continued economic growth and stability is assumed.

The Postponement Transition is based on the assumption that the fertility level under replacement threshold in Europe have occurred due to five distinct demographic and behavioral factors (Kohler et al., 2002). The first factor is a distortion of the period fertility measure. The total fertility rate, which is often presented as a basic measure for fertility, is not capable

of capturing the fertility postponement and changes in the parity composition of the population. Therefore, to use a distinct measure as completed fertility, the decline in fertility would not be necessarily as severe as was documented in the period total fertility rate in Europe in the 90's. The economic and social changes are the second component of the assumption. The authors suppose that the postponement of fertility is a rational response to new conditions. The third factor is dedicated to the social interaction process. The individual decision about fertility is not done independently of the social interactions. Quite the opposite, the social interactions have relevant effect on the fertility dynamics. The fertility postponement as a population response to new socio-economic conditions has been even remarkable in comparison with an individual response. In the fertility surveys, participants revealed the persistent preferences about family size, but the realization was shifted to higher ages. The fourth cause of the emergence of low fertility by Kohler et al. (2002) is the institutional settings. They argue that countries with the lowest-low fertility are characterized by institutional settings in favour relatively low quantum of fertility. The main features are: an insufficient child care support, a relatively inflexible labour market, a low support for families with children via tax allowance and direct transfers, and a highly unbalanced division of labour within household. The last but not least factor of their assumption is a postponement-quantum interaction. The postponement of childbearing is not necessarily the cause of the large fertility fall, if the shift is from low ages. The intended fertility plan can be realized later. But, if the postponement is already from high ages to even higher ages, fertility has to decline as the fecundity decrease and quantum effect reveals.

As Billingsley (2010) points out, the work of Kohler et al. (2002) is remarkable at least for two reasons. Firstly, they propose a causal mechanism behind the fertility postponement which is distinct from the mechanism introduced in the Second Demographic Transition. Secondly, the work does not distinguish the European countries based on the rule of socialist experience. On the contrary, the similarities among the Southern, Central and Eastern European countries are detected. Therefore, transition economies and their economic recessions are not seen as the main causes of the fertility postponement. The main driving force of the change in fertility is seen in general economic uncertainty. Another benefit of this approach is the consideration of the macro and micro level of decision making and their interplay.

The last concept concerned the fertility decline in developed countries is the Theory of gender equity. Equity is understood with respect to both individual and family. Tradition gender roles correspond with man-breadwinner and woman-housewife. But with the economic progress and greater decision making power of women, the traditional roles have been distorted. If equity between man and woman is unbalanced at least in one of aforementioned dimensions in given population, than according the Theory of gender equity, it is reasonable to assume that the fertility level will be low in comparison with population where equity is present in both dimensions. This approach is emphasized by discrepancy between fertility levels in North and South Europe. While the total fertility rate in Italy has been substantially below replacement level, in Norway has been ca. 2 children per woman. Italy is in comparison with Norway characterised by relatively traditional approach to the family. Therefore, pro-natalist population

policy should focus on instruments mitigating gender inequalities within family. The potential problem is, that it is not clear from the theory how it should be done.

Theoretical concepts dealing with the fertility decline in developed countries in the second half of the 20th century are both in individual and aggregate level and predominantly reflect ideational changes and economic forces. With this respect, they are more or less capable determined observed trends of development, but none of them provides insight into future development. From aforementioned approaches it is not clear how to cope with the issue of low fertility.

3.3.2 Summary of relevant economic theories at micro and macro level

Economics is the social science focused on economic reproduction resulting from action of economic agents. The family, or rather household, is a basic economic agent that participates in the market to attain desirable goods and services for consumption. While in the product market household is a consumer, in the resource market it is a seller. Households are unique owners of productive factors; labour, land, and capital, which are sold to firms. By trading household gets income using for purchase of desired goods and services. Household consists of several members who have their own preferences. By exchange in the market they try to fulfil their demands for goods and services. Economics deals with the family/household on the principle quid pro quo with respect to described framework. Household is both consumer and producer, which via rational behaviour is fulfilling predetermined goals. In addition, it is worthwhile to notice that households differ by structure and constitutes room for bargain, negotiation, and redistribution among household's members.

Understanding of family behaviour sheds light on some economic issues, therefore economics devotes substantial attention to the family at both micro and macro level. While economists carrying out research in the field of labour market or economic organisation perceive the family as a "small factory", economists focusing on public choice theory or game theory view the family as a group of negotiators. In economics, the family can be analysed from distinct perspectives, but this section summarizes basic economic concepts at micro and macro level and their attempts to internalize the family into consideration. It concerns with work of the Chicago school of economics, especially with work of a Nobel Prize laureate G. S. Becker, and approaches of intra-household allocation within frameworks of cooperative and non-cooperative behaviour at micro level and theories of economic growth at macro level.

3.3.2.1 The economic theories at micro level[67]

The most famous economic school, which has carried out research considering the family, is the Chicago school of economics. The roots of the school are in neoclassical economics of the first period therefore the approach is based on classical political economy and marginal analysis. It is focused on a consumer who follows his own interests to achieve his predetermined goals. Economic man is seen as an actor maximizing his utility; homo oeconomicus. The Chicago school of economics is characterised by micro-economics utilitarian models

[67] The text in extended version was firstly presented in the work Sivková, O. 2009. Economics of the Family. Institute of Economic Studies, Faculty of Social Sciences, Charles University in Prague.

established on individualism, maximization, and rationality, because only individual knows what is good enough for him. The school applies mathematical formalism, as well as empirical hypothesis testing and assumes, that people think about noneconomic issues in economic perspective. Therefore, family behaviour or racial discrimination can be also model via economic approaches. In this section firstly, the concepts to children as consumer and capital goods are discussed, afterwards attention is devoted to models of non-cooperative and cooperative behaviour within family, which complement previous approaches.

Gary S. Becker is well known as a one of the first economists who has dealt with the topics traditionally assigned to sociology; racial discrimination, crime, family organization, and drug addiction. The fundamental idea of his work, published in *The Economic Approach to Human Behavior* in 1976, is in assumption that a man behaves according the same rules of rationality in any situation regardless of the fact if he takes it into account or not. Therefore, according to Becker it is suitable to study man's behaviour with respect to utility maximization framed by his set of preferences (Holman, 2001, p.448). He acknowledges economic approach to human behaviour to be general and does not refuse human fallibility due to imperfect memory, wrong prediction of future development, or unawareness. Becker assumes marginal impact of bounded rationality on predictions of reality and high significance of time as a scarce resource. In his view, the costs and benefits are financial and non-financial which are illustrated by social status, fortunate family life, happiness about children, etc. The time costs equal to opportunity costs, which refer to the next-best choice available to someone who has picked among several mutually exclusive choices. Therefore, the loss of utility is caused by impossibility of other choices.

In *A Treatise on the Family* firstly published in 1981, Becker analyses economic behaviour with respect to marriage, divorce, decision about a child, decision about number of children as well as their timing. According to Becker, in all listed examples the approach of cost-benefit analysis is suitable, although costs are not necessarily pecuniary. While a couple gets married because it is mutually profitable for them in comparison with the status of singles, decision about a child he relates to utility resulting from upbringing and to family altruism with respect to all members. Becker assumes population policy as an efficient tool. In case of women in the well-paid jobs, a trend of fertility reduction is present if child benefits or tax deductions decrease or costs of child rearing increase. On the other hand, he does not accept state social support ascribed directly to an elderly person or a child, because this kind of support disrupts solidarity within the family.

Children as consumption goods enter to the cost-benefit analysis via parents preferences. Parents, household's leaders, distribute their disposable income among common goods and children. The overall budget devoted to children depends on their number, as well as on their well-being and quantity-quality interaction. Family utility function U equals to equation (3.1), where n denotes number of children (quantity), q quality of each children, and $Z_1....Z_m$ are commodities of ordinary consumption (Becker, 1993, p.137),

$$U = U(n, q, Z_1, \dots, Z_m). \tag{3.1}$$

Children are consumption goods which do not have any substitutes, it is not possible to replace them by any commodity, and each family does not purchase them, but produces. For a child "production" the family demands common goods, services, and time. The rearing costs differ from family to family, therefore are highly specific for given household. In general, if p_n presents child costs, π_z costs of common goods, which without loss of generality are symbolised by Z, than household budget constrain with disposable income I can be expressed in the form of equation (3.2) (Becker, 1993, p.138),

$$p_n n + \pi_z Z = I. \tag{3.2}$$

Optimal consumption set including ordinary goods and children is determined by household budget constrain and assumption of marginal utility (*MU*), which refers to the utility gain (or loss) from an increase (or decrease) in the consumption of given good (Becker, 1993, p.138),

$$\frac{\frac{\partial U}{\partial n}}{\frac{\partial U}{\partial Z}} = \frac{MU_n}{MU_z} = \frac{p_n}{\pi_z}. \tag{3.3}$$

Relative price of children, proportion of costs of children and common goods p_n/π_z, and disposable income determine demand for children. Increasing relative price of children in combination with constant income decease demand for children and increase demand for the rest of goods. The pattern is caused by rise in cost of children or by decline in price of other commodities. If the costs p_n and π_z are changed in the same direction, than demand for children remain unchanged. According to Becker (1993), costs of children can be decreased by several mechanisms, for instance, by their domestic help, contribution to household budget via field cultivation or assistance in family firm, etc. His line of reasoning involves differences in household size in the countryside and in the city. Broadly speaking, demand for children in the countryside is substantial in comparison with the city, because family agricultural production may utilize child domestic help to a higher extent than industrial production conducted in the city. Nevertheless, it has to be taken into account, that in case of mechanization of agriculture production, it does not hold (Becker, 1993, p.139).

A social support to mothers with dependent child/children is a further factor which influences costs of children and their rearing. Providing greater social support, the opportunity costs of maternity are mitigated and cost of children may decrease. Therefore, Becker (1993) assumes that state social programs focused on mother with dependent child/children caused disparities between the number of children born within and without marriage in the USA during the 60's in the 20th century (Becker, 1993, p.139). The state support made situation of unmarried mother easier.

Relative price of children in Becker's framework is deeply dependent also on time costs. He assumes that time of married-women significantly influences total cost of children and their rearing. It is assumed that time cost consists two thirds of total costs of children in the USA (Becker, 1993, p.140). The statement is emphasized by observation of increasing incomes of women in the labour market in developed economies over the last century. While considerable incomes induced greater participation of women in the labour market and decreased fertility level, improvements in men wealth did not significantly influence costs

of children. Time spend with children had been already marginal. Therefore, if a child consumes more ordinary goods than father's time, than improvements in father's wealth may more likely decrease relative price of children. With this respect, household surveys focused on time allocation and demand for children revealed negative relationship between demand for children and mother wage, or other variable used as an approximation of time cost, and positive relationship between demand for children and father wage (Becker, 1993, p.140).

In addition, demand for children is also formed by disposable income. Basically, if disposable income increases, then also demand for common goods increase, and vice versa. Involving children into the vector of common commodities, the demand for children should also increase as disposable income increase. This pattern corresponds with the demographic behaviour prior to the 19th century. Men with considerable wealth tend to have more children and if it was possible, they had also more wives. But, during the 19th century additional economic progress induced negative correlation between fertility levels and household incomes. Becker (1993) supposes that negative relationship between fertility and wealth is caused by quantity-quality interaction. Therefore, demand for children does not necessarily increase as disposable income increase.

If p_c denotes constant cost per unit of quality, q presents overall quality of a child, and $p_c qn$ equals to total costs, than the budget constrain (3.2) with unchanged utility function (3.1) and differentiation children from other consumption goods gains the form of equation (3.4) (Becker, 1993, p.145),

$$p_c qn + \pi_z Z = I. \tag{3.4}$$

The budget constraint (3.4) is not linear. It depends on relationship between quality q and number of children n. The concept assumes, that children within given family are the same quality and utility maximization with respect to budget constrain generates following conditions,

$$\frac{\partial U}{\partial n} = MU_n = \lambda p_c q = \lambda \pi_n, \tag{3.5}$$

$$\frac{\partial U}{\partial q} = MU_q = \lambda p_c n = \lambda \pi_q, \tag{3.6}$$

$$\frac{\partial U}{\partial Z} = MU_z = \lambda \pi_z. \tag{3.7}$$

Relative shadow prices are π_n, π_q and depends on p_c, price of a unit of quality, but remarkable fact is, that π_n also depends on q and relative price π_q on n. With increasing overall quality q, the share of budget devoted to cost of a child increases therefore relative price of a child rises. Analogously situation is in case of increasing number of children n, it is complicated to add a unit of quality, because it has to be provided to each child.

Demand for n children, their quality q, and other commodities are, based on equations from (3.4) to (3.7), rewritten into the functions of shadow prices π_n, π_q, π_z, and shadow income R, for which substitution and income effect holds (Becker, 1993, p.145-146),

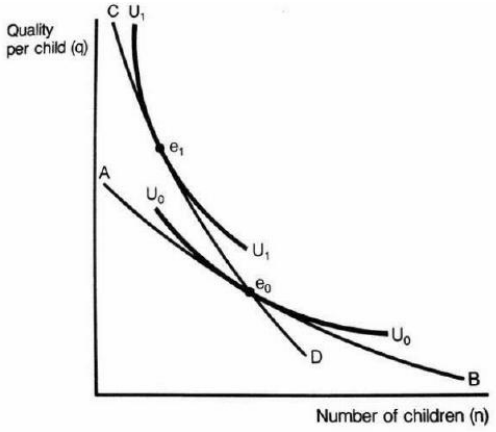
$$n = d_n(\pi_n, \pi_q, \pi_z, R), \tag{3.8}$$

$$q = d_q(\pi_n, \pi_q, \pi_z, R), \tag{3.9}$$

$$Z = d_z(\pi_n, \pi_q, \pi_z, R). \tag{3.10}$$

With increasing shadow price *n*, *q* or *Z* and the fact, that other shadow prices and shadow income *R* remain unchanged, demand decreases. If the p_c, π_q, and *I* are held constant, than exogenous increase in number of children increases shadow price of quality $\pi_q(=n\ p_c)$ and decreases demand for *q*. Restriction to *q* reduces shadow price π_n, because it depends on *q* and increase demand for *n* (Becker, 1993, p.146). The relationship between quantity and quality of children is illustrated in the Chart 3.13. The indifference curves[68], which present parents' preferences between *n* and *q*, are denoted U_0 and U_1 (*Z* is constant) and curves AB and CD show budget constraints. All of them are convex to the origin. Solution exits, for instance point e_0 and e_1, if the curvature of indifference curve is greater than the curvature of budget constraint. Therefore, the solution exists only in case that *q* and *n* are not close substitutes.

Chart 3.13: Quality-quantity interaction



Source: Becker, 1991, p.147

Fertility decline has been explained by miscellaneous approaches. In this respect, Becker (1993) provides framework which explain fertility decline via quantity-quality interaction. Demand for children significantly responds to price and income changes, although children do not have real substitutes. Analysis is simplified, if the fix costs of each child p_n are assumed. The costs include time, spending, and inconvenience caused by pregnancy and delivery, child benefits (negative costs), costs related to contraceptive method, and other psychological and financial costs which are unrelated to quality of children (Becker, 1993, p.148). Let's p_q denote expenditure on children independent of their number (e.g. inherited clothes, or costs of learning from parents) and average and marginal costs of quality vary (e.g. due to state support of education programmes), than budget constraint can be expressed in the following form,

$$p_n n + p_q q + p_c(q)qn + \pi_z Z = I. \tag{3.11}$$

Utility maximization with respect to budget constraint (3.11) reveals that shadow prices *n* and *q* do not depend only on their relationship, but also on ratio of fix and variable costs and proportion of marginal and average costs of quality. Compensated increase in p_n turns budget constraint AB into CD (See Chart 3.13). The indifference curve indicates that a new equilibrium

[68] The indifference curves show different bundles of goods between which a consumer is indifferent. At each point on the curve, the consumer has no preference for one bundle over another.

is achieved by leftwards shift from e_0 to e_1. In this case, parents demand fewer children but higher quality.

Basic economic theory claims that change in price of any commodity induces change of the opposite direction in demand for given commodity or its substitutes. Quality-quantity relationship supposes that, for instance, demand for other goods may decrease, if the price of quantity increased and elasticity of substitution was equal to all commodities. An assumption of negative correlation between quality and quantity is fundamental. If the quality issue is not involved in analysis, than improvement in income would generate only net positive income effect. Demand for children would increase. But, quality-quantity interaction in combination with income improvement and higher returns from quality supposes fertility reduction. Therefore, wealthier families in developed economies have tended to have fewer children. Economic development may influence fertility level and quality of children via improvement in incomes, as well as returns from investments in education and human capital.

In spite of the fact that, this approach has been turning and emphasized relevance of child costs and parents' income, it has not involved either decision making process within family or overall macroeconomic development. The concept has not been able to explain distinct development among countries. Therefore, a new approach, known as *A reformulation of the Economic Theory of Fertility*, was formulated by Robert J. Barro and Gary S. Becker in 1986.

The theory of fertility arises from parents' altruism towards children. Parents' utility depends on their consumption and on utility of each of their child, but child's utility depends as well on his own consumption and utility of his children. With this respect, dynastic utility function is established in the form (3.12),

$$U_0 = \sum_{i=0}^{\infty} A_i N_i v(c_i), \tag{3.12}$$

where A_i is a degree of altruism of the dynastic head toward his descendant in generation i which is defined as follows (Barro, Becker, 1986, p.6),

$$A_0 = 1, \tag{3.13}$$

$$A_i = \prod_{j=0}^{i-1} a(n_j) \quad \text{pro } i = 1,2,\dots . \tag{3.14}$$

Variable n_j presents number of children per parent in generation j, N_i denotes number of descendants in generation i, c_i corresponds with consumption per adult in generation i and v is a standard utility function with positive first and negative second derivations. Function $a(n_j)$ reflects parent's utility, which is gained per child and depended on number of descendants. If parents have only one child and $a(1)$ equals to the value less than 1, than parents can be considered to be selfish, because a child does not fulfils their expected utility.

Each adult supplies the market with a unit of labour and earns wage w_i. He also bequeaths inheritance to descendants, which is understand as a permanent capital k_{i+1} in the model and is generated at the beginning of period i. This capital appreciates in value by the interest rate r_i, which may have negative values in case of debts inheritance. Therefore, adult from generation

i spends his overall resources $w_i+(1+r_i)\ k_i$ on his own consumption c_i, inheritance to children $n_i k_{i+1}$, and expenditures on children's education $n_i\beta_i$. Further assumptions of the model are related to quality and adult's income. Expenditure on children's education $n_i\beta_i$ depends on quality of children and cost of rearing is proportionally contingents on adult's income due to time as an opportunity cost. Value of time devoted to upbringing equals to wage, which is lost. Therefore, costs of upbringing are higher for parent with significant income. The budget constrain for adult in generation *i* is following,

$$w_i + (1 + r_i)k_i = c_i + n_i(\beta_i + k_{i+1}). \tag{3.15}$$

The head of dynasty deals with maximization of dynasty utility function U_0 (3.12) in respect of budget constrain (3.15) and the initial wealth.

By application of dynastic utility function to open economy, which is defined as an economy of international capital market with one interest rate and with wages generated by given economy due to labour immobility, determinants of fertility level n_i are obtained (Barro, Becker, 1986, p.27),

$$n_j = \left[\alpha^j(1 + r_{i+1})\right]^{\frac{1}{\varepsilon^j}} \left[\frac{c_i^j}{c_{i+1}^j}\right]^{\frac{(1-\sigma^j)}{\varepsilon^j}}. \tag{3.16}$$

Index *j* denotes country, r_{i+1} is an interest rate at the moment of descendent birth in *i* generation, ε presents elasticity of parents' consumption with respect to children consumption, $\sigma(c_i)$ is elasticity of utility in respect of consumption c_i and altruism to children α. According to equation (3.16), population growth is greater in economies where parents are significantly altruistic to their children (α_j) and altruism is indirectly dependent on number of children. Population growth can be assumed also in case of considerable interest rate, although consumption per capita grows gradually. Consumption growth per capita between generations equals to growth of net costs per descendants. Further investigation revealed that fertility is positively correlated with probability of child survival and negatively with growth of social security. Authors conclude that fertility should be lower in open economy if substantial technological progress, significant revenue from social security, and low life expectancy at birth is present.

The Chicago school of economics has explored also the second approach to fertility, children as capital goods. The main differences between those two approaches are in reasoning why people demand children. While children as consumption goods are demanded for utility which generate to their parents, children as capital goods are demanded for revenues in long-run which are brought to their parents. The second concept shows a child as investment. This approach is applied by several sciences, but for the purpose of this section the basic model described by Assaf Razin and Efraim Sadka (1995) is utilized.

The basic model assumes two periods covering productive age and retirement, and one general goods *K*, which is generated only by labour. Each adult at productive age devotes his labour to production of k_1 unit of goods *K* and brings children, who are capable to produce k_2 unit of good *K* in the second period, into the world. Also in this model children generate

costs. Child consumption, which is exogenous factor, equals to x_1 units in the first period and x_2 units in the second period. Parent's utility U depends only on his own consumption in both periods (Razin, Sadka, 1995, p.24),

$$U = u(c_1, c_2). \tag{3.17}$$

In the first period, parent can assign his output to own consumption c_1, to investments in children nx_1, and/or to investments in financial or physical capital S. Therefore, the budget constrain in the first period corresponds with equation (3.18) (Razin, Sadka, 1995, p.25),

$$k_1 = c_1 + nx_1 + S. \tag{3.18}$$

In the second period, family involves also children, who may generate k_2 units of goods K. Children provide revenues k_2-x_1, but adult only consumes revenues gained from his children and investments accomplished in financial or physical capital S with real return r in the first period (Razin, Sadka, 1995, p.24),

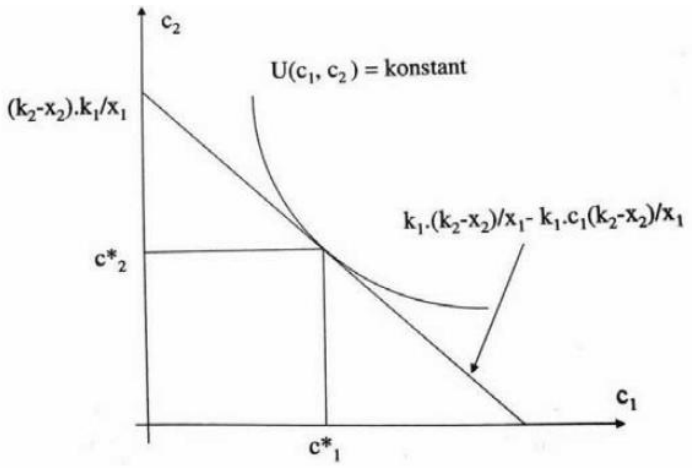
$$c_2 = n(k_2 - x_2) + (1 + r)S. \tag{3.19}$$

If the investments S equal to zero, than formula (3.19) can be rewritten into (3.20),

$$c_2 = \frac{(k_2 - x_2)(k_1 - c_1)}{x_1}, \tag{3.20}$$

which implies that maximal parent's consumption of the second period can be attained by zero consumption in the first period and investment in a child, i.e. k_1/x_1. The revenue obtained in the second period equals to $(k_2\text{-}x_1)(k_1/x_1)$. Considering graphical illustration, patent chooses a point at the budget constrain which maximizes utility function (c_1^*, c_2^*) (See Chart 3.14).

Chart 3.14: Consumption set and optimal number of children



Source: Razin, Sadka, 1995, p.26

If an existence of the capital market is assumed then parents have a choice to invest in financial and/or in physical capital, $S \neq 0$. According to described model, parent decides in favour

of children, if gained revenue from a child overcomes revenues from other capital assets (Razin, Sadka, 1995, p.28),

$$(k_2 - x_2)x_1 \geq 1 + r, \tag{3.21}$$

otherwise prefers investments in financial and physical capital rather than in children. Children and other assets for investments are substitutes. This approach involves an assumption of the single-side capital market, which means, that adult may invest, but not borrow resources for investments. Therefore, it is reasonable to assume, that in case of the two-side capital market, certain families may afford children and overall fertility level will be higher in comparison with state of affairs in the single-side capital market. In sum, the model supposes transfers from present to future via children for families with higher revenues from descendants compared with other assets of investments. On the other hand, families gaining lower revenues from children profit from families with higher revenues via loans at financial market. Therefore, financial market improves rather than worsen fertility in given economy.

Aforementioned approaches of the Chicago school of economics, children as consumption and capital goods, simplifies the process of decision making within family on to maximization of family utility function with respect to budget constrain. No one doubts that approaches have contributed to reveal new knowledge about family and related issues. But individual interests may considerably contradict family's interests. The discrepancy is evident. The Chicago school deals with the family as a unit and supposes that family income is shared independently on contributions of family members. Expenditures on children and parents' consumption are determined only by total family income. But this ideal does not correspond with reality. Preferences substantially vary by family members and may significantly influence well-being of each family member. Therefore attention of following paragraphs is devoted to concepts of decision making and redistribution within the family, approaches of non-cooperation and cooperation behaviour are discussed.

Basically, if the family income is decisive then it is not necessarily to distinguish, who receives transfer from social security system. But, if the income levels of parents are relevant, then it is important who gains the state support, mother or father. The fundamental economic approach assumes that parents' revenue from being parents is a public good, i.e. consumption is non-rival, non-excludable, indivisible, and undiminished. Each parent has his/her own preferences, which are characterised by utility function U^j (3.22), where G denotes "quality of children" involving costs and x_j labels consumption of parent j (Ermisch, 2003, p.22).

$$U^j = U^j(x_j, G). \tag{3.22}$$

In case that, parents do not cooperate because they do not communicate, then their behaviour follows Nash equilibrium. Nash (1950) defined equilibrium of non-cooperative game as set of strategies prescribed to each player. Given set of strategies maximizes expected utility of each player with respect to remaining player. If parents' behaviour does not correspond to Nash equilibrium, then there is a possibility that one of them is better-off. Following Ermisch's labelling, each parent may, based on his/her own preferences, contribute to child

consumption by g_j units ($g_j \geq 0$). Therefore, consumption of parent j, x_j, equals to differences between income y_j and expenditures on children g_j (3.23), and total costs G can be expressed by sum of children costs relatively to their price p (3.24),

$$x_j = y_j - g_j, \tag{3.23}$$

$$G = \frac{g_1 + g_2}{p}. \tag{3.24}$$

Each of parents chooses contribution to children g_j based on utility maximization with respect to partner contribution which is considered to be given. Therefore, he/she maximize utility $U^j(y_j-g_j, (g_1+g_2)/p)$ with respect to $g_j \geq 0$, which implies that the marginal rate of substitution[69] between public good G and private goods x_j is lower or equal to relative price of public good (Ermisch, 2003, p.22)[70],

$$\frac{U_G^j(x_j^*, G^*)}{U_x^j(x_j^*, G^*)} \leq p, \qquad j = 1,2. \tag{3.25}$$

If the formula (3.25) is in the form of equality, then g_1 and g_2 characterising parents' strategies can be expressed and utilized for specification of Nash equilibrium. If inequality is hold for a partner j, then his contribution to children equals zero, because he/she is too poor. The marginal rate of substitution for parent j is lower than marginal cost of public goods. Let's assume with no loss of generality, that utility function of parent j is in the form (3.26), where his/her preferences are labelled α, and relative price of children equals to 1,

$$U^j = \alpha_j \ln(x_j) + (1 - \alpha_j) \ln(G) \tag{3.26}$$

If mother and father contribute to expenditures on children by amounts greater than zero ($g_1 > 0$ and $g_2 > 0$), then their reaction functions correspond with formulas (3.27a) and (3.27b),

$$g_1 = (1 - \alpha_1) y_1 - (\alpha_1 g_2), \tag{3.27a}$$

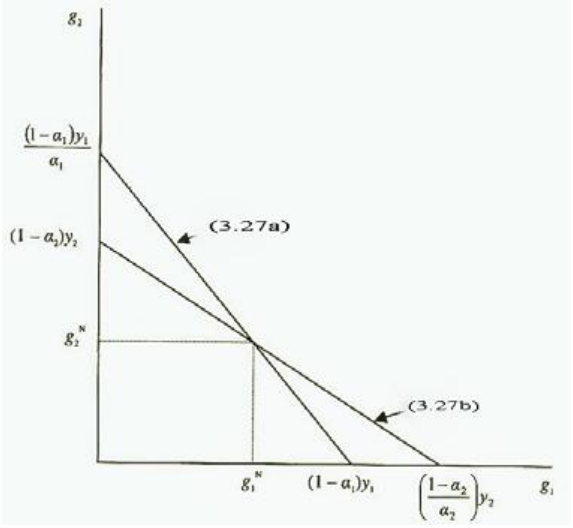
$$g_2 = (1 - \alpha_2) y_2 - (\alpha_2 g_1). \tag{3.27b}$$

The situation for $\alpha_1 > \alpha_2$ is illustrated by the Chart 3.15.

[69] The marginal rate of substitution is the rate at which a consumer is ready to give up one good in exchange for another good while maintaining the same level of utility.

[70] $U^j_G(x_j^*, G^*)$ and $U^j_x(x_j^*, G^*)$ are partial derivations of $U^j = U^j(x_j, G)$ with respect to x_j and G.

Chart 3.15: Reaction functions



Source: Ermisch, 2003, p.24

The parents' reaction functions point out that favourable strategy for mother or father is to diminish share of expenditure on children in her/his income, while remaining partner increases her/his contribution to children. In what extent the decline is going to be implemented depends on preferences α. The Nash equilibrium is in the point where reaction functions intersect and optimal amounts of contributions are expressed by formulas (3.28a) and (3.28b),

$$g_1^N = \frac{(1-\alpha_1)y_1 - \alpha_1(1-\alpha_2)y_2}{1-\alpha_1\alpha_2}, \tag{3.28a}$$

$$g_2^N = \frac{(1-\alpha_2)y_2 - \alpha_2(1-\alpha_1)y_1}{1-\alpha_1\alpha_2}. \tag{3.28b}$$

Expenditure on a child of parent j is increasing with income and decreasing with income of remaining partner. The equations (3.29) imply that in case that parents share costs of children, than only total income is relevant. Therefore, income redistribution between partners does not have impact on either their private consumption or expenditures on children,

$$G^N = \frac{(1-\alpha_1)(1-\alpha_2)(y_1+y_2)}{1-\alpha_1\alpha_2}, \tag{3.29a}$$

$$x_1^N = \frac{\alpha_1(1-\alpha_2)(y_1+y_2)}{1-\alpha_1\alpha_2}, \tag{3.29b}$$

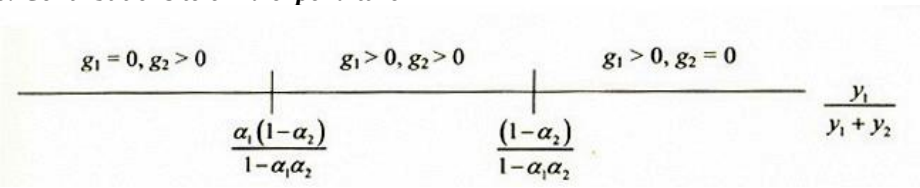
$$x_{21}^N = \frac{\alpha_2(1-\alpha_1)(y_1+y_2)}{1-\alpha_1\alpha_2}. \tag{3.29c}$$

It has to be noticed, that results are changed if only one of parents contributes on children expenditures. Let's denote father by number 1 and assume that he does not make contributions to children. Father's zero contribution is equivalent with his marginal share on family income (3.30),

$$\frac{y_1}{y_1 + y_2} < \frac{\alpha_1(1-\alpha_2)}{1-\alpha_1\alpha_2}. \tag{3.30}$$

What is marginal depends on the parameters of parents' preferences. If α_1 is large, father prefers his own consumption, and α_2 is small, then mother prefers children and equilibrium amount of expenditures on children is determined only by mother's income, $G^N=(1-\alpha_2)y_2$, $x_1^N=y_1$, and $x_2^N=\alpha_2 y_2$. Further, income redistribution between partners influences total costs of expenditures on children and their total consumption. Transfer from mother to father decreases G^N as well as x_2^N. If the reverse reasoning is applied, than intervals of parents contributions are obtained (See Chart 3.16).

Chart 3.16: Contributions to child expenditure



Source: Ermisch, 2003, p.25

However moments when parents do not cooperate are common in family life due to misunderstandings, cooperation is more ordinary for family functioning. Therefore, in following approach parents' cooperation and communication is assumed.

Approach of cooperation supposes that parents agree about division of their income between their consumption and children expenditures and none of them can be better off without making remaining partner worse off. The allocation is Pareto efficient, therefore each parent maximizes his/her utility with respect to budget constraint and utility of his/her partner which reaches higher or at least the same level of utility prior to redistribution (3.31). Parameter μ is Lagrange multiplier which characterises efficiency,

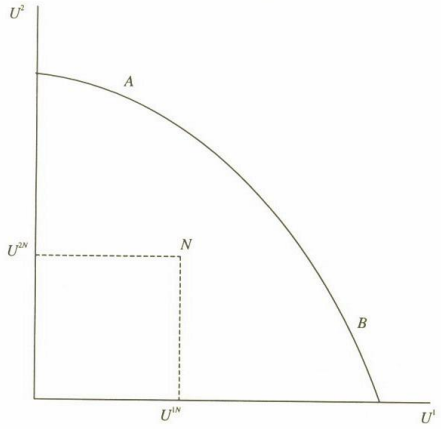
$$\begin{aligned} &MaxU^1(x_1, G) + \mu U^2(x_2, G), \\ &y_1 + y_2 = x_1 + x_2 + pG. \end{aligned} \tag{3.31}$$

Solutions of maximization are equations (3.32) and (3.33) which imply that marginal cost of providing the public good of child expenditure p equals to the sum of the parents' marginal rates of substitution. It corresponds with Samuelson condition for the efficient provision of public goods (Ermisch, 2003, p.26). Therefore, equilibrium without cooperation is inefficient.

$$U_x^1(x_1^e, G^e) = \mu U_x^2(x_2^e, G^e), \tag{3.32}$$

$$p = \frac{U_G^1(x_1^e, G^e)}{U_x^1(x_1^e, G^e)} + \frac{U_G^2(x_2^e, G^e)}{U_x^2(x_2^e, G^e)}. \tag{3.33}$$

Chart 3.17: Utility possibility frontier



Source: Ermisch, 2003, p.26

Pareto optimal combinations of parents' utility with respect to their utility functions and given values y_1, y_2, and p are presented in the Chart 3.17. Equilibrium of non-cooperative behaviour is denoted by *N* and is located below the utility possibility frontier. Therefore if parents cooperate they may reach frontier with higher utility level. Nevertheless the risk of potential conflict is persistent, because higher level of utility for one parent implies lower utility for other moving alongside the curve.

Based on the first and the second maximization conditions the demand functions are inferred via the implicit function theorem in the form of formulas (3.34) and (3.35), which depend on Lagrange multiplier μ, family income y_1+y_2, and price of public good p,

$$G = G^e(y_1 + y_2, p, \mu), \tag{3.34}$$

$$x_j = x_j^e(y_1 + y_2, p, \mu), \qquad j = 1,2\,. \tag{3.35}$$

Parameter μ determines location of optimal solution on the utility possibility frontier and it is function of parents' income and price of public good, i.e. $\mu=\mu\ (y_1, y_2, p)$. In all demand functions, μ represents efficiency and cooperation and allows us inferring condition of proportionality for allocation testing within family. The proportionality condition (3.36) implies that marginal propensities to consume out of different sources than income must be proportional with respect to each other across all of the goods (Ermisch, 2003, p.27),

$$\frac{\frac{\partial G}{\partial y_1}}{\frac{\partial G}{\partial y_2}} = \frac{\frac{\partial \mu}{\partial y_1}}{\frac{\partial \mu}{\partial y_2}} = \frac{\frac{\partial x_1}{\partial y_1}}{\frac{\partial x_2}{\partial y_2}} = \frac{\frac{\partial x_2}{\partial y_1}}{\frac{\partial x_1}{\partial y_2}}\,. \tag{3.36}$$

Efficiency resulting from cooperation mitigates impact of income, because it operates via Lagrange multiplier μ.

In case of cooperation with utility function in the form (3.26), parents demands can be expressed by equations (3.37) and (3.38), which imply that parent's consumption and his/her contribution to expenditures on children corresponds with the share of his/her income in total family income, i.e. $1/(1+\mu)$ and $\mu/(1+\mu)$. Given parents' preferences are included,

$$pG^e = [(1-\alpha_1) + \mu(1-\alpha_2)]\frac{y_1+y_2}{1+\mu}, \tag{3.37}$$

$$x_1^e = \frac{\alpha_1(y_1+y_2)}{1+\mu}, \qquad x_2^e = \frac{\mu\alpha_2(y_1+y_2)}{1+\mu}. \tag{3.38}$$

If mother's share in total family income is denoted θ, i.e. $\mu/(1+\mu)$, then the equation (3.39) can be inferred from demand for public good (3.37). The equation reveals that improvements in mother's income have basically two effects,

$$\frac{\partial G^e}{\partial y_2} = \frac{[(1-\theta)(1-\alpha_1) + \theta(1-\alpha_2)] + (y_1+y_2)(\alpha_1-\alpha_2)\frac{\partial\theta}{\partial y_2}}{p}. \tag{3.39}$$

The first effect relates to improvements in total family income, which increase also contribution to expenditures on children. Improvements in mother's income also strengthen her position for negotiation within family, $\partial\theta/\partial y_2 > 0$. Income effect significantly depends on preferences, but from (3.39) it is obvious that if redistribution between parents, who have different preferences and $\partial\theta/\partial y_2 \neq 0$, is realized $(dy_1=-dy_2)$, then contributions to children are also changed. In case of $\alpha_1 > \alpha_2$, when mother prefers children to private consumption more than father, then redistribution from mother to father increases also recourses spent on children. On the other hand, in case that, parents have identical preferences, $\alpha_1 = \alpha_2$, then expenditures on children depend only on total family income, $pG^e = (1-\alpha_1)(y_1+y_2)$, but it does not imply that their consumptions are unchanged. If this result is compared with non-cooperative Nash equilibrium i.e. $G^e/G^N = 1+\alpha_1 > 1$, than it is obvious that contributions to children rearing are greater in parents cooperation.

In both, non-cooperation and cooperation, approaches considering parents preferences, income is significantly relevant for contributions to expenditures on children and parents' consumption. While in non-cooperative approach the difference between parents' incomes has to be substantial, otherwise only family income matters, in cooperative approach income determine parent's position for negotiation even though parents have the same preferences. The basic economic models of intra-household allocation revealed that maximization of utility function based on family income is justified only in some cases.

3.3.2.2 The economic theories at macro level

The economic approaches at macro level with respect to the family and demographic reproduction can be basically divided into groups. The first approach is strictly theoretical and includes growth theories which deal with differences of output per worker in time and area. The second approach is empirical and consists of econometric analyses, which touch policies related to population and the family as well as any demographic variables regarding economic development. This sub-chapter sheds some light only on the first approach and briefly summarizes some of the basic assumptions and implications of the fundamental concepts, which

embraced demographic variables into consideration[71]. Rather than to provide full and deep discussion of these concepts, the aim of the sub-chapter is to illustrate attempts of integration of demographic variable into macroeconomic theory.

A breakthrough work considering growth theories was introduced by Solow in 1956, who stressed importance of capital intensity, i.e. capital K per unit of labour L[72]. He extended the Harrod-Domar model by labour as a factor of production, diminishing returns on labour and capital, and constant returns on both factors in case of their combination. Solow comes out of the Cobb-Douglas production function, which is easy to use due to constant returns to scale and seems to be a good approximation to actual production function[73],

$$F\ (K, AL) = K^{\alpha}(AL)^{1-\alpha}, \qquad 0 < \alpha < 1, \tag{3.40}$$

where A refers to effectiveness of labour or technology/knowledge. The model is placed into a closed economy, which is characterised by zero external trade, and into continuous time. The initial amounts of capital K, labour L and knowledge A are given. While capital is changed by investments and capital depreciation, s denotes a share of output devoted to investment and δ the depreciation rate of existing capital, labour and knowledge grow at constant rates n and g, which are exogenous (Novalis et al., 2010, p.54-55)[74],

$$\dot{K}(t) = sY(t) - \delta K(t), \tag{3.41}$$

$$\dot{L}(t) = nL(t), \tag{3.42}$$

$$\dot{A}(t) = gA(t). \tag{3.43}$$

Restrictions on the rates n, g and δ are not clearly set up, but it is assumed that their sum is a positive number. A fundamental equation of the Solow model specifies that the rate, in which the capital per unit of effective labour is changed, equals to a difference between actual investments per unit of effective labour and break-even investments[75],

$$\dot{k}(t) = sf\big(k(t)\big) - (n + g + \delta)k(t), \tag{3.44}$$

(Novalis et at., 2010, p.64; Romer, 2006, p.13). Break-even investment has to be done to keep capital at its existing level. Amount of capital remains constant if actual investments equal to break even investments. Otherwise capital grows if actual investments exceed break even investments and fall if break even investments exceed actual investments (See Chart 3.18).

[71] The econometric approach is not discussed in this section due to its comprehensiveness. Econometrics is defined as a sub-discipline of economics which utilizes mathematics and especially statistical methods to economics. In a simplified way, econometrics tests economic theories by application of statistical methods on economic data. A range of studies applying different econometric methods with respect to demographic variables is currently enormous. One specific approach is also applied in the work with respect to the Czech Republic. In is also important to notice that in case that data exist, analysis are done at micro level too.

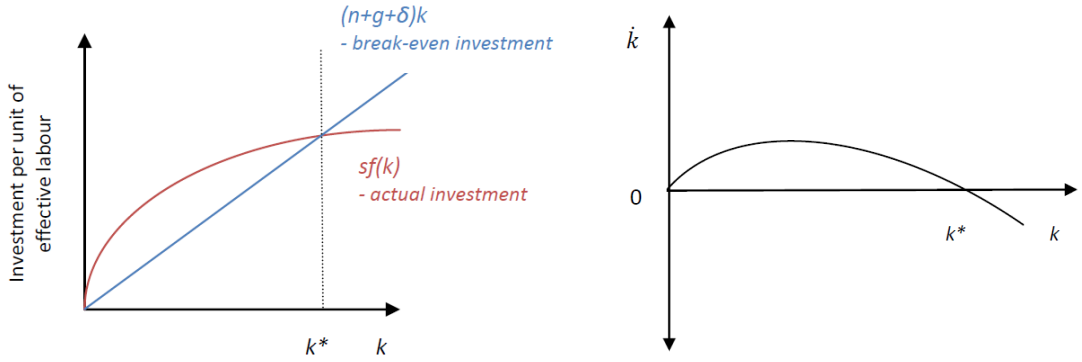
[72] At the same time Trewor W. Swan launched the model including the same ideas, therefore the model has been frequently called Solow-Swan model.

[73] The notation utilized in this section corresponds, except for the last presented model, with notation in Romer, 2006.

[74] A dot over a variable refers to a derivative with respect to time.

[75] Lower case letter denotes variable per unit of effective labour.

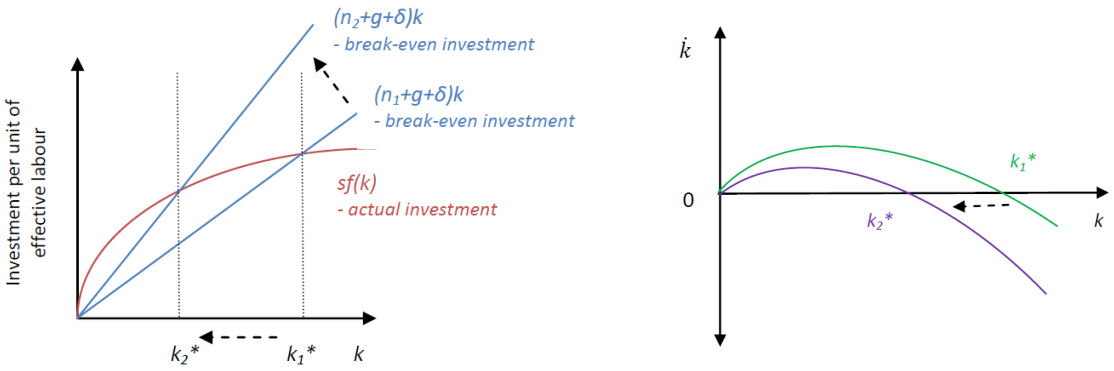
Chart 3.18: Actual and break-even investment and phase diagram in the Solow model



Source: Romer, 2006, p. 13-14

The Solow model allows illustrating impact of changes in savings as well as in technological progress. But with respect to the work more important is a change in population. Population growth is denoted in the model *n*. Therefore, let's assume that population growth increased from n_1 to n_2. Then, break-even investments increase too and equilibrium amount of capital diminishes, i.e. the new steady state[76] capital per worker and output per worker are lower (See Chart 3.19). The effect is reverse in case of decline in population growth.

Chart 3.19: Effect of increased population growth in the Solow model



Source: Author's work

The basic implications of the model are that economies with higher rates of population growth should have lower levels of capital per worker and lower level of income. In addition, output per worker depends only on technological growth and total output is related to population and technological growth. In spite the fact that, the Solow model is the simplest, it introduced additional factors to solve an issue of economic growth, i.e. technological progress. Population growth is considered as exogenous factor without any reverse interactions.

The extensions of the Solow model are the Ramsey-Cass-Koopmans model and the Diamond model, which dynamics results from the decision at the microeconomic level (Romer, 2006, p.38-88). Both models have the growth rates of knowledge and population

[76] Steady state refers to situation, when growth rate can be maintained constant forever.

exogenous as the Solow model, but the saving rate became due to the competition of firms and households in the effective markets endogenous.

The Ramsey-Cass-Koopmans model[77] assumes that economy consists of identical firms with production function characterised by constant returns to scale and identical private households. Amount of firms and households is huge in the economy and number of households does not change. The model is placed into infinite time horizon. While firms maximize their profits and are owned by households, households divide their incomes between consumption and savings. Each household maximizes its utility *U* with respect to its budget constraint,

$$U = \int_{t=0}^{\infty} e^{-\rho t}\, u\big(c(t)\big)\frac{L(t)}{H}\,dt, \tag{3.45}$$

$$\int_{t=0}^{\infty} e^{-R(t)}\, C(t)\,\frac{L(t)}{H}\,dt \le \frac{K(0)}{H} + \int_{t=0}^{\infty} e^{-R(t)}\, A(t)w(t)\frac{L(t)}{H}\,dt, \tag{3.46}$$

where ρ is the individual discount rate, *c(t)* consumption per capita in household and *L(t)/H* is number of household members (Romer, 2006, p.39). The budget constrain implies that current consumption *C(t)L(t)/H* has to be lower or equal to wealth *K(0)/H* and income from employment *A(t) w(t) L(t)/H*. Furthermore, one unit of output invested in time *0* generates $e^{R(t)}$ units in time *t*, which means that *R(t)* vary over time,

$$R(t) = \int_{\tau=0}^{t} r(\tau)d\tau. \tag{3.47}$$

Also it is important to notice, that utility function *u(C(t))* is constant-relative-risk aversion utility and therefore, parameter of uncertainty θ is independent to consumption (Romer, 2006, p.40),

$$u\big(C(t)\big) = \frac{C(t)^{1-\theta}}{1-\theta}. \tag{3.48}$$

In comparison with households, assumptions stated for the firms are simple. Firms employ stock of capital and labour for production and pay them their marginal products. Because the production function has constant returns to scale and market is competitive, than firms gain zero profit.

If all assumptions related to households and firms are combined, than two basic equations of the model are obtained. These equations allow studying whole dynamics of the economy,

$$\frac{\dot{c(t)}}{c(t)} = \frac{f'(k(t)) - \rho - \theta g}{\theta} = \frac{r(t) - \rho - \theta g}{\theta}, \tag{3.49}$$

$$\dot{k}(t) = f(k(t)) - c(t) - (n+g)k(t), \tag{3.50}$$

where *ċ(t)/c(t)* refers to the growth rate of consumption, *g* to the growth rate of knowledge and *r(t)* to the instantaneous rate of return (Romer, 2006, p.46-47). The equation (3.49) is called Euler equation and states that consumption per worker is rising if the real return exceeds the rate

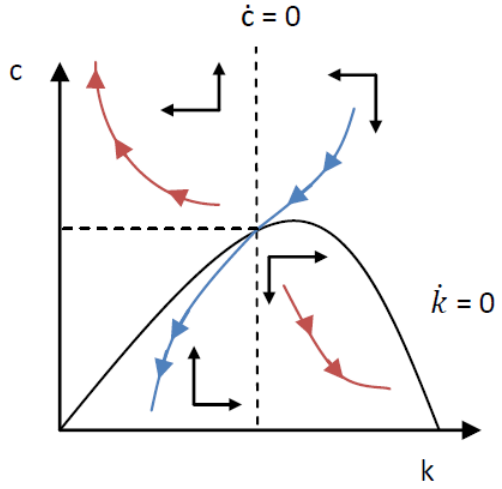
[77] RAMSEY, F.P. 1928. A Mathematical Theory of Saving. *Economic Journal*, 38 (December), p. 534-559.

CASS, D. 1965. Optimum Growth in an Aggregate Model of Capital Accumulation. *Review of Economic Studies*, 22 (July), p. 233-240.

KOOPMANS, T. C. 1963. On the concept of optimal economic growth (Cowles Foundation Discussion Papers No. 163). *Cowles Foundation*. Available at: <http://cowles.econ.yale.edu/>.

at which the household discounted future consumption. In general, the equation defines how consumption behaves with respect to its initial value. On the other hand, change in capital is zero if consumption equals to difference between actual output *f(k(t))* and break-even investment *(n+g)k(t)*. The dynamics of the economy is illustrated by the phase diagram. Although the model has analytical solution for its steady state, analytical solutions for the transition to steady state do not exist (See Chart 3.20).

Chart 3.20: Phase diagram of the Ramsey-Cass-Koopmans model



Source: Author's work

In spite the fact that, the model avoids to all imperfections resulting from the market and differences in households, the Ramsey-Cass-Koopmans model represents additional steps in understanding of economic growth. The saving rate became the endogenous factor and by adding government to model specification, the effect of the policy could be studied[78]. The model reveals that temporary increased government purchases affect the interest rate in short-run. The rate temporarily increases and afterwards decreases to initial level. Furthermore, on the balanced growth path the social welfare is maximized, therefore it is impossible to make anyone better off without making someone else worse off.

The extension of previous model is the Diamond model[79], which assumes that number of households is not fixed. Although it seems that the change is marginal, consequences are substantial. The Diamond model in comparison with the Ramsey-Cass-Koopmans model considers link between generations. Frequently the model is called the overlapping-generation model. The model is discreet with assumption in turnover in population. Each individual lives only two periods of time. Therefore, $L_t = (1 + n) L_{t-1}$ individuals live in the first period and $L_{t-1} = L_t/(1 + n)$ individuals in the second period, where n refers to population growth. If C_{1t} and C_{2t} denote consumptions of young and old individuals in time t, than the individual utility function at time t is follows,

[78] Assumptions with respect to government in the model: government purchases do not influence households' utilities from consumption, also they do not influence future outputs and are financed by lump-sum taxes.

[79] DIAMOND, P.A. 1965. National Debt in a Neoclassical Growth Model. Americian Economic Review, 55 (December), p. 1126-1150.

$$U_t = \frac{C(t)_{1t}^{1-\theta}}{1-\theta} + \frac{1}{1-\rho}\frac{C(t)_{2t+1}^{1-\theta}}{1-\theta}, \qquad \theta > 0, \rho > -1, \tag{3.51}$$

where θ is a risk aversion factor and ρ refers to the individual discount rate (Barro et al., 2004, p.191; Romer, 2006, p.73). In addition, each young individual supplies one unit of labour and distributes his/her income to consumption or savings in the first period. In the second period, he/she consumes savings increased by the interest rate resulting from the first period. The risk aversion factor θ illustrates willingness of the consumption transfer from the first to the second period. If θ is small than an individual is highly risk averse and prefers to consume more in the first period, the substitution effect is present. The shift of consumption may occur if returns on savings are high enough. In case of large θ the income effect prevails. On the other hand, if the individual discount rate ρ is greater than zero then an individual prefers consumption in the first period rather than in the second period and reversely. As in previous case, an individual maximizes its utility with the budget constrain,

$$C_{1t} + \frac{1}{1+r_{t+1}}C_{2t} = A_t w_t. \tag{3.52}$$

Therefore, the present value of life-time consumption equals to initial wealth, which is in this case zero, and the present value of life time labour income $A_t w_t$ (See equation 3.52). The variable r in the equation denotes the real rate of return. Solving this maximization problem, the equation (3.53) is obtained,

$$\frac{C_{2t+1}}{C_{1t}} = \left[\frac{1+r_{t+1}}{1+\rho}\right]^{\frac{1}{\theta}}, \tag{3.53}$$

(Barro et al., 2004, p.191; Romer, 2006, p.74). The result states that, individual's consumption changes within time with respect to the real rate of return weather is greater than or less than the discount rate. The interest rate determines how much an individual is going to consume in the first period and what amount is going to be saved for the second period. Individual's savings increase in r if and only if $(1 + r)^{(1-\theta)/\theta}$ is increasing in r.

If all individuals are aggregated then the dynamics of the economy can be studied. The capital stock K in the time $t+1$ in the economy is equalled to

$$K_{t+1} = s(r_{t+1})L_t A_t w_t, \tag{3.54}$$

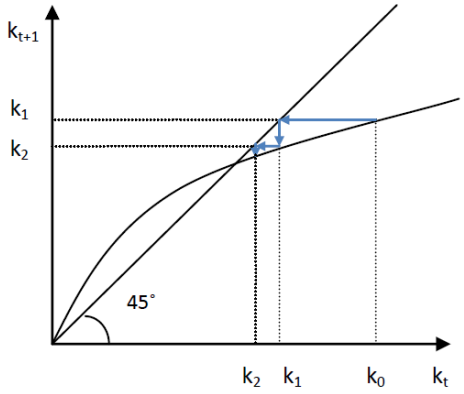
(Romer, 2006, p.75). Although general expression for relationship between k_{t+1} and k_t exists, it does not reveal a lot. Therefore, the general case is specified by applying logarithmic utility and the Cobb-Douglas production function[80]. With respect to these assumptions, the economy dynamics follows

$$k_{t+1} = \frac{1}{(1+g)(1+n)}\ \frac{1}{1+\rho}\ k_t^{\alpha}(1-\alpha), \tag{3.55}$$

where parameter α comes from the specification of the production function (See equation 3.40) (Barro et al., 2004, p. 197; Romer, 2006, p. 76).

[80] The intensive form, per unit of effective labour, of the Cobb-Douglas production function equals to $f(k) = k^{\alpha}$.

Chart 3.21: The dynamics of k in the Diamond model



Source: Romer, 2006, p.77

The economy has two equilibriums, the first one is at the origin and the second one is in the point where two curves cross (See Chart 3.21). The capital endowment in the first period corresponds to k_1 on the vertical axis and capital endowment in the second period equals to k_2 on the same axis. The economy moves toward the point of cross regardless the position of initial capital endowment k_0. The Diamond model is in the core capable to answer differences in economic growth among countries.

If initial capital endowment is smaller than optimal defined in the cross point, the growth rate of economy is positive and reversely. Therefore, differences between countries considering economic growth are explained by distinct phase of development with respect to optimal capital endowment. Nevertheless economic growth per worker cannot be explained by changes in capital, because its growth cannot be unbounded. The economic growth per worker is explained by changes in technology/knowledge which have remained to be an exogenous factor in the model. In addition, when the optimal point is reached than the growth rate of capital per unit of effective labour is zero and the capital/output ratio, as well as the output per worker are growing at the constant rate. But in reality neither of developed countries which approach to optimal capital endowment fulfilled these assumptions.

The Diamond model can be as the previous model extended by government sector, but neither this extension contributed to full understanding of economic growth. If government purchases are permanent, than their higher level generates lower level of the capital stock and increases the interest rate in equilibrium. If government purchases are only temporal, than in a period of increased purchases the capital decreases and the interest rate increases, but only provisionally. After government purchases are at the initial level, capital also backs to initial level. Therefore, the important fact is that the model brings into consideration a new aspect present in population. Although intergenerational relationships are substantially simplified, the model stresses their importance. Due to shortcomings of given models and insufficient cognition of economic growth, further research involved into consideration sectors of research and development and human capital. Technological progress was relevant, but exogenous without explanation of its origin.

One of the influential works including sector of research and development was introduced by Romer in 1990, but his work is not directly discussed in this sub-chapter. The following paragraphs move ahead and focus on the model presented by Jones in 1995. He established

a semi-endogenous growth model, which combines Romer's approach with growing population and decreasing returns to scale[81]. The growth is endogenous in the sense that it is generated by rational and profit-maximizing agent. The basic model with sector of research and development claims, that economic growth increases in an amount of resources devoted to research. To be more precise, the growth of economy reflects productivity which is enhanced due to inventions in the sector of research and development.

The economy in the Jones' model consists of three sectors, the sector of final-goods, the sector of intermediate products, and the sector of research and development. While intermediate products and labour *L* are productive factors in the sector of final-goods, capital *K* and technology *A* are productive factors in the sector of intermediate products. The sector of research and development has only labour *L* as a factor of production, because it depends on a ratio of labour force involved. In the model, individuals utilize existing stock of knowledge to originate new designs which are consequently selling to producer of intermediate goods. And those firms, with position of monopoles, sell their production to the sector of final-goods. In addition, the economy is closed at the state of full employment, part of output is saved and the capital stock *K(t)* consists of several commodities.

In more detail, the final-good sector produces durable goods with constant share of labour L_Y and intermediate goods x_i. To find an optimal amount of labour and intermediate goods used in production *Y*, firms have to maximize their profit[82], i.e.

$$\max L_Y \int_0^A x_i^{1-\alpha}\, di - wL_Y - \int_0^A p_i x_i di, \tag{3.56}$$

where *w* refers to wage, p_i is a price of intermediate good *i*, and a range from *0* to *A* denotes the variety of intermediate inputs (Jones, 2002, p.112). The solution yields two conditional demand functions,

$$w = \alpha \frac{Y}{L_Y}, \tag{3.57}$$

$$p_i = (1-\alpha) L_Y^{\alpha} x_i^{-\alpha}, \qquad \text{for all i.} \tag{3.58}$$

These functions (3.57) and (3.58) imply that firms demand additional labour in production until the marginal product of labour equals to wage and utilize additional intermediate goods until marginal product of capital equals the rental price (Jones, 1995, p.780; Jones, 2002, p.112).

The sector of intermediate goods is consisted of infinite number of firms in the range from *0* to *A*. As mentioned above, firms purchase designs of their intermediate products in the sector of research and development at fix costs. Due to specificity of design they became monopolists facing constant marginal costs and elasticity of demand. Furthermore, their production follows simple production function which transforms a unit of raw capital into one unit of intermediate good. The profit maximization which has to be solved is

$$\max_x p(x)x - rx, \tag{3.59}$$

[81] Romer assumes that labour supply is constant and sock of human capital is fixed.

[82] The price of output is without loss of generality normalized to unity in each period.

where r denotes the rate for which capital is rented in the period (Jones, 1995, p.780; Jones, 2002, p.113). The following equations are the results,

$$\bar{p_i} = \bar{p} = \frac{r}{1-\alpha} \quad \text{for all i,} \tag{3.60}$$

$$\bar{x_i} = \bar{x} = \left[\frac{1-\alpha L_Y^{\alpha}}{\bar{p}}\right]^{\frac{1}{\alpha}} \quad \text{for all i,} \tag{3.61}$$

$$\bar{\pi_i} = \bar{\pi} = \alpha \bar{p} \bar{x} = \alpha(1-\alpha)\frac{Y}{A} \qquad \text{for all i,} \tag{3.62}$$

where $\bar{p}$ refers to price, $\bar{x}$ quantity, and $\bar{\pi}$ profit (Jones, 1995, p.780; Jones, 2002, p.114). Price of an intermediate product equals to rental price with mark-up. In addition, due to equal demand functions for all firms, the firms sell their production at the same price and in the same amount. Therefore they gain the same profit. Also it is valuable to notice, that total amount of capital in the market equals (Jones, 1995, p.781),

$$K = \int_0^A x_i di = A\bar{x}. \tag{3.63}$$

The sector of research and development assumes that anyone can contribute to production of new ideas which generate new capital goods. Because, the ideas are highly specific, they are protected by patent which is forever. Change in knowledge $\dot{A}$ is as follows,

$$\dot{A} = \delta\, L_A A^{\theta} l_A^{\lambda-1}, \quad 0 < \lambda \leq 1, \tag{3.64}$$

where δ denotes the rate in which new knowledge are invented, L_A refers to the amount of labour in the sector of research and development, and l_a labels externalities occurring in the economy due to duplications in the sector (Jones, 1995, p.765). In equilibrium $l_a = L_A$. It is necessary to take into account that the invention rate δ is a function of the amount of knowledge in economy. It is assumed that at the very beginning the fundamental ideas, which enhance productivity of followers, are discovered, but later on to invent new designs and ideas become difficult. Therefore, probability of additional discovery decreases with the amount of knowledge in economy. More precisely, if $\theta < 0$ than the invention rate decreases with the level of knowledge, this case is called "fishing out", if $\theta > 0$ than positive external returns are generated, and finally, if $\theta = 0$ than the innovation rate is independent of stock of knowledge in the economy[83].

The steady-state growth path of knowledge in the economy in case of increasing labour force is derived from the equation (3.64) by relaxing assumption of $\theta = 1$ (Jones, 1995, p.767),

$$\frac{\dot{A}}{A} = \delta \frac{L_A^{\lambda}}{A^{1-\theta}}. \tag{3.65}$$

It is constant, if the numerator and denominator grow at the same rate. Taking logs and derivatives of the equation (3.65), than

$$\frac{\dot{A}}{A} = \frac{\lambda n}{1-\theta}, \tag{3.66}$$

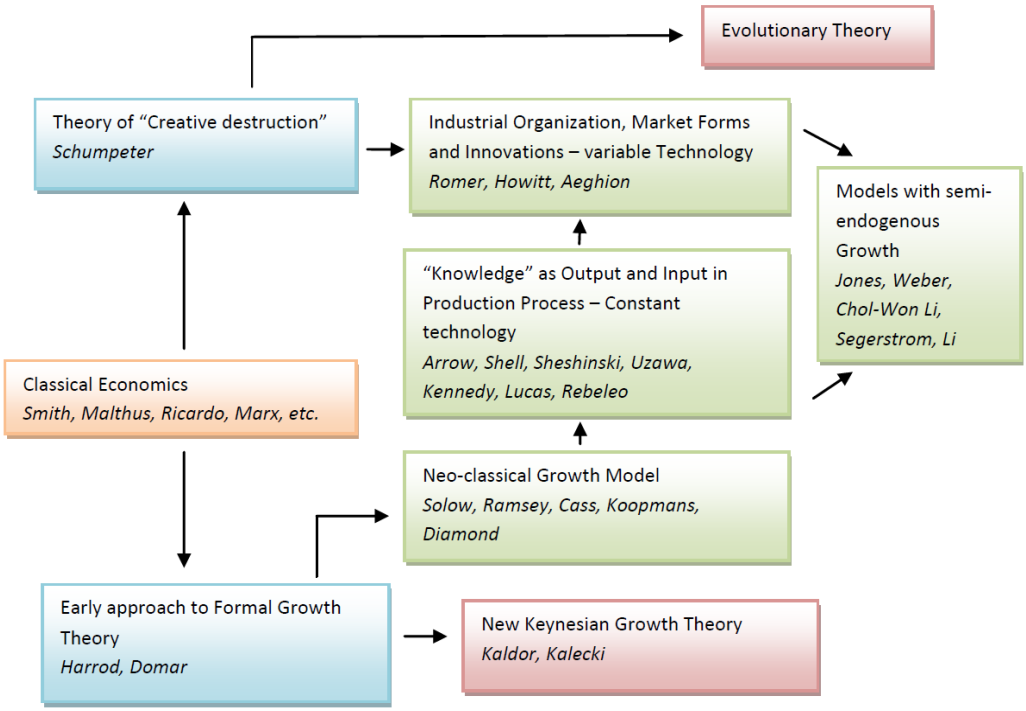
[83] If $\theta = 1$ and $\lambda=1$, than the equation correspond with Romer.

which implies that the growth rate of economy in the steady state is influenced only by exogenous parameters λ and θ and the growth rate of the labour force (Jones, 1995, p.767). In addition, if $\lambda = 1$ and $\theta = 0$, than knowledge grow only by the population growth rate. Jones (1995) also points out that policy subsidies may contribute to find a new steady state level, but cannot influence long-term economic growth.

As the Jones model revealed, population variable is important in approaches involving sectors of research and development. Labour stock equals to whole population without considering its structure, but in comparison with the Solow model labour is divided into sectors of the final goods and research and development. In addition, models of research and development revealed how exogenous technical progress in the Solow model is generated. In case of Jones model, economic growth depends in equilibrium on population growth.

Although the presented models are not the most developed in this area of research, they clearly sketch how demographic variables as household and population growth are integrated into consideration at macro level. From the very beginning, population has been significant factor of economic development, but as an exogenous factor without interconnections. In spite the fact that, some augmented models also discuss possible consequences of economic growth on population and households, none of theoretical models clearly consider population structure and its change into their frameworks. In addition, presented models as well as majority of others are focused only on supply side. The effect of demographic reproduction on demand side is frequently omitted. Because only basic models were involved in this subchapter, the elementary overview of development in the growth theory is presented in the Chart 3.22.

Chart 3.22: History of economic growth theory



Source: Weber, 2010, p. 91 and author's actualization

Chapter 4

Evidence from the Czech Republic

With respect to the research objective, to study the relationship of the family as a basic social unit where human reproduction is carried out, and the market economy, the analysis is narrowed to the case of the Czech Republic. The Czech Republic represents a group of countries which have undergone the transformation from a centrally planned economy to market economy and provides high quality and reliable data for the research. In general, the economic and social transformation observed after the collapse of Communism is a natural experiment which allows yielding up, at least, the basic features of the studied relationship. But, specificity of the transition process has to be taken into account. Therefore, the fourth section of the work is divided into two relatively independent parts. The first sub-chapter deals with the population development in the Czech Republic since the year 1989, when the transformation begun. The second sub-part of the chapter is focused on the economic development in the Czech Republic since 1989 and the analysis of the relationship between demographic and economic variables at macro level. Furthermore, impact of changes in tax technique on financial situation of the family is also studied.

4.1 Population development in the Czech Republic since 1989

In spite of the fact that, the work is predominantly focused on fertility, this sub-chapter summarises the basic trends of the population development in the Czech Republic since a collapse of a command economy and communist regime. To understand the changes which occurred with the socio-economic transformation, it is convenient to put fertility development into a broader context of population development. Accordingly, apart from fertility trends, development in other demographic processes (population size, mortality, abortions, nuptiality, divorce, migration, and household structure) is presented. The issue of availability and reliability of population data is also discussed.

4.1.1 Population data availability and reliability

The transformation process in the Czech Republic is dated from the beginning of the Velvet revolution in November 1989. Hence, demographic data since 1989 to the most actual year 2009 from three main sources, the Czech Statistical Office, the Human Fertility Database (HFD), and Human Mortality Database (HMD), are investigated.

The Czech Statistical Office[84] is a prime institution which gathers and provides official data about the Czech Republic since 1919[85]. The tradition of population data collection is long-term in the territory of the Czech Republic. The first regional population counts were gathered in 16th century and the first standard vital statistics was collected in 1785. Later on, in 1869 the first modern census was held (Srb, 2004, p.15-21). Vital statistics and censuses are principal sources of demographic data which are involved in the agenda of the office.

In general terms, one of the Czech data advantage is their comparability with respect to territory. The territory of the nowadays Czech Republic has been relatively stable for centuries.[86] The last territorial changes, which are relevant to inspected data, are associated with the formation of the Czech and Slovak Republic in 1993[87]. But these changes were minor and influenced only two small settlements over the Czech-Slovak border. Their impact on population statistics has been in sober fact marginal (Zeman, 2010, p.2). Since then, the Czech Statistical Office follows the fundamental law Act No. 347/1997 Coll., on formation of superior self-governing territorial divisions and amendment of the Constitution Act No. 1/1993 Coll., as amended by Act No. 176/2001 Coll. With respect to the European Union, the office also follows territory division into NUTS[88] units since the year 1999. The listed laws specify the units for which data are collected.

Vital statistics contains cross-tabulated information about population count, birth, death, marriage, divorce, abortion, and migration which are experienced by individuals living in certain area during given period of time. Basically, vital statistics refers to events that add to or deduct the membership of the population and are publicly available. Since 1929, the bulletins of the vital statistics, which covers the territory of the nowadays Czech Republic, are published with annual periodicity[89]. The former publications are called "Pohyb obyvatelstva" in a given year and since 2005 bulletins are named "Demografická ročenka České republiky" in a given year.

Czech vital statistics data include the resident population of the country regardless of citizenship. Since 2001, based on the recommendation of the United Nations foreigners

[84] Available online: <http://www.czso.cz/csu/redakce.nsf/i/home>.

[85] In1919, the State Statistical Office was established by the Statistical Service Law (Act No. 49/1919 Coll.) in the Czechoslovakia. At the present time, the Czech Statistical Office continues in the tradition of the former State Statistical Office and the Federal Statistical Office, which operated from 1989 to 1993, when Czechoslovakia was split into two independent states; the Czech Republic and the Slovak Republic.

[86] The border of the present-day Czech Republic has been same since 1920, when a part of the Czech territory was attached to Poland (part of the former Duchy of Cieszyn) and three areas were joined to Czechoslovakia (Hlučínsko, Valticko, and a part of the area Vitorazsko) (Srb, 2004). The territory of Czechoslovakia, which was established in 1918, consisted of the nowadays Czech Republic, Slovak Republic, and Carpathian Ruthenia. In 1938 based on the Munich Pact, border area of the present-day Czech Republic, known as the Sudetenland, was incorporated to Germany. After the end of the Second World War, Czechoslovakia was re-established without area of Carpathian Ruthenia. That time Czech territory was not affected. Marginal territory changes were done on Polish-Czech border in 1958 (Zeman, 2010).

[87] For the whole time data were collected for both territories, the Czech and Slovak Republic, independently.

[88] NUTS refers to the "Nomenclature of Statistical Territorial Units" which were created by the Eurostat at the beginning of the 1970's. NUTS is a division system of the European Union´s territory in order to produce regional statistics for the Community. NUTS involves at least three levels: NUTS 1, NUTS 2, and NUTS 3. In Case of the Czech Republic, NUTS 1 is equal to the whole territory of the state. While NUTS 2 refers to eight joined regions, level NUTS 3 involves former fourteen regions. Since 2008, level NUTS 4 is replaced by the Local Administrative Units (LAU). In the Czech legal system NUTS were implemented by the action of the Czech Statistical Office No. 33/1999 Coll. (CZSO, 2010c).

[89] The first bulletin is for the year 1919.

with long-term stay, i.e. those with visa over 90 days[90], or with the asylum status[91], are involved to the population count. In addition to that, with respect to accession to the European Union in May 2004[92], the figures contain also citizens of the Union with temporary stay in the Czech Republic and citizens of other countries with long-term stay. Also events (birth, deaths, and marriage) of permanent residents of the Czech Republic which were experienced abroad are involved to the data (CZSO, 2010a; Zeman, 2010, p.3). Although, since 2005 international migration flows are not negligible in Czech data, they have not been significant enough to profoundly influence trends in the population development (See following sub-chapter 4.1.6.)[93].

In spite of the fact that, vital statistics reveal the annual changes in population structure, population census has been a basic source of information about population and background for balances presented in the vital statistics. For instance, for the studied period 1989-2009 population counts till 1991 are the results of the balances of births, deaths, and migrants based on the Czechoslovak Population Census 1980, the Population and Housing census 1991 provides background for data till the year 2001, and current data arise from the integrated population census 2001. Balances of vital statistics are established on individual statistical reports of birth, death, marriage, divorce, and migration. The reports are gathered by official institutions listed in given law[94] and provided to the Czech Statistical Offices on regular basses. Register office is responsible for marriage, birth, and death reports; law court for divorce reports, the Information System of Inhabitants Register[95] provides data about migration, and the Institute of Health Information and Statistics of the Czech Republic supplies to the Czech Statistical Office data about abortions.

As the case of population count revealed, one of the basic factors, which influence data quality and comparability, is an administrative change in legislation. Except migration legislation, where changes were relatively noticeable, the law related to the rest of demographic events was almost unchanged over studied period 1989-2009. For instance, the definition of life birth has been a valid since 1988. A live birth is defined as the complete expulsion or extraction of a foetus weighing at least 500 grams from its mother, irrespective of the duration of the pregnancy, which after such separation, breathes or shows any other evidence of life such as heartbeat, umbilical cord pulsation, or definite movement of voluntary muscles, whether the umbilical cord has been cut or the placenta is attached. If the foetus weighs less than 500 grams, it is recorded as a live birth only if it survives 24 hours after delivery, otherwise it is classified as a spontaneous abortion (i.e., miscarriage) (Rychtaříková et al., 2006, p.5). On the other hand, a stillbirth is defined as a foetus showing no sign of life at delivery and

[90] Act No. 326/1999 Coll., on the Residence of Aliens in the Territory of the Czech Republic, as amended.

[91] Act No. 325/1999 Coll., on refugee asylum and on modification of Act No. 283/1991 Coll., on the Police of the Czech Republic, as amended.

[92] Revision of the Act No. 326/1999 Coll., on the Residence of Aliens in the Territory of the Czech Republic, as amended.

[93] For further information and definitions of migrant, permanent resident, etc. see CZSO. 2010. *Foreigners in the Czech Republic 2010*. Czech Statistical Office, Prague. Available online: <http://www.czso.cz/csu/2010edicniplan.nsf/engpubl/1414-10-2010>.

[94] Act No. 89/1995 Coll. on The State Statistical Service, as subsequently amended.

[95] In Czech: "Informační systém evidence obyvatel (ISEO)". The Information System is run by the Ministry of the Interior of the Czech Republic since 2005.

weighing at least 1000 grams. A similar foetus weighing less than 1000 grams is defined as a spontaneous abortion (Rychtaříková et al., 2006, p.6)[96].

In spite of the fact that, abortion data are provided to the Statistical Office by the Institute of Health Information and Statistics of the Czech Republic, their final tabulation slightly differ. The vital statistics of the Statistical Office include to the counts also abortions of migrants with residence in the Czech Republic. The abortion is defined as the termination of a pregnancy while a foetus does not show any of the life evidences and its weight is less than 1 000 grams or if pregnancy terminated before the 28th week. If the foetus shows any evidence of life, its weight is less than 500 grams and does not survive 24 hours, than it is also abortion. Abortion is also extraction of a blighted ovum from uterus or extraction of decidua. Termination of the ectopic pregnancy, as well as induced abortions according to stipulated regulations are by definition also abortions (CZSO, 2010b).

With respect to death counts, the major legislation change during studied period was acceptance of a new revision of the International classification of diseases (ICD), which is a system providing codes to tabulate diseases and external causes of injury or disease. The ICD is provided by the World Health Organization (WHO), it is accepted by its members, and therefore it allows with some limitations international comparison of mortality data by cause. The 10th Revision (ICD-10), which has been still valid, was approved in the Czech Republic in 1994. Except changes in codes, major innovation of the ICD-10 is in a system of updates[97] (WHO, 2011; CZSO 2010b).

Considering, formation and dissolution of marriage, administrative changes of data gathering affect predominantly divorce. The Czech Statistical Office counts marriages which are in accordance with Czech law[98], i.e. the engaged are single, at least at the age of 18[99], and unrelated with kinship, and are reported to responsible register. Till the year 2006, data about marriage dissolution were collected for all divorce motions irrespective of denial or approval. Afterwards divorces are gathered based on dates when the decision about divorce motion come into force. For both periods, all pieces of information are collected reflecting the last place of permanent residence of the couple (CZSO, 2010b).

Two additional data sources for detecting trends in population development in the Czech Republic from the year 1989 are the Human Fertility Database[100] (HFD) and the Human Mortality Database[101] (HMD). Both databases are project of the Max Planck Institute for Demographic Research (MPIDR) in cooperation with the Vienna Institute of Demography (VID) in case of HFD and with the University of California, Berkeley in case of HMD. Currently, databases provide access to detail data about fertility for 16 countries and about mortality for 37 countries. The raw data originate primarily from the official sources and are

[96] Definitions of a life birth and a still birth were administratively changed several times in Czechoslovakia since 1925 and resulted, for instance, in a increase in infant mortality from 19.1 ‰ (definition 1964) to 23.7 ‰ (definition 1965) (Rychtaříková et al., 2006). For further information see Rychtaříková and Jasilionis, 2006 and Zeman, 2010.

[97] Since 2009, ICD-10 in the second edition with updates from the years 2004-2008 released by WHO is in force in the Czech Republic (CZSO, 2010).

[98] Act No. 94/1963 Coll., on the Family, as subsequently amended.

[99] In a special case, the court can permit marriage at the age of 16 years.

[100] Available from: <http://www.humanfertility.org/>.

[101] Available from: <http://www.mortality.org/>.

corrected especially for processing errors (e.g. missing zero in number, comma separator, etc.)[102]. In spite of the fact that, the Czech data in both databases are based on the official data of the Czech Statistical Office, the population counts by age in databases differ from the official data due to their adjustment for underestimation of migration and mortality in intercensal period (Zeman, 2010, p.5). Czech data arise from post-censal estimates and are not adjusted backward with respect to latest results of census. Therefore, data reveal discontinuities at census year (Rychtaříková et al., 2006, p.4). In general, one of the databases' advantages is distribution of data into basic demographic units according to the Lexis Chart for a longer time period, which is more user friendly in comparison with some raw data of the official statistics.

Considering data reliability, a population census quality is a cornerstone, because population census provides background for the vital statistic balances. The population census is defined by the United Nations as the operation that produces at regular intervals the official counting of the population in the territory of a country and in its smallest geographical sub-territories together with information on a selected number of demographic and social characteristics of the total population (UN, 2006, p. 6). Although it is hard to specify term quality, in this context census quality is narrowed to the process quality[103], which refers to the quality of the operations and instruments used in the data production process. In spite of the fact that, effort to improve census quality has been significant (i.e. formulation of recommendations), it is generally recognized that by definition census cannot be error free. Basically three kinds of errors are identified; coverage errors, content errors, and operational errors (UN, 2006, p. 20; Baffour et al., 2008, p.6-7). The coverage errors are generated by omission or duplicate count of individual. The content errors are due to incorrect answer to the question or incorrect registering of the answer. The last kind of errors, operational errors are created during data collection and processing. Without doubts Czech population censuses have contained these errors. For instance, in the Population and Housing census 2001 the number of people who refused to fulfil the registration form based on census takers' appeal was 261. In addition to that, 76 people refused to replenish missing information and 28 refused to correct obviously incorrect data. The Czech Statistical Office assumed that ca. 1 % of population was not captured by census (CZSO, 2005). Despite certain shortcoming in Czech data, they are recognized to be reliable for the research purposes.

4.1.2 Population size and structure

The basic demographic feature of each population is its size and structure by sex and age. Therefore, the sub-chapter deals with these basic characteristics of Czech population in the period 1989-2009. Possible future population counts and structures based on official projection are also discussed. All figures are constructed from the official data of the Czech Statistical Office.

In the year 1989 population of the present-day Czech Republic in mid-year was 10 362 thousand people. Then years later, in 2009, mid-year population equalled 10 492

[102] For further information see HFD and HMD methods, which are available online at hyperlinks listed in two previous footnotes.

[103] In general, census quality is characterized by six dimensions: relevance, accuracy, timeliness, accessibility, interpretability, and coherence (UN, 2006). For further information also see Baffour and Velente, 2008.

thousand. The difference is 130 thousand people and it could evoke that population gradually increased over given period. But development of population counts was not so simple and smooth. Population size grew in the period 1989-1993 and 2003-2009 and declined between years 1994 and 2002. While the first growth was due to natural increase and higher immigration than emigration, from the year 2002 to 2005 population sizes increased only due to positive net migration. The natural population decrease per year fluctuated from 18 to 22 thousand people in the 90's and was compensated by net migration in a range from 6.5 to 12 thousand people. From the beginning of the 21st century significance of net migration gradually increased and the year 2006 was the first with natural population increase in a new century. The new path of development was caused by change in balance procedure which has included also migrants with long-term stay since 2001, i.e. those with visa up to 90 days who stayed more than 1 year in the Czech Republic, migrants with asylum status, and since 2004 all migrants with long-term resident permit. The second factor, which contributed, was that numerous cohorts of women born in the 70's have realized their reproductive plans and the shift in mortality to higher ages has taken place. In spite of the fact that, recent development is positive from a long-term perspective it is questionable, if it is possible to keep this trend, because it seems to be only fluctuation around equal balance of births and deaths.

Table 4.1: Population size, absolute and relative population increase/decrease, the Czech Republic, selected years

	1989	1992	1995	1998	2001	2004	2007	2009
Thousand								
Mid-year Population	10 362	10 318	10 331	10 295	10 224	10 207	10 323	10 491
Natural	0.6	1.4	-21.8	-19. 0	-17.0	-9.5	10.0	10.9
Migration	1.5	11.8	10.0	9.5	-8.6	18.6	83.9	28.3
Total	2.1	13.1	-11.8	-9.5	-25.6	9.1	93.9	39.2
Population increase/decrease per 1000 people								
Natural	0.1	0.1	-2.1	-1.8	-1.7	-0.9	1.0	1.0
Migration	0.1	1.1	1.0	0.9	-0.8	1.8	8.1	2.7
Total	0.2	1.3	-1.1	-0.9	-2.5	0.9	9.1	3.7

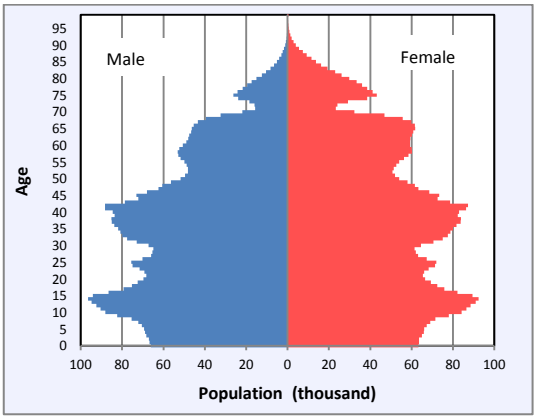
Source: The Czech Statistical Office

However population size and its change are fundamental indicators of population, more substantial are changes in age-structure of given population and its composition by sex. The basic measurement of sex-structure is sex ratio and masculinity proportion. Sex ratio refers to the number of men per 100 women in population and masculinity proportion express the share of male population per 100 people. Both indicators were relatively stable in inspected period of time in the Czech Republic. The average sex ratios in 1989-2009 correspond to 94.9 men per 100 women and average masculinity proportion equalled 48.7 per 100 inhabitants. Population structure by sex is changing over age and it is determined by biological factor, i.e. more boys are born then girls, and by migration. Developed countries, the Czech Republic is included, have been typical of excess male mortality and therefore differences in life expectancies by sex.

In comparison with population composition by sex, the figures were less stable for the age-structure. In the Czech Republic, age-structure changed significantly over period of twenty

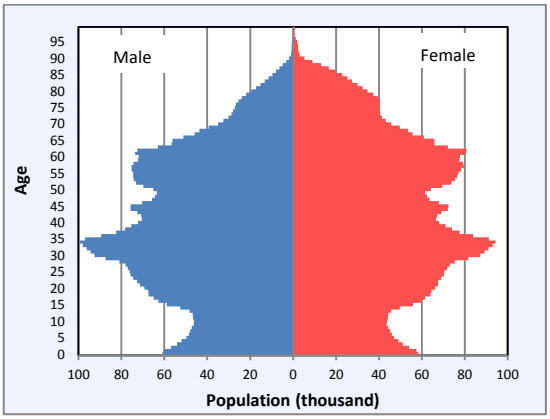
years. The Chart 4.1 and Chart 4.2 graphically present age-structure of the population in the years 1989 and 2009. In general, their shapes are formed by the development in fertility, mortality, and migration. The Czech age-pyramids are relatively volatile and a regressive type, i.e. old age-groups outnumbers young age-groups. The age-pyramid 1989 reveals trend of declining fertility in recent years, numerous cohorts of 70's as a respond to population policy, as well as numerous cohorts of post-war generations and the effect of the First World War. On the other hand, age-pyramid 2009 is characterised by a new notch caused by low level of fertility in the 90's, by disappearance of the First World War consequences, and expanding spire of the pyramid due to improvement in mortality. Although background of the pyramid is also slightly expanding, with respect to shrinking cohorts entering into fertile age, it is reasonable to assume that broader base is only a transitional state.

Chart 4.1:Population structure by age and sex, the Czech Republic, 1. 7. 1989



Source: The Czech Statistical Office

Chart 4.2: Population structure by age and sex, the Czech Republic, 1. 7. 2009



Source: The Czech Statistical Office

To follow changes in age-structure, population is artificially divided into three age-groups. The young age-group is framed by ages from 0 to 14, the productive age-group is defined between ages 15 and 65, and the last group, post-reproductive includes all individuals aged 65 years and more. The classification fulfils the assumption that human beings start to be economically active at the age of 15 and end their economic activity at the age of 65. In spite of the fact that, these days age of a retirement is modified in majority of developed countries, the classification is capable to detect significant changes. In 1989, the share of age groups 0-14 on population correspond to 21.7 %, the productive age-group involved 65.8 % of the population, and the percentage of persons aged 65 and more out of the whole population equalled to 12.5 %. Twenty years later, respective percentage changed to 14.2 %, 70.6 %, and 15.2 %. The representation of the young age-group gradually decreased and since 2006 it was equal to the share of post-reproductive age-group. While in the 90's population ageing was predominantly due to low level of fertility, in the 21st century ageing has been exaggerated by the fact that numerous cohorts, people born during the Second World War and afterwards, have survived to the age of 65. An observed trend of population ageing is also supported by the figures of the age-dependency ratios presented in the Table 4.2.

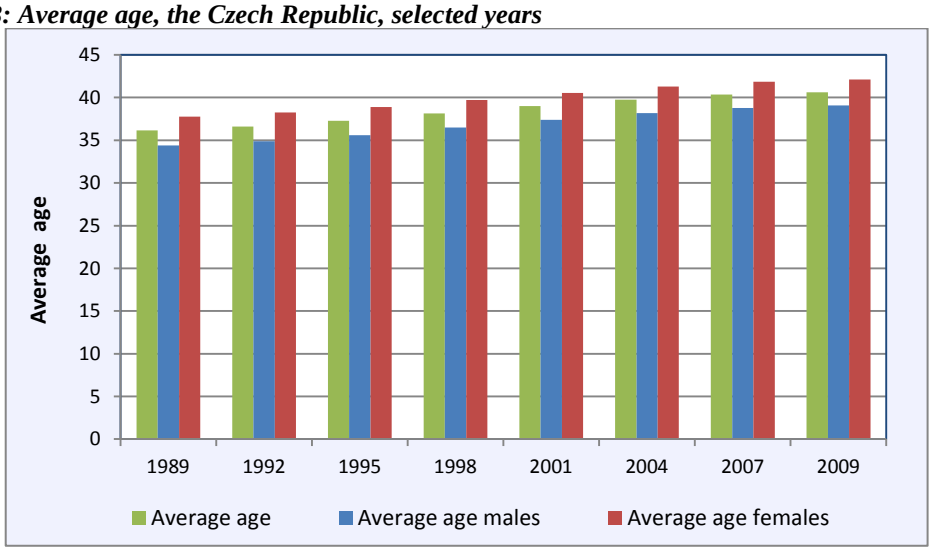
Table 4.2: Dependency ratios, the Czech Republic, selected years

	1989	1992	1995	1998	2001	2004	2007	2009
Index of ageing[1]	57.4	64.3	72.5	80.6	87.2	94.0	102.4	107.0
Age of dependency[2] **ratio**	52.0	48.9	46.3	44.4	42.3	40.8	40.4	41.7
Young age dependency ratio[3]	33.0	29.8	26.8	24.6	22.6	21.0	20.0	20.2
Old-age dependency ratio[4]	19.0	19.2	19.4	19.8	19.7	19.8	20.5	21.6

[1] Ratio of age group 65+ and 0-14
[2] Percentage of person aged 0-14 and 65+ out of person 15-64
[3] Percentage of person aged 0-14 out of person 15-64
[4] Percentage of person aged 65+ out of person 15-64
Source: The Czech Statistical Office

The age distribution of the population is also summarized in mean age and median age, which divides population into two groups, i.e. half of the population is younger than this age and half is older. Median age of Czech population equalled 32.3 years for males and 35.6 years for females in 1989 and increased to 36.7 years for males and 40.1 for females in 2009. The growing trends have been observed also in case of mean age, which increased from 36.1 years in 1989 to 40.6 years in 2009. With respect to male excess mortality mean ages by sex differ for given period in average by three years and are presented in the Chart 4.3.

Chart 4.3: Average age, the Czech Republic, selected years



Source: The Czech Statistical Office

Several projections and prognoses[104] for the Czech Republic exist[105], but following figures, with regard to data source continuity, are from the official projection of the Czech Statistical

[104] Population projections are calculations which show the future development of a population when certain assumptions are made about the future course of population change, usually with respect to fertility, mortality and migration. On the other hand, population prognosis/forecast is a projection in which the assumptions are considered to yield a realistic picture of the probable future development of a population. (Multilingual Demographic Dictionary, second edition 1982).

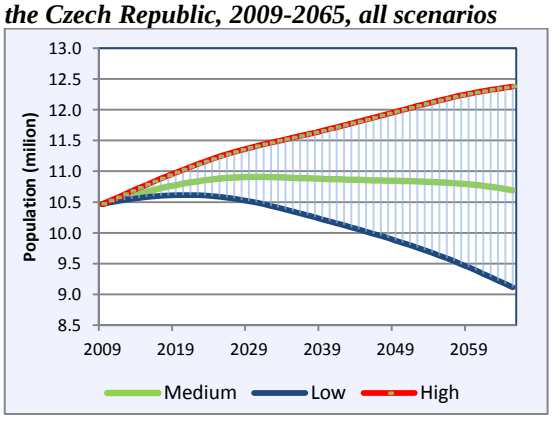
[105] Current population projections of the Czech Republic:

1. Czech Statistical Office. 2004. *Populační prognóza ČR do r. 2050* (Population Prognosis of the Czech Republic up to 2050); revised in 2009. *Projekce obyvatelstva České republiky do roku 2065* (Population Projection of the Czech Republic up to 2065). Available online: <www.czso.cz>.
2. Burcin, B.; Kučera T. 2003. *Perspektivy populačního vývoje České republiky na období (2003-2065*. Praha: DemoArt. ISBN 80-86746-01-1.
   Burcin, B.; Kučera T. 2004. Nová kmenová prognóza populačního vývoje České republiky (2003-2065). *Demografie*, 2004/46, p. 100-111.
   Burcin, B.; Kučera T. 2010. Prognóza populačního vývoje České republiky na období 2008-2070. <http://www.mfcr.cz/cps/rde/xbcr/mfcr/Prognoza_2010.pdf>. *The note is proceeding in the next page.*

Office published in 2009. The Population Projection of the Czech Republic up to 2065 (CZSO, 2009) was calculated based on population balance at the beginning of the year 2009 and it is a revision of the former population prognosis released in 2004. Three scenarios; low, medium, and high, with slightly different assumptions were computed. In sum, all scenarios assume that total fertility as a basic indicator of fertility development will grow. Also, they anticipate growth of the life expectancy at birth as an approximation of mortality development. Considering migration, scenarios involve presumption that net migration will be positive in the future and it was set down to be a constant, i.e. 15 thousand migrants for the low variant, 25 thousand migrants for the medium variant, and 40 thousand migrants for the high variant.

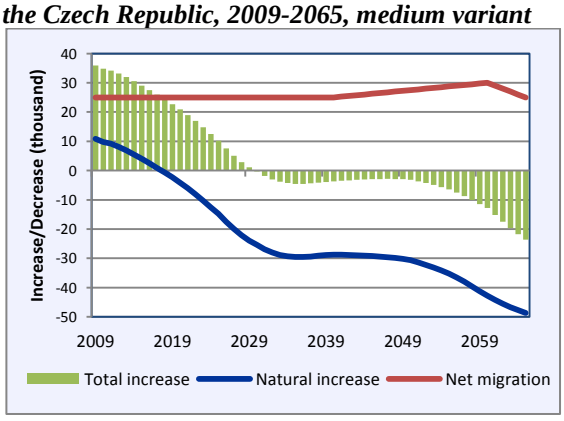
In median scenario, which is considered to be the most probable, the population count should increase to 10 908 thousand people in 2030 and afterwards decline to 10 609 thousand people in 2065. With respect to different assumptions in each scenario, low variant also assumes unhurried grow till the year 2030 and later on substantial decline to the 9 111 thousand people in 2065. On the other hand, high variant present gradual increase in population counts till the population of 12 376 thousand people (See Chart 4.4). But this pattern is substantially supported by high net migration. From the year 2030 all variants of the projection are characterised by natural population decline (See Chart 4.5 for medium variant). Projection revealed that age-pyramids in medium variant remain regressive and that one third of the population in the year 2065 will be older than 65 years (See Chart 4.6 and Chart 4.7). Based on given figures population ageing is inevitable process in the Czech Republic.

Chart 4.4: Expected population counts, the Czech Republic, 2009-2065, all scenarios



Source: The Czech Statistical Office

Chart 4.5: Expected structure of total increase, the Czech Republic, 2009-2065, medium variant

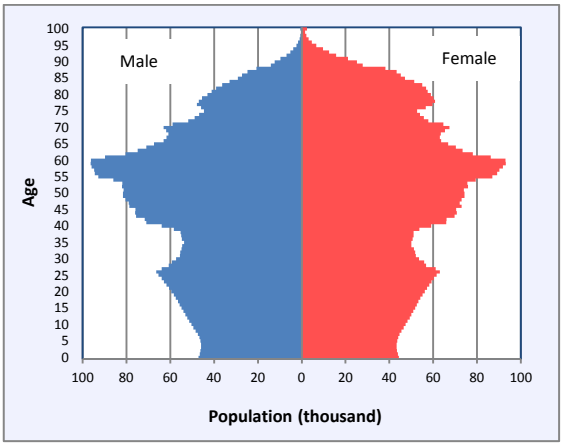


Source: The Czech Statistical Office

Note. Department of Demografy and Geodemography, Faculty of Science, Charles University in Prague.

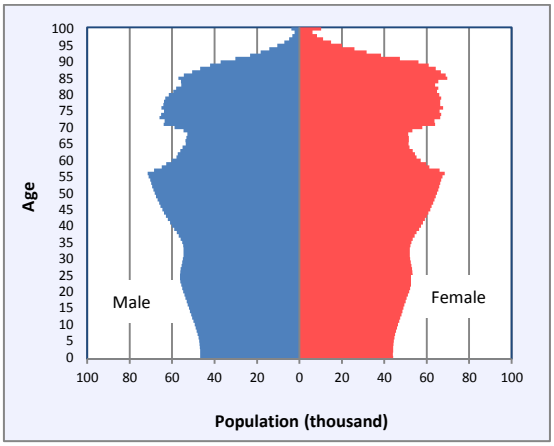
3. The Univeristy of Economics, Prague. 2009. *Prognóza lidského kapitálu obyvatelstva České Republiky do roku 2050* (Prognosis of Human Capital of the Czech Republic up to 2050). Praha. Oeconomica, 238p. ISBN 978-80-245-1576-2.
4. Eurostat. 2010. Population Projection (EUROPOP2008, convergence scenario) [electronic resource]. [10.5.2011]. Available online: < http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Population_projections>.
5. United Nations. 2011. World Population Prospect. The 2010 Revision. Available online: <http://www.un.org/esa/population/>.

Chart 4.6: Expected population structure by age and sex, the Czech Republic, 2035, medium variant



Source: The Czech Statistical Office

Chart 4.7: Expected population structure by age and sex, the Czech Republic, 2065, medium variant



Source: The Czech Statistical Office

Table 4.3: Expected age structure, the Czech Republic, selected years

	Age group 0-14 (%)			Age group 15-64 (%)			Age group 65+ (%)		
Year	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**	**Low**	**Medium**	**High**
2010	14.2	14.2	14.2	70.6	70.6	70.6	15.2	15.2	15.2
2020	15.4	15.6	15.7	64.5	64.4	64.4	20.1	20.1	19.9
2030	13.3	13.8	14.3	63.5	63.1	63.0	23.2	23.1	22.7
2040	12.2	12.9	13.4	60.8	60.3	60.3	27.0	26.8	26.2
2050	12.9	13.8	14.5	55.4	55.0	55.2	31.7	31.1	30.3
2065	11.9	13.2	14.1	55.2	54.6	54.3	33.0	32.2	31.7

Source: The Czech Statistical Office

4.1.3 Fertility

The age-pyramid 2009 presented in the previous section is peculiar by notch in young age groups. An issue of significantly low fertility which occurred in the 90's of the 20th century in the Czech Republic is discussed in following part of the work. Figures are based on data from the Human Fertility Database[106] and the Czech Statistical Office. To demonstrate changes magnitude, occasionally, longer time period than 1989-2009 is taken into account.

In 1989 more than 128 thousand children were born. Twenty years later, in 2009, the value corresponded to 118 thousand children. Total numbers revealed decline in a range of 10 thousand babies. But fall in counts of life births was even pronounced during the 90's. Development can be characterised by a u-shape curve with a minimum in 1999, when 89.5 thousand children were born. Threshold of 100 thousand life births was reached again in the year 2005. Since then, moderate increase has been observed, but the value of the year 1989 was not in the least touched.

A new path of development was also set up with respect to marital status. While at the beginning of studied period, in 1989, about 92 % babies was born to married couple, in 2009 more than 38 % of children were born outside marriage. Marriage was a social norm

[106] Data only up to the year 2008 are currently available in the database.

which legitimized children and a majority of people entered into marriage at younger ages. This was changed and new forms of partnerships without formal commitments occurred. The statement is supported by the numbers of premarital conceptions and changes in mean ages of mothers irrespective of parity and for a 1st child. While in 1989 more than 52 % babies were born after eight months from wedding, the share declined into 25.6 % in 2009. Mean age of mothers gradually increased from 24.8 years in 1989 to 29.4 years in 2009. Significant shift also occurred in case of mean age of mothers for a first child. The age moved up from 22.5 years in 1989 to 27.4 years in 2009. These basic fertility indicators revealed decline in fertility in given period and a shift to higher ages.

Table 4.4: Life births by vitality and age of mother in childbirth, mean age of mothers, the Czech Republic, selected years

	1989	1992	1995	1998	2001	2004	2007	2009
Life births	128 356	121 705	96 097	90 535	90 715	97 664	114 632	118 348
outside marriage	10 141	13 008	14 947	17 209	21 276	29 839	39 537	45 954
outside marriage (%)	7.9	10.7	15.6	19.0	23.5	30.6	34.5	38.8
Life births by age of mother in childbirth								
till the 19 years	17 467	19 719	10 609	6 035	3 827	3 659	3 534	3 614
up the 40 years	665	768	707	710	852	1 150	1 670	1 987
Stillbirths	525	437	300	294	263	265	315	319
Total Births	128 881	122 142	96 397	90 829	90 978	97 929	114 947	118 667
Mean age of mothers	24.8	24.8	25.8	26.6	27.5	28.3	29.1	29.4
Mean age of mothers at 1st child	22.5	22.5	23.3	24.4	25.3	26.3	27.1	27.4

Source: The Czech Statistical Office

The total fertility rate (TFR) [107], which measures the average number of births a group of women would have by the time they reach age 50 if they were to give birth at the current age-specific fertility rates, is a basic indicator applied to detect fertility trends. The total fertility rate is expressed as the average number of births per woman and currently it does not reach the level of the replacement[108] in the Czech Republic. Although the Czech total fertility rate had been below 2.1 children per woman before the year 1989, during the transformation process it dropped down below 1.5 children per woman. The lowest total fertility rate, 1.13 children per woman, was reached in 1999 (See Chart 4.8) and it overcame a long-standing minimum 1.67 children per woman from the year 1936. Moderate improvement in the total fertility rate has been observable recently and it is explained as a partial compensation of the fertility postponement applied by generations born in the 70's of the 20th century.

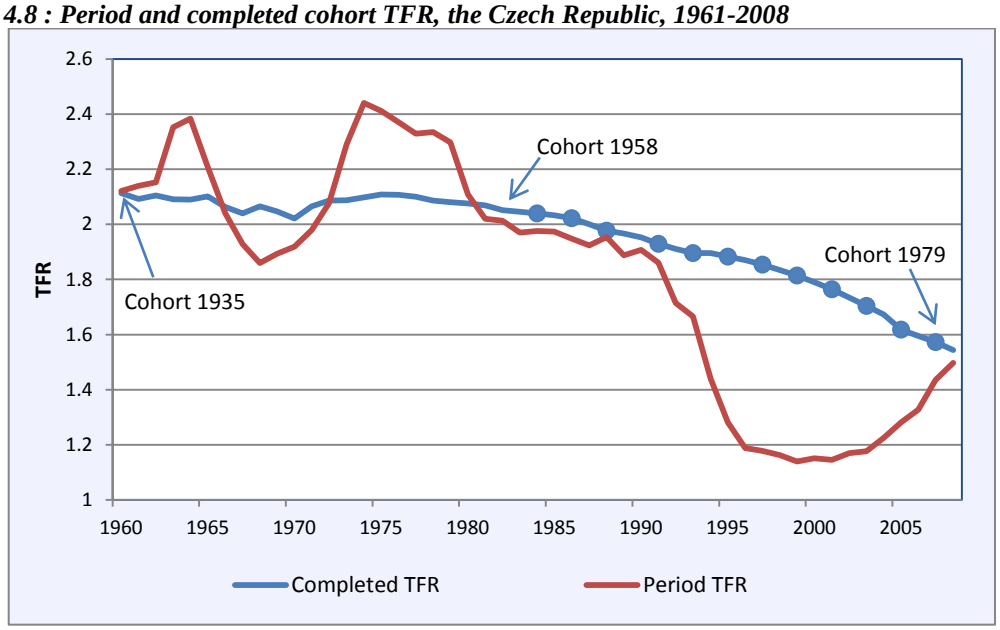
Despite the fact that the completed cohort total fertility rate, which refers to average number of children per woman in given cohort, can be calculated based on real data only till the generation 1958, because younger cohorts have not gone through their reproduction period yet, the total fertility rate in cohort perspective revealed different pattern. The completed cohort

[107] Data for age-specific fertility rates are utilized from the Human Fertility Database, based on them analytical data in this section are computed for the ages 15-49, therefore results in this work may differ from analytical data in the Human Fertility Database which are computed for the larges available span, i.e. for ages 12-55.

[108] Replacement fertility level is an artificial level of fertility at which a population exactly replaces itself from one generation to the next. For developed countries the threshold is set down to be 2.1 children per women and for developed countries, where infant and child mortality is high the average number of births may need to be much higher.

total fertility rate for generations born between the years 1935 and 1958 was more stable then period measure and above the value two children per woman. To see possible future development, missing data for each cohort were approximated by real data for the nearest generation. The simulation demonstrates that if the generations from 1959 to 1979 reached the age-specific fertility rates of the previous generations at higher ages, then the completed cohort total fertility rate also declines below the replacement level, but remains above the values of the period total fertility rates. Therefore, fertility decline would not be as severe as the period total fertility rate indicates.

Chart 4.8 : Period and completed cohort TFR, the Czech Republic, 1961-2008



Notes: Because not all cohorts have terminated their reproductive period, from cohort 1959 missing data were approximated by the available data of the nearest cohort (approximation- line with dots). Completed cohort TFR was shifted by average age of mothers at birth.

Source: The Human Fertility Database

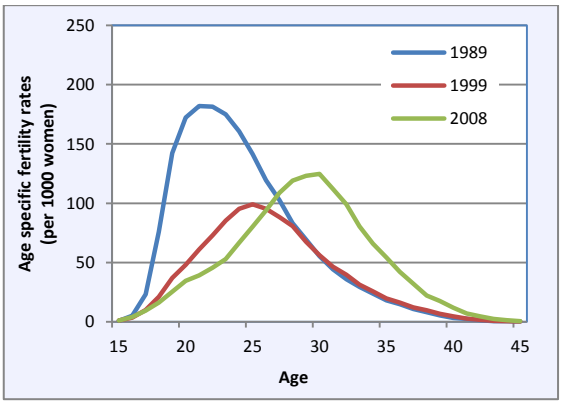
The changes in period and completed cohort total fertility rates require a closer look at the development in age-specific fertility rates, which are bases of these summary measures. In a period perspective, the age-specific fertility rates reached their maximum 182 children per 1 000 women at the age of 21years in 1989. The highest rates were gained between ages 19 and 27. Afterwards, in the year 1999 all age-specific fertility rates declined in comparison with the year 1989 and for any age they did not exceed value 100 children per 1 000 women. The core of fertility moved between ages 23 and 28 years. In addition to that, in the year 2008, maximum age-specific fertility rate was reached at the age of 30, which means that age-specific fertility rates declined for younger and increased for higher age in comparison with previous stated years (See Chart 4.9). But it is necessary to note that the increase did not fully compensated decline. In fact, it was approximately half size.

The Chart 4.11 illustrates development of the age-specific fertility rates for selected ages between the years 1989 and 2008. The considerable decline is noticeable for the ages of 20 and 25. While at the age of 20 the age-specific fertility rate dropped from 172 children per 1 000 women in 1989 to 34 children per 1000 women in 2008, at the age of 25 the fall was from 142 to 80 children per 1 000 women. On the other hand, significant increase is observable

for the ages 30 and 35. For these ages the age-specific fertility rates grew from 55 to 125 children per 1 000 women and from 18 to 54 children per 1 000 women respectively between years 1989 and 2008. Therefore in this case the increase covers only 53 % of the decline.

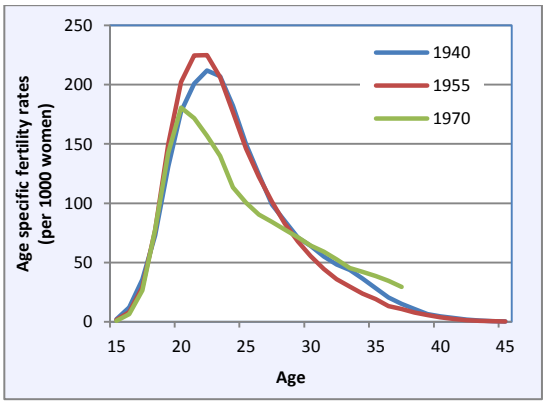
In a cohort perspective, for generations 1940, 1955, and 1970, figures revealed rather different pattern of development (See Chart 4.10). The maximum values of age-specific fertility rates moved to younger ages. While maximum value for cohort 1940 correspond with 212 children per 1 000 women at the age of 22, cohort 1955 reached maximum 224 children per 1 000 women at the age of 21. In spite the fact that, the maximum age-specific fertility rate for the generation 1970 also shifted into younger age, specifically into 20 years, the value declined substantially, to 180 children per 1 000 women. The age-specific fertility rates for cohort 1970 followed from the beginning to the maximum the same pattern as the rates for two previously stated generations, but then till the age of 30 they significantly declined and afterwards increased in comparison with the age-specific fertility rates of generations 1940 and 1955 (See Chart 4.10). Based on described trend of development it is reasonable to assume, that age-specific fertility rates for cohort 1970 from the age of 38, which are currently unknown, will be slightly higher than those for cohorts 1940 and 1955 and will be partly compensate decline in younger ages.

Chart 4.9: Period age-specific fertility rates, the Czech Republic, selected years



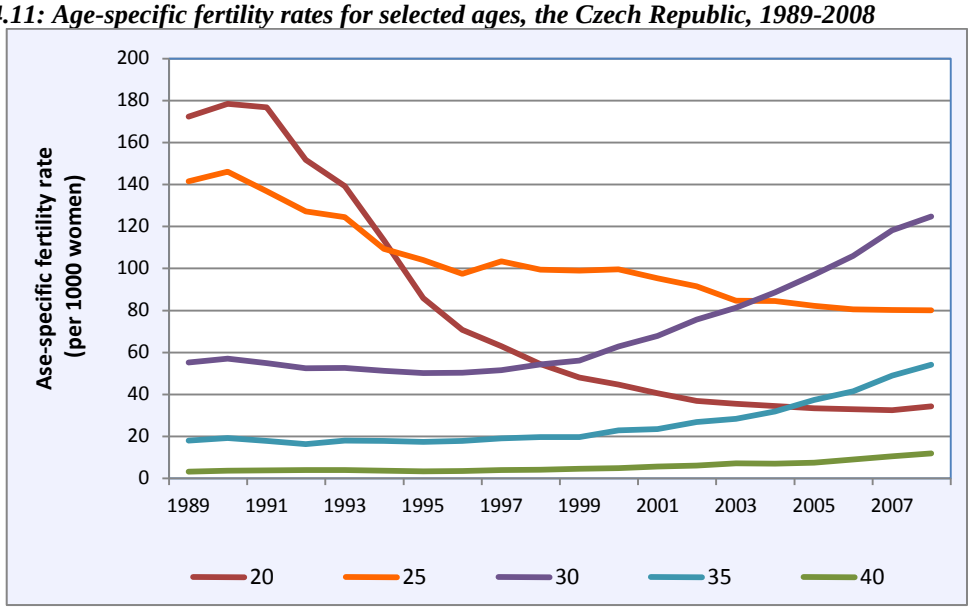
Source: The Human Fertility Database

Chart 4.10: Cohort age-specific fertility rates, the Czech Republic, selected cohorts



Source: The Human Fertility Database

Chart 4.11: Age-specific fertility rates for selected ages, the Czech Republic, 1989-2008



Source: The Human Fertility Database

Considering birth order[109], for the years 1989-2008 figures also revealed a decline. The period total fertility rate composed of 47.4 % births of the first order, 47.7 % births of the second order, and 11.1 % births of the third order in 1989. In total 58.8 % of children were born within the two first parities and only 3.8 % births were up to the higher orders. Orientation towards a two-child family was pronounced. In the year 1999, when the lowest total fertility rate 1.13 children per woman was observed, fertility of the first order reached almost 59 % of the 1989 value, the second order correspond to 61 % of the 1989 value, and fertility of the third equalled of 57 % of the 1989 value. In spite the fact that, the year 2008 was characterised by partial recovery, fertility by order did not reach figures of the year 1989 (See Chart 4.12).

With respect to general trend of fertility development in the Czech Republic since 1989, it is not surprising that described pattern in fertility by order was caused by an extraordinary change in timing and magnitude. Comparison of the age-specific fertility rates by order and age in the years 1989 and 2008 is presented on the Chart 4.14. The shapes of the curves clearly depict that the core of the global maxima of fertility rates by parity moved in case of the first birth order from 20 years in 1989 to 28 years in 2008, in case of the second order from 23 years to 29 years, and from 29 years to 33 years in case of the third order. It is also noticeable that curves of the year 2008 became flatter with significant tails.

From a slightly different perspective changes in period fertility by birth order are presented in the Chart 4.16. The parity progression ratio refers to probability that women will have another baby, for instance that childless woman will have a baby, that woman with one child will have a second baby, etc. The figures for period between years 1989-2008 revealed a remarkable pattern. While 90 % of women had one child, 80 % of women with one child had a second child, and 30 % of them had a third child in the year 1989, ten years later, in 1999, only 53 % of women had one child, 82 % of them had a second child, and 28 % of women

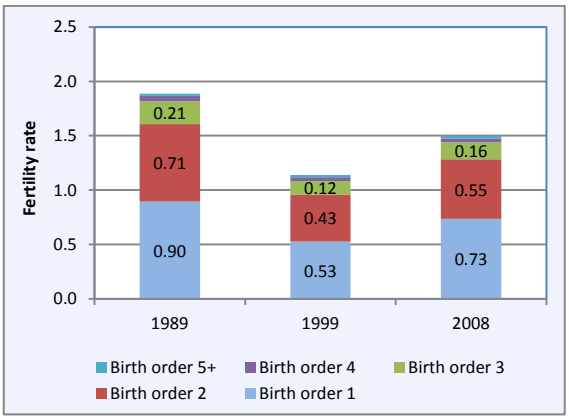
[109] However birth order is defined to be the birth order of the child and parity as the number of children a woman has given birth to at the time of observation, in this work both terms are used as synonyms.

with two children had a third child. Drop in probability to have a first baby was tremendous between the years 1989 and 1999. The progression rations in the year 2008 moderately improved. Almost 75 % of women had one child, 75 % of women with one child had a second child, and 28 % of them had a third child. With respect to listed progression ratios, an increase in hypothetical ratio of childless women was striking over given period. The figure of childless women grew from 10 % in 1989 to 47 % in 1999 and afterwards declined to 27 %. Based on this pattern it is not clear which trend of development prevail, if the orientation towards two children remains principal for a part of population and significantly higher part of female population becomes childless or if orientation towards two children transforms into orientation towards one child, which accepts majority of population. In this case, childlessness could remain relatively low.

Despite the fact that not all data are known and that composition of the completed cohort fertility rate by birth order is in general more stable in time than period measure, figures for the cohort 1970, for which were data from age 38 approximated, disclosed a change (See Chart 4.13). While for the cohort born in 1940 births of the first order accounted for 44.6 % of the given completed cohort fertility rate, for the generation 1970 it was 49.3 %. The relevance of the first order births increased, but it is necessary to notice, that the share of the second births on the simulated completed cohort fertility rate did not changed significantly in comparison with other cohorts. For the cohort 1940 the completed cohort fertility rate was composed as follows: 44.6 % accounted for the first parity, 36.2 % for the second parity, 12.9 % for the third parity, 3.8 % for the fourth parity, and 2.5 % for the fifth and higher parities. From this point of view, as simulation revealed reduction in third and higher birth orders significance in case of generation 1970 is probable, because due to fertility postponement and biological constrain not all planned children can be born. Therefore, in this case it is also reasonable to assume that share of childless women increase in generation 1970. While hypothetical ratio of childless women in generation 1940 equalled to 6 %, with respect to approximation the ratio increased in generation 1970 into 8 %.

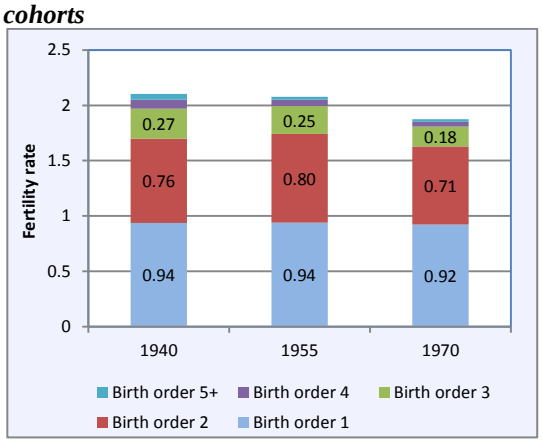
A first glance at the Chart 4.15 discloses that the age-fertility rates of the first birth order for the cohort 1970 overcame values recorded for the generation 1940. But the rates are slightly higher only till the age of 20, which correspond with the year 1990, the first year of transformation. More than a new pattern these higher rates at younger ages reflected previous demographic behaviour and the fact that a part of population could take an advantage of persisting state support to newly formed families provided by previous regime, which should be reduced within transformation process. Afterwards the fertility rates of the first birth order for the cohort 1970 declined with age below the level of the cohort 1940. The curves crossed again at the age 26, when the postponement fertility was put into practice. Age-specific fertility rates for the second and third birth orders for generation 1970 in comparison with the cohort 1940 were lower and reached higher values at higher ages. Their curves are flatter with significant tails. Although data from age 38 are unknown it seems that figures will be due to fertility postponement a little bit higher than for the previous generations.

Chart 4.12: Period total fertility rate by birth order, the Czech Republic, selected years



Source: The Human Fertility Database

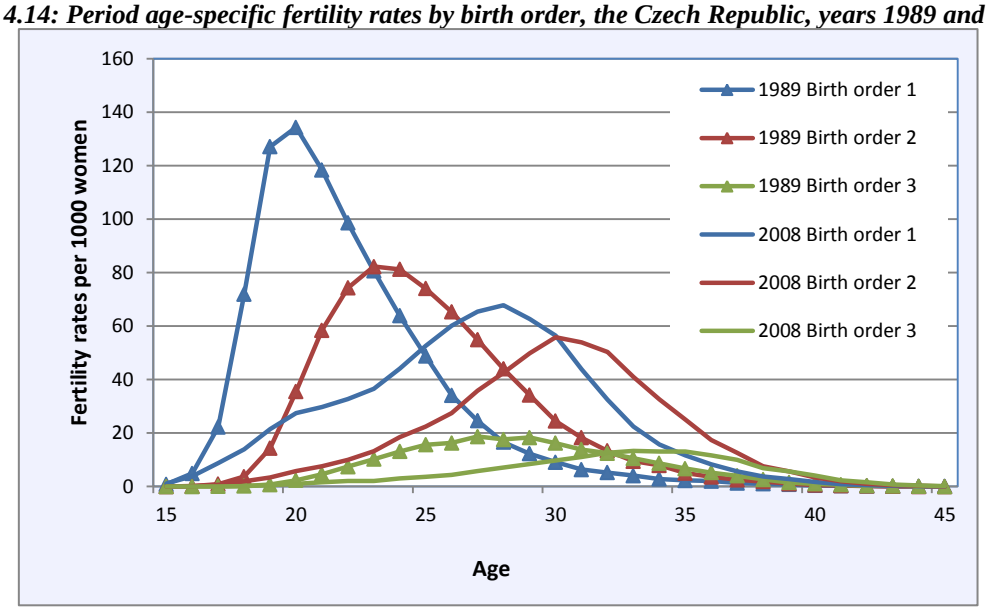
Chart 4.13: Cohort completed total fertility rate by birth order, the Czech Republic, selected cohorts



Notes: Missing data for cohort 1970 were approximated by the available data of the nearest cohort.

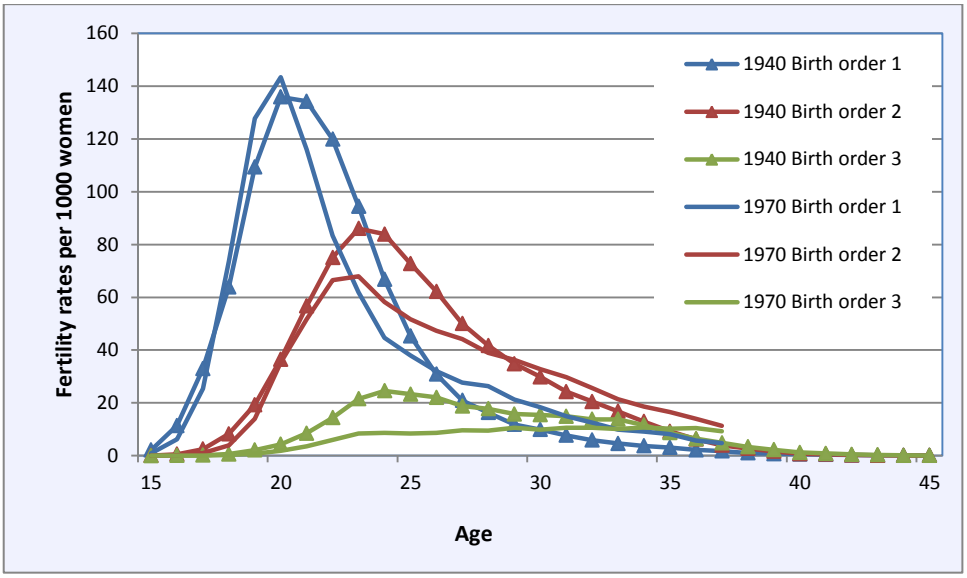
Source: The Human Fertility Database

Chart 4.14: Period age-specific fertility rates by birth order, the Czech Republic, years 1989 and 2008



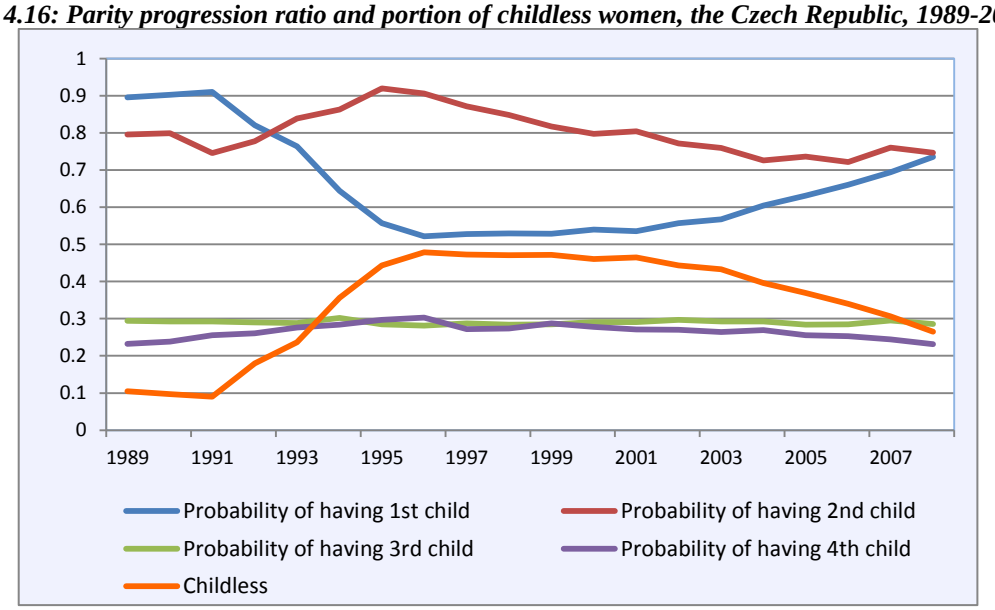
Source: The Human Fertility Database

Chart 4.15: Cohort age-specific fertility rates by birth order, the Czech Republic, cohorts 1940 and 1970



Source: The Human Fertility Database

Chart 4.16: Parity progression ratio and portion of childless women, the Czech Republic, 1989-2008

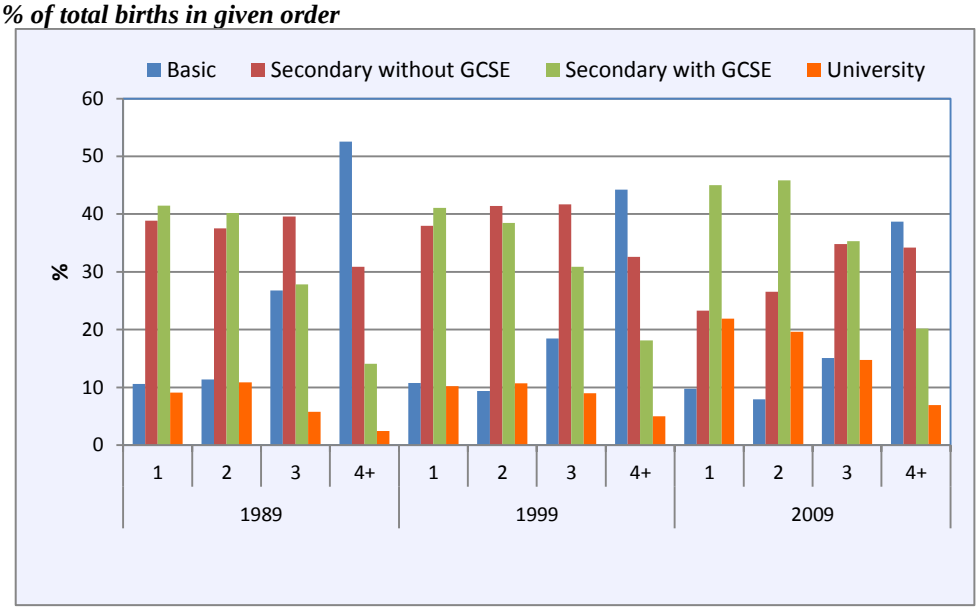


Source: The Human Fertility Database

Without a doubt attained education has been a factor which influenced fertility development in the Czech Republic since 1989 significantly. For all three years and the first three birth orders a majority of mothers attained secondary education. While for the years 1989 and 1999 secondary education without the General Certificate of Secondary Education prevailed, in the year 2009 secondary education with the General Certificate of Secondary Education and university degree dominated (See Chart 4.17). In case of the fourth birth order, although with diminishing magnitude, basic education remained the most important. For instance, in the year 1989 more than 50 % of children given parity had mother with basic education, twenty years later the percentage correspond with the value of 38 %. Although the changes in fertility

by education reflected the fact that, more and more women attained higher education since 1989, the pattern higher the birth order less educated mothers was present in the composition.

Chart 4.17: Life births by birth order and attained education of mother, the Czech Republic, selected years, % of total births in given order

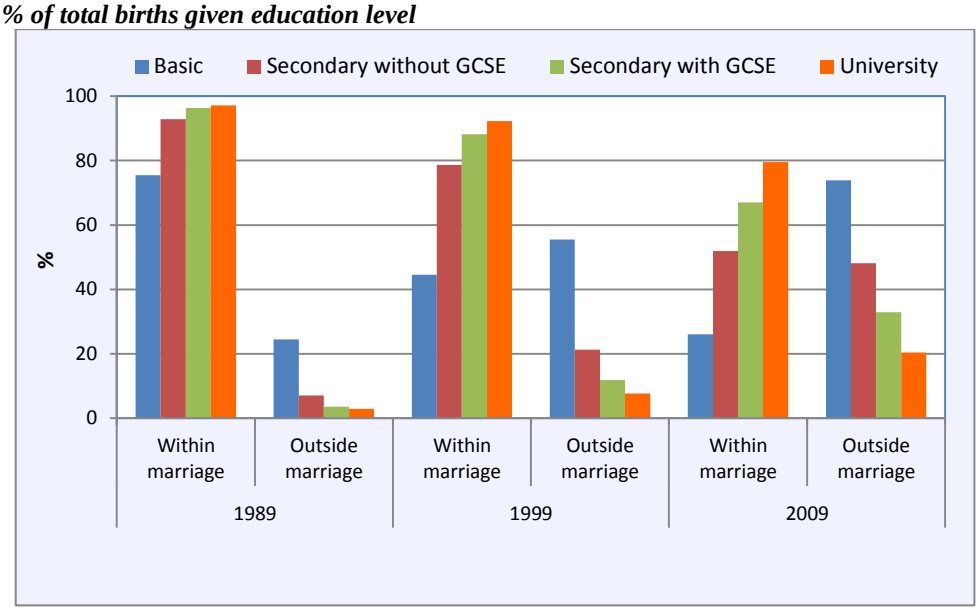


Notes: GCSE refers to the General Certificate of Secondary Education. Data for basic education the years 1999 and 2009 include also unfinished basic education.

Source: The Czech Statistical Office

With respect to legitimacy extraordinary change occurred in Czech data since beginning of transformation. As stated above, in the 1989 more than 92 % of children were born within marriage. Thereafter, in the year 1999 the percentage declined into the value 72 % and consequently to the 62 %. This means that recently more than 38 % of children were born outside marriage. According available data, 73 % of children born outside marriage had mother with basic education in the year 2009, 48 % mother with secondary education without the General Certificate of Secondary Education, 33 % mother with secondary education with the General Certificate of Secondary Education, and finally 20 % of children born outside marriage had mother attained university degree (See Chart 4.18). In spite the fact that, women with university degree are perceived to be more capable of accepting partnership without formal commitment, just the reverse is true. Almost 80 % of children born within marriage had mother with university degree in the year 2009. With regard to education, demographic behaviour has been relatively homogenous. For instance, in the year 2009 more than 55 % children born within marriage and almost 42 % children born outside marriage had parents with the same educational level.

Chart 4.18: Life births by attained education of mother and legitimacy, the Czech Republic, selected years, % of total births given education level



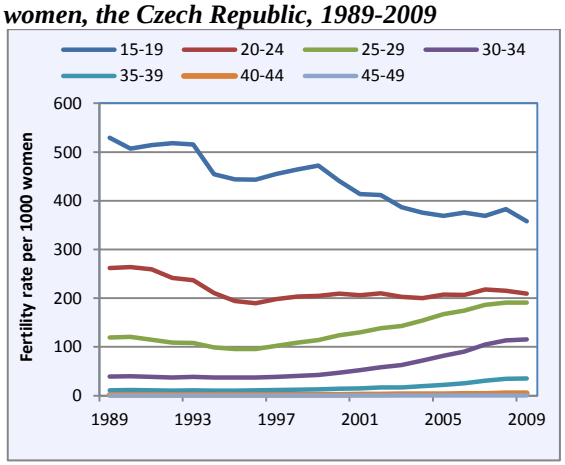
Notes: GCSE refers to the General Certificate of Secondary Education. Data for basic education the years 1999 and 2009 include also unfinished basic education.

Source: The Czech Statistical Office

A more detailed description of changes in fertility trends by marital status provides data for single and married women. Children are born also to women divorced and widowed, but in comparison with single and married women their importance is marginal. Over period 1992-2009, each year less than 0.5 % children were born to widowed woman. Regarding divorce mothers, within time a moderate growth of the figures occurred. While in the year 1992 almost 3 % children were born to divorced mothers, in the year 2009 the percentage equalled to the value 6.4 %. Taking into account that 38 % of children were born outside marriage in 2009, more than 84 % of them had single mother. An increase in representation of single mothers was tremendous since 1992, because figure grew from 7.8 % to 32 % in the year 2009. With the above mentioned development with respect to education, it is hardly surprising that significant majority of single mothers had basic or secondary education without the General Certificate of Secondary Education.

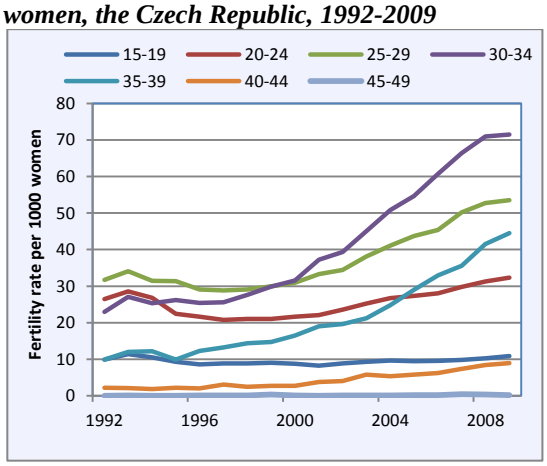
Fertility intensity differs not only by marital status, but as well as by age. Development in the age-specific fertility rates for married and single women are illustrated on the Chart 4.19 and Chart 4.20. The curves clearly disclose that figures for married women are higher rank for all ages than those for single women. With respect to age, the highest fertility rates are for married women at the youngest ages, because number of life births almost equal to number of married women, afterwards rates decline as women became older. Both charts depict the fact that, fertility was postponed to higher ages and more children were born to single mothers recently. For married women only curve of the age group 15-19 continuously decline since 1989. The other curves slightly decline or stagnate at the beginning of the period and afterwards for higher age groups increase. In case of single mothers, the curves remain unchanged for the youngest and the oldest age groups over given period and for the rest the trend is increasing.

Chart 4.19: Age-specific fertility rates of married women, the Czech Republic, 1989-2009



Source: The Czech Statistical Office

Chart 4.20: Age-specific fertility rates of single women, the Czech Republic, 1992-2009



Source: The Czech Statistical Office

The fertility terns in the Czech Republic since 1989 can be summarized by following statements. The significant fertility decline occurred in the 90's and more children were born outside marriage. Even though, fertility of married women remained highly relevant in Czech population. The fall in fertility is currently partly compensated by increased fertility at higher ages, but it is not enough to at least touch the fertility replacement level. With respect to children born outside marriage they have frequently single mother with basic or secondary education without the General Certificate of Secondary Education. In contrast, majority of children born in marriage had mother with university degree these days. Despite the lack of data, fertility in a cohort perspective also changed, but it seems that presented pattern is not final and further changes can be expected.

4.1.4. Mortality and Abortion

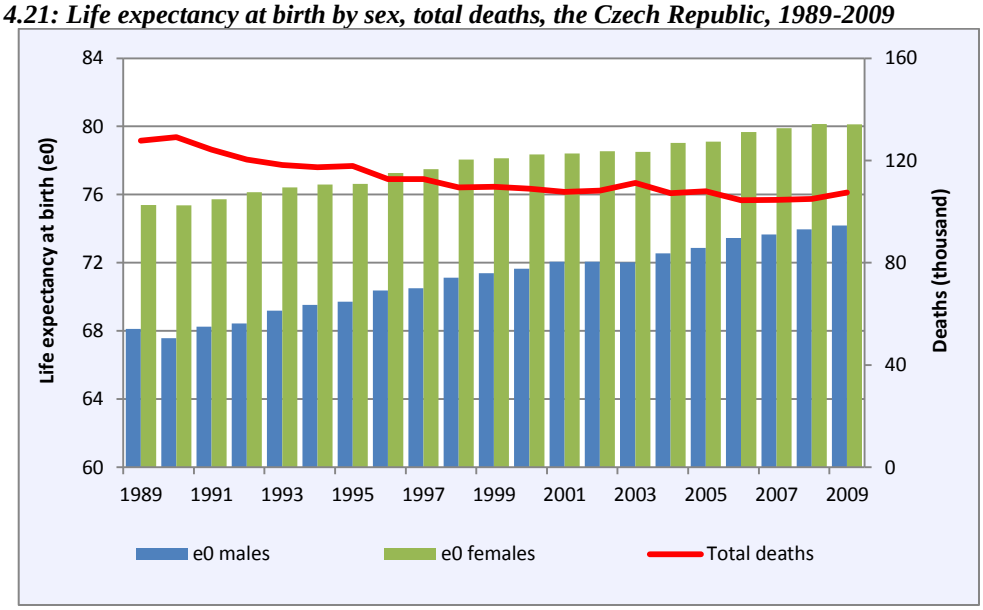
Although mortality partially lost its importance to population development in the Czech Republic due to predominant impact of fertility in the 90's and afterwards supremacy of migration, mortality contribution to ageing has been significant since 1989 too. Therefore, mortality trends in the period 1989-2009 are inspected in this section. Attention is also devoted to abortion, which by its nature reduces a population size. Data from the Czech Statistical Office, the Human Mortality Database, and the Institute of Health Information and Statistics of the Czech Republic are utilized.

According to data, while in total 128 thousand people died in 1989, in the year 2009 the number of deaths equalled to 107 thousand people. Decline was relatively smooth and encompassing 21 thousand people between the beginning and end of stated time span (See Chart 4.21). But it has to be taken into account that number of deaths is considerably influenced by population age-structure. More convenient indicators are the standardized death rate and the life expectancy at birth. The death rate refers to number of deaths in a year per 1 000 people of mid-year population. In addition, standardized death rate is related to specific age-structure. In this case population structure of the year 1989 was applied. The standardized death rates revealed significant improvement. While in the year 1989 the rate corresponded to 12.3 ‰, in the year 2009 it was 7.8 ‰. Therefore, with respect to current population size in the Czech

Republic the intensity implies approximately 82 thousand deaths in the year 2009, what is smaller than number of deaths counted in 1989 by almost 46 thousand deaths. The difference is even pronounced in comparison with real data for the year 2009 and it is caused by changes in population age structure approximately encompassing 25 thousand deaths and by improvements in mortality in a scale of 21 thousand deaths.

The life expectancy at birth estimates the number of years to be lived by a female or male new-born, based on current age-specific mortality rates. For both males and females the life expectancy at birth has grown in the Czech Republic since 1989. For males the figure increased from 68.1 years in 1989 to 74.2 years in 2009 and for females from 75.4 to 80.1 years respectively. Within a time males gained 6.1 years and females 4.7 years, which ranked the Czech Republic among European countries with the best improvements in mortality. Difference in the life expectancy between males and females slightly diminished, from 6.1 years in 1989 to 4.7 years in 2009.

Chart 4.21: Life expectancy at birth by sex, total deaths, the Czech Republic, 1989-2009

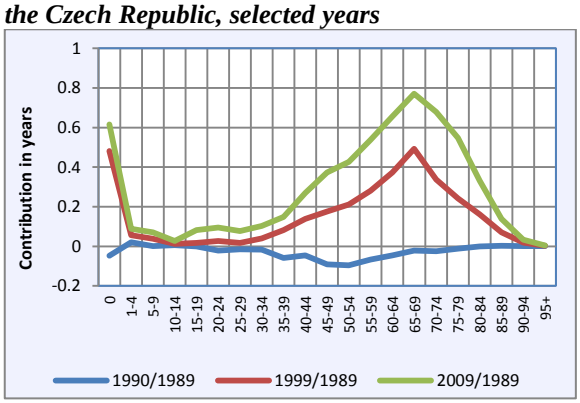


Source: The Czech Statistical Office

To see how each age group contributed to mortality improvement, the life expectancy at birth was decomposed for males and females separately on the background of the year 1989 (See Chart 4.22 and Chart 4.23). The first decomposition compares the years 1990 with respect to the year 1989. That time the life expectancy at birth for both males and females a little bit declined, by 0.5 year and 0.02 year respectively, therefore it is not surprising, that age contributions fluctuated around zero. Afterwards, in the year 1999 in comparison with 1989 mortality improved and the life expectancy at birth increased for males by 3.3 years and for females by 2.5 years. The curves on chart the Chart 4.22 and Chart 4.23 reveal that the major improvement occurred for male between age groups 40-45 to 80-84 and for females between age groups 50-54 and 80-84. These age groups involve 73 % and 76 % of the whole mortality improvement for males and females respectively. The last decomposition is focused on the year 2009. With the above mentioned facts it is hardly astonishing, that the greatest contributions provided the same age groups. The curves of the Chart 4.22 and Chart 4.23 only shifted up, with the maxima 0.7 year in age group 65-69 for males and 0.73 year in age group 70-74 for females.

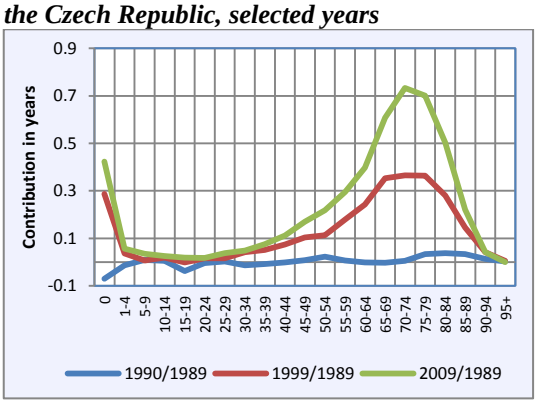
Improvement in mortality for higher ages within a time is also disclosed on the surface charts of age-specific mortality rates, the Chart 4.24 and Chart 4.25. Upward coloured strips point out that the mortality rates at given age are lower in a new century in comparison with the mid-20th century.

Chart 4.22: Contributions of age groups to the change in life expectancy at birth, males, the Czech Republic, selected years



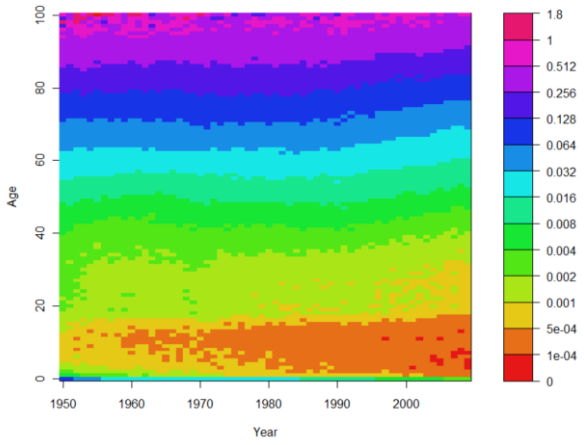
Source: The Czech Statistical Office

Chart 4.23: Contributions of age groups to the change in life expectancy at birth, females, the Czech Republic, selected years



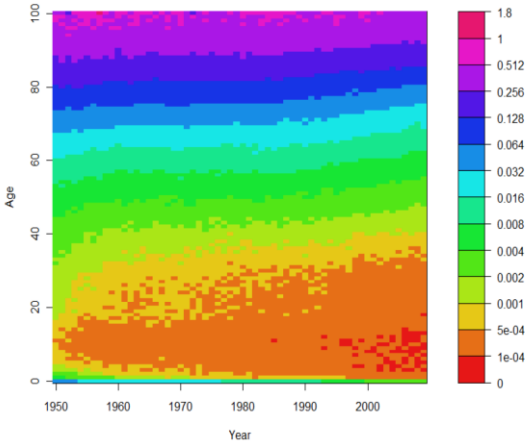
Source: The Czech Statistical Office

Chart 4.24: Age-specific death rates, Males, the Czech Republic, 1950-2009



Source: The Human Mortality Database

Chart 4.25: Age-specific death rates, Females, the Czech Republic, 1950-2009



Source: The Human Mortality Database

The previous charts of the life expectancy decomposition also revealed that improvement in mortality occurred at the youngest ages. Within demographic study mortality till the first year of life has special position and its indicators are used for international comparison of socio-economic development. The infant mortality rate, which is a basic indicator and refers to the number of deaths of babies under one year of age per 1000 live births at given year, is sensitive to definition of life birth, but in case of period 1989-2009 the specification has been unchanged in the Czech Republic. These days, the infant mortality rate reaches significantly low level, which touches biological boundary 2 ‰, in the Czech Republic (See Table 4.5). The value of approximately 3 death babies per 1 000 live births in 2009 was reached from the value of 10 deaths per 1 000 live births in 1989. Enhancement was attained in both mortality under 28 days (neonatal mortality) and mortality above 28 days till one year (postneonatal

mortality). Deaths under one year in 2009 accounted for 27 % of value documented in the year 1989. In addition, deaths under 28 days reached 22 % of the value in 1989. The ratio of deaths under 28 days and under one year improved from 70 % to 57 % over given period as well. According to presented figures, substantial improvements in infant mortality cannot be expected in following years. Also it is clear that more than infant mortality, changes in mortality at older ages are relevant for population development in the Czech Republic.

Table 4.5: Mortality under 1 year, the Czech Republic, selected years

	1989	1992	1995	1998	2001	2004	2007	2009
Deaths under 1 year	1 280	1 204	740	472	360	366	360	341
Deaths under 28 days	886	749	475	289	212	224	235	194
Percentage of deaths under 1 year from total deaths	1.0	1.0	0.6	0.4	0.3	0.3	0.3	0.3
Percentage of deaths under 28 days from deaths under 1 year	69.2	62.2	64.2	61.2	58.9	61.2	65.3	56.9
Infant mortality rate (‰)	10.0	9.9	7.7	5.2	4.0	3.7	3.1	2.9
Neonatal mortality rate (‰)	6.9	6.2	4.9	3.2	2.3	2.3	2.1	1.6
Postneonatal mortality rate (‰)	3.1	3.7	2.8	2.0	1.6	1.5	1.1	1.2

Notes: Neonatal mortality rate refers to the number of deaths of babies under 28 days of age per 1000 live births at given year. Analogously, postneonatal mortality rates equals to the number of deaths of babies 28-365 days of age per 1000 live births at given year.

Source: The Czech Statistical Office

In general, mortality development in long-term perspective can be divided by stages which are characterised by occurrence of specific group of diseases. The Epidemiological transition, how the conceptualization is named, concerns three stages: the age of pestilence and famine, the age of receding pandemics, and the age of degenerative and man-made diseases. The Czech Republic with no doubts had been at the third stage since 1989. Neoplasms, disease of circulatory, respiratory and digestive systems encompassed 89 % of deaths in the year 1989 and this figure remained relatively unchanged over following twenty years.

More than half of deaths were caused by diseases of circulatory system, which remained, in defiance of decline in absolute numbers, a primary cause of deaths within a span of two decades. In addition, while cerebrovascular diseases and acute myocardial infarction prevailed with a share of 33 % and 24 % respectively in 1989, in 2009 chronic ischemic heart diseases and cerebrovascular diseases dominated with almost 35 % and 22 %. In spite the fact that, counts of deaths caused by nepolams did not changed over period 1989-2009, its percentage significance increased from 22 % in 1989 to 26 % in 2009. The most frequent neoplsams were the bronchi and lungs with 5 446 cases, the large intestine with 2 274 cases, and neoplasms of the breast and prostate with 1 622 and 1 305 cases respectively in the year 2009. The similar pattern of development occurred due to changes in age structure and ageing with respect to diseases of the respiratory and digestive systems. While diseases of the respiratory system counted annually for 4 % to 6 % of total deaths between the years 1989-2009 and disease of the digestive system accounted for deaths in a rage from 3 % to 5 % of total deaths, in absolute terms figures did not changed. On the other hand, external causes of deaths in absolute numbers declined from 8.4 thousand deaths in 1989 to approximately 6 thousand deaths in 2009.

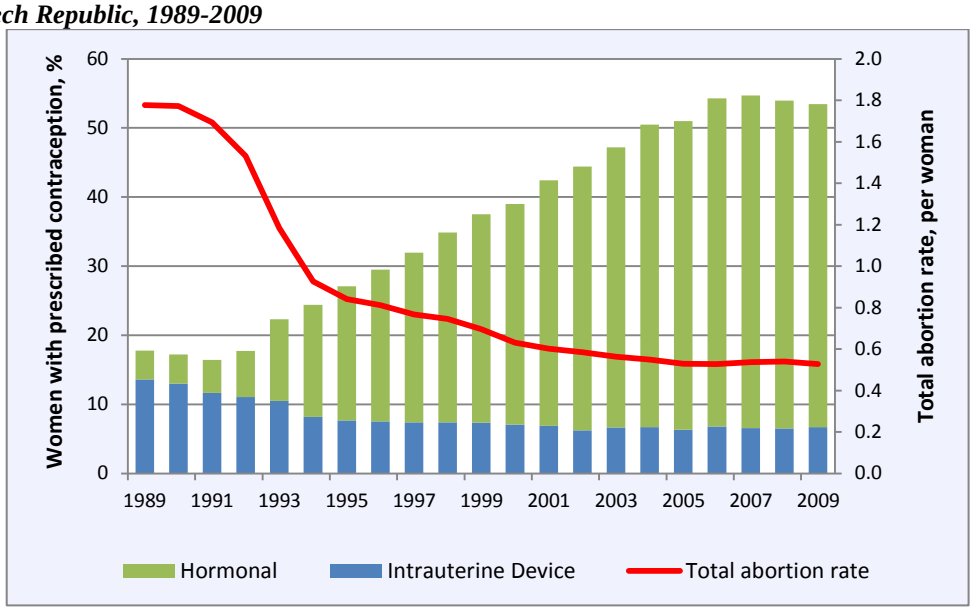
Table 4.6: Deaths by causes, the Czech Republic, selected years

	1989	1992	1995	1998	2001	2004	2007	2009
Neoplasms	**28 007**	**28 018**	**28 631**	**28 015**	**28 455**	**29 304**	**27 709**	**28 064**
Diseases of the circulatory system	**71 842**	**67 054**	**65 951**	**60 397**	**57 404**	**55 042**	**52 464**	**54 100**
Acute myocardial infarction	17 244	16 577	13 709	11 635	10 583	8 045	6 550	6 565
Chronic ischemic heart disease	15 701	14 924	16 057	12 058	12 069	12 809	19 276	18 903
Arthrosclerosis	8 161	8 734	11 010	12 378	10 474	11 618	5 058	5 920
Cerebrovascular disease	23 347	20 181	18 139	16 651	16 845	14 466	11 640	11 769
Diseases of the respiratory system	**6 027**	**5 093**	**5 076**	**4 105**	**4 653**	**5 755**	**5 715**	**6 393**
Diseases of the digestive system	**4 828**	**4 435**	**4 326**	**4 158**	**4 418**	**4 537**	**4 747**	**4 809**
External causes of deaths	**8 393**	**8 692**	**8 502**	**7 013**	**6 910**	**6 991**	**6 080**	**5 946**
Traffic accidents	1 125	1 481	1 667	1 428	1 484	1 316	12 48	1 026
Suicides	1 912	1 991	1 733	1 613	1 623	1 583	13 75	1 464
Total deaths	**127 747**	**120 290**	**117 913**	**109 527**	**107 755**	**107 177**	**104 636**	**107 421**

Notes: Till the year 1994 data according the 9the revision, afterwards data according to 10th revision.
Source: The Czech Statistical Office

In spite the fact that, abortion is studied separately in Demography, an issue of unborn was involved in this section due to its nature of hypothetical reduction of population size. Abortions were allowed in Czechoslovakia since 1958, but they were limited by abortion committees. Abortion as a free decision of woman was established in the year 1987, when the committees were abolished. Since then number of induced abortion increased significantly. For instance in the year 1989 induced abortions counted for 111.7 thousand cases of total 126.5 thousand abortions in the present-day Czech Republic. That year the number of terminated pregnancies almost equalled to the number of life births. Within a span of two decades, the number of induced abortions declined to 24.6 thousand cases of total 40.5 thousand abortions. Therefore, in absolute counts spontaneous abortion increased from 14.8 thousand cases in 1989 to 15.9 cases in 2009. Although figures of spontaneous abortions slightly increased, the total reduction in abortion with a range of 70 % was extraordinary over stated period. Hence, it is not surprising, that the total abortion rate, which refers to the average number of abortions that a woman would have during her life if she experienced the age-specific abortion rates of a given year, declined from 1.78 in 1989 to 0.53 abortion per woman in the year 2009 (See Chart 4.26). Enhancement with respect to abortion was also attained due to expansion of contraceptive usage. While in the year 1989 a share of women with prescribed contraception from total number of women at fertile age 15-49 equalled to 17 %, in the year 2009 the share correspond with 53 %. Within twenty years preference of hormonal contraception to intrauterine device was profound.

Chart 4.26: Total abortion rate and percentage of women with prescribed contraceptive, the Czech Republic, 1989-2009



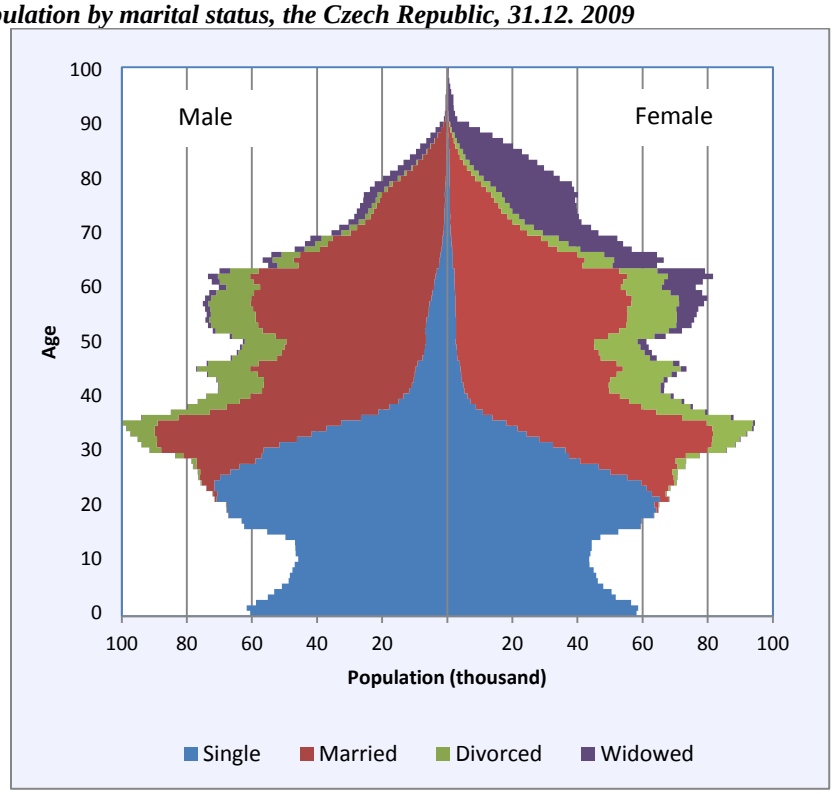
Source: The Czech Statistical Office, the Institute of Health Information and Statistics of the Czech Republic

4.1.5. Nuptiality and Divorce

Although it is reasonable to assume that nuptiality with respect to the first marriage in an ageing population is going to be at a lower level than in population with young age structure, nuptiality has remained a major factor in fertility in the Czech Republic since 1989. Also divorce as a legal dissolution of marriage has been relatively significant. Therefore, this section is devoted to an issue of basic trends of development in formation and dissolution of families in the Czech Republic in a period 1989-2009. Data from the Czech Statistical Office provide background for all presented figures.

With the above mentioned features, nuptiality as a frequency of marriage within a population varies with the age structure of population. The age-pyramid by marital status of the Czech population in the year 2009 is presented on the Chart 4.27. Taking into account the fact that marriages are bounded by law, it is not surprising that background of the pyramid consists of single population. Population from birth to eighteen years accounted for 19.7 % of male and 18 % of female population. Approximately from the age of 18, number of singles in population continuously shrinks as young people enter to marriage, later divorces and dissolution of marriages due to spouses' deaths occur. In the year 2009, 44 % of males and 42 % of females were married, 8.9 % and 10.9 % respectively divorced, and 2.3 % of males and 11.8 % of females were widowed. Higher proportion of widowed females at older ages has been related with males' excess mortality.

Chart 4.27: Population by marital status, the Czech Republic, 31.12. 2009

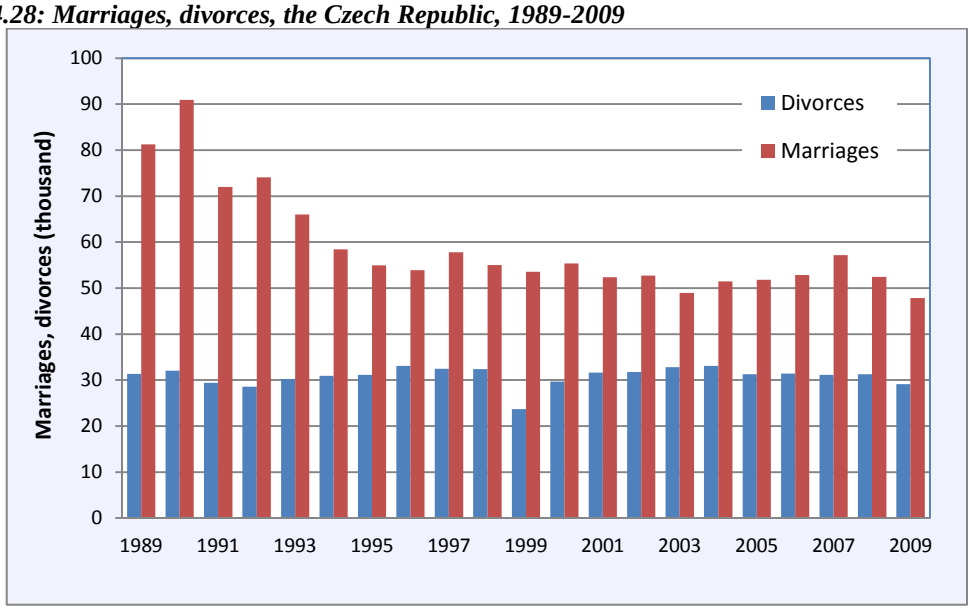


Source: The Czech Statistical Office

Within a period 1989-2009 substantial fall in total number of marriages was observed. In the year 1989, more than 81 thousand marriages were declared, one year later the value extraordinarily increased to almost 91 thousand marriages. Since then annual number of marriages fell into decline with marginal fluctuations (See Chart 4.28). In the year 2009, the figure corresponded to 47.9 thousand marriages, which equalled to decrease in amount of 33.4 thousand in comparison with the year 1989. This development is explained not only by changes in age structure, but also by changes with respect to the first marriages.

While the proportion of first marriages in 1989 corresponded to 89.2 % for males and 95.3 % for females at the age of 50, in the year 2009 the percentages equalled to 56.1 % and 62.7 % respectively. This means that based on nuptiality tables for singles at the age of 50 almost 44 % of males and more than 37 % of females would not enter into marriage in 2009. But population balance by marital status in 2009 revealed that only 10.5 % of males and 4.2 % of females were singles. The difference is caused besides other things by shift in mean age at the first marriage, which increased from 24.6 years for males and 21.8 years for females in 1989 to 32 years and 29.2 years respectively in 2009. Within a span of two decades, mean age at the first marriage increased by 7.4 years for both males and females. The changes are explained by prolonged studies. While more than 7.7 thousand bridegrooms and almost 4.9 thousand brides from total 81.3 thousand marriages attained university degree in 1989, in 2009 more than 10 thousand bridegrooms and 11.2 thousand brides from total 47.9 thousand marriages had university degree. In addition, 73 % of the engaged were under the age of 30 in 1989 and 31 % in 2009. The postponement of the first marriage has been pronounced in the Czech Republic in the period 1989-2009.

Chart 4.28: Marriages, divorces, the Czech Republic, 1989-2009



Source: The Czech Statistical Office

Table 4.7: Summary measures of nuptiality, the Czech Republic, selected years

	1989	1992	1995	1998	2001	2004	2007	2009
Total marriages	81 262	74 060	54 956	55 027	52 374	51 447	57 157	47 862
Crude marriage rate (‰)	7.8	7.2	5.3	5.4	5.1	5.0	5.5	4.6
Total first marriage rate (%)								
Males	89.2	85.4	73.2	70.8	66.0	63.6	64.5	56.1
Females	95.3	91.5	79.9	75.7	72.5	69.8	71.1	62.7
Mean age at first marriage								
Males	24.6	24.8	26.7	28.1	29.3	30.5	31.2	32.0
Females	21.8	22.6	24.6	25.8	26.9	28.0	28.6	29.2

Source: The Czech Statistical Office

Considering marital status of the engaged rich diversity was documented over given period (See Table 4.7). In the year 2009, almost 64 % of the engaged entered into marriage as singles and 17 % entered into their at least second marriage. The cases when one of a spouse was single, i.e. single man married divorced or widowed woman or the other way around, accounted for almost 20 % cases. Majority of subsequent marriages were predominantly due to divorced population, because only 2.5 % of widowed regardless of gender entered into marriage again. According to order of marriage, the second marriages were prevailing. From the total subsequent males' marriages 12 454 more than 84 % correspond to the second marriages, almost 14 % to the third marriages, and approximately 2 % covered marriages of the fourth and higher orders in 2009. Females entered into total 12 001 subsequent marriages and percentages with respect to marriage order were pretty similar to those for males. With respect to age and marital status of the engaged, till the age of 35 years marriages of singles preponderated in 2009, afterwards marriages of divorced gained in importance.

Table 4.8: Marriages by marital status of bride and groom, the Czech Republic, selected years

	1989	1992	1995	2001	2004	2007	2009
First male and female marriages							
Marriages	55 958	51 883	36 756	33 918	33 022	36 247	30 315
Share of total marriages (%)	68.9	70.1	66.9	64.8	64.2	63.4	63.3
Single male marriages to divorced or widowed female							
Marriages	6 587	5 710	4 751	4 923	4 918	5 505	4 550
Share of total marriages (%)	8.1	7.7	8.6	9.4	9.6	9.6	9.5
Divorced or widowed male marriages to single female							
Marriages	6 779	6 113	4 923	5 300	5 125	5 785	4 888
Share of total marriages (%)	8.3	8.3	9.0	10.1	10.0	10.1	10.2
Bilateral subsequent marriages							
Marriages	11 938	10 354	8 526	8 233	8 382	9 620	8 109
Share of total marriages (%)	14.7	14.0	15.5	15.7	16.3	16.8	16.9

Notes: Data for the year 1998 available only for the same marital status of the engaged.

Source: The Czech Statistical Office

Within a period 1989-2009 total number of divorces decline from 31 thousand in 1989 to 29 thousand in 2009. It could seem to be an improvement, but the reverse is a plain truth, because taking into account number of marriages, figures deteriorated. While in 1989 almost 39 divorces belonged to hundred marriages, in 2009 the figure corresponded to 61 divorces. Although these numbers are interesting, they do not explain much, because divorces are not related to marriages from which they originate. Therefore, the total divorce rate, which refers to the percentage of marriages that would end in divorce if the divorce rate of the reference year remained the same during the entire marriage, is more reliable. Within a span of two decades the total divorce rate increased from 37 % in 1989 to 47 % in 2009. This means, that currently almost half of marriages end with divorce. According to length of marriage, the highest intensity of divorce remained within the first six years of marriage. Then after, intensity with the length of marriage declined. The average length of marriage was extended by 2.4 years in given period, i.e. from 10.1 years in 1989 to 12.5 years in 2009.

With respect to divorce in the Czech Republic since 1989, it is necessary to note that in 1998 significant change in divorced law was made. An amendment of the law changed the prerequisites for divorce especially with respect to dependent children. A form of childcare after divorce has to be untangled before divorce. A bill of the law was introduced in 1996 and since then number of divorces increased. The minimum, 23 657 divorces, was reached in 1999, next year after the law introduction. In spite the fact that, a share of divorces with dependent children from total divorces fell from 72 % in 1989 to 58 %, the change cannot be fully ascribed to a change in law. This pattern was also supported by more divorces of long lasting marriages and fertility decline in the 90's.

Table 4.9: Summary measures of divorce, the Czech Republic, selected years

	1989	1992	1995	1998	2001	2004	2007	2009
Total divorces	31 376	28 572	31 135	32 363	31 586	33 060	31 129	29 133
Crude divorce rate (‰)	3.0	2.8	3.0	3.1	3.1	3.2	3.0	2.8
Divorces per 100 marriages	38.6	38.6	56.7	58.8	60.3	64.3	54.5	60.9
Average length of marriage	10.1	10.2	10.5	10.8	11.3	11.9	12.3	12.5
Share of divorces with dependent children from total divorces (%)	72.1	71.7	71.0	66.9	65.1	62.9	59.1	57.8
Total divorce rate (%)	37.2	33.9	38.4	43.1	44.7	49.3	48.7	46.8

Source: The Czech Statistical Office

4.1.6. Migration

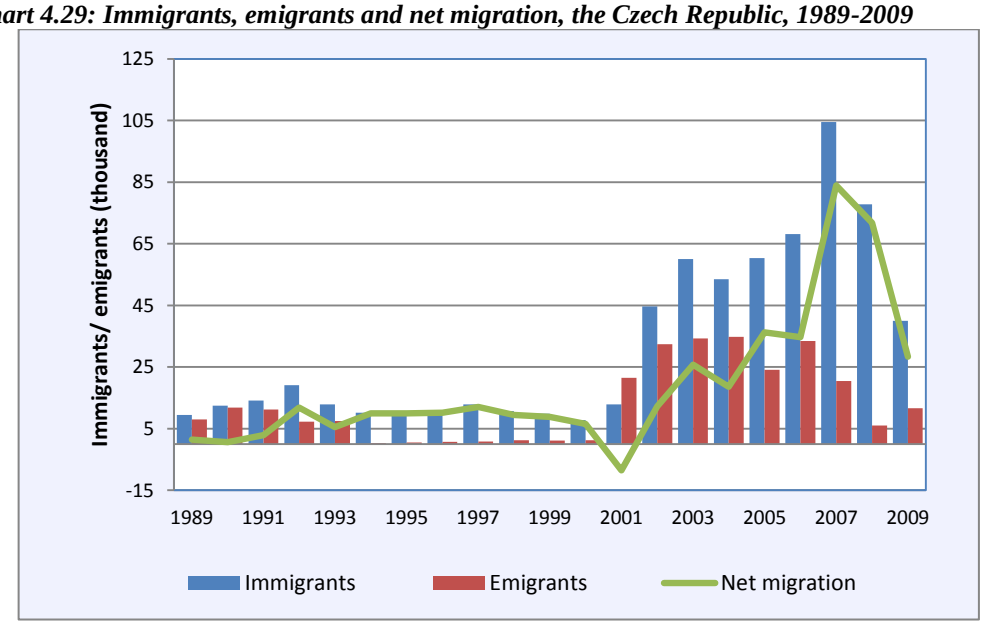
Before the year 1989, international migration balance was marginal due to closed borders. Official negative net migration count for the period 1950-1989 was set onto 70 667 inhabitants, but it is assumed that the loss was greater due to illegal emigration, especially after the years 1948 and 1968. Based on disparity between population count balances and census results it is assumed that total negative net migration count for given period involved almost 556 000 inhabitants (Srb, 2004). Since 1989, when borders of Czechoslovakia were open, magnitude of international migration and its impact on population development increased. Therefore, this section focuses on the basic trends in international migration in the Czech Republic since 1989. All presented figures are based on data of the Czech Statistical Office.

With respect to political development in the Czech Republic it is not surprising that foreigners accounted only for 0.3 % of total population in 1989. Since then the country has attracted migrants, therefore in the year 2009 foreigners made up 4.1 % of population. Nevertheless Czech population has been still relatively homogenous with respect to nationality. In absolute numbers, while in 1989 more than 9.4 thousand people immigrated and 8 thousand emigrated, in 2009 almost 40 thousand people came and 11.6 thousand leaved the Czech Republic (See Chart 4.29). The figures fluctuated substantially over given period. For instance, the maximum value of immigration was reached with 104 thousand people in 2007 and minimum with 7.8 thousand migrants in 2000. With respect to emigration, the maximum value almost 35 thousand people was documented in 2004 and minimum 256 persons in 1994. But it is necessary to take into account that migration, in general, is burdened by processing mistakes more than any other demographic processes and that with combination of all legislative changes considering migration, data cannot be complete and fully comparable over all period.

According to type of residence, since 1993 more than half of foreigners had long term stay over 90 days (See Chart 4.30). The figures fluctuated relatively frequently, but general trend was increasing over all period. Because age-structure of foreigners has been specific, i.e. majority of migrants has fallen into age groups of economic active population, it can be assumed that significant share of migration has been related to work migration. In that case, fluctuations in numbers of long term stay over 90 days are reasonable. On the other hand, number of foreigners with permanent stay continuously increased in the period 1989-2009, from 27 thousand in 1989 to 180 thousand people in 2009. According to nationality, in the year 2009 more than 30 % of foreigners came from Ukraine, 17 % from the Slovak Republic, 14 %

from Vietnam, 7 % from Russia, and 4.5 % from Poland. As stated above, majority of foreigners has been in reproductive age, therefore 3 thousand from total 118 thousand life births were children with nationality different from the Czech in the year 2009. More than 30 % of children born to foreigners had Vietnamese nationality, 25 % Ukraine nationality, and 14 % of them had Slovak nationality. In spite the fact that, migration has become higher by several orders of magnitude and significantly has contributed to population increase in the 21 century, foreigners' fertility in defiance of increasing trend has not been capable to paste a gap in age structure caused by low level of fertility[110].

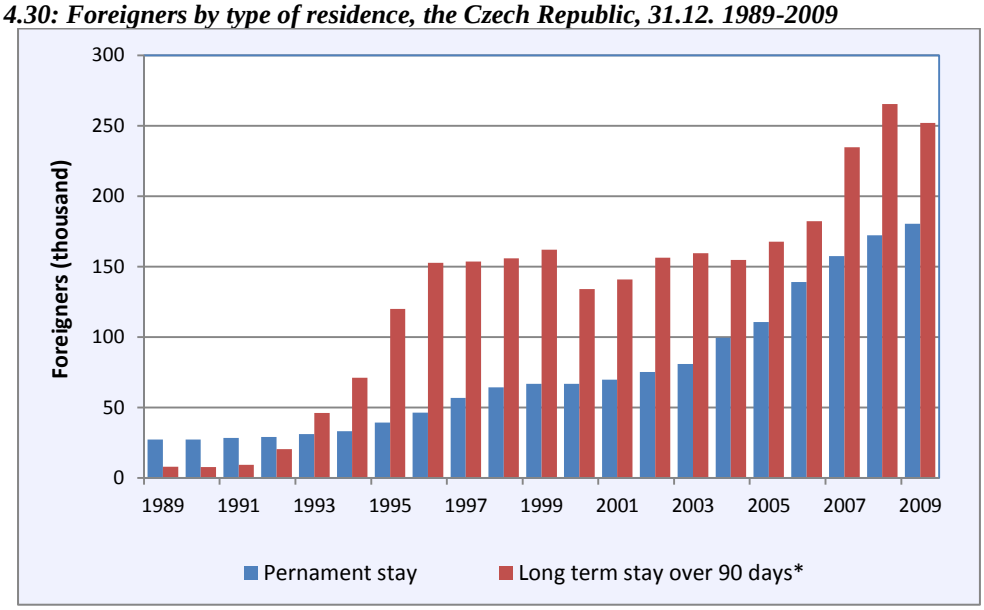
Chart 4.29: Immigrants, emigrants and net migration, the Czech Republic, 1989-2009



Source: The Czech Statistical Office

[110] Since 1995 data about nationality of new born child are available. From the year 2002 number of children with nationality different from the Czech has steadily and significantly increased. For instance, 665 babies had different nationality from the Czech in 1995, in the year 2002 it was 1 154 babies, and in the year 2009 the figure equaled to 3 104 babies.

Chart 4.30: Foreigners by type of residence, the Czech Republic, 31.12. 1989-2009

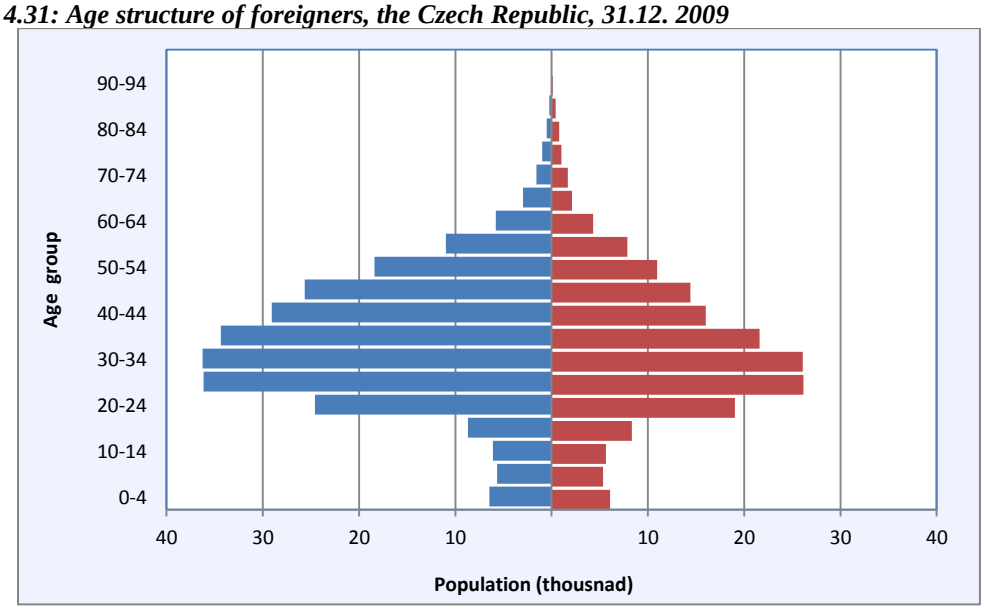


Notes: Till the year without stateless persons.

* 1985-1999 long-term residence, 2000-2003 90-days-and-over visa, since 2004 temporary EU, long-term residence and 90-days-and-over visa are included.

Source: The Czech Statistical Office

Chart 4.31: Age structure of foreigners, the Czech Republic, 31.12. 2009



Source: The Czech Statistical Office

4.1.7. Household structure

The household structure is not commonly included in basic characteristics of population development, but with respect to the topic of the work it seems reasonable to complete the basic demographic trends with additional information about household/family structure in the Czech Republic since 1989. To fulfil the task the following section is devoted to analysis of households data which were collected in censuses and have been provided by the Czech Statistical Office. Unfortunately, the last census data from the year 2011 have not been available

yet, therefore structures captured in the Population and Household Census 1991 and 2001 are predominantly presented in this section.

In the Czech censuses three types of households have been distinguished since 1961. The first, a dwelling household involves all persons living permanently together in one dwelling. This kind of household may be comprised of one or more housekeeping households, the second type of household. The housekeeping household consists not only by persons living permanently together in one dwelling, but also by persons sharing the housing costs. The housekeeping household can be comprised of one or more census households, the third type of household. The census household is defined based on kinship or other relationships. Basically two kinds of census households are distinguished, family household and non-family households, which are subdivided into following sub-classes: family household with two parents (complete family household)[111], family household with one parent (single-parent household)[112], which are both subsequently divided into families with and without dependent children, and non-family households of individuals (single-member household)[113] and non-family household of several members (multi-member household) [114] (CZSO, 2004) [115]. This section is focused only on censuses households which specify the family in Czech statistics.

Although with delay, household and family structures are capable to capture all changes in population development. In Czech data, lower levels of nuptiality and fertility in combination with their postponement to higher ages in the 90's of the 20th century were reflected on fall in number of completed family households with dependent children between censuses 1991 and 2001. Decrease accounted for 305 thousand families (See Table 4.10). On the other hand, higher intensity of divorce, new and less stable family forms as well as decline in mortality caused increase in single-member households, single-parent households, and complete family households without dependent children. In total, the gain of single-member households between 1991 and 2001 corresponded to almost 187 thousand households and a share 30 % of total census households in 2001. Significant increase was especially in single-member households up to 30 years due to numerous generations of the 70's and lower intensity of nuptiality at that age. An important increase, 142 thousand households between censuses 1991 and 2001, was documented in case of single-parent households. Almost 63 % of the change accounted for single-parent families with dependent children. It is highly probable that given change reflected higher intensity of divorce, significant share of children born outside marriage and lower intensity of subsequent marriages. Increase in complete households without dependent children was related to popular cohabitation at the age group 25-29 years and couples older than

[111] Comprised of married couple or cohabiting couple living in a consensual union (the so-called de facto marriage or consensual unions) without children or with children.

[112] Consist of one parent living at least with one child.

[113] Be composed of persons living in a dwelling separately or as subtenants, or living together with another household, but with a separate housekeeping.

[114] Consist of two or more persons who share common housekeeping and are or are not relatives.

[115] Data about household are not necessarily comparable within time, because changes in household methodology were done. For instance, in census 2001 dependent children was specified not only by kinship, but as well by economic inactivity (without earning livelihood) and by age 0-25 years (CZSO, 2004). Also grandparent with grandchild was moved from single-parent household, in this case from incomplete family households, to multi-member non-family household (Bartoňová, 2005).

50 years whose children were grown up. Given trends were also mirrored in average number of household members.

Table 4.10: Census households, the Czech Republic, census 1991 and 2001

	Number of households (thousand)		Change 1991-2001		Average number of household members	
	1991	**2001**	**thousand**	**%**	**1991**	**2001**
Census households	4 051.6	4 270.7	219.1	5.4	2.53	2.38
Family households	**2 947.3**	**2 910.0**	**-37.3**	**-1.3**	x	x
Complete family household	2 512.9	2 333.6	-179.3	-7.1	3.21	3.12
with dependent children	1 395.9	1 090.8	-305.1	-21.9	3.92	3.88
without dependent children	1 117.0	1 242.8	125.8	11.3	2.33	2.45
Single-parent household	434.4	576.4	142.0	32.7	2.44	2.46
with dependent children	254.1	343.4	89.3	35.1	2.64	2.62
without dependent children	180.3	233.0	52.7	29.2	2.17	2.24
Non-family households	**1 104.3**	**1 360.7**	**256.4**	**23.2**	x	x
Single-member household	1 089.6	1 276.2	186.6	17.1	1	1
Multi-member household	14.7	84.5	69.8	474.8	2.06	2.12

Source: The Czech Statistical Office

Considering demography, family households are the most important for its potential of reproduction. Despite the decline in total number of family households in 2001 in comparison with the previous census, they consisted 68 % of census households. In addition, more than 8 703 thousand people from total 10 224 thousand people lived in this form of household in 2001. Decomposition of family households into detailed units revealed impact of changes in fertility and family formation between years 1991 and 2001. Completed families comprised of married couple and dependent children accounted for majority of family households in both censuses, but the change was noticeable (See Table 4.11). In 2001 the families reached 76.6 % of the value obtained in 1991. With respect to number of dependent children, the largest change occurred in families with three and four and more children. The figures 2001 embraced 60 % of families with three children and 71 % of families with four and more children from the year 1991. Not surprisingly, number of families with one and two dependent children also declined. They reached 82 % and 76 % value of the year 1991 respectively in 2001 and while in 1991 they together involved 88.7 % from total number of families comprised of married couple and dependent children, within ten year percentage increased to 90.3 %.

A special category within completed families belongs to cohabitations. Although their share on the total completed families almost doubled between 1991 and 2001, they accounted only for 5.4 % in the census 2001. The increasing trend in counts has been obvious, from 84.9 thousand in 1991 to 125.3 thousand, but nevertheless it seems that available counts have undervalued real state with respect to data collection and processing. Also, Czech data did not reveal that fertility within cohabitation has been substitute to fertility within marriage. Majority of consensual unions were without dependent children, 45.4 thousand in 1991 and 73.9 thousand in 2001. In addition, 41.4 % of males were single and 49.5 % of males were divorced within cohabitation in 2001. Corresponding percentages for females equalled to 35.2 % and

46 % respectively. Despite the significant increase of cohabitations at the age up to 30 years between stated censuses, most frequently consensual unions comprised of divorced older than 40 years. Furthermore, those cohabitations, which had dependent children, had in 54.8 % one child and 32 % two children in 2001 (See Table 4.11). Their share on total number of consensual unions accounted for 35.6 % in 2001[116]. With respect to the total number of families with dependent children in 2001, cohabitations involved 3.6 %.

Table 4.11: Family households by type with dependent children, the Czech Republic, 1991 and 2001

Type of the family	Year	Number of dependent children				Total	In %	Index 2001/1991
		1	2	3	4+			
Completed family: married couple	**1991**	546 281	657 301	131 985	20 816	1 356 383	82.2	76.6 %
	2001	445 499	500 088	78 888	14 876	1 039 351	72.5	
Completed family: cohabitation	**1991**	19 190	13 820	4 738	1 737	39 485	2.4	149.8 %
	2001	28 181	16 448	4 838	1 952	51 419	3.6	
Single-parent: male	**1991**	21 007	7 753	1 245	223	30 228	1.8	163.4 %
	2001	28 818	12 017	1 711	374	42 920	3.0	
Single-parent: female	**1991**	144 964	65 671	11 223	1 997	223 855	13.6	154.4 %
	2001	193 156	90 352	14 070	2 907	300 485	21.0	
Total	**1991**	731 442	74 4545	149 191	24 773	1 649 951	100	86.9 %
	2001	695 654	618 905	99 507	20 109	1 434 175	100	

Source: The Czech Statistical Office

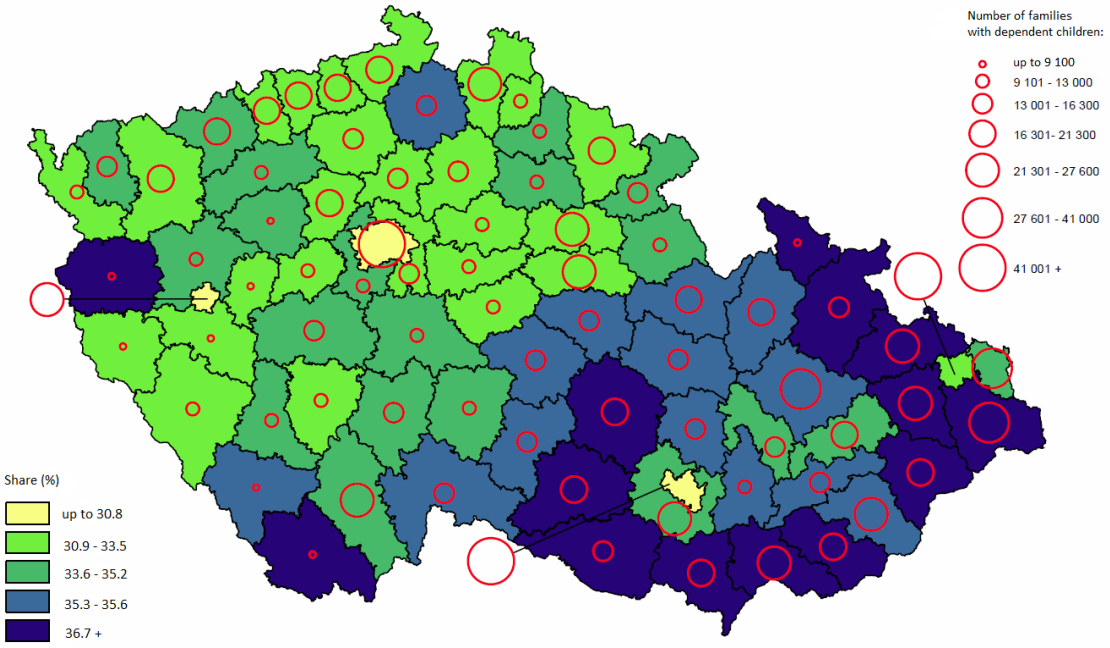
Within a span of ten years, significant growing trend was documented with respect to single-parent households both without and with dependent children. Besides that, number of incomplete families with dependent children grew both for males and females as a head of household. For instance, the number of male-parent households increased from 30 thousand in 1991 to almost 43 thousand in 2001 (See Table 4.11). Their share on total family households changed from 1% to 1.5 % between stated censuses. No surprisingly their proportion to families with dependent children was greater, 3 % in 2001, but in comparison with female-parent families it was marginal. The figure of female-parent families with dependent children arose from 223.9 thousand in 1991 to 300.5 thousand in 2001. Their share on total family households increased from 7.6 % in 1991 to 10.3 % in 2001. Considering only families with dependent children, female-parent families accounted for 21 % families in 2001. With no doubt, women were with dependent children seven times more often than men. Unexpected can be the fact, that figures grew for all families with respect to number of dependent children between 1991 and 2001. Less surprising can be that more than 60 % of change added up to families with one dependent child for both female and male parent families. In most cases, age of woman in female-parent households fell into age-group 25-39 years and man in male-parent households into 35-49 years in 2001. In addition, more than half of females and males were divorced within age-group 30-39 years. Relatively significant were also figures for married females and males.

[116] A share of cohabitation with dependent children on total number of consensual unions equaled to 41 % in 2001.

At the time of census 2001, more than 26 % of females and 28 % of males as a head of single-parent household with depended children were married.

Regional differentiation in family households with dependent children on total census households in 2001 is captured in the Chart 4.32. The lowest shares of households with dependent children were in Prague (29.9 %), Pilsner (29.6 %), and Brno (30.8 %). On the other hand, their corresponding shares of single-parent households reached the highest values, approximately 30 % each, among cities up to 50 thousand inhabitants. But in general, clear causality between number of incomplete families and size of city did not hold for Czech data 2001.

Chart 4.32: Share of families with dependent children from total census households, the Czech Republic, 1. 3. 2001



Source: The Czech Statistical Office

4.2 Analysis of economic data regarding population development

The previous section provides the basic trends in population development in the Czech Republic since 1989. This section combines that information with knowledge regarding economic performance of the Czech Republic over period 1989-2009. The sub-chapter is comprised of three seemingly independent parts. The first part introduces the fundamental features of economic development since 1989, the second analyses macro-economic data with respect to fertility, and the last part is focused on micro analysis which encompasses changes in taxes and benefits with respect to the family in the Czech Republic over stated period of time.

4.2.1 Economic development in the Czech Republic since 1989

Also this subchapter about economic development in the Czech Republic since 1989 is divided into three autonomous sub-parts. The first part discusses an issue of transformation from

a centrally planned economy to a market one, which was definitely a crucial process influencing both population and economic trend. To illustrate the magnitude of a change, development of basic economic indicators is presented in the second subchapter. The last, third sub-section is devoted to the economic situation of Czech families with children. Included figures reveal how families with children have been affected by the transformation process and subsequent economic development.

4.2.1.1 Economic transformation

With no doubt, economic development has been characterised by unique transformation from a command to a market economy in the Czech Republic since 1989. Therefore, to understand possible relationship of economy to fertility not only subsequent development of the Czech economy, but also background of the economic transformation is discussed in this section. Firstly, advantages and disadvantages of the present-day Czech Republic for transformation process are discussed. Then after, basic steps of transformation as a market liberalization, macroeconomic stabilization, privatization, and formation of social net are sketched.

The aim of the transformation was a switch from a centrally command to a decentralised system. The present-day Czech Republic had its advantages as well as disadvantages which could promote or limited the transformation in comparison with other command economies that time. Švejnar (1997) claims that one of the advantage was general knowledge in population about economic performance before the year 1948, when communist took over political power in Czechoslovakia. That time Czechoslovakia belonged to the most developed economies in the world. Therefore, economic drop of socialist central-command system was understand as a failure and relatively strict reforms were accepted in comparison with other transforming economies, as a way to reach previous position within developed western economies. A new political representation had problem to introduce radical reforms in countries where former economic development had not been so extensive, i.e. Poland. On the other hand, this knowledge generated not only potential for a change, but also unrealistic expectations with respect to speed of capturing western economies.

Geographical location of the country in the central Europe with shared borderlines with Germany and Austria also positively contributed to the transformation. The Czech Republic was the most westerly located transition economy, which enabled to easier flows of commodities, know-how and people from western countries to the Czech Republic (Švejnar, 1997, p.12; Žídek, 2006, p.1). In spite the fact that, humanistic and social studies were underdeveloped in Czechoslovakia due to communist ideology, human capital measured as attained education was relatively high in Czech population. Especially, technical branches had qualified work-force. Undoubtedly, some skills were missing at the beginning of the transformation, but in comparison with developing economies human capital reached high quality (Průcha et al., 2009, p.942). Therefore, despite several structural imbalances Czechoslovak economy was most developed with marginal income inequalities among other post-communist economies (Žídek, 2006, p.2). It is necessary to take into account that level of advancement was only relative. While in the 50's of the 20th century Czechoslovakia was ranked among western countries, in the late 80's gross domestic product per capita reached only

20 % of value in Austria (Žídek, 2006, p.2). Nevertheless, Švejnar (1997) and others point out that communist economic policy was somewhat cautious, therefore at the beginning of the transformation the state did not have to struggle with hyperinflation, industry consisted of complete branch structure, and agriculture was capable of production commodities of temperate zone. Also state budget deficit and foreign debt attained low levels compared to other transforming economies (Průša, 2009, p.941-942). To the contrary, the present-day Czech Republic was also equipped by several disadvantages resulting from a centrally planned system at the beginning of the process. They were interconnected, but major disadvantages were in a shortage of physical capital and technologies, deep dependence on market of other command economies, and degree of centralization.

Centrally planned economy was characterised by the vertically hierarchical system in which decision about production passed down from a centre to delegated units and finally to enterprises. The core of the system was a plan. But decision makers in the centre did not know productive capacity of enterprises as well as demand for their products. It was really difficult for them to estimate real demand for goods, because prices did not fulfil allocation function. Prices were artificially defined and fixed. Hence, command economy was rather than by central plan characterised by missing markets with prices bearing information about effective allocation. Therefore, to define central scheme managers of enterprises participated in negotiations about inputs and outputs for their production. Because enterprises were evaluated based on realization of stated plan, managers in their expected production minimized outputs and maximized inputs. In fact, decision about production was done not from centre and the top of hierarchical pyramid, but from the bottom. Mlčoch (1990 a,b) designated the system as an upturned pyramid. In addition, Mlčoch (1990 a,b) points out that vertical control was limited by specific horizontal supplier-customer relationships among monopolised markets. All of them had interest to fulfil defined plan and had to solve a problem of resources rather than problem of sales.

According the above mentioned features, a plan was specified not ex-ante, what would be expected, but ex-post when capacities of enterprises were known (Holman, 2000, p.12). The system led to significant wastage, which in combination with economy orientation into heavy industry (metallurgical, engineering, and power) resulted in significant ecology burden. Economists had realised that extensive production was unsustainable. They initiated a change to intensive economy based on innovation and technological progress as it was known from capitalistic economies. But they did not succeed. Czechoslovak heavy industry accounted for 63 % of total GDP and services for 30 % in 1980 (Holman, 2000, p.13). The system did not motivate enterprises to be effective. They did not compete for customers in comparison with market economies and therefore, they did not invested to technologies and innovations so much. While in 1996 approximately 12 % of Czechoslovak products were capable of international competition, in 1979 it was 2 % products (Steiner et al. in Žídek, 2006, p.10). The disproportion was exaggerated by dependence on the markets of the Council for Mutual Economic Assistance[117] and the deep centralization.

[117] Rada vzájemné hospodářské pomoci (RVHP).

Because command economies were losing competitiveness in foreign markets their exports were oriented predominately to the markets of the Council for Mutual Economic Assistance. The Council for Mutual Economic Assistance was established in 1949 as a counterpart to the European Recovery Program and encompassed all communist countries under hegemony of the Union of Soviet Socialist Republics. In 1989, almost 46 % imports and 43 % exports in Czechoslovakia were heading from or to the Soviet Union (Collins et al., in Žídek, 2006, p.15). Economic integration of Czechoslovakia into the council was greater than of Poland or Hungary (Švejnar, 1997, p.13). Therefore, it is not surprising that after a collapse of communist regime Czechoslovak economy was affected by loss of markets more than others. In addition, this dependence on other command markets exaggerated ineffectiveness in production. The council provided certain selling markets, which means that producers could even more focused on resources of inputs. Specific duality in economy occurred, while high quality products were exported to market economies and lower quality were sold to command economies. Because the Council for Mutual Economic Assistance traded in exchange rouble, the interdependence among markets and their isolation were strengthen. The exchange rouble could be used only for purchase in the council's market (Holman, 2000, p.11-12).

Another disadvantage of the present-day Czech Republic was degree of centralisation which was in comparison with Poland or Hungary extreme. Private ownership or partial market institutes did not exist in Czechoslovakia before 1989 (Švejnar, 1997, p.13; Žídek, 2006, p.8). State interfered in all economic sectors and did not allow any initiative to enterprises. Competition, which in general leads to improvements in production, was considered to be wastage and eliminated. Therefore, monopolisation was widely spread. For instance, two hundred biggest enterprises in Czechoslovakia employed 1 251 thousand people in 1990, which encompass 38 % of economic active population, and their total book value of assets accounted for 63 % of total assets of industrial enterprises (Frydman et al. in Žídek, 2006, p.5). Mlčoch (1990 a,b) claims that socialist government was so rigorous that established monopoles in areas where economies of scale did not take place. With no doubts, degree of centralisation affected knowledge of market mechanisms and strengthened horizontal supplier-customer relationships among monopolised markets, which resulted in additional ineffectiveness in production.

Undoubtedly, a significant drawback of the system was in its price mechanism. Not only for inability to provide information about supply and demand to markets, but also for inability of population to recognize real costs. Price mechanism was relatively complicated and significantly distorted by taxes and subsidies in Czechoslovakia. Basically, price was defined by price office based on negotiation involving producer, subcontractors, subscribers, and officers representing quality requirements of a product. Mlčoch (1990 a,b) assumes that despite a substantial effort price office was unable to completely isolate price within given market. Taxes and subsidies were greatly selective (See Table A.1 in Appendix). Especially food, necessities, and energies were substantially subsided via negative turnover taxes. Hanousek et al. (1997) assume that subsidies account for 3 % of total GDP in 1990. Therefore, it is not surprising that prices, which have been generated by market mechanism, might seem to be too high.

Transformation process from a command to a market economy could be done in several ways with respect to advantages and disadvantages of given economy, but something as a user guide has not existed[118]. Therefore, one in two known approaches, liberal or institutional, could be applied. Liberal approach is based on creation of market stimulus, which would evoke market behaviour in population. It is assumed that people are adaptable and therefore, structural changes should lead to establishment of new entrepreneurships, searching of new markets, higher productivity, etc. Fundamental structural changes (market liberalization and privatization) have to ensure market prices, free entrance to a market, and private ownership. Afterwards, based on subsequent development of market economy market institutions are established and specified. But creation of market stimulus is a precondition for whole transformation process. In case of institutional approach, establishment of both formal and informal institutions with penalty for their violation is a background of a switch from a centrally planned to a market oriented system. According to that, transformation is understood as a complex change of deep-rooted behavioural patterns. The path dependence in human behaviour is assumed therefore transformation is seen as a long-term process. In spite of the fact that, both approaches are tenable, they partly exclude each other. If transformation involves only creation of market stimulus, than due to missing institutions they can be abused to undesirable market behaviour as misappropriation, etc. On the other hand, if economic transformation is based only on creation of institutions, missing market stimulus may limit development of forming institutions.

In spite the fact that, the roots of the transformation were dated to 17th November 1989, when a peaceful student demonstration was suppressed by police in Prague, major economic reforms were introduced by 1st January 1991. The time before was devoted predominately to fundamental political changes and preparation of the economic transition. Firstly, it was absolutely necessary to establish foundations of a new state which declared its existence on democracy and market system. Therefore, the previous Constitution of the Czechoslovak Socialist Republic was reformulated to a new document, which allowed existence of the Czechoslovak Federal Republic since 29th March 1990[119]. Afterwards new laws introducing market principles into reality were generated. For instance, laws on private enterprise, joint-stock companies, and state enterprises were approved. Furthermore, the Czechoslovak National bank got its independence and basic operations became provided by commercial banks. The Constitutional Court was established. After a heat debate, in September 1990 the state authority decided for the rapid reforms[120], which were focused on four items; market liberalization, macroeconomic stabilization, privatization, and social net.

[118] For more information about privatization theories and literature overview see Loužek, M. 2005. Nazrál čas k vyváženému hodnocení české privatizace?, Praha: *Politická ekonomie*, issue 2005/2, p.147-161.

[119] By the constitutional Law 101/1990, passed on 20 April and in force since its declaration on 23 April, the name of the republic was changed into the Czech and Slovak Federal Republic. The final dissolution of Czechoslovakia into two independent republics, the Czech Republic and the Slovak Republic, took place 1st January 1993.

[120] No one doubted that liberalization was necessary, but opinions diverged about speed by which reforms should be introduced. Uncertainty was presented predominately with respect to external trade. Supporters of gradual approach, who suggested progressive liberalization, were afraid that home producers would not be able to compete with their products on international market and economic downturn would be unavoidable. On the other hand, defenders of shock therapy, who were emphasizing potential of moment, assumed that postponement of reforms would lead to previous system, therefore reforms should be broad as much as possible and quick (Holman, 2000).

The strategy included restrictive fiscal and monetary policy with zero growth and surplus state budget till the end of year 1991 and a change of ownership via small-scale privatization, large-scale privatization, and restitution. Furthermore, within market liberalization deregulation of prices and wages as well as introduction of crown convertibility was assumed. Formation of a functional social net was considered as an essential step to mitigate impact of introduced economic reforms on population.

It is necessary to note that the first attempts to price deregulation and crown convertibility begun with elimination of subsidies on consumable goods and crown devaluation in 1990. As mentioned above, especially food and necessities were subsidized substantially. For instance Průcha et al. (2009) state that subsidies via negative turnover taxes were applied for 216 from total 1 400 groups of commodities in 1982. More specifically, that year negative turnover tax for beef accounted for - 53 %, for butter - 68 %, for fruits and vegetable products - 39 %, and for non-alcoholic beverages - 275 % (Průcha et al., 2009, p.962). At the time when subsidies were removed, prices of food increased by 24 % (Holman, 2000, p.31). Price deregulation also included bus and train traffic as well as fuels, but only partly. To moderate such an increase in living costs and maintain support for the reforms, government introduced a supplementary benefit in amount of 140 crowns per inhabitant, which was in reality redistributed subsidy. Crown devaluation was applied three times within the year 1990, which means that US dollar finally cost about 80 % more than in 1989[121]. Former external trade was done within specific monopoles which could buy foreign currency. Therefore, to open a market foreign exchange regulations had to be abolished. Within the year, foreign exchange allocation was limited and missing foreign currencies could be bought on auctions. Furthermore, crown was tied on five currencies (US Dollar, Austrian Schilling, German Mark, Swiss Franc, and French Franc). Devaluation undervalued crown, therefore while Czechoslovak exporters gained advantage in foreign markets, importers to Czechoslovakia were disadvantaged. On the other hand, it contributed to rise in prices and consequently decrease in real wages. In 1990 number of enterprises involved into foreign trade was 52 in Czechoslovakia (Dillon at el., in Žídek, 2006, p.15). In spite the fact that, these steps were only initial changes within the transformation process, all of them provided important and valuable impulses to economy.

At the beginning of the year 1991, government untied 85 % of prices, introduced wage regulation and internal convertibility of crown with 20 % import charge (Dyba et al. 1997, p.29; Průcha et al., 2009, p.963). To avoid undesirable side effects, liberalization was followed by restrictive monetary and fiscal policy. A major problem was seen in uncontrolled inflationary spiral, which could be induced by given market liberalization. That time nobody knew what equilibrium of untied prices was and foreign trade could disrupt a balance of payments. It was reasonable to assume that demand for foreign products would be great. But in this case significant trade gap could induce additional devaluation of crown which would subsequently

[121] While the last exchange rate in 1989 was 15.6 crowns per US dollar, the first devaluation accounted for 18.6 % with respect to freely convertible currencies and 10 % currency revaluation considering rouble. Official exchange rate for trade was fixed to 17 crowns per US dollar and exchange rate for tourists to 38 crowns per US dollar. Afterwards, devaluation was in amount of 54.5 % for trade, i.e. 24 crowns per US dollar. The last devaluation in 1990 added 16 %, i.e. 28 crowns per US dollar and exchange rates were unified into one (Průcha, 2009).

generate inflationary pressures. Therefore, apart from price liberalization subsidies to enterprises from budget and credits from banks were limited. Enterprises had to begin to concern their inefficient production as well as their financing, which discontinued being automatic. In addition, government regulated growth of wages. Wages were created based on market, but to avoid inflation nominal wages were kept under control with defined range. To fulfil this aim, government used taxes and tripartite negotiation. If defined range was exceed, than enterprises had to pay additional tax. With respect to exchange rate, inflationary pressures created by crown devaluation were overcome by exchange rate anchoring as mentioned above. Foreign trade was liberalized alongside price liberalization, i.e. import and export was allowed, but crown convertibility was only internal, which means that importers could buy foreign currencies in the central bank, but exporters had to sell obtained foreign currencies back to the central bank. To bound imports and therefore stabilize trade gap, an import charge was introduced.

The third part of the reforms was focused on privatization as a way how to transfer ownership from a public to a private sector. The strategy involved small-scale privatization, large-scale privatization, and restitution. Restitutions, which refer to recovery of property wrongfully confiscated to original owners, begun in Czechoslovakia already in the year 1990. In essence, restitutions are significantly complicated, because crucial moment as well as population and property which should be covered had to be decided. According to that, state authority stipulated that property confiscated to Czechoslovakia citizens after communist takeover in 1948 and in special cases church property had to be returned. The process has not finished yet, because it was complicated by the fact that restitution should be natural and not financial. Therefore, several bids for misappropriation occurred and restitution of church property has been still discussed. Fawn (2000, in Žídek, 2006, p.160) assumes that restitution have involved 30 % of state property and 30 % of population. Real amount of restitution has been unknown therefore numbers vary from author to author. For instance, Češka (1999, in Holman, 2000, p.55) assumes 25 milliards Czech crowns and Dyba and Švejnar (1997) suppose 3-4 milliards US dollar. Despite unknown accurate value of restitutions, it has seemed that this kind of privatization was as important as small privatization. Small privatization started at the outset of the year 1991 and included sales of small business premises in public auctions. In the present-day Czech Republic more than 24 thousand items worth 31 milliards crowns were sold till the year 1993 (Průcha et al, 2009, p.976). Small privatization has been assessed to be successful, although in fact contributed to problems in bank sector in subsequent years. Žídek (2006) points out that due to shortage of household savings small privatization was predominately financed by credits.

In spite the fact that, voucher privatization has been best known form of large privatization carried out in the present-day Czech Republic in the 90's in the 20th century, large privatization consisted of several standard strategies: public auctions, public tenders, direct sales, transformation to joint-stock company, gratuitous transfers of property rights to municipalities,

utilization of employee shares, and temporal control of the Fund of National Assets[122]. The law equalled all listed strategies. The large privatization took place between years 1991 and 1994. The first step consisted of transformation of enterprise into joint-stock company. Then after, a company was privatized via combination of stated strategies. Žídek (2006) illustrates the process by an example of Jitex Písek, plc[123], where property was divided as follows: 69 % vouchers, 10 % direct sales, 5 % employee shares, the rest was assigned over to funds and municipality. How company would be privatized deepened on approved proposal by the Ministry of National Property Administration and Privatization[124]. Almost 50 % of all joint-stock companies participated in voucher privatization. The motivation of the privatization strategy has been in quick transfer of property rights to new owners. Each citizen older than 18 years could buy coupon book worth 1035 crowns[125]. After that, owner of coupons could obtain assets of company involved into voucher privatization. The weak point of the strategy was that owner structure would be too disintegrated. Therefore, participation of investment funds to which coupons can be entrust were concerned. Funds were neither organized nor controlled by state. They were established by banks, investment companies or private persons and have had a curtail role within whole voucher privatization and subsequent development in Czech society.

The voucher privatization has been characterised by spontaneously formed owning structures of enterprises. Owners of vouchers had to decide by themselves where their vouchers should be invested, if to enterprise directly or to fund. Higher investment risk could be expected with respect to voucher price. The privatization was organized in two rounds. The first round, which was held from November 1991 to January 1993, involved 988 enterprises, 5.95 million investors, 429 funds, and total property of enterprises was worth 212.49 milliards crowns in the Czech Republic (Kořená et al., in Žídek, 2006, p.174). This round has been considered to be successful because number of investors was unexpectedly high, only 7.2 % of shares were unsold and state profit reached 6 milliards crowns. Majority of people 72 % entrusted their vouchers to funds. In addition, ten most successful funds obtained 56 % of total vouchers assigned to funds (Žídek, 2006, p.174-5). The second round took place from the beginning to the end of the year 1994 and encompassed 861 enterprises worth 155 milliards crowns, 6.16 million investors, and 349 funds, which obtained 63.5 % of all vouchers (Kořená et al, in Žídek, 2006, p. 174). Overall state gain was 4.4 milliards crowns (Žídek, 2006, p.174-5). In sum, property in book value 333 milliards from total 780 milliards crowns was transferred by this strategy. To illustrate magnitude of voucher privatization, standard method of large privatization accounted for 237 milliards crown and gratuitous transfers of property rights to municipalities encompassed of 121 milliards crowns (Češka, in Holman, 2000, p.55). In spite

[122] In Czech: Fond národního majetku. The Fund of National Assets was established in 1991 and its primary function was realization of privatization. Within the fund chosen enterprises were transferred into joint-stock companies. Found was also responsible for privatization account, but other institutions decided about returns. Returns were not including to state budget. The fund was closed in 2005.

[123] Company produced knitwear and clothes.

[124] The list of companies which should be privatized was created. Afterwards, company management as well as other independent subjects was responsible for submission of privatization plan. From all plans was by the Ministry of National Property Administration and Privatization chosen the best one.

[125] That time the value corresponded to one-week wage.

the fact that, whole privatization process did not finish in 1994 almost 80 % of state property was transferred to private sector that time (Švejnar, 1997, p.21).

Voucher privatization has been considered to be an effective strategy of privatization in the present-day Czech Republic. Nevertheless subsequent problems related to privatization process negatively influenced population trust to the market system and democracy. A short time after voucher privatization new owners, especially funds, revealed that their major strategy did not involve obtaining significant share in an enterprise to achieve its restructuring, but sealing the share as soon as possible. It was not necessarily wrong approach, because company restructuring demands specific knowledge which was in several cases missing. The problem emerged in uncontrolled trade with shares. Investors could trade with shares not only in securities exchange but as well as in the RM-system and the Centre for securities provided by the Ministry of Finance. The RM-system was established in 1993 as a company which organizes over-the-counter market with securities for small shareholders from the voucher privatization. Via trade should be disentangled a problem with disintegrated ownership structures and a new and responsible owner should be found. A weak point of the approach was that by concentration of private ownership minority shares loosed their value[126] and pyramid structure of ownership with banks on the top was created (Holman, 2000, p.61). In a standard economy it is nothing unusual but not in transforming economy. It generated additional problems, because majority shareholder of biggest banks was the state till 1998.

In more detail, enterprises suffered, besides other things, by so called transformation debts. They provided foreign credits, for instance to the Soviet Union or to Arab countries, which were not pay back during previous regime. Therefore, enterprises struggled not only with inconvenient structure of production which did not respond to demand, but as well with irrecoverable debts. In addition to that, enterprises could not pay back their own bank credits which utilized for their investments and privatization. If an enterprise was privatised by standard strategy, than possible owners competed. Final price was relatively high for bulk of investors, therefore purchase were financed predominately by bank loans. Hence, as enterprises became insolvent they demanded additional bank credits. But not all requested credits could be fulfilled due to restricted monetary policy which limited amount of loans to avoid inflationary spiral. As a result chain of insolvent debtors occurred, because enterprises did not pay to their suppliers. The primary insolvency induced the secondary insolvency. Although the state seemed to be serious, it was partially solved by extended maternity. Periods for payment were in comparison with standard market economy too short. But not all irrecoverable debts were removed. Angelis (1994, in Žídek, 2006) assumes that irrecoverable debts as a memory of communist regime in bank sector accounted for 190 milliards crowns.

At the very beginning of the transformation process bank sector grew substantially. Former bank sector was created by the State bank of Czechoslovakia[127], Živnostenská banka[128],

[126] Law what protected minority shareholders came into force in the year 1996.

[127] The State bank of Czechsolovakia was established in 1950 and at the same time it was central, commercial, and investment bank. As a central bank was responsible for monetary policy, i.e. issued banknotes and organized foreign exchange policy. As a commercial and investment bank was responsible for bank deposits, credits, foreign exchange and organized system of payment, but only for enterprises.

[128] Živnostenská banka was accountable for foreign exchange to private customers and ensured good relationships with foreign banks. Also bank contributed to organization of foreign trade.

Československá obchodní banka[129], and Česká státní spořitelna[130]. In 1990 the State bank of Czechoslovakia was divided into central bank and commercial banks Komerční banka, Všeobecná úvěrová banka, and Investiční banka. Afterwards, in 1992 Česká státní spořitelna, Živnostenská banka, and Komerční banka were transformed into public limited company and part of their assets was involved to the voucher privatization. That year state share in Živnostenská banka was sold to BHF Bank. State shares in the rest of listed banks were basically major and varied between 48 % and 49 % (Žídek, 2006, p.201-2). The sector was supplemented by new bank subjects, but in spite the fact that requirements for bank formation were not so strict, market was relatively concentrated[131] (See Table 4.12). In the market new small banks, most often Czech, and branch banks of foreign companies were formed[132]. On the one hand foreign banks imported their knowledge, on the other hand took over solvent customers to banks with a state share.

Table 4.12: Share of commercial banks on total deposits and credits, Czechoslovakia, the end of the year 1990

Bank name	% of credits	% of deposits
Komerční banka	47.8	17.5
Všeobecná úvěrová banka	20.1	2.9
Investiční banka	14.6	8.3
Česká a Slovenská spořitelna	10.3	62.3
Others	7.2	4.0

Source: Jonáš in Žídek, 2006, p.197

With respect to the rapid reforms, privatization of bank sector was postponed to the year 1998. State authority was afraid that in case of privatization new foreign owners with substantial knowledge about bank services would limit their loans, which could consequently limit whole privatization process. Privatization and enterprises restructuring have demanded a lot of capital. But although significant restrictions to bank credits existed, the biggest banks characterised by significant state share had potential to undesirable behaviour. For instance, banks provided so called soft bank credits. They were indulgent to grant loans, because they were too big to fail. In case of serious problems state help was expected. A downfall of big bank could destabilize whole sector. Furthermore, banks established funds which became owners of several enterprises via the voucher privatization. Therefore, it seemed reasonable for them to support their own property. As a consequence, credit applicants and their project were judged not so strict and undesirable credits were accumulated. In simple terms, banks supported ineffective productions,

[129] Československá obchodní banka was owned by the State bank of Czechoslovakia and some enterprises involved to foreign trade. Furthermore, the bank was responsible for foreign trade with economies of the Council for Mutual Economic Assistance.

[130] Česká státní spořitelna was established to ensure credits and deposits to households. A complementary element in a bank sector in Czechoslovakia was Slovenská státní spořitelna.

[131] In 1990 for a new bank establishment 50 million crowns was needed. In 1991 the request was 300 million crowns and in 1993 it was 500 million crowns. Also other requirements became demanding.

[132] A special position within transformation process in bank sector obtained Konsolidační banka, Českomoravská záruční banka, and Česká exportní banka. Konsolidační banka was responsible for irrecoverable debts from previous regime and bad credits created during transformation in state banks. Later on, the bank was transferred to agency. Českomoravská záruční bnka was established by the state and biggest banks in 1992 to support small and middle enterprises. Česká exportní banka provided cheap credits to exporters. The bank has been owned by the state and the Export Guarantee and Insurance Corporation (EGAP), which has been also owned by the state.

which consequently hindered their privatization. It is assumed that postponed bank privatization coasted 300 milliards crowns, which was fully financed by taxpayers (Žídek, 2006, p.212). With respect of argument for bank privatization postponement, Holman (2000) assumes that banks would behave equally irrespective of their status, private or state, because state would help them in case of troubles anyway.

Bank sector privatization has been frequently considered to be a weak point of Czech transformation, therefore let's see in basic features what happened. In 1998 Investiční a poštovní banka, one of the biggest banks, was sold to investment company Nomura. The price was relatively low, 3 milliards crowns and promise of additional 6 milliards crowns to bank capital, because bad credits accounted for 20 % from all credits in the bank that time (Simons, in Žídek, 2005, p.204). But afterwards, the bank was affected by recession, therefore between February and June 2000 the bank lost 34 milliards crows and became insolvent. Receivership sold the bank to Československá obchodní banka within three days at price one Czech crown. In addition, state guarantees were provided and could reach 160 milliards crowns. The risk of bank downfall was eliminated, but several arbitration proceedings were begun. For instance, Nomura asked for compensation, because the Czech Republic was not capable to protect its investments. On the other hand, the Czech Republic sued Nomura for reimbursement of costs related to receivership and Československá obchodní banka exacted promised guarantees on the Czech Republic[133]. Československá obchodní banka, the best performance state bank that time, was sold to KBC bank in 1999 at the price of 40 milliards crowns. In 2000 Česká spořitelna got new majority owner Erste Bank at the price of 19.3 milliards crowns, but it is necessary to note that before privatization state authorities paid 46 milliards crowns to make the bank feasible for investors. The last biggest bank with significant state share was Komerční banka. The bank was privatized in 2001 to Societe General, which made a payment 40 milliards crowns and could sale bad credits 20 milliards crown-worth till the end of the year 2003. It is assumed, that bank recovery cost the Czech Republic in total 75 milliards crowns (Konkolská et al., in Žídek, 2006, p.206). Total costs of bank sector privatization were not negligible. Furthermore, with respect to public opinion the situation was exaggerated by the fact that co-operative credit unions, which were since their establishment in 1996 very popular due to their high promised interests, plunged into deep crisis at the turn of the century.

Six biggest unions which took care about 60 % of deposits became bankrupt in 2000 (Dubská, 2003, p.142). The following year 2001 only 55 credits unions from total 135 carried on business without any limitation from state agencies. In addition, number of unions' members diminished from 112 thousand to 8 thousand participants and amount of deposits declined from initial 10.5 milliards to 6 milliards crowns from which only 843 million crowns were in credit unions without supervision (Dubská, 2003, p. 142). A securing fund, which was established by state and got 6 milliards crowns, paid compensations worth 4 milliards crowns to members in 2001. In spite the fact that, consequently a new law toughened up the regulations about

[133] Investment bank Nomuna demanded 40 milliards crowns, the Czech Republic 263 milliards crowns in arbitration held in London. Additional arbitration took place in Switzerland. Finally, all cases between Nomura and the Czech Republic were solved by agreement in the year 2006. The Czech Republic paid to Nomura compensation 3.6 milliards crowns. Československá obchodní banka won arbitration with the Czech Republic in 2010. The Czech Republic was obliged to pay 1.6 milliards crowns with interest and costs of arbitration.

money transfers to subsidiary companies and supervision emerged, in 2002 additional 22 credits unions went to bankrupt and 51 credits unions were in liquidation (Dubská, 2003, p.142). The bank sector became functioning, but at relatively high price which was even higher with respect to public opinion about a new system.

Causes of this undesirable development have been seen in weak institutions both formal and informal. The transition process in the Czech Republic has been accompanied by corruption, misappropriations of unpaid property, abuse of insufficient legal framework and unclearly defined owning structure, and inadequate business ethics and morality. Mean critique highlights the fact that proper legal framework was not established and that not only government and state authorities, but as well-chosen transformational approach undervalue a role of institution in process (Sojka, 2000, p.115). Mlčoch (2000, in Sojka) points out, that rapid institution change destabilizes society and economy and presents a danger to whole social order. No one doubt, that initial change in law and institutions with respect to personal, political, and human rights was exacting, but with regard to transformation needs the process was sometimes too slow and insufficient. Even considerable problem has been in law enforceability. Sokol (2003) claims that a major problem has been in number of approved laws with completely new regulations and the fact that interpretation has been often unclear also to experts. In addition to that, he points out that amendment to laws have been done unsystematically within regulation which has been a distant related. According to that quick orientation within regulations has been too difficult, for inhabitants without specific knowledge almost impossible, and law court overload has been unavoidable. Therefore, length of legal cases has been frequently criticized[134]. But it is necessary to take into account that length of a legal case reveals more about system and its organization, rather than quality of legal framework. It is questionable if the system has not been abuse in a sense that not all cases have had to be solved in a court, but to avoid critique for inactivity motions have been submitted. Furthermore, it is essential to consider that institution formation, at least in case of formal institutions, has been strongly conditioned by political development in a country. Not surprisingly, political development in a transition economy is turbulent, the Czech Republic not excepting[135].

[134] For instance, in 1999 the length of civil litigation was 371 days, commercial litigation took approximately 479 days, and restitution litigation demanded in average 1 206 days (Ročenka HN, 2000).

[135] Political development in the Czech Republic in the transition period has been too comprehensive issue and beyond the scope of this work. Nevertheless, with no doubt it has been a highly significant factor, which influenced whole process of transformation and subsequent development. More information available for instance in:

Rampet, S.P. 2010. *Central and Southeast European Politics Since 1989*. Cambridge University Press. ISBN 978-0-521-71616.

Mansfeldová, Z. 2004. The Czech Republic, in *The handbook of political change in Eastern Europe*. Edward Elgar Publishing, Inc. p.223-254. ISBN 1-84064-854- 6.

Průcha et al. 2009. Počátky postkomunistické transformace ekonomiky do rozdělení Československa (1989-1992), in *Hospodářské a sociální dějiny Československa 1918-1992 (Volume 2)*. Brno: Nakladatelství Doplněk, p. 939-1002, ISBN 978-80-7239-228-5.

Turnovec, F. 1997. Politický system a ekonomická transformace, in Česká republika a ekonomická transformace ve východní a střední Evropě, Prague: Academia, 1997, p. 47-84, ISBN 80-200-0568-4.

Table 4.13: Number of approved laws and constitutional laws, the Czech Republic, 1990-2009

Year	Number of laws in collection	Year	Number of laws in collection	Year	Number of laws in collection	Year	Number of laws in collection
1990	148	**1995**	74	**2000**	152	**2005***	9
1991	133	**1996**	37	**2001**	104	**2006***	23
1992	184	**1997**	58	**2002**	139	**2007***	5
1993	78	**1998**	47	**2003**	99	**2008***	10
1994	70	**1999**	72	**2004**	153	**2009***	13

Source: ASPI, *Chamber of Deputies, Parliament of the Czech Republic

The last component of the reforms utilized in the Czech Republic was creation of a social net. It was reasonable to assume that transition from a command to a market economy, for example via price liberalization, would affect population noticeably. Therefore, the goal was to keep provision of basic social services, which included education and health systems, and to offer new services related to emerging unemployment and to adaptation to new state of affairs. In spite the fact that, discussion about transformation involved also introduction of market mechanism to provision of social services, social security scheme and health service undergone only partial changes at the very beginning of the process. The first legislative norms were focused on prerequisite for functioning labor market. A system of labor force central planning was abolished and law which allowed private enterprise and workforce employment was approved. In addition, the norm also regulated obligations of new established employment offices with respect to active employment policy. They started to provide information and consulting services and then after also retraining. A new aspect of the law was a free decision about employment, which means that people were not forced by the state to work. Social development was also anchored by introduction of a tripartite mechanism. Key issues of social and working conditions became discussing within negotiation of government, the labor unions, and association of employers. A safety net was formally presented in 1991 and established mechanism by which income from wage and social security was accommodated to changes in cost of living. Furthermore, the social net regulated unemployment benefits, guaranteed minimal wage and social support to underprivileged. The most important thing is that the social system did not collapsed and that whole range of services was provided over all period of transition in comparison with other transforming economies. Education and health services were available for a long time without any private contributions.

Although Czech transformation did not avoid problems and subsequent development was not all the time desirable, the process was successful in the core. Functioning market economy was established and the country was integrated into the European Union and other international organizations. Currently, the Czech Republic has to catch up developed countries more in political culture rather than in economic sphere.

4.2.1.2 Development of basic economic indicators

This second sub-section of economic development in the Czech Republic since 1989 is focused on trends in basic economic indicators. The magnitude of the transformation is presented on figures of gross domestic product, unemployment, inflation, external trade as well as on figures approximating standard of living. The official statistics of the Czech Statistical Office

are main sources of data. Nevertheless, it is necessary to take into account that economic statistic underwent in comparison with population statistics fundamental change and therefore data especially in early phase of the transformation process are not necessarily accurate[136]. It means that numbers are not necessarily precise, but they are capable to provide basic trends and information about impact of transformation process on economy and population. If data are available, development in period from 1989 to 2009 is inspected.

Based on changes in real gross domestic product in the Czech Republic, several stages of development can be recognized. A period of transformation recession from 1989 to 1993, then after three years of recovery and additional two years of downturn, furthermore since 1999 prolonged period of economic growth, and beginning of global recession are visible in the trend (See Chart 4.33). The transformation recession was with no doubt related to the change of economic system. It affected all transforming economies and roots of the decline were not only in steps of given transformation process but as well as in general uncertainty. Although experts could have an idea, how a change should be done, it was not clear what path economy development would follow. The tremendous fall in real GDP was documented in 1991, when change was almost 12 %[137]. The initial downfall was expected, therefore with respect to internal and external disequilibrium caused by rapid increase in real wages and relative amount of current account deficit in balance of payments fiscal and monetary policy was applied.

Subsequent recovery and boom from 1993 to 1996 was caused by increased demand, more specifically by investments due to transformation of financial reserves, bank willingness to provide credits, and improved expectations with respect to rapid application of the reforms. Nevertheless, it has to be noted, that economic growth could be even higher. In 1993 Czechoslovakia was split into two autonomous states, therefore additional burden on economy was generated. It is assumed, that growth could be by 0.5-1 % higher in following years since 1993 (Žídek, 2006, p.111). The ensuing downturn in 1997 and 1998 were related to two "emergency packages", which had significant impact on household consumption. Packages were introduced in May and August 1997 and involved budget cuts equivalent to over 3 % of GDP (Myant, 2003, p.52). In addition, the specific sources of growth were exhausted and banks changed their strategy of over-extended credits.

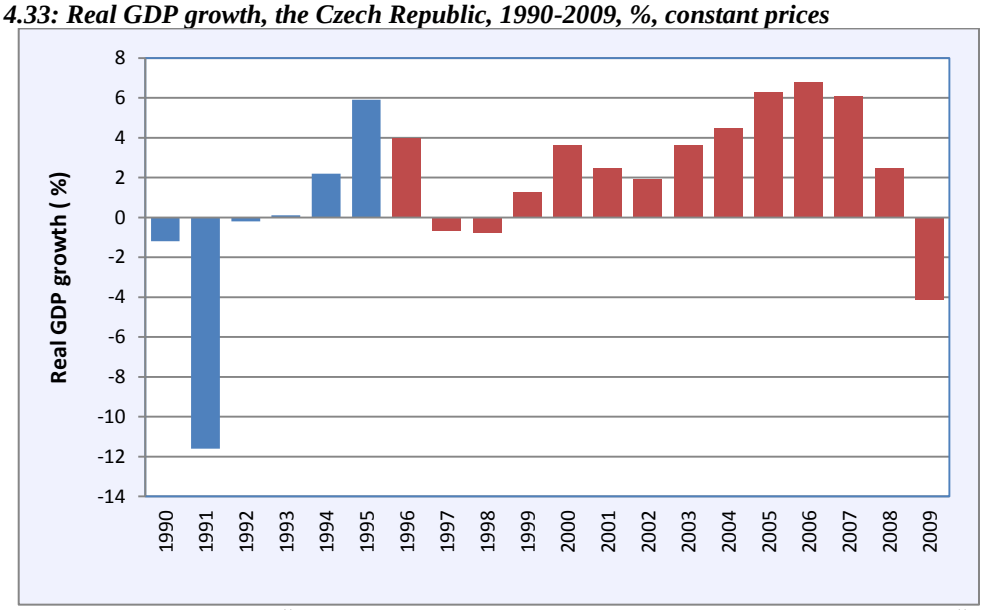
The economic growth was restored in 1999 and with fluctuations remained into 2009, when economy was deeply affected by downturn in world economy. Recovery was caused by export to the European Union and by improved household consumption in 1999. Afterwards, investment to fixed capital, especially to technologies and machineries, took a dominant position within economic stimulus. In 2002, economy was affected by floods. The service balance dropped by 37.5 milliards crowns due to significant outflow of foreign visitors. Despite economy fall considering previous year, main source of growth was household consumption which increased by 3.8 % in 2002. The households took advantage of consumer credits and mortgage loans. Extraordinary economic growth accounted for more than 6 % per year was recorded between years 2005 and 2007. Such a development created environment for necessary

[136] More detailed information in Jílek, J. 1997. Věrohodnost a dostupnost statistických informací v období ekonomické transformace, in *Česká republika a ekonomická transformace ve východní a střední Evropě*, Prague: Academia, 1997, p. 85-99, ISBN 80-200-0568-4.

[137] For instance, Hanousek et al. (1997) assumes that change in GDP growth was even pronounced, i.e. -14.3 %.

economic reforms, which are generally unpopular, but they were not issued. The positive economic development was largely supported by export production. Therefore, it is not surprising that when world economy was hit by financial crisis and followed by economic downturn, the Czech economy which has been relatively small and open also fall into recession. In 2008 GDP growth was only 2.8 % and in 2009 negative value of 4.1 % was reached. With respect to development in cycles, recovery can be expected, but questionable is when it takes place. Nevertheless, pressure on economic growth has been worldwide significant and any improvement at decimal place has been presented as recovery in news.

Chart 4.33: Real GDP growth, the Czech Republic, 1990-2009, %, constant prices



Notes: Blue columns data based on Žídek (2006), red columns data based on the Czech Statistical Office, Česká republika od roku 1989 v číslech.

Source: The Czech Statistical Office; Žídek, 2006, p. 105

According available data, GDP per capita in purchasing power standard (PPS)[138] grew over all period from 1995 to 2008. The initial value GDP per capita in purchasing power standard 10 774 increased to 20 100, which account for 73 % and 80 % of EU-27 average. Except Slovenia, the Czech Republic was the best performed economy from all post-communist countries. From former members only Portugal reached lower figures than the Czech Republic in the last two years. In comparison, the United States of America attained GDP per capita in purchasing power standard 23 300 in 1995 and 36 800 in 2008. The year 2009 has not been mentioned, because all countries recorded downfall, which did not influenced relative figures. In a detail, composition of GDP changed considerably at the beginning of transformation process. While in 1990 the primary sector of agriculture and forest industry accounted for 8.3 %, the secondary sector of industry and construction for 53.8 %, and the tertiary sector for 37.9 %, in 1998 percentage corresponded to 4.7 %, 43.7 % and 51.6 % respectively (Chvojka et al, 2000, p.816). Thereafter, GDP composition stabilized with significant share

[138] Purchasing power standard is an artificial currency unit, by which differences in purchasing power of national currencies are mitigated. The standard is based on currencies of all member states of the European Union since enlargement 2007. Average purchasing power of 1 PPS equals average purchasing power of 1 € in all member states of the Union.

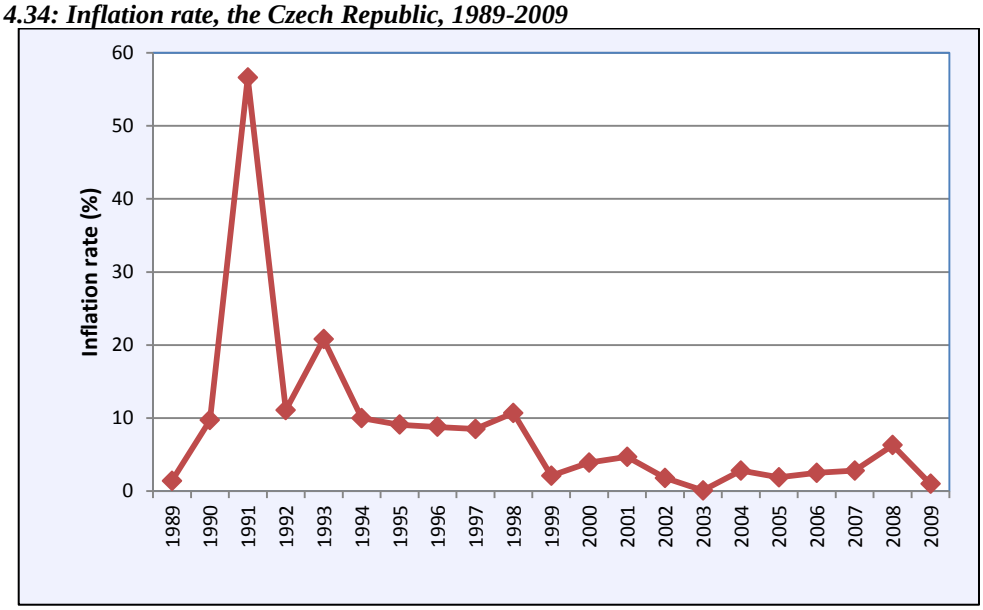
of tertiary sector of services. In 2009 share of services on GDP comprised 60 %. With this respect the Czech economy belongs to developed economies.

Inflation refers to change in price level within month or year. In case that inflation is high, than households which have gradually increasing or fix income may consume less than before. The well-marked increase in price level in the Czech Republic was caused by price liberalization in 1991. Index of consumption prices increased by 26 % just in January 1991, but in the course of the year consequences of deregulation were partly absorbed. The average annual inflation rate, counted as an increase in consumption prices index with respect to average of previous year, reached 56.6 % in 1991 (See Chart 4.34). In spite the fact that, state authority assumed growth only by 30 %, the result was relatively successful (Myant, 2003, p.26). In case that increase documented in January would hold over the whole year, then the inflation rate would reach 1 760 % in 1991(Hanousek et al., 1997, p.772). Higher price level was also related to introduction of a tax system in the Czech Republic and currency separation of Czechoslovak crown into the Czech and Slovak crown in 1993. The inflation rate was almost 21 %. Afterwards, inflation rate stabilized at the average annual level 10 % and monthly level below 1 % till the year 1998. On the one hand relatively low inflation preserved households' savings from depreciation, on the other hand enterprises were not clean from bad credits, and therefore their restructuring was more costly. Since 1998 price level was influenced by the recession as well as by restrictive policy. In addition, the Czech National Bank changed their policy and focused on inflation targeting[139]. The inflation rate without seasonal effects declined over the year 1998 from 13.8 % in January to 6.8 % in December.

Disinflation continued also in following years. Only in 2001 small increase in the inflation rate to 4.7 % was documented due to additional deregulations. Prices of gas, electricity, rental, traffic, and post and telecommunication services were decontrolled in 2001. Following years, reduced demand, strong currency and low level of resources on world market generated the lowest price levels documented since beginning of the transformation. The inflation rate reached only 0.1 % in 2003. On the contrary, the highest inflation rate was in a new century documented in the year 2008, when the average annual rate equaled to 6.3 %. That year, value added tax for some goods and services increased from 5 % to 9 %, also consumption tax on tobacco became higher, and prices of food, powers, rents rose. Furthermore, regulation frees in a health care system were introduced. The next year, in 2009, the average inflation rate accounted for 1 %. Prices of food and nonalcoholic beverage declined by 3.9 %, furthermore fuels by 11.8 %, and cars by 9.2 %. Although market prices fall by 0.7 %, regulated prices increased by 8.1 %.

[139] Further information about inflation targeting on the official websites of the Czech National Bank of the Czech Republic: <http://www.cnb.cz/en/monetary_policy/inflation_targeting.html>.

Chart 4.34: Inflation rate, the Czech Republic, 1989-2009



Source: The Czech Statistical Office

Extraordinary development was documented in case of unemployment, because with respect to communist ideology unemployment had not existed. Therefore, the initial value of annual registered unemployment rate was only 0.73 % in 1990 (See Chart 4.35)[140]. Afterwards, the rate increased to 4.13 % in 1991, but within period 1992-1996 remind at relatively low level, below 4 %. Such exceptional development in comparison with other transforming economies has been explained by high qualified work force, effective tripartite negotiation, active policy on labor market, geographical location, because unemployment was lower alongside borders with Germany and Austria, and inadequately sized sector of services, which was capable to partly absorb unemployed from primary and secondary sectors. Furthermore, positive impact on unemployment indicators had diminished labor supply. For instance, while 446 thousand pensioners worked in 1990, two years later number of employed pensioners decreased to 162 thousand (Žídek, 2006, p. 124)[141]. In addition, maternity leave was extended from two to three years and a part of labor force started to participate in black economy or found a job in abroad. Low level of unemployment was also kept via restrictive wage policy, which maintained high qualified work force relatively cheap and attractive for foreign investors, and slow restructuring of enterprises. Besides that, formation of small business influenced positively unemployment too. It is necessary to note, that from beginning of the transformation process development in unemployment differed in the Czech and Slovak part of Czechoslovakia

[140] The registered unemployment rate refers to the ratio of unemployed registered in database of the labour offices and economic active population which includes also employees from the European Union as well as foreigners from the third countries working with permission in the Czech Republic. The rate differs from the general unemployment rate constructed based on the recommendations of the International Labour Organization. Numerator of the general unemployment rate consists of unemployed from the labour survey. The rates differ in magnitude not in trend. From the year 2000 the general unemployment rate has been lower than registered unemployment rate in the Czech Republic.

[141] This decreased was caused by government policy which doubled income tax rate for pensioners between 1991 and 1992. Furthermore, a lot of people took advantage of early retirement and the fact, that policy with respect to disability pensions was liberal (Jírová, in Žídek, 2006).

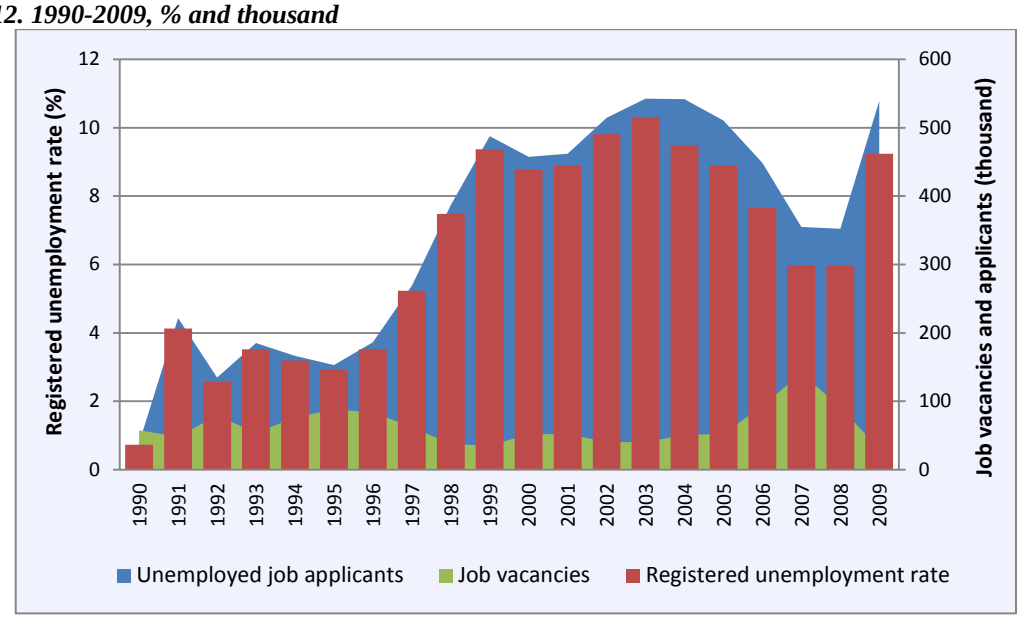
substantially. While ratio of Slovak to Czech unemployment was 2:1 in 1990, in 1993 the ratio equaled approximately to 5:1 (Švejnar et al., 1997, p.239).

Unemployment increased within economic downturn in 1997, when population groups of less qualified, the handicapped, mothers after maternity leave, and young people being fresh from secondary schools and universities had a problem to find a job. Also regional disparities became more significant and visible, because heavy industry and some agriculture productions were cut. Therefore, while the unemployment rate in Prague accounted for 2.4 % in 1997, in Moravian-Silesian region or the Usti region the rate equaled to 8 % and 9.9 % respectively. Although economic recovery begun in 1999, unemployment remained high and later on even increased. Annual unemployment rate overpassed 8 % within the period 1999-2005. Besides limited ability of the Czech economy to absorb unemployed, low motivation for job searching due to relatively marginal disparity between minimal wage and social benefits, as well as high total costs per labor force due to wage level and costs of social and health insurance contributed to high unemployment. Furthermore, Czech labor force has been somewhat immobile. Because unemployment became largely long-term[142], it is reasonable to assume that it was predominantly structural unemployment related also to transformation. As mentioned before restructuring of enterprises was frequently postponed. According to that, productivity supported economy more than creation of new job vacancies.

Since 2004, the unemployment rate gradually diminished to 6 % in 2007 and 2008. Economy grew and new job vacancies were created (See Chart 4.35). This positive trend was stopped by economic recession caused by worldwide economic downturn. The unemployment rate temporarily increased to 9 % in 2009, which means that more than 475 thousand people searched for job. Almost 45 % of unemployed did not have job less than half a year. Considering gender, females were unemployed more often than males and 45 % of unemployed belonged to age groups 15-30 years and 50 and more years over all period 1993-2009. In addition, composition of unemployed by education was relatively stable too. The most advantages were people with high education, because in average only 4 % of unemployed had university degree in the period from 1993 to 2009. Contrary to that in average 45 % of unemployed attained secondary school without the General Certificate. Regional distribution of unemployment unchanged too therefore the highest unemployment rates were documented in North Moravia and North-west Bohemia, where restructuring of heavy industry was significant. Also sub-mountains regions depended on agriculture and textile and cloth industry have suffered by high unemployment.

[142] The long-term unemployment consists of those unemployed who try to find a job more than one year. In the Czech Republic, long-term unemployed encompassed 18.5 % of total unemployed in 1993, 48.8 % in 2000, and 51.5 % in 2008. In 2009 the percentage diminished to 31.7 % due to significant increase of total number of unemployed caused by economic downturn.

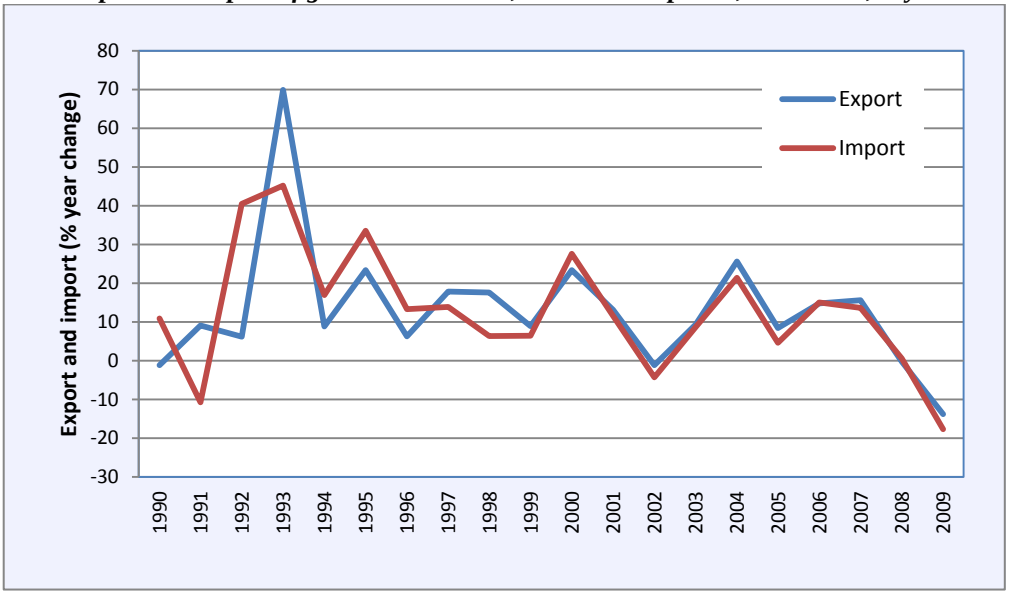
Chart 4.35: Registered unemployment rate, job vacancies and applicants, the Czech Republic, 31. 12. 1990-2009, % and thousand



Notes: Based on data of the Ministry of Labour and Social Affairs, since 2005 new methodology applied.
Source: The Czech Statistical Office

At the very beginning of the transformation process in the Czech Republic external trade re-orientated from the markets of the Council for Mutual Economic Assistance to western European markets. Although exports, as well as imports, grew almost each year, full recovery from loss of eastern markets did not take place (Myant, 2003, p.57). Export to western market economies was limited by currency convertibility, unknowingness of new final markets, protection policy of foreign countries, and products quality. More often rather than sophisticated production raw materials, fuels and semi-products were exported. On the other hand, imports consisted of machinery, transport equipment, and final products. While share of high technology products on export and import accounted for 4.6 % and 12.2 % in 1993, in mid-year 2008 percentages equalled to 14.8 % and 15.5 % respectively. Furthermore, export and import to developed market economies encompassed 58.5 % and 64.5 % in 1993 and increased to 90.6 % and 75.5 % respectively in 2008. Considering division of Czechoslovakia into two independent states, it is assumed that Czech export increased by 25 % and import by 21 % (Žídek, 2006, p.136). But, it is necessary to note that main issue with respect to external trade was current account deficit in the Czech Republic in the 90's, which reached 2.7 % of GDP in 1995 and afterwards 6.7 % of GDP in 1997. Because, this deficit was not covered by surpluses in financial accounts, imbalance resulted into reduction of foreign exchange reserves and consequently to monetary crises in 1997. In following years current account deficit were also significant due to high price of oil on world market, but its coverage by financial account was sufficient. External trade development in a new century has been relative stable and reflecting changes in world market. Remarkable changes in development in foreign trade were caused by lower demand and floods in 2002 and finally by world economic downturn in 2009, when export as well as import declined in absolute terms.

Chart 4.36: Export and import of goods and services, the Czech Republic, 1990-2009, % year change



Notes: Year 2009 based on estimations.
Source: The Czech Statistical Office

Although basic economic indicators have been capable to illustrate changes in entire economy related to transformation, supplement aggregate figures with some other indicators of standard of living may reveal impact of economic transformation on everyday life. For instance, number of registered cars equaled to 2 247 thousand vehicles in 1989, within ten years the number increased by 53 % and within twenty years by 97 % to the value 4 435 thousand cars (Sdružení automobilového průmyslu, 2011). Tremendous increase was documented regarding telecommunications. While in 1989 count of fix telephones corresponded with 1 947 thousand, at the turn of the century statistics presented 3 872 thousand fix telephones. Gradually, fix telephones were replaced by cell phones, which became spread worldwide. Active cell phones encompassed 14 thousand devices in 1993, within a decade 4 343 thousand mobiles were registered and the most recent statistics revealed, that in the Czech Republic each person gets 1.4 pieces, because 14 217 thousand cell phones were active in 2009. In addition, internet became a standard mean of communication. Because the Czech Republic opened its border at the same time as new technologies broadened, they were applied immediately without significant delay in comparison with developed market economies. Another approximation of changed standard of living is the extent of foreign travel. Czechs took advantage of their new freedom gained in 1989 and travel to abroad more frequently. While 2.1 million longer trips abroad were made of purpose of spending leisure in 1996, the count more than doubled to 4.5 million trips abroad in 2009. Consumer spending on holidays, which are highly sensitive to economic development, increased with exception of economy hardship over all period, therefore it is reasonable to assume that standard of living improved in the Czech Republic.

Although previous figures sketched how every day was affected by economic development, for sure the impact of the economic changes was not uniform across the population. Although inequality and poverty widened from the very beginning of the transformation process, an increase was not as severe as in other post-communist countries (Sobotka et al., 2008, p.434)

(See Table A.2 in Appendix). The Gini index[143] ranged between 0.22 in 1995 and 0.26 in 2008 in the Czech Republic (Marek, 2010, p.139). The most affected sub-population has been non-workers, specifically marginalized ethnic groups, pensioners, and long-term unemployed. For instance, households survey data reveal that the average per capita income for pensioner households declined from 82 % of the average for all households in 1988 to 77 % in 2000 (Myant, 2003, p.67). In addition, at the beginning of the new century to 2009 the percentage stagnated at 77 %. Income inequality among those who worked arose from greater dispersion of employees' earnings and partly from private businesses and property. Coefficient of variation with respect to monthly wage in given economic sectors increased from 0.14 in 1989 to 0.29 in 2008. Widening gap was caused largely by substantial increase in top earnings. While lower income level of the top fifth percentile encompassed 167 % of average in the 1980's, the percentage increased to 190 % in the 1990's. Within a span of two decade, remarkable growth in monthly wage was documented in case of financial services, where share of monthly wage on average increased from 98 % in 1989 to 189 % in 2008. Contrary to that, only gradual increase, which kept wages below average at the level ranged from 80 % to 90 %, took place in education, health and social services. In addition, monthly wage in agriculture, fishery and industry sectors decline over all period 1989-2008, therefore for instance monthly wage in agriculture accounted for 75 % of the average wage in 2008. According to distinction of private and public sector, monthly wages linearly grew in both sectors with relatively small disparity. The average monthly wage in the present-day Czech Republic increased from 3.2 thousand crowns in 1989 to 23.4 thousand in 2008.

Considering presented economic indicators the transition process from a centrally planned to a market economy was successful. The Czech economy became small open economy with significant share of tertiary sector, GDP per capita markedly increased and inflation and unemployment which could causes severe damages to the process, economy and consequently to whole society were kept under control at the beginning of the transition. Nevertheless, not all the people were winners, because income inequality widened. On the other hand, although the real value of benefits and transfers from the social system was reduced, in comparison with other post-communist countries the social net has remained functioning and health services as well as education were available.

4.2.1.3 Economic situation of Czech families with children

In comparison with previous sub-chapter which deals with general features of economic development in the Czech Republic since 1989, this part is focused on financial situation of different types of families, predominantly with dependent children, based on data from the Household budget surveys. There is no question whether families were affected by the transformation, but in what magnitude they were influenced. The Czech data of the period 1989-2009 are under investigation.

[143] Gini index measures the extent to which the distribution of income among individuals within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual. The Gini index refers to the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

The Household budget surveys have been held by the Czech Statistical Office since 1989 and provide fundamental information about families in the Czech Republic. Households involved in the statistics are chosen based on quota selection and known structure obtained in a previous research. All regions of the present-day Czech Republic have been involved. The statistic consists of two data sets. The primary data set includes approximately 3 thousand households and complementary data set about 400 households. The complementary data set guarantees that families with minimal incomes are covered in the survey adequately. It has to be mentioned, that the household budget survey procedure was changed substantially in 2006. Sampling characteristic became economic activity and employment status of a head of household. Thus, data provide information about household of economic active pensioners or unemployed. On the other hand, continuity of time series has been interrupted and therefore data can be compared in time with extreme caution. With respect to that, the sub-chapter is focused on data about financial situation of households with dependent children, either household of employee or household with minimum income, in comparison with an average household in period 1989-2005 and on the latest data 2009 about families with dependent children and families with dependent children and minimum income.

Table 4.14: Composition of average household and its income and expenditure, the Czech Republic, selected years*

	1989	1993	1997	2001	2005	2009**
NUMBER OF HOUSEHOLDS	**3 874**	**3 189**	**2 539**	**3 184**	**2 965**	**2820**
Per household average						
Members	2.64	2.49	2.53	2.48	2.34	2.27
Working persons	1.33	1.19	1.21	1.17	1.12	1.02
Dependent children	0.84	0.73	0.74	0.71	0.61	0.57
Non-working pensioners	0.38	0.47	0.47	0.47	0.48	0.52
TOTAL GROSS MONEY INCOME	**26 796**	**47 937**	**82 804**	**105 776**	**127 295**	**160 675**
% from total						
Income from employment	75.44	70.95	69.28	68.73	65.69	50.29
Income from self-employment	.	4.48	6.90	6.84	8.43	8.20
Social income	19.26	20.39	19.66	20.09	21.27	24.39
Other income	4.91	4.18	4.16	4.34	4.62	5.74
TOTALGROSS MONEY EXPENDITURE	**25 748**	**46 332**	**80 911**	**99 897**	**117 784**	**146 895**
% from total						
Income tax, health and social insurance	12.80	15.16	15.77	15.63	16.66	12.44

Notes: * Average per person and year, Czech crown, ** based on new methodology.

Source: The Czech Statistical Office

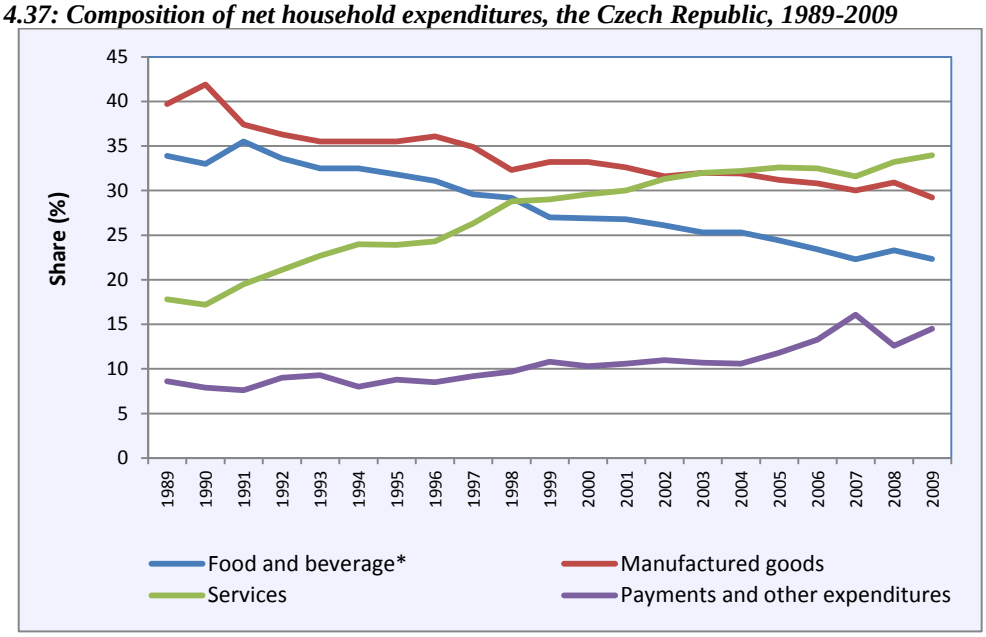
While average Czech household consisted of 2.64 members in 1989, where 1.33 were economically active and 0.84 dependent children, in 2005 the average household was smaller by 0.3 member. Representation of economically active members and dependent children diminished about 2.5 and 5.7 percentage points respectively in the period 1989-2005. On the contrary, number of non-working pensioners increased by 6 percentage points, which corresponded with 42 % rise. In sum, Czech household became older within the fifteen years since the economic transformation begun. Furthermore, structure of income per person in average household changed significantly too. In spite the fact that, the highest share of gross

money income per person in average household originated from employment over all period, importance of self-employment and social incomes was significant. While a share of income from self-employment in total gross money income equalled to 0.7 % in 1991, the percentage increased to 8.4 % in 2005. Maximum and extraordinary annual growth of income from self-employment captured in data reached 550 % in 1993. This unique change is explained by initiated economic transformation process. Considering social income such an exceptional change was not documented. Proportion of social income on total gross income per person in average household rose from 19.3 % in 1989 to 21.3 % in 2005. The majority of social income came from pensions and social benefits including child and parental allowances.

With respect to total gross money expenditure per person in average Czech household, the annual average growth corresponded to 10 % over period 1989-2005 and mostly were utilized for food, housing, transportation, and leisure time. For instance, while a share of food on total expenditures declined from 22.9 % in 1989 to 15.9 % in 2005, proportion of housing expenditures on total increased due to high costs of energies from 8.4 % to 15.6 % within stated period of time. Chart 4.37 illustrates structure of net household expenditures in the Czech Republic in 1989-2009. The curves clearly reveal decreasing trend in expenditures on food and non-alcoholic beverages and manufactures goods. On the contrary, shares of expenditure on services, payments and other expenditures become significantly larger. The curve also present response on tax rise in the year 2008, when value added tax for some goods and services was increased from 5 % to 9 %. In addition, turns in curves around the year 2008 partly reflect rise in the consumption tax on tobacco and prices of food and energies.

Although expenditures grew markedly from 1989 to 2005, person in an average household was capable to save part of income based on household budget survey. On the other hand, according to the Czech National Bank household indebtedness has been important in a new century. Household consumption became partly financed by increased indebtedness since 2001, when amount of loans to households significantly increased. The major part has been comprised by mortgages. Although the rate of indebtedness growth accelerated in a period 2002-2006, in comparison with countries in the Eurozone indebtedness was lower. For instance, while share of household loans in GDP accounted for 7.4 % in the Czech Republic in 2002, the percentage corresponded 45.9 % in the Eurozone at the same year. The shares increased to 16.9 % and 54.1 % respectively in 2006 (Singer, 2007, p.10). Higher household indebtedness corresponded with higher number of levied executions on property. Number of execution ordered grew from 4.3 thousand in 2001 to 270.5 thousand in 2005 (Czech National Bank, 2006) (See Chart A.5 in Appendix). Amount of debts to 10 thousand crowns increased significantly. They accounted for three quarters of all executions in 2005 and predominantly were caused by unpaid fines to police or public transport companies, unpaid health insurances and energy bills (Czech National Bank, 2005). With respect to income amount, household with low income had more often consumption credits and higher income household mortgages. Not surprisingly, low income household had more often problems to fulfil their obligations in comparison with high income households (Czech National Bank, 2009, p.30).

Chart 4.37: Composition of net household expenditures, the Czech Republic, 1989-2009



Notes: *Non-alcoholic.

Source: The Czech Statistical Office

Table 4.15: Composition of income and expenditure in household of employees with children, the Czech Republic, selected years*

	1989	1993	1997	2001	2005	2009**
NUMBER OF HOUSEHOLDS	1 641	1 034	820	1 034	863	706
Per household average						
Members	3.73	3.64	3.59	3.54	3.49	3.48
Working persons	1.81	1.73	1.71	1.62	1.57	1.58
Dependent children	1.75	1.68	1.64	1.63	1.62	1.62
Non-working pensioners	0.03	0.03	0.03	0.03	0.02	0.02
TOTAL GROSS MONEY INCOME	24 008	44 350	75 319	97 072	112 261	146 268
% from total						
Income from employment	82.0	83.2	85.5	84.9	84.8	81.2
Income from self-employment	.	0.6	0.5	0.8	0.9	1.0
Social income	11.9	11.3	9.2	9.2	9.1	9.4
Other income	5.9	4.9	4.8	5.1	5.2	8.4
TOTAL GROSS MONEY EXPENDITURE	23 094	42 580	73 151	92 101	105 225	131 148
% from total						
Income tax, health and social insurance	13.7	17.6	19.1	18.9	19.5	15.8

Notes: * Average per person and year, Czech crown,** based on new methodology.

Source: The Czech Statistical Office

The family of employees with dependent children had in average 3.73 members in the Czech Republic in 1989. In more detail, 1.81 members were economically active and 1.75 members were allotted to dependent children (See Table 4.15). Considering, demographic development in the Czech Republic in the 90's of the 20th century, it is not unexpected that average count of family members declined to 3.45 members in 2005. Drop with respect to economically active members was more profound in comparison with number of dependent children. Data revealed that if a complete family involved only one economically active member, than dependent child at the age of 0-5 year was present in the family with probability

0.79 in case of family with one dependent child and with probability 0.57 in case of family with two dependent children. Therefore, it is reasonable to assume that non-economically active family member could be mother on parental leave[144]. Relatively considerable proportion of children at the age of 10-14 years and 15-25 years was in incomplete families.

The Household budget survey provides average annual income and expenditure per capita in household in Czech crowns. Although number of children influence data, it is not necessarily clear in which direction. Average annual income per person should decrease with additional child, because family is consisted of more members, on the other hand a new born child is related to lower tax burden, additional social benefits, etc. Therefore, fall in income per person is not imperatively so severe. The reverse effect is present in case of expenditures per person considering a new born child. Expenditure increase is assumed, while the rise can be compensated by supplementary incomes.

The highest proportion of annual income per capita in the family of employees with dependent children came from employment in the period 1989-2005. In average it equalled to 83 %. Furthermore, while share of income from self-employment and other sources remained unchanged at the level of 1 % and 5 % respectively over all period, percentage of income from social security declined from 11.9 % in 1989 to 9.1 % in 2005. Absolutely social income per person grew, but it was not capable to cover additional costs of living. Data also revealed that mothers contributed to family income less than father independently of income source, whether income came from employment or from private business. For instance, mother contribution from employment reached 60 % of father contribution in 2005. If a median female wage and parental allowance in the year 2005 are taken into account, than woman on parental leave decreased family annual income by 153 thousand crowns.

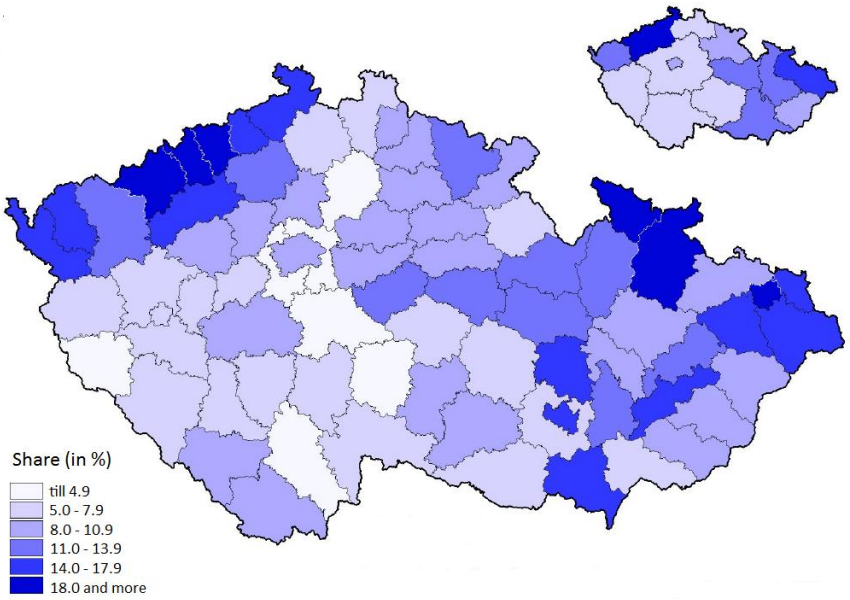
Gross financial expenditure per capita in household of employees with dependent children more than quadrupled in the period 1989-2005. The trend development in a structure of expenditures corresponded with figures for an average Czech household. In the average, 60 % of expenditures in this kind of family were devoted to food and non-alcoholic beverages, housing, transportation costs, and costs related to leisure time over all period. In addition, while expenditures on housing grew, expenditures on food and non-alcoholic beverages declined. Data also pointed out that the family more financial sources saved rather than withdrew from an account over stated period with the exceptions of the years 1990 and 1992. In the average, 2 618 crowns per person were annually deposited. Not surprisingly, loans and consumption credits became important within household budgets. In more detail based on data 2005, families with one dependent child and economically active adult borrowed money more frequently than families with both parents active on the labour market. The opposite was true for the families with two dependent children. In average, family of employees with two dependent children borrowed per capita 5 575 crowns in 2005.

Taking into account information provided by population census 2001 and register of socially disadvantaged, a regional distribution of families with dependent children, which participate in social benefits, can be studied (See Chart 4.38). The last data 2001 pointed out

[144] Share of fathers, who provide all-day care to their dependent children within parental leave in the Czech Republic, has corresponded approximately to 1 % (Nešporová, 2005).

that share of socially disadvantaged families with dependent children on total number of families with dependent children equalled 11 % in the Czech Republic. The highest share corresponded with 30.1 % in Most and the lowest share 2.5 % was documented in Benešov. Regional distribution of socially disadvantaged families with dependent children has reflected economic enhancement of Czech regions.

Chart 4.38: Share of socially disadvantaged families with dependent children on total number of families with dependent children, the Czech Republic, 2001



Source: The Czech Statistical Office

Table 4.16: Composition of income and expenditure in household with minimum income and dependent children, the Czech Republic, selected years*

	1991	1993	1997	2001	2005	2009**
NUMBER OF HOUSEHOLDS	324	389	426	445	422	270
Per household average						
Members	4.06	4.01	3.83	3.60	3.37	3.30
Working persons	1.39	1.22	1.00	0.94	0.84	0.62
Dependent children	2.20	2.22	2.21	2.04	1.86	1.93
Non-working pensioners	0.02	0.03	0.03	0.06	0.06	0.07
TOTAL GROSS MONEY INCOME	19 016	23 087	35 734	44 505	49 819	48 158
% from total						
Income from employment	64.1	60.3	56.4	51.9	47.6	36.0
Income from self-employment	0.3	4.5	4.4	7.8	10.2	10.7
Social income	31.3	30.4	33.7	34.4	35.9	43.4
Other income	4.3	4.8	5.4	5.8	6.3	9.7
TOTAL GROSS MONEY EXPENDITURE	18 634	23 188	36 703	44 682	50 595	51 813
% from total						
Income tax, health and social insurance	8.5	10.5	9.6	8.2	7.9	0.2

Notes: * Average per person and year, Czech crown, ** new methodology.

Source: The Czech Statistical Office

In comparison with the average Czech household and family of employees with dependent children, family with minimum income and dependent children had in average the largest number of members in 1991. Nevertheless, family size was dwindling in the period 1991-2005 too. While the household consisted of 4.6 members in 1991, in addition to that 1.39 was economically active and 2.20 accounted for dependent children, in 2005 the household involved 3.6 members, where 0.84 participated in labour market and 1.86 were dependent children.

Gross annual money income per person more than doubled to 49 819 crowns in 2005 in comparison with 1991 and more than half of this income originated from employment over all period. The significant part, in average 34 %, encompassed social income. For instance, in 2005 more than 65 % of social income was comprised of social benefits (parental allowance, supplementary benefit, child allowance, etc.). Considering previous types of households, the income was half-sized and more dependent on social system. Furthermore, gross money expenditure in families with minimum income and dependent children equalled to 50 595 crowns in 2005, what was also two times more than 1991, but less than half of expenditures of average Czech household and family of employees with dependent children. With respect to the fact that, household was classified as family with minimum income and dependent children, it is not unanticipated, that more than 60 % of total expenditures per person were devoted to housing, food and non-alcoholic beverages and only 7 % to leisure activities in 2005. Costs of transportation accounted for 5 %. Over all period 1991-2005, the structure of expenditures was relatively same. Also it is valuable to note, that based on balance sheet items the families with minimum incomes more frequently withdrew money rather than deposited them within a stated period of time.

Table 4.17: Households composition based on the Household Budget Survey, the Czech Republic, 2009

	Households in total	Households without children	Households with children							
			Total	Number of children			With minimum income	Number of children		
				1	2	3+		1	2	3+
Per household average										
Members	2.27	1.61	3.45	2.78	3.88	4.99	3.30	2.21	3.38	4.80
Working persons	1.02	0.77	1.48	1.42	1.53	1.50	0.62	0.53	0.64	0.72
Dependent children	0.57	0.00	1.59	0.99	1.97	3.05	1.93	1.00	1.99	3.22
0 - 5 years	0.15	0.00	0.41	0.26	0.52	0.56	0.42	0.25	0.43	0.67
6 - 9 years	0.09	0.00	0.26	0.11	0.37	0.61	0.34	0.19	0.34	0.57
10 - 14 years	0.12	0.00	0.33	0.15	0.40	0.95	0.49	0.21	0.49	0.91
15 - 25 years	0.21	0.00	0.59	0.47	0.68	0.93	0.68	0.35	0.73	1.07
Non-working pensioners	0.52	0.78	0.05	0.09	0.02	0.02	0.07	0.06	0.09	0.05
Others	0.16	0.06	0.33	0.28	0.36	0.42	0.68	0.62	0.66	0.81
NUMBER OF HOUSEHOLDS	2 820	1 809	1 011	472	462	77	270	97	109	65

Source: The Czech Statistical Office

In spite the fact that, methodology of household budget survey was changed in 2006, ageing of Czech household persisted in the year 2009. The Czech household consisted in average of 2.27 members, while 1.02 accounted for economically active members and 0.5 member was

devoted to dependent child or non-working pensioner (See Table 4.17). Distribution of dependent children corresponded with general fertility development, i.e. lower fertility level in the 90's of the 20th century and with raised compensatory fertility thereafter. Share of dependent children at the age of 0-5 years was in comparison with children at the age of 6-9 years and 10-14 years higher.

The net annual money income per person was higher in the families without children in 2009, but it does not mean, that pensioners were better off (See Table 4.18). The childless household consisted also of persons below the age of retirement, who were economically active and their income were definitely higher than pensions. Almost 39 % from total net income per person in childless household came from pensions and 48 % from employment. The net annual money income per person in household with dependent children was about 30 % lower than in childless household and about 16 % lower than in average Czech household in 2009. Member of household with dependent children and minimum income had approximately about 66 % lower net income in comparison with member of average Czech household. A closer look at data revealed that the family consisted of married couple with one economically active member and child had 29 980 crown per person less than the family with two working parents. Almost 58 % of social income encompassed to parental allowance, therefore it is reasonable to assume that non-working parent was in half cases on parental leave. Furthermore, downswing in net annual income per person in families with two dependent children in case when only one parent worked compared to both working parents equaled to 24 544 crowns in 2009. Considering previous case the fall was smaller. The share of parental allowance decreased to 52 %, but child benefit became more important. Nevertheless, it is important to note, that social income per person in families with children accounted for 12 % of total net income and majority came from employment.

Net annual money expenditures per person in average Czech household in 2009 were covered by net income. The same hold for the households with dependent children, one or more dependent children, but not for households with dependent children and minimum incomes. On the other hand, while household with dependent children regardless of their number had negative balance of money raised and deposited as well as balance of accepted loans and installments per person, household with minimum income and dependent children was characterized by positive balance of money raised and deposited and by negative balance of accepted loans and installments per person in 2009. Considering structure of consumption significant differences among household types were not presented in data. The major part of expenditures was devoted to basic necessities, i.e. in average 19 % was devoted to food and non-alcoholic beverages, 18 % to housing and energies, 11 % to transportation costs, and additional 11 % to services and other expenses. Shares of given categories vary by household type but with exception of households with minimum income and dependent children the range did not exceed 2 percentage points. The household with minimum income and dependent children spent money income predominantly on food, housing and energies, while the other categories were marginal.

In more detail, the Table 4.20 compares expenditures of household with minimum income and dependent children with expenditures of household with dependent children. For all

expenditure items the nominal index was lower than 100 % in 2009, therefore it is clear that expenditures in families with minimum income were lower. Their expenditures per person were half-size. To detect impact of minimum income on expenditures a standardized index was constructed. If the index is higher than 100 % than household with minimum income and dependent children spent more money on given category than average family with dependent children in the Czech Republic. On the other hand, value below 100 % can be interpreted reversely. Considering that, family with minimum income and dependent children had higher net expenses than average family with children in 2009. In addition, the standardized index confirmed that minimum income was devoted to food and non-alcoholic beverages, housing, energies, water, post-services and telecommunication. The difference can be explained by family size and differences in housing type.

Table 4.18: Total income and expenditures of households, the Czech Republic, 2009*

	Households in total	Households without children	Households with children							
			Total	Number of children**			With minimum income	Number of children**		
				1	2	3+		1	2	3+
Gross money income	160 675	189 708	136 384	159.7	126.9	100.9	48 158	52.6	48.4	44.8
Net money income	142 402	169 217	119 967	139.5	111.8	91.1	48 041	51.4	48.6	45.2
Social benefits (%)	27.5	40.8	11.9	12.7	10.9	13.1	43.5	43.4	42.2	45.2
Social security benefits (%)	2.8	0.1	6.0	5.0	6.3	9.3	31.7	28.6	28.9	37.7
Gross money expenditure	146 895	172 859	125 172	146.7	115.8	95.7	51 813	59.7	52.2	45.9
Net money expenditure	128 622	152 368	108 754	126.5	100.7	85.9	51 697	58.5	52.4	46.3

Notes: * Average per person and year, Czech crown; **in thousand.

Source: The Czech Statistical Office

Table 4.19: Average monthly disposable income of average households with children, the Czech Republic, 2009, Czech crowns

Average family with children	Number of family members	Adults	Working persons	Children	Average monthly disposable household income (crown)	Subsistence monthly household income (crown)	Share of disposable and subsistence income (%)
Completed	3	2	1.6	1	36 119	7 435	4.9
		2	1	1	31 507	7 280	4.3
		2	2	1	39 002	7 525	5.2
	4	2	1.65	2	37 901	9 351	4.1
		2	1	2	32 593	9 031	3.6
		2	2	2	30 581	9 513	3.2
	5	2	1.59	3*	38 809	11 526	3.4
Incomplete	2	1	0.77	1	1 975	4 936	0.4

Notes: * three children and more included, but average accounted for three children.

Source: The Czech Statistical Office

Table 4.20: Comparison of expenditures, families with dependent children and families with minimum income and children, the Czech Republic, 2009*

	Households with children	Families with children and minimum income	Index (households with children = 100)		
			nominal	standardised	test of deviation**
TOTAL NET MONEY EXPENDITURES	108 754	51 697	47.5	118.7	+ +
A. CONSUMPTION EXPENDITURES	98 255	50 981	51.9	129.6	+ +
01 FOOD AND NONALCOHOLIC BEVERAGES	18 411	13 276	72.1	180.1	+ +
02 ALCOHOLIC BEVERAGES, TOBACCO	2 240	1 125	50.2	125.4	+ +
03 CLOTHES AND SHOES	5 837	2 183	37.4	93.4	—
04 HOUSING, WATER, POWERS, FUELS	17 927	15 990	89.2	222.7	+ +
05 FLAT EQUIPMENT	6 194	1 620	26.2	65.3	— —
06 HEALTH	2 079	875	42.1	105.1	+
07 TRANSPORT	11 574	2 655	22.9	57.3	— —
08 POST AND RELECOMMUNICATION	4 815	2 784	57.8	144.4	+ +
09 HOLIDAYS AND CULTURE	10 724	3 467	32.3	80.7	— —
10 EDUCATION	1 062	346	32.6	81.4	— —
11 CATERING AND ACOMMODATION	6 207	2 482	40.0	99.9	o
12 OTHER GOODS AND SERVICES	11 186	4 179	37.4	93.3	—
B. EXPENDITURES OTHER THAN CONSUMPTION	10 500	715	6.8	17.0	— —
Purchase and reconstruction of house or flat	8 895	281	3.2	7.9	— —

Notes: * Average per person and year

** Deviation of expenditures in comparison with standard is evaluated in percentage points in three levels:

o	± 5 points
+ or —	± 5.1 to ± 15 points
+ + or — —	± 15.1 and more points

Source: The Czech Statistical Office

According to household budget survey data 1989-2005 household structure has significantly changed. Not only average number of household members declined, but as well average number of economically active members and dependent children fell. On the other hand, share of non-working pensioners increased. Differences were obvious also with respect to incomes and expenditures. Families with minimum income and dependent children had net annual money income per person half-size compared to family of employees with dependent children and approximately about 60 % lower than average Czech household. In addition, 40 % of the income came from social system. The majority of expenditures were devoted to necessities as food, housing, water, and energies, but in comparison with average Czech household expenditures on food did not diminish. Current data 2009 arose from different methodology, but even though basic characteristic did not differ so much. Consumption behaviour of Czech families regardless of number of dependent children or economic status of adults stabilised. Nevertheless, detailed data confirmed income downswing with respect to additional child in family.

4.2.2 Analysis in a macro perspective[145]

The extensive debate regarding the fertility decline in the post-communist countries covers mainly three approaches: the Second Demographic Transition, the Postponement Transition and the Economic crisis hypothesis. Not all approaches clearly define the channels through which fertility is influenced by economic performance, but in all of them a change in economic output is taken into account. Therefore, this sub-chapter deals with the relationship of fertility and economic performance in the transition economy of the Czech Republic in a macro perspective and tests by employing time series analysis if the economic changes had a significant impact on fertility decision of the Czech population in the short run. However, the Czech economy also performed symptoms of economic crisis they were not as severe as in other post-communist countries. For instance, the Czech Republic is one of the countries which avoided hyperinflation. Therefore, it is hypothesized, that the economic crisis approach is not so powerful for the explanation of the fertility development in the Czech Republic as it was documented for other post-communist economies.

The basic assumption of the analysis is a mutual dependence of fertility and macroeconomics variables. Fertility affects economic development while economic performance shapes a population development. To detect the channels of interactions the analysis of correlation is not enough. In this analysis in a macro perspective, a multi-variable vector autoregressive model (VAR) is employed. This technique has become a standard tool of econometric analysis of multivariate time series after a critique of Sims in 1980. The VAR models assume endogenous variables, which are characterized by their dependence. These models are a natural extension of the univariate autoregressive to dynamic multivariate time series and are considered as a useful instrument for describing the dynamic behavior of economic and financial time series.

To fill a gap in the literature, in this analysis three models are built up. In the first one, the fertility is approximated by the crude birth rate. But the crude birth rate has been criticized as it does not take into account changes in the age structure. Therefore the period total fertility rate is employed in the second model. This measurement also has a shortcoming, because it does not reflect the childbearing postponement. The adjusted total fertility rate is included in the third model. Changes in economic performance are characterized in all models by the changes in output, monetary base M2 [146] and unemployment rate. The endogenous variables were chosen based on approach of Wang at al. (1994), Petrucci (2003) and Maksymenko (2009) utilizing economic theory, as well as, on assumptions of the Second Demographic Transition, the Postponement Transition and the Hypothesis of an economic crisis.

The sub-chapter focused on analysis at macro level is structured as follows. Firstly, methodology of a multi-variable vector autoregressive model is explained. Afterwards data,

[145] The analysis was originated as a final project within the European Doctoral School of Demography at Lund University in the academic year 2009/2010.

[146] Monetary aggregate M2, in financial terminology, includes money that can be used for spending (M1) plus items that can be quickly converted to M1 (bank deposits with notice period 3 months and bank deposits with 2 years maturity).

empirical models and their diagnostics are introduced. Following part presents results of the models and the last section discussed obtained outcomes.

4.2.2.1 Methodology

The aim of the analysis is to build up a model, which employs time series data and allows us to determine the interactions between fertility and economic development in the Czech Republic in the period from 1996-2008. The most common approach deals with correlation analysis, but correlation is not capable to isolate the channels of interactions. Therefore, the multi-variable vector autoregressive models (VAR), which assume endogenous variables, are built up.

The basic multivariate VAR(p) model of *K* endogenous variables $y_t = (y_{1t}, \ldots, y_{kt}, \ldots, y_{Kt})$ is structured as follows:

$$\boldsymbol{y}_t = A_1 \boldsymbol{y}_{t-1} + \cdots + A_p \boldsymbol{y}_{t-1} + C D_t + \boldsymbol{u}_t, \tag{4.1}$$

where A_i are *(K x K)* coefficient matrices for $i=1,2,\ldots,p$ and $\boldsymbol{u}_t$ is a *K*-dimensional white noise process with a time-invariant positive definite covariance matrix,

$$E(\boldsymbol{u}_t \boldsymbol{u}_t') = E\left[\left(\boldsymbol{u}_t - E(\boldsymbol{u}_t)\right)\left(\boldsymbol{u}_t - E(\boldsymbol{u}_t)\right)'\right] = \sum\nolimits_u . \tag{4.2}$$

C represents the coefficient matrix of potentially deterministic regressors with dimension *(K x M)* and D_t an *(M x 1)* vector of the appropriate deterministic regressors as a constant, trend and dummy.

The equation no. 1 is often rewritten into the following form:

$$A(L)\boldsymbol{y}_t = C D_t + \boldsymbol{u}_t, \tag{4.3}$$

where

$$A(L) = I_k - A_1 L - \cdots - A_p L^P \tag{4.4}$$

and I_k corresponds to identity matrix (Lütkepohl, 2007, p.10).

The VAR(p) model is characterized by its stability. This does mean that the model generates stationary time series with time-invariant means, variances and covariance structure for given sufficient starting values. Because the stable AR(p) process can be rewritten as an infinite moving average-process (MA (p)), the same holds for VAR(p) representation. The Wold moving average representation, which is utilized for calculation of the impulse response function and forecast error variance decomposition, is follows:

$$\boldsymbol{y}_t = \Phi_0 \boldsymbol{u}_t + \Phi_1 \boldsymbol{u}_{t-1} + \Phi_2 \boldsymbol{u}_{t-2} + \cdots, \tag{4.5}$$

where Φ_0 is equal to I_k and Φ_s corresponds to matrices, which can be recursively computed according to:

$$\Phi_s = \sum_{j=1}^{s} \Phi_{s-j} A_j \qquad \text{for} \qquad s = 1,2,\ldots \tag{4.6}$$

where Φ_0 is equal to I_k again and $A_j = 0$ for $j > p$.

Given stationarity, the important issue, in the case of VAR(p) models, is a way how to determine the appropriate lag order. The standard approach applies sequential testing procedure with model information criteria. The selection criteria as Akaike (AIC(p)), Hannan and Quinn(HQ(p)), Schwarz (SC(p)) or Final predictor error (FPE(p)) are minimized over a set of possible orders $m = 0, \ldots, p_{max}$ (Lütkepohl, 2007, p.24; Lütkepohl, 2005, p.146-157).

$$AIC(p) = log\ det\left(\tilde{\Sigma}_u(p)\right) + \frac{2}{T} p\ K^2, \tag{4.7}$$

$$HQ(p) = log\ det\left(\tilde{\Sigma}_u(p)\right) + \frac{2\ log\left(log(T)\right)}{T} p\ K^2, \tag{4.8}$$

$$SC(p) = log\ det\left(\tilde{\Sigma}_u(p)\right) + \frac{log(T)}{T} p\ K^2, \tag{4.9}$$

$$FPE(p) = \left(\frac{T + p^*}{T - p^*}\right)^K det\left(\tilde{\Sigma}_u(p)\right), \tag{4.10}$$

where p^* is the total number of parameters in each equation, p represents the number of lags and

$$\tilde{\Sigma}_u(p) = T^{-1} \sum_{t=1}^{T} \widehat{\boldsymbol{u}_t} \widehat{\boldsymbol{u}_t}'. \tag{4.11}$$

The long-run causal ordering of the dynamic system covered in the models of this study is follows: labor market variable, fertility variable, money holding variable, and output variable. This structure has been justified by Wang at al. (1994) and Maksymenko (2009). Based on this structure, four structural shocks u_t are assumed: an unemployment shock, a preference shift towards higher fertility, a monetary shock, and a Harrod-neutral productivity shock, which means, that technology is labor-augmenting.

The advantage of the VAR models is that they allow us to study the relationships among mutually dependent variables and whole dynamics of the system. On the other hand, the system can be too complicated and to get robust results could be difficult. The assumptions of time series stationarity, no serial correlation in the residuals, normality of residuals, and no heteroscedasticity have to be fulfilled. A weak point can be also in a selection of endogenous variables. They should be justified by theoretical knowledge. In this study, the variables were chosen based on the study of Maksymenko (2009). She empirically tested the economic theory involved in the work of Wang at al. (1994) and Petrucci (2003) for Ukraine data.

4.2.2.2 Data and determination of empirical models

The empirical study covers three VAR models and employs Czech quarterly data covering period from 1. 1. 1996 to 31. 12. 2008[147]. In the first model, the fertility variable is approximated by the crude birth rate (CBR). The crude birth rate is a rough indicator of fertility level and it does involve both age-structure changes and fertility postponement. In general, it is a basic ratio of live births per 1 000 individuals of the mid-population in given year. In this case,

[147] All calculations are done in application R, in this work the version 2.11.1 is utilized. The year 1996 is the first year for which all data are available. The year 2009 is excluded from the analysis due to its particularity caused by global economic crisis.

it is a number of live births over 1 000 individuals of the mid-population in given quarter. In the second model, the period total fertility is applied (TFR). Yearly total fertility rate, which represents the average number of births a group of women would have by the time they reach age 50 if they were to give birth at the current age-specific fertility rates, was with the assumption of marginal impact of women mortality redistributed by births in given quarters. Because the postponement of births to higher ages is highly relevant for the Czech data, the adjusted total fertility rate (ATFR) applying Bongasrts-Feneey (1998)[148] approach was calculated for the third model of the analysis. ATFR was also redistributed by births in given quarters.

In all three VAR models the economic variables are approximated by change in unemployment rate (UNP), money holdings (M2) and gross domestic product (GDP). Gross domestic product is calculated based on the income approach and is presented in the milliards of Czech crowns at purchaser prices. Quarterly growth rates of GDP, monetary aggregate M2 and unemployment are counted as a change related to the corresponding quarter of the previous year. Unemployment rate is calculated for population economically active. It fulfills the requirements of the International Labor Organization (ILO) and Eurostat.

The time series of gross domestic product (GDP), the live births, population, total fertility rate (TFR) and unemployment (UN) were obtained from the website of the Czech Statistical Office. The data on real money holdings (M2) were obtained from the publicly available database of the National Bank of the Czech Republic.

Following the aforementioned methodology, the 1st model with the crude birth rate (CBR) is estimated according to:

$$\begin{bmatrix} UNP_{1,t} \\ CBR_{2,t} \\ M2_{3,t} \\ GDP_{4,t} \end{bmatrix} = \sum_{i=1}^{p} \begin{bmatrix} \alpha_{11,i} & \alpha_{12,i} & \alpha_{13,i} & \alpha_{14,i} \\ \alpha_{21,i} & \alpha_{22,i} & \alpha_{23,i} & \alpha_{24,i} \\ \alpha_{31,i} & \alpha_{32,i} & \alpha_{33,i} & \alpha_{34,i} \\ \alpha_{41,i} & \alpha_{42,i} & \alpha_{43,i} & \alpha_{44,i} \end{bmatrix} \begin{bmatrix} UNP_{1,t-i} \\ CBR_{2,t-i} \\ M2_{3,t-i} \\ GDP_{4,t-i} \end{bmatrix} + CD_t + \begin{bmatrix} u_{1,t} \\ u_{2,t} \\ u_{3,t} \\ u_{4,t} \end{bmatrix}, \qquad (4.12)$$

where D_t corresponds to trend. The other two models are estimated based on similar structure.

Basic descriptive statistics of the time series in Table 4.21 reveal that the average number of children per 1000 individuals of the mid-quarter population is about 2.4. The mean number of children per women in fertile age corresponds to 1.2, and reflecting changes in age of mothers at birth the value increases up to 1.7 children per woman. The magnitude of postponement is obvious. The highest variation is in the time series of change in real money holdings, which fluctuates between values 2.4 % and 21.6 %. The percentage change in gross domestic product shows narrow range of fluctuation, between 2.6 % and 15.6 %. Even smaller fluctuations are present in case of the change in unemployment rate.

The Chart 4.39 shows the time series which interactions are analyzed in the VAR models. The increasing trend of the fertility series is evident. Particularly, the fluctuations are noticeable for the crude birth rate time series. Considering the formula and population development

[148] The adjusted total fertility rate at time *t* is calculated based on following formula: $ATFR_t = \frac{TFR_t}{1-r}$, where *r* corresponds a change in the mean age of mothers at birth in given time period. The parities were not taken into account.

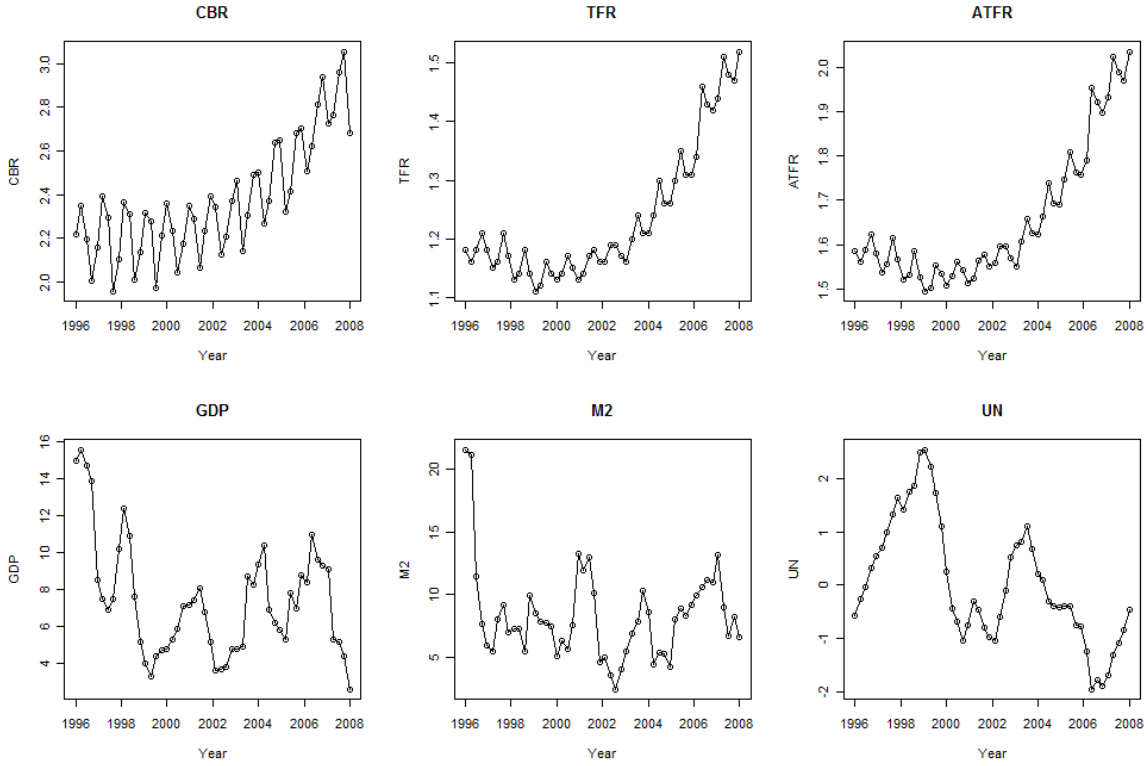
in the Czech Republic, the oscillations are caused predominantly by changes in population. The economic time series do not vary so much. Their similar pattern, especially for the output and money holdings series, indicates their interdependence.

Table 4.21: Descriptive statistics of studied time series, the Czech Republic, 1996-2008

Variable	Mean	Min	Max	Standard deviation
CBR	2.375	1.956	3.057	0.262
TFR	1.235	1.110	1.520	0.115
ATFR	1.656	1.494	2.037	0.155
GDP	7.408	2.600	15.600	3.098
M2	8.262	2.400	21.600	3.682
UNP	0.030	-1.935	2.594	1.155

Source: Author's calculations

Chart 4.39 : Time series of CBR, TFR, ATFR, UNP, M2, GDP, the Czech Republic, 1996-2008



Source: The Czech Statistical Office, the Czech National Bank, author's calculations

4.2.2.3 Diagnostics

To estimate a VAR model the stationarity of the time series as well as the order of the model and all assumptions imposed on residuals have to be tested. That is, the absence of serial correlation, normality of an error process, and heteroscedasticity has to be checked. If one of those assumption is obeyed than the model is not well specified, and therefore results are not robust.

In order to check for stationarity, which means that joint probability distribution does not change with shifts in time, the Dickey-Fuller test is employed. The Dickey-Fuller test or the Unit Root test is constructed as follows:

$$\Delta x_t = \gamma x_{t-1} + u_t, \tag{13}$$

where x_t is a variable tested for stationarity, $\Delta x_t = x_t - x_{t-1}$, and u_t is the error term. The tested hypothesis is: H_0: $\gamma = 0$, the variable has a unit root, against the alternative H_1: $\gamma < 0$, the variable is stationary. The Table 4.22 shows all the results for the Augmented Dickey-Fuller Test of Unit Root for all time series. Based on p-values for all of them the null hypothesis is rejected at the 5 % level of significance. The result of the test is also supported by the Chart 4.39, which present the development of each variable in time.

Table 4.22: Augmented Dickey-Fuller Test of Unit Root

Variable	Deterministic term	Lags	Test value	Critical values			P-value	H_0 (5%)
				1 %	5 %	10 %		
CBR	-	4	2.345	-2.6	-1.95	-1.61	0.024 *	rejected
TFR	-	3	3.411	-2.6	-1.95	-1.61	0.002 *	rejected
ATFR	constant	3	5.043	-3.51	-2.89	-2.58	8.79e-06 ***	rejected
GDP	constant	4	-2.119	-3.51	-2.89	-2.58	0.040**	rejected
M2	constant	4	-2.742	-3.51	-2.89	-2.58	0.009**	rejected
UNP	-	1	-2.304	-2.6	-1.95	-1.61	0.026*	rejected

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Source: Author's calculations

The number of lags in VAR models, the curtail issue of the specification, is chosen based on information criteria. The results of selection process are summarized in the Table 4.23. In general, the Akaike (AIC(p)) criterion always chooses the largest order, SC(p) the smallest and Hannan and Quinn(HQ(p)) is between them (Lütkepohl, 2007, p.24). If the suggestions of the lag number differ for given model, the results of the diagnostics tests for the model with the various lags have to be compared. In this study, for the first model with the crude birth rate the diagnostics for four and six lags are confronted. For other two models, the variants with four and five lags are compared. Based on comparisons, the first VAR model with the crude birth rate is determined by four lags and the other two models with the total fertility rate and the adjusted fertility rate by five lags. The essential issues of untaken variants are unfulfilled assumptions imposed on residuals.

Table 4.23: Selection criteria

Model	AIC(n)	HQ(n)	SC(n)	FPE(n)
(1) with CBR	6	4	4	6
(2) with TFR	5	5	4	5
(3) with ATFR	5	5	4	5

Source: Author's calculations

The diagnostics of the models involves the Portmanteau test of serial correlation in the residuals, the Jarque-Bera tests of residuals normality and the ARCH-LM Test of heteroscedasticity. In the Portmanteau test the hypothesis H_0: no autocorrelation against H_1: autocorrelation is checked. The Jarque-Bera tests of residuals normality is constructed similarly, it tests H_0: normal distribution of the residuals against H_1: no normal distribution of the residuals. The diagnostics for heteroscedasticity, which means that the random variables have different variances, is based on the standard ARCH-LM test. The null hypothesis H_0: no heteroscedasticity is examined against alternative H_1: heteroscedasticity.

The results of these diagnostics are presented in the Table 4.24 - Table 4.26. The p-values for all three models in the Portmanteau test of serial correlation in the residuals indicate that the null hypothesis about no autocorrelation cannot be rejected. The same statements are obtained in another two tests. The null hypothesis about normality of residuals in the Jarque-Bera tests as well as null hypothesis about no heteroscedasticity in the ARCH-LM test cannot be rejected. All the models fulfill the requirements of assumptions for well-defined VAR model. This models' specification is also supported by the diagrams of fits and their residuals, which are presented in the Appendix (See Charts A.9 - A.11 in Appendix).

Table 4.24: Portmanteau test of serial correlation in the residuals

Model	χ^2	P-value	H_0 (5%)
(1) with CBR	221.77	0.069	not rejected
(2) with TFR	204.59	0.068	not rejected
(3) with ATFR	199.03	0.113	not rejected

Source: Author's calculations

Table 4.25: Jarque-Bera tests of residuals normality

Model	Variable	χ^2	P-value	H_0 (5%)
(1) with CBR	JB-Test (multivariate)	2.530	0.960	not rejected
	Skewness (multivariate)	0.936	0.919	not rejected
	Kurtosis (multivariate)	1.593	0.810	not rejected
	UNP	0.576	0.749	not rejected
	CBR	0.483	0.786	not rejected
	M21	1.362	0.506	not rejected
	GDP	0.227	0.893	not rejected
(2) with TFR	JB-Test (multivariate)	1.699	0.989	not rejected
	Skewness (multivariate)	0.795	0.939	not rejected
	Kurtosis (multivariate)	0.905	0.924	not rejected
	UNP	0.576	0.750	not rejected
	TFR	0.764	0.683	not rejected
	M2	0.017	0.992	not rejected
	GDP	2.878	0.237	not rejected
(3) with ATFR	JB-Test (multivariate)	1.916	0.984	not rejected
	Skewness (multivariate)	1.352	0.852	not rejected
	Kurtosis (multivariate)	0.564	0.967	not rejected
	UNP	0.424	0.809	not rejected
	ATFR	1.648	0.439	not rejected
	M2	0.083	0.959	not rejected
	GDP	3.368	0.186	not rejected

Source: Author's calculations

Table 4.26: ARCH-LM Test of heteroscedasticity

Model	Variable	χ^2	P-value	H_0 (5%)
(1) with CBR	ARCH (multivariate)	430	0.989	not rejected
	UNP	12.421	0.715	not rejected
	CBR	18.210	0.312	not rejected
	M2	11.620	0.770	not rejected
	GDP	14.904	0.532	not rejected
(2) with TFR	ARCH (multivariate)	420	0.996	not rejected
	UNP	6.872	0.976	not rejected
	TFR	19.970	0.221	not rejected
	M2	20.402	0.203	not rejected
	GDP	16.609	0.411	not rejected
(3) with ATFR	ARCH (multivariate)	420	0.996	not rejected
	UNP	7.982	0.949	not rejected
	TFR	13.548	0.632	not rejected
	M2	19.014	0.268	not rejected
	GDP	13.533	0.634	not rejected

Source: Author's calculations

4.2.2.4 Results

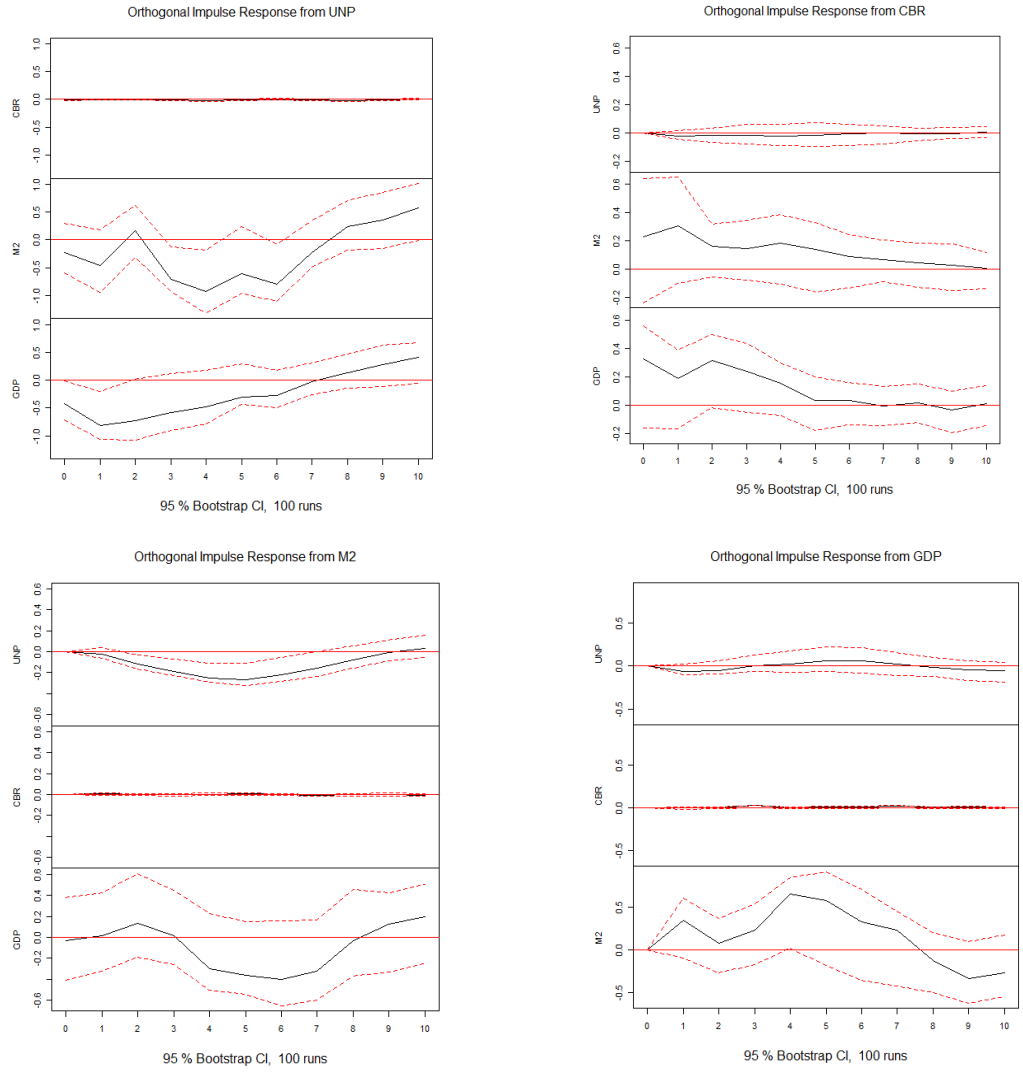
This section is devoted to the results of all three VAR models in the form of the impulse response functions and the forecast of the variance decomposition. The impulse response analysis is used to investigate the dynamic interactions between endogenous variables in the system and is based on the Wold moving average representation of a VAR(p) process. The estimated coefficients are interpreted as an expected response of variable *y* to a unit change in variable *x* of the system. The forecast of the variance decomposition goes further. It analyzes the contribution of variable *x* to the *h*-step forecast error variance of variable *y*.

All three systems of VAR models involve four shocks; the unemployment shock, the fertility shock as a preference shift to higher fertility, the monetary shock, and the output shock. The ordering of the VAR system is a crucial for the results of the impulse response function. If the sequence is changed, the results can differ. For the results comparability, this study follows the ordering applied in the work of Wang at al. (1994) and Maksymenko (2009). It is assumed that the curve of a labor supply is vertical in the long run and moves only by shocks to itself. The permanent change in the rate of inflation has no effect on unemployment in the long run (a vertical Phillips curve). Furthermore, the fertility choice does not depend on the monetary disturbances and Harrod-productivity shocks in the long run and development of real money is not affected by the Harrod-neutral productivity shock (Maksymenko, 2009, p.83). Therefore the dynamics of the system is present in the short run, but not in the long run.

The following charts Chart 4.40 - Chart 4.42 show the impulse responses functions for each model within ten quarters. At first glance, the similar pattern of the responses to given economic disturbances is obvious. The model with the crude birth rate differs from the models with the period total fertility rate and the adjusted total fertility rate in levels and magnitudes, but not in trends of development. It means that curves look identically, but are shifted up or down and turn points are sharper or blunt. In the second and the third model the responses to

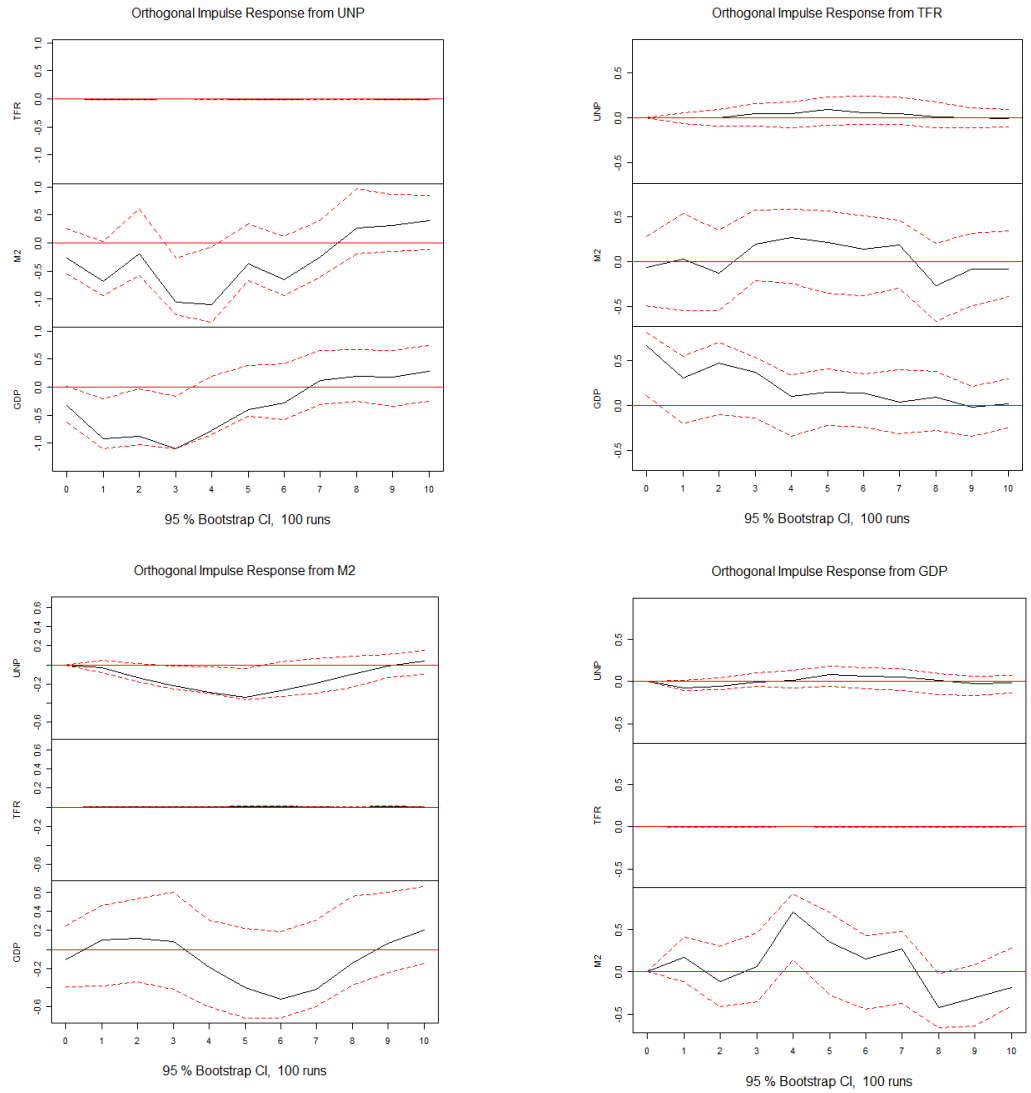
economic shocks are the same, but in comparison with the first model are even pronounced. The visible differences are also evident in case of responses to fertility disturbances. Considering the trends, the first and the third models resemble more to each other than to the second model. Even though, fertility does not respond to economic incentives in the Czech data it seems that the objection against the only utilization of the crude birth rate is legitimate. The VAR models included in this study reveal that different approximation of fertility lead to slightly diverse model specification and results. Based on given findings, the conclusion on which measurement is better cannot be reached. But regarding the responses of the economic variables to fertility disturbances it seems that applying the crude birth rate leads to similar results as the utilization of the adjusted total fertility rate, if it is calculated by the given approach.

Chart 4.40: Orthogonal impulse response function for the model (1) with CBR



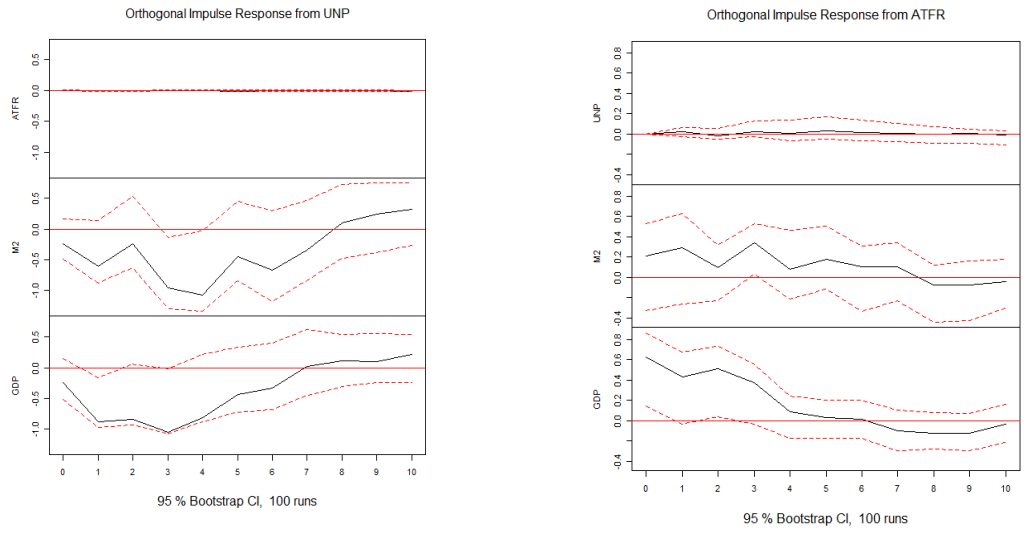
Source: Author's calculations

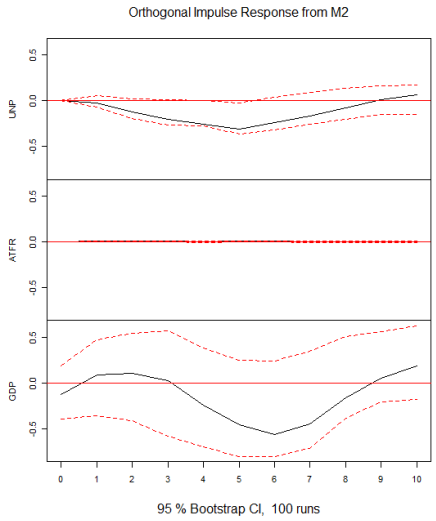
Chart 4.41: Orthogonal impulse response function for the model (2) with TFR

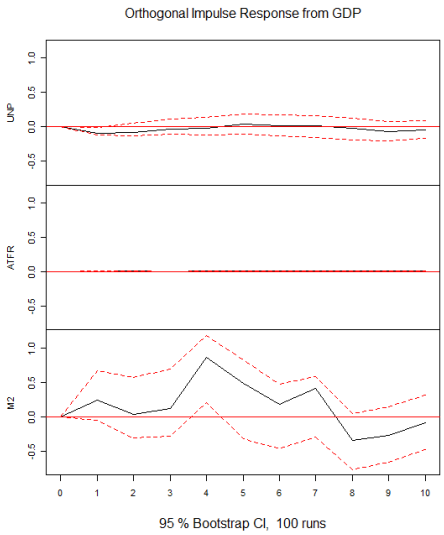


Source: Author's calculations

Chart 4.42: Orthogonal impulse response function for the model (3) with ATFR







Source: Author's calculations

Let's see the pattern of development in the short run. The unemployment disturbance does not affect any of the fertility measures. The trend is a straight line equal to zero. Therefore, it seems that childbearing is not considered as an alternative to be unemployed and that unemployment does not affect timing of fertility decision. The substantial fluctuations are observable in case of the real money holdings. The trend in development is the same for all models, but the level of fall is pronounced for the second and the third model. The negative response of savings to higher unemployment could be explained by their spending. As time moves on and unemployment backs to its stable level, the people start to save again. In case of output development, the output declines as less people are employed and increase as the reduction in labor is substituted by advanced technology. In the long run, all these responses disappear.

The impulse response of the unemployment series to the fertility shocks is marginal and relatively diverse from one model to another. While in the first model the response is slightly negative, in the second model is positive and in the third model the response fluctuates around zero. The negative response means that as the preference shift to higher fertility takes place, the unemployment decrease. The explanation can be in employment of labor to positions that become vacant due to maternal/parental leave. On the other hand, the increasing unemployment with the preference shift to higher fertility can be explained by insurance motive of employers. At the macro level, childbearing is related to human capital depreciation and the fact that women with children are less time-flexible in their jobs than childless women. Therefore employers could try to avoid hiring young women, who have or plan to form family. The fluctuations in the third model can be due to a mix of previous explanations. Despite of responses insignificance, the relevance of application of different measures is obvious. Relatively distinct pattern is also evident in case of the response of the real money holding series. In all three models savings increase as child is born at the beginning and later on are reduced as additional costs have to be covered. The remarkable fact is that while in the first and the third model another turn is observed immediately after the first one, in the second model the short period of saving accumulation is evident. There are apparent differences in timing

of the responses. Contrary to that, the impulse responses of output series to fertility shocks are relatively the same. At the beginning, the output accelerates as the fertility shock occurred and decreases as capital accumulation is slowed down. Again, all the effects gradually disappear in the long run.

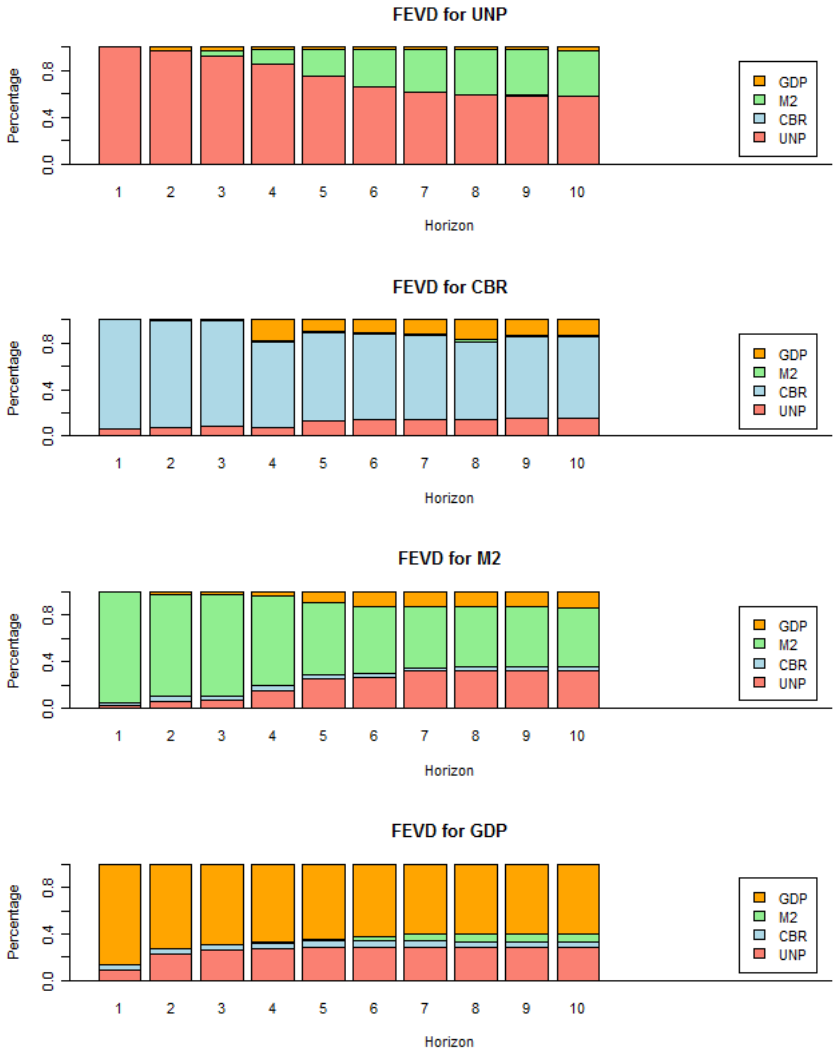
In case of the money holdings disturbances, the interdependence of the system is evident. As additional capital is available in economy, the output growth and unemployment is reduced. Later on, when the supplementary capital disappears, the output growth is reduced and subsequently unemployment increases. Because the fertility variables do not respond to the unemployment shock, any response to the money disturbance is not surprising. Again the trend is a straight line equal to zero. The results also correspond to the assumption of no response in the long run.

The remarkable results are present in the responses to output disturbances. The unemployment is reduced as the production increases at the beginning, but the response is negligible. It could be surprising, but if we take into account the rigidity of the Czech labor market no response of unemployment to output shocks is not so astonishing. Once again, fertility variables do not response to output disturbance at all. The only pronounced response in form of fluctuations is evident in case of the real money holdings. As the disturbances to output take place, the savings are accumulated due to insurance motive. But with more money, people become richer and may afford to realize the costly investments, which are not done every day. As it is supposed, all responses disappear in the long-run.

Because the results are relatively similar for all three models, the forecast error variance decomposition for the first model only is presented[149]. The figures in the Chart 4.43 show that the error variation is mostly explained by the variable itself. In case of unemployment, in the tenth step, 58 % of the variation corresponds to unemployment, almost 40 % to money holdings and 2.5 % to technology shock. The similar pattern is present for the crude birth rate. In the tenth step almost 70 % variation is explained by fertility itself, the 16 % is devoted to unemployment and additional 13 % to the gross domestic product. Just a marginal part of variation is explained by the money holdings. For the rest of variables, decomposition fits to describe structure. The remarkable fact is that ca. 5 % of error variation in output is explained in each step by fertility.

[149] The results for all models are included in Table A.4 in Appendix.

Chart 4.43: Forecast Error Variance Decompositions for the model 1



Source: Author's calculations

The forecast error variance decomposition supports the results obtained with the impulse response functions. The interdependence of macroeconomics variables is evident while the significant response of fertility variables is not present. From this perspective the Hypothesis of an economic crisis for the explanation of fertility development observed in the Czech Republic from the year 1996 is not justified. But this does not mean that the economic variables do not shape the fertility pattern. The results of three VAR models indicate that the development of the Czech fertility has been forced by different mechanisms than by just poor economic forces. There is also support for utilization of distinct fertility measures. The different approximations of fertility led to distinct models specification and consequently to slightly modified results.

4.2.2.5 Discussion considering the analysis in a macro perspective

The Czech Republic is a member of a group of post-communist countries, where the substantial decline in fertility has occurred from the beginning of the 1990's. All the countries have undergone economic transformation from a command to a market economy, which results

in different pattern of development. This fertility decline is mainly explained by three approaches; the Second Demographic Transition, the Postponement Transition and the Hypothesis of an economic crisis. In spite of the fact that, each of them considers the economic performance from the different perspective, all suppose economic factors as relevant. Therefore, the main motivation behind this analysis has been detecting the channels through which the fertility and economic performance interacts and test employing VAR technique if the Hypothesis of economic crises can help to understand the development of fertility in the Czech Republic after the year 1989.

Based on literature three channels of interaction between fertility and economy were chosen; the unemployment, the real money holding M2, and the gross domestic product. It is supposed that higher unemployment in economy should reduce the fertility, because people would like to keep their jobs. The second channel of interaction comes from economic theory, which works with the assumption that people consider their savings in their fertility decision, because they would like to bequest some property to their descendants. The savings are also important as an insurance against the additional and unexpected expenses. Based on work of Petrucci (2003), the fertility should increase as savings increase. The relationship between fertility and gross domestic product is more diverse. While the negative relationship between fertility and change in output has been found in the long run, it is assumed that fertility should increase as economy grows and vice versa in the short run. With an expanding economy people become richer and therefore they can afford children, which are currently related to substantial costs.

Because all aforementioned variables are interrelated, the technique of the multi-variable vector autoregressive model (VAR) had to be utilized. Taking into account the critique of applying the crude birth rate as an approximation to fertility, in total three VAR models were built up. The first model involved the crude birth rate, the second one the period total fertility rate and the last one the adjusted fertility rate. That additional fertility measures should be more suitable, because they reflect the changes in the age structure and the fertility postponement. The results of the models supported this statement. The utilization of distinct approximations of fertility led to different specification of models and slightly different results. Furthermore, the VAR models revealed that there is no response of fertility on economic variables at all. The interdependence of macroeconomic variables was obvious, which argues in favor of VAR technique, but no impact on fertility. Therefore, it seems that the Hypothesis of an economic crisis cannot be a predominant explanation of the fertility development in the Czech Republic after the Velvet revolution.

Although the response of fertility to economic incentives was not found in this analysis, it does not mean that economic factors were not important in a fertility decision of Czechs. Quite the opposite, the results argue in favor of the Second Demographic Transition or the Postponement Transition, which are based on ideational change in population, but economic factors take into account too. Considering the results and the population and economic development in the Czech Republic after the year 1989, the fertility decline corresponds with the Postponement hypothesis. However the small fertility decline had been documented before the demise of the state socialist regime, the real fall in fertility occurred after the year 1992 and reached minimum in the year 1999. From the cohort perspective, the baby-

boomers' cohorts of the mid 70's came into fertile age. While women born at the beginning of 1970s had children relatively early as was typical for the fertility model of socialist era, the women which had been still childless after 1989 changed the timing of childbearing to higher ages (Sobotka et al., 2008, p.416). Although it is estimated, that the percentage of permanently childless has increased in cohort 1975 and afterwards in comparison with cohorts born in the 1960's, the recuperation of the first birth has been evident. Therefore, any response of fertility to economic disturbances is reasonable, because analyzed data involved mainly fertility which was postponed. Taking into account increasing age of mothers at first birth, the couples had children because they wanted them independently to economic situations and changes in family policy. The important factor in fertility decision has become age.

Another factor which argues in favor of the Postponement hypothesis is the institutional settings in the Czech Republic. Kohler et al. (2002) point out that the low fertility is also the result of an insufficient child care support, a relatively inflexible labor market, a low support of families with children via tax allowance and direct transfers, and a highly unbalanced division of labor within household. Let's see in a nutshell what happened with those institutions in the Czech Republic after the collapse of the communist regime.

Since the 1970's the daily child care system had been extensive. The socialist regime supported the idea of full employment of women and their early return to work after childbearing (Sobotka et al., 2008, p.443). As the paid maternity and parental leaves were prolonged in total into three years in 1989 and the responsibility to run those facilities was transmitted to municipalities, the system collapsed. The number of crèches was dramatically reduced and as fertility was declining the nursery schools were closed due to high operating costs (See Table A.5 and Table A.6 in Appendix). While 14 % of children under the age of three were enrolled in public crèches in the year 1989, in 2000 the percentage corresponds to 1 % (Kantorová, 2004, p.68). This level maintained in following years too. In spite of the fact that the shortage of kindergartens was observed at the beginning of 21st century, the authorities argued in favor of a whole social reform, which due to political disagreement resulted just into several subsequent changes in regulations for providers of kindergartens, tax allowances and direct transfers, and a new scheme of parental leave.

Private nursery schools emerged, but they have not become solution for most of parents due to their fees and the fact, that majority of employers has not had any incentives to established kindergartens in their company. The labor market in general remains rigid. To employ or dismiss a labor as well as to have part-time jobs has been relatively costly for entrepreneurs. Therefore, they have not been motivated to hire young women who can leave soon to maternal leave or women, who have young children. The women disadvantage in the labor market can be illustrated by the fact, that they had the higher unemployment rate than men over all period 1993-2008 and that just 8.5 % of employed women had a part-time job in 2008 (CZSO a, b, 2009).

The support of families with children via tax allowances and direct transfers have undergone a lot of changes too. For instance, the calculation of a tax burden for families based on tax allowance per children remind the same till the 2004, one year later the tax allowance had been changed into tax relief, tax benefit and the joint taxation of married couples. In the year 2006

the basic tax allowance per person was transformed to tax relief. In the year 2008 a new concept of super gross wage was introduced and the joint taxation of married couples was abolished[150]. The sequence of turns in tax technique was relatively quick and not obvious at first glance, because the bulk of calculations have lied on employers. Therefore, a majority of people did not know which reform was beneficial for them and if they were better off or not. The changes in the parental allowance and other direct transfers have been more obvious (See Table A.7 in Appendix), but not in an amount which could directly improve financial situation families with children. It is more probable, that people have perceived state's financial support to families as a nice pocket money, but not as an income, which predominantly influence their fertility decision.

The assumption about unbalanced division in labor within a household in the Postponement Transition is also fulfilled in the Czech Republic. On the basis of the ISSP survey held in 2002, women do two third of the housework (Chaloupková, 2005, in Sobotka et al., 2008, p.438). Furthermore, the burden of housework does not vary a lot by the type of job weather it is a full-time or a part-time. Although women have a double role in fulfilling work and family obligations, a low satisfaction with division of labor in household has not been documented in the Czech Republic. Kohler et al. (2002), except for the difficulties related to fertility measures, point out also, that social response to economic uncertainty is a substantial in comparison with the individual preferences. In the Czech Republic the postponement in fertility is distinct, but changes in individual preferences are less profound. In the PPA Survey in 2001 [151] the preferences in favor of family remain unchanged (Sobotka et al., 2008, p.438).

However the Postponement Transition seems capable to explain the fertility development in the 1990's in the Czech Republic, it should be taken into account, that it follows only the major pattern present in population. For instance, the economic crisis hypothesis is more capable to describe the development trend of fertility in a population, which had had children already at the beginning of the 1990's. Their response to economic uncertainty was not just postponement of childbearing, but its stopping. Furthermore, the Second Demographic Transition with its assumption of economic stability and growth does not fit the described pattern in the economic transition, but it could hold for a subpopulation as well as for the development from the beginning of the 21st century, when the economic growth and improvement in stability has been pronounced. The change in preferences regarding family was not documented, but individualism and self-actualization do not necessarily imply selfishness and preferences in favor of no family formation.

In summary, in spite of the fact that, it would be more desirable to investigate monthly data from the beginning of the transition, the analysis reveals that the fertility development after the year 1996 in the Czech Republic cannot be predominantly explained by economic forces as it was documented for instance in case of Ukraine in work of Maksymenko (2009) or Billingsley (2010). The VAR models show no response of fertility variables to economic disturbances. Therefore, it is seems that the economic factors of the Czech transformation had

[150] Changes in tax technique are discussed in detail in following sub-chapter: 4.2.3 Analysis in a micro perspective.

[151] The PPA Surevy refers to the Population Policy Acceptance Survey.

indirect effect on fertility decision. Considering all assumptions, the concept of the Postponement Transition appears more appropriate for the fertility development in the Czech Republic observed in the 1990's than the Second Demographic Transition.

4.2.3 Analysis in a micro perspective

The study at micro level in this section is focused on an issue how the family has been integrated within policy in the Czech Republic in the period 1989-2010[152]. Considering comprehensiveness of the topic the study is narrowed to the financial support to Czech families, which has been guaranteed by the Declaration of Human Rights[153]. Financial support to families has been fundamentally understood as a compensation for costs related to children rearing or as an acknowledgement regarding fulfilment of family functions and one of the most important support which is provided. The sub-chapter of the thesis is divided into four parts, which are deeply related and strictly following effective legislation in the Czech Republic. The financial support in the system is basically direct and indirect[154] therefore the first part discusses a social security system with respect to the family and the second part monitors changes in tax techniques introduced in amendments considering families with distinct income levels. The third part involves simulations which combine both previous sources of state support to the family and illustrates the impact of the system on different types of families. The last part discusses obtained results from previous three parts.

4.2.3.1 Direct financial support

The social security system, which provides a direct financial support to the family, has been consisted of three components in the Czech Republic since the 90's of the 20th century, i.e. benefits from state social support, sickness insurance and assistance in material need. It is important to note that with respect to welfare system the family is judged as a unit of parents and dependent children if they reside jointly and cover costs of their needs in common (See article 115 of the Civil Code). Furthermore, dependent children are preschool-age and school-age children, children up to the age 26 who continuously prepared themselves to their employment and/or who with respect to their mental and physical disorder are not capable to ensure their living and do not draw disability pensions.

The social security scheme aims to equalize the income downswing which may occur over human life (Act No. 100/1988 Coll., on Social Security as amended). Therefore, the support is related to certain events which led to short-term or long-term financial looses. For instance, assistance is provided in case of unemployment, illness, senescence, disability, pregnancy, maternity, etc. Social security benefits are granted on the base of previous contributions of given person to the system. Contributions differ with respect to person status whether it is employee or self-employed person, because system of financing is established on contributions of employees, employers and the state. Act No. 589/1992 Coll., on Social Security Premiums

[152] Unless otherwise stated, data are presented with respect to the year 2010.

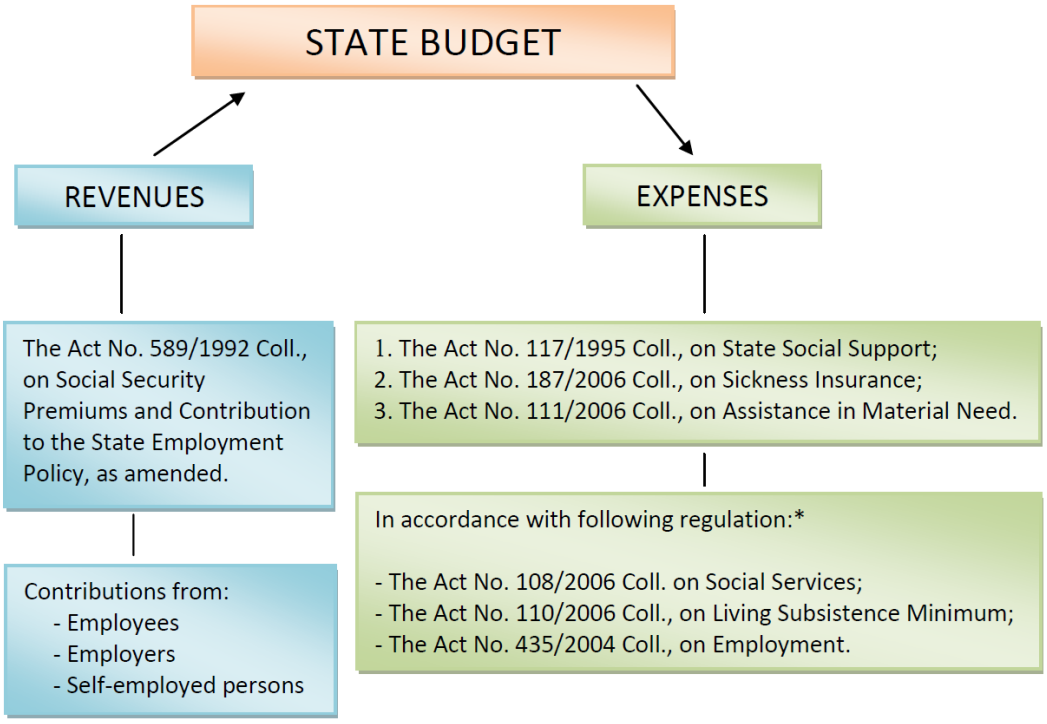
[153] Based on the Declaration of Human Rights, which has been a component of fundamental laws in the Czech Republic, parents who take care of their dependent children are entitled to be supported by the state.

[154] It is necessary to note, that additional support as discounts to traffic, culture, specific services, etc. has existed in the system too, but are not discussed in the work.

and Contribution to State Employment Policy defines levies to the state budget, policyholders, basis of assessment, etc. An insurance premium is determined as percentage rate on basis of assessment ascertained over period of payment and it is highly relevant with respect to natural person income tax, which is studied in the next section 4.2.3.2.

The social security scheme focuses basically on person who contributes to the system from his earnings, but in case that given person lives in the family and changes his status from contributor to receiver of benefits, than the family income can be significantly influenced. Therefore the family is indirectly concerned too. All components of the system and its basic features are sketched in following sections based on the law in force. Although, structure of the section could seem too detailed, the whole system of financial support to the family is so interconnected in the Czech Republic, that information presented in this section are necessary for understanding of indirect financial support examples and simulations in following two sub-sections. The structure of this section reflects three fundamental laws listed below.

Chart 4.44: Financial flows of direct support, the Czech Republic



Notes: *only selected laws
Source: Author's work

Considering sources of the state budget (See Chart 4.44), social benefits can be provided based on three regulations[155]:

1. The Act No. 117/1995 Coll., on State Social Support;
2. The Act No. 187/2006 Coll., on Sickness Insurance;
3. The Act No. 111/2006 Coll., on Assistance in Material Need.

[155] Another law related to the social system is the Act No. 108/2006 Coll., on Social Services.

The first, the Act No. 117/1995 Coll., on State Social Support involves benefits of following type:

- Benefits with respect to income:
    - Child benefit;
    - Social allowance;
    - Housing allowance.
- Other benefits:
    - Parental allowance;
    - Foster care benefits;
    - Birth grant;
    - Funeral grant.

The basic pillar of the system as stated above is the state social support which distributes financial assistance to a person, who has been in socially recognized situations, e.g. a member of the family with dependent children. Valid claim is established by fulfilment of specified criteria which respect social desirability and status. The principal criteria (also for assistance in material need) are a subsistence minimum and a living minimum defined in the Act No. 110/2006 Coll., on Living and Subsistence Minimum[156]. The living minimum is a socially recognized minimum level of income to ensure sustenance and other basic personal needs. A person with income below the level of the living minimum suffers by material need. Total living minimum of the family is calculated as a sum of living minimums of each household member. On the other hand, the subsistence minimum is a minimum level of income, which is considered to be necessary to ensure sustenance and other basic personal needs at a level allowing the individual to survive. The subsistence minimum cannot be used for dependent children, the recipients of an old-age pension, for fully disabled persons and for persons over the age of 68. Amount of the subsistence minimum is updated on January, 1 of given year with respect to inflation. If a consumer price index exceeds 5 % than adjustment can be done directly by government order. In case, that a consumer price index does not exceed 2 % than adjustment need not take place. In addition, if costs of living increase significantly than worsening of financial position of the family is compensated via benefits and allowances reflecting a living minimum. Both minima were introduced into present-day Czech legislation in 1991[157].

[156] Citizens have a right to benefits if they and the household members assessed with them are permanently resident in the Czech Republic or if they are EU citizens - subject of directly applicable legislation of the European Communities. For non-EU foreign nationals, permanent residence in the Czech Republic is considered to be the period once 365 days have passed since the date they registered to stay in the Czech Republic (Ministry of Labour and Social Affairs of the Czech Republic, 2011).

[157] The Act No. 643/1991 Coll., on the Living Minimum.

Table 4.27: Living minimum per month, the Czech Republic, in force since 1.1. 2010*, Czech crown#

Living minimum per family member	Czech crowns
Single	3 126
First person in household	2 880
Second and other persons who are not a dependent child	2 600
Dependent child aged	
under 6 years	1 600
6 - 15 years	1 960
15 - 26 years	2 250
Subsistence minimum	2 020

Notes:

* the same for the period 2007-2009

Development of living minimum in time see Appendix Table A.8.

Source: The Act No. 110/2006 Coll., on Living and Subsistence Minimum

The first benefit involved in the state social support, which is applied with respect to income, is ***child benefit***. Child benefit is provided in an amount presented in Table 4.28 in case that family income does not exceed product of family living minimum and coefficient 2.5 for the years 2007-2009, and coefficient 2.4 for the years 2010-2011.

Table 4.28: Child benefit per month, the Czech Republic, in force 1.1. 2010*, Czech crown#

Dependent child aged	Child benefit per month in Czech crowns
under 6 years	500
6 - 15 years	610
15 - 26 years	700

Notes:

* The same for the period 2007-2009.

Development of child benefit in time see Appendix Table A.9.

Source: The Act No. 117/1995 Coll., on State Social Support

Social allowance is the next benefit provided by the state social support which is income tested[158]. The assistance is focused on families with minimum income in order to cover their living costs. Families are entitled to this allowance if parents take care for at least one dependent child and the family income in the previous calendar quarter does not exceed two times the family's living minimum. Basic principle applied is an inverse proportion therefore with increased family income the social allowance decreases. On the other hand, in case of child long-term illness or disability the social allowance increases. State support can be also increased in case of multiple pregnancy or if family living costs grew due to child education at secondary school or university. The articles 20-22 of the law clearly define all prerequisites and coefficient of calculation.

The last benefit in accordance with the family income is ***housing allowance*** in the Act No. 117/1995 Coll., on State Social Support. Also this benefit is focused on the low income families to overcome higher costs with respect to housing. Housing allowance is provided irrespectively of house or flat ownership. Owner or tenant with permanent residence is entitled to this allowance if 30 % of family income is not capable to cover costs of housing and at the same

[158] For the year 2011 social allowance is abolished.

time this 30 % of family income is lower than the relevant prescriptive costs set by law[159]. The level of housing allowance is set as the difference between prescriptive housing costs and the relevant family income multiplied by a coefficient of 0.3[161].

The other benefits from the state social support related to the family do not depend on the family income. The core benefit is ***parental allowance***, which was considerably changed in the last years. The allowance is provided to a parent who personally and properly cares for a child who is the youngest in the family on an everyday basis over whole month. Benefit can be received for a period of up to two, three or four years of the child. According to the length of allowance receiving, the amount of benefit is defined as follows:

- Faster draw of parental allowance ensues maternity benefit at the increased rate of 11 400 Czech crowns until the child is 24 months old.
- Standard draw of parental allowance follows maternity benefit at the basic rate 7 600 Czech crowns until the child is 36 months old.
- Slower draw of parental allowance is provided after maternity benefit at the basic rate 7 600 Czech crowns until the child is 9 months old and after it at the reduced rate 3 800 Czech crowns until the child is 48 months old.

Although the allowance entitlement is not tested with respect to parent income, several conditions have to be fulfilled. For instance, a child at the age under 3 years cannot be in day nursery more than 5 days per month. A child older than three years can go to kindergarten, but cannot spend there more than four hours per day or five days per month. Currently, occasional income is allowed alongside parental allowance, but during the period of this occupational activity, the parent must ensure that the child is in the care of another adult. Relatively complicated rules are applied with respect to procedure of request for parental allowance. For example, parent can apply for faster draw of parental allowance till the age of 22 weeks of the youngest child. In case of standard draw of parental allowance application has to be submitted till the age of 9 months of the youngest child. If parent does not apply for faster or standard draw of parental allowance, than parent will receive parental allowance at the slower draw when the child reaches the age of 9 months. In addition, when the method of parental allowance is selected than it cannot be changed. The law also defines all conditions with respect to parental allowance in case of child disability.

The Act No. 117/1995 Coll., on State Social Support also delimits benefits to the foster families. ***Foster care benefits*** assist to cover costs of child's needs within foster care as well as reward foster parents for their care. In addition, benefit related to coming of a child to the family is provided. For instance, the amount of the allowance for a dependent child is 2.3 times the child's living minimum and for an independent child it is 1.4 times the child's living minimum. The foster parent allowance for one child is 3 126 Czech crowns per month. Foster care benefits were not changed in the period 2007-2010.

In comparison with foster care benefit, ***birth benefit*** was provided to all Czech families till the year 2010. Initially, birth benefit should help to cover additional costs related to the child

[159] In case of Prague percentage equals to 35 % and coefficient 0.35.

birth and did not depend on the family income. By amendment of the law dated 1. January 2011, birth benefit became a one-off benefit for low-income families. Therefore, the benefit is income tested these days and is provided to families in case that the family income in the calendar quarter prior to the birth of the first child does not exceed 2.4 times the family's living minimum. An amount of birth grant for the first child, 13 000 Czech crowns, remained unchanged over period 2008-2011[160]. But the amendment introduced birth grant to twins and triplets in an amount of 19 500 Czech crowns in 2011.

Table 4.29: Birth grant, the Czech Republic, 1990-2011, in Czech crowns

Legal force	Birth grant for the first child	Ratio of birth grant and average gross wage (%)
1. January 1990	2 000	60.9
1. May 1991	3 000	79.1
1. May 1993	4 000	67.8
1. October 1994	4 500	64.2
1. October 1995	4 920	59.2
1. January 1996	5 280	53.7
1. October 1996	5 640	57.4
1. July 1997	5 920	54.8
1. April 1998	6 240	52.9
1. April 2000	6 400	47.0
1. October 2001	8 450	57.1
1. January 2005	8 600	45.2
1. January 2006	8 750	43.3
1. April 2006	17 500	86.6
1. January 2007	17 760	81.9
1. January 2008	13 000	58.4
1. January 2011*	13 000	56.2**

Notes: * for low-income families, ** average gross wage of the first quarter of the year.
Source: Kocourková, 2006, p. 115; author's actualization

The last benefit of the state social support which does not depend on the family income is ***funeral grant***. The funeral grant is a one-off payment to a person who has arranged for the funeral of a dependent child, or to a person who was the parent of a dependent child. The benefit is in an amount 5 000 Czech crowns and it is conditioned by the fact that the deceased was a permanent resident of the Czech Republic on the date of death. With respect to all benefits of the state social support it is necessary to note that they are provided by the employment offices and the country councils.

The second regulation, Act No. 187/2006 Coll., on Sickness Insurance involves benefits of following type:

- Sickness insurance benefit;
- Maternity benefit;

[160] Years prior to amendment 2011, birth benefit was provided to each live-born child.

- Care benefits;
- Pregnancy and maternity compensation benefits.

Administration of the sickness insurance was delegated on the base of Act No. 102/1951 Coll. to the Revolutionary Union Movement till the year 1990. Although administration was entrusted to entrepreneurs thereafter, the system was regulated by the Act No. 54/1956 Coll. up to the year 2006. Several amendments as well as new benefits were introduced, but real change came with the Act No. 187/2006 Coll., on Sickness Insurance, which came into force 1. January 2009. The law moved responsibility for sickness insurance from employers to the Social Security Administration. In addition to that, the new regulation increased employers' involvement on employees' incapacity for work. Newly, employer has to ensure financial independence of his employee for fourteen calendar days of his incapacity for work[161]. Financial compensation with respect to incapacity for work is not provided within first three days.

Calculation of sickness insurance benefits in general depends on the daily assessment base and its reductions. The daily assessment base is calculated by dividing the income received by an employee in the decisive period[162] by the number of "contributing" calendar days in this decisive period. Afterwards, the daily assessment base is reduced by boundaries which are defined in three levels currently.

Maternity benefit is provided to individual on maternity leave within 28 weeks in case of a one child and 37 weeks in case of multiple births, including at least 6 weeks before the expected date of childbirth. As stated above, the benefit is related to individual income received in the decisive period and in addition the individual must have participated in sickness insurance for at least 270 days within previous two years. By the new law, maternity benefit can be provided not only to mother but to her husband or father of the child in case of the care for that child. This alternation is permitted at the outset of the 7th week from the date of birth and the frequency of such alternation is not restricted. Since 2009, maternity benefit has been in an amount 70 % of the daily assessment base.

The next benefit based on sickness insurance which may significantly influence financial situation of the family is ***care benefit***. Care benefit is provided to an employee caring for an ill member of his household within nine calendar days. If an employee is single than assistance is received sixteen calendar days in case that child is aged less than 16 years and did not terminated school enrolment. The last benefits, ***pregnancy and maternity compensation benefits*** are guaranteed to woman who due to pregnancy, maternity or breastfeeding was transferred to a different type of work with a lower income in comparison with previous work. All benefits are provided by the District Social Security Administration from the 15th day of incapacity for work.

According to above mentioned regulations, it is obvious that calculation of the sickness benefits has been relatively complicated, but highly important for the financial situation of the family. Because, in case of incapacity for work of at least one household member the family income decreases significantly. Due to reduction boundaries the income from the sickness insurance cannot reach earnings from employment.

[161] Since 2012 employer will be responsible for 21 days of employee's incapacity for work.

[162] A decisive period refers to 12 calendar months before the calendar month in which the social event occurred.

The third regulation of direct financial support to Czech families is the Act No. 111/2006 Coll., on Assistance in Material Need. Considering the title, it is obvious that the law involves guidance to provision of social help to socially needy families. Based on the regulation, a person is entitled to the benefits with respect to all members of the family. The rules of the assistance are tied with the Act No. 110/2006 Coll., on Living and Subsistence Minimum. Responsibility for all administration and provision of these benefits is delegated to state and local authorities, district councils and the Ministry of Labour and Social Affairs of the Czech Republic.

Whole sub-chapter dealt with the issue of direct financial support to Czech families, which has been the first component of the support received from the state. The assistance is provided via the state social scheme established primarily on three laws. Although the system has been relatively broad, it has been also relatively complicated. Especially sickness insurance, which may have significant impact on the family income and living standard of the family, has been comprehensive issue broadly unknown to the public. The following section continues in a question of the state policy with respect to the family, but from a perspective of the tax system.

4.2.3.2 Indirect financial support

In comparison with the direct financial support, which is relatively visible for the public, because benefits are received as cash or account deposits, indirect financial support is more incomprehensible. This support is provided by the state via a tax system and therefore, its complicated nature, which consequently can generate system unknowingness, depends solely on the state authorities. The basic idea behind application of indirect financial support to families in the policy is to leave more money to families, strengthen their independence from the social security scheme and self-sufficiency, and improve employment. In reality indirect financial support is provided via tax techniques. For instance, in case of the natural person income tax, tax technique can be illustrated as a remission of tax via extraction of object of the tax or via exclusion of object of the tax, as a tax deduction for a husband/wife or dependent child, as a tax relief, as a zero tax rate, or as a choice of subject to taxation, etc. In spite the fact that, authorities can have en effort to established tax system as simple as possible, an issue of tax system has been in general complicated. Therefore, especially with respect to the family policy, chosen tax technique should be the simplest. Falling that, the policy effect could be marginal and the general public would not be able to understand what is the state opinion considering the family. In addition, the simplest approach means that people themselves with certain effort are capable to calculate contribution of given policy to their families.

This sub-section of the work is focused on the fundamental changes in tax techniques with respect to families in the Czech Republic since 1989 and on the current situation. Firstly, to understand components' interconnections, basic features of the Czech tax system are introduced. Afterwards examples of applied tax techniques with respect to distinct income levels reflecting results obtained from the Household Budget Survey are presented. The partial discussion about advantages and disadvantages of given technique considering gained numbers is involved.

Let's shed some light on the basic characteristic of the Czech tax system. In general, the tax refers to a financial charge or other levy upon a taxpayer imposed by a state or the functional equivalent of the state (district councils, local authorities, etc.), which is non-returnable and stipulated by the law. Taxes are imposed on natural or legal person and are used to cover costs related to fulfilment of the state functions. Furthermore, taxes are tool of state budget redistribution and have socially-economic character. According to that, system of taxation involves all levies, charges and fees at state and regional level, which are collected in a given period by tax principles set by an act. Subscriptions to social and health insurance are separated from the tax system. Tax administration followed guidance of the Act No. 500/2004 Coll., on Rules Administrative Procedure till the year 2010 and since 2011 it has been regulated by the Act No. 280/2009 Coll., on Tax Procedure.

The Czech system of taxation is in force only in the territory of the Czech Republic. In case that a Czech citizen crosses the border, than he/she falls within a competence of given state tax system regardless whether it is in the European Union or in the third country. In the Czech tax system elimination of double taxation for natural persons is included in the article 38f of the Act No. 586/1992 Coll., on Income Tax Code, as amended. The elimination is based on mutual agreements which are made according to a model OECD agreement and which protect civil rights of each individual. In a core the Czech system of taxation is comparable with those utilized in other Union's member states. Although the system has been a result of negotiations among several interest groups, in essence it must not omit fundamental tax principles as neutrality, universality, tax yield, flexibility, acceptability of the tax burden and equitability. Nevertheless it is questionable how these principles are applied in the Czech tax system.

Basic division of taxes within the system is into indirect and direct (See Table 4.30). Indirect taxes consist of value added tax, excise duties and ecological taxes and are imposed deliberately and selectively to put strains on sales in order to limit consumption. Although indirect taxes influence budget of each individual, the taxes are paid by retailers. On the other hand, direct taxes which involve income and property taxes are paid by each person both natural and legal.

Table 4.30: Taxes, the Czech Republic

Direct taxes	Income taxes	Legal person income
		Natural person income
	Property taxes	Real estate taxes
		Transfer tax
		Road tax
		Inheritance and gift tax
Indirect taxes	Value added tax	from Natural Gas
	Excise duties	from Fossil Fuel
	Ecological taxes	from Electricity

Source: Pelech, Pelcl and Stuchlíková, 2002, p. 13; Author's actualization

Considering financial situation of the family, the natural person income tax and property taxes, in more detail real estate tax, inheritance and gift tax, and transfer tax, are the most relevant. Real estate tax depends on place where real property is situated and to which purpose

is used. For instance, whether a house is used for permanent or temporal residence, which is more expensive. Inheritance and gift taxes underwent several changes in the last years. Although they are not the most important taxes, they may have significant impact on the family budget.

In accordance with the Act No. 357/1992 Coll., on Inheritance Tax, Gift Tax and Real Estate Transfer, as amended all listed taxes were incorporated to the Czech system of taxation by the reform dated 1. January 1993. They replaced previous notarial charges defined by the Act No. 146/1984 Coll., on Notarial Fees. Inheritance tax imposes duty on unpaid acquisition of property due to death of a natural person. Therefore, property of inheritor obtained without any compensation is affected by the tax. The tax rate depends on family or other relationship of an inheritor and a deceased and on amount of obtained property[163]. On the other hand, gift tax taxes property that one living person gives to another[164] and transfer tax is levied on paid transfer of property between persons. The last named tax, in an amount of 3 % of a combination of purchase price and expert value, is not a subject of the study, because it reflects personal preferences to purchase or sale real estate.

With respect to property taxes the most important issue is to which category a taxpayer is classified. The law recognizes considering inheritance, gift and transfer taxes three categories[165]. It is valuable to note, that relationships established by blood kinship are at the same level as those established by the law. The fist category with the lowest rate involves children, grandsons and granddaughters, great-grandsons and great-granddaughters, parents, grandparents and other relatives in a line. In addition, the tax rates of inheritance and gift taxes are zero for selected items[166]. The second category of taxpayers consists of collateral relatives, i.e. persons who have the same ancestor but do not descend from each other (siblings, nephews and nieces, uncles and aunts). Furthermore, the category is consisted of spouse's children, spouse's parents, spouses of spouse's parents, and other persons who share a household with a donor or a deceased one year prior to acquisition of property and who contributed to joined household or were fully dependent on a donor or a deceased. Therefore, the category involves partners without formal commitments, other persons without blood kinship as husband children from previous marriage without adoption, children in foster care, etc. The last third category compasses all persons which are not involved in the previous two categories. The final amount of duty depends not only on category and tax base but as well on the tax rate (See Table 4.31-Table 4.33).

[163] In accordance with the law, only testamentary succession and passing down inheritance are allowed.

[164] Gift tax is paid by a holder in due course and donor is a guarantor. In case that gift is provided across border, than gift tax is paid by a donor.

[165] The article 11 of the Act No. 357/1992 Coll., on Inheritance Tax, Gift Tax and Real Estate Transfer, as amended.

[166] In the article 19, a scope of activity was extended into the second category in 1 January 2008.

Table 4.31: Inheritance and gift tax rates for a person of the first category, the Czech Republic, Czech crown, in a force 2008-2010

Over thousand crowns	Up to thousand crowns	Tax rate
-	1 000	1 %
1 000	2 000	10 000 CZK and 1.3 % over 1 mil. CZK
2 000	5 000	23 000 CZK and 1.5 % over 2 mil. CZK
5 000	7 000	68 000 CZK and 1.7 % over 5 mil. CZK

Source: Article 12 of the Act No. 357/1992 Coll.

Table 4.32: Inheritance and gift tax rates for a person of the second category, the Czech Republic, Czech crown, in a force 2008-2010

Over thousand crowns	Up to thousand crowns	Tax rate
-	1 000	3 %
1 000	2 000	30 000 CZK and 3.5 % over 1 mil. CZK
2 000	5 000	65 000 CZK and 4.0 % over 2 mil. CZK
5 000	7 000	185 000 CZK and 5.0 % over 5 mil. CZK

Source: Article 13 of the Act No. 357/1992 Coll.

Table 4.33: Inheritance and gift tax rates for a person of the third category, the Czech Republic, Czech crown, in a force 2008-2010

Over thousand crowns	Up to thousand crowns	Tax rate
-	1 000	7 %
1 000	2 000	70 000 CZK and 9 % over 1 mil. CZK
2 000	5 000	160 000 CZK and 12 % over 2 mil. CZK
5 000	7 000	520 000 CZK and 15 % over 5 mil. CZK

Source: Article 14 of the Act No. 357/1992 Coll.

From a brief summary of conditions related to inheritance and gift taxes it is obvious, that the state significantly has affected acquisition of property via tax rates and personal relationship between participants of a transaction. Although relationships between partners without formal commitments are not omitted, relationships based on blood or legal kinship are preferable by the law. Therefore, married has to pay less than unmarried.

Considering the family, income taxes are even more important in comparison with property taxes. Income taxes are regulated by the Act No. 586/1992 Coll., the Income Tax Act, as amended in the Czech Republic. The law involves both natural and legal entities. With respect to the work theme income tax on natural person with permanent residence in the Czech Republic [167] are only discusses in this section. The law defines incomes and gains from employment and functional benefits, self-employment, rental, capital, dividends and other income, but this analysis is narrowed only to income from employment based on article 6 of the law and income from private enterprise of married couples and other contributing persons based on article 7 of the law. In both cases of analysis, the simplest examples are chosen.

Since 1992 several highly relevant changes were done in income taxes. On the one hand, tax rate has remained uncomplicated, because it can be obtain by basic calculation (See Table 4.34). On the other hand, calculation of tax burden underwent sundry changes in particulars years.

[167] Also natural person who stays in the Czech Republic for at least 183 days in the relevant calendar year is regarded as Czech tax residents.

The analysis comes from a state of the year 2004. Till then procedure of deductible items was applied in accordance with article 15 sections 1-4 of the law. After that tax exemption for a dependent child was abolished and replaced by tax relief and tax bonus and a common taxation of married couple was introduced. The next year, in 2006, non-taxable amount for a person was cancelled and substituted with tax relief. Afterwards, in 2008 a concept of the super-gross wage was established and the common taxation of married couple was abolished. These changes in tax technique are tracked in following examples.

Table 4.34: Tax rates and tax brackets, the Czech Republic, in force 2004, 2005, and 2006#

Tax basis 2004, 2005		Tax	From a basis exceed
From CZK	**Up to CZK**		**CZK**
0	109 200	15 %	
109 200	218 400	16 380 CZK + 20 %	109 200
218 200	331 200	38 220 CZK + 25 %	218 400
331 200	and more	66 429 CZK + 32 %	331 200

Tax basis 2006*		Tax	From a basis exceed
From CZK	**Up to CZK**		**CZK**
0	***121 200***	***12 %***	
121 200	218 400	***14 544 CZK + 19 %***	***121 200***
218 200	331 200	***33 012*** CZK + 25 %	218 400
331 200	and more	***61 212*** CZK + 32 %	331 200

Notes:

* Changes compared to the year 2004, 2005 are in bold italics.

Development of tax rate in time see Appendix Table A.10.

Source: Article 16 of the Act No. 586/1992 Coll.

Before presentation of announced examples it is necessary to understand how the tax system defines a dependent child and when non-taxable amount for a spouse can be applied. In accordance with the law on income tax, a dependent child is a biological child, adopted child, foster child, child one of a spouse, grandson/granddaughter if his/her parents do not have substantial income from which tax advantages can be applied[168]. In addition, a dependent child is an underage or a major up to 26 years, in special case up to 28 years. A non-taxable amount for a spouse, who share a household with a taxpayer, could be applied in the years 2004 and 2005[169] if his/her income did not exceed 38 040 Czech crowns over tax period[170]. A spouse income has been able to be composed of gross wage, income from self-employment, income from rent, old age pension or disability pension, sickness benefit, maternity benefit, etc. Benefits from the state social support, state's contributions to building society account or supplementary pension insurance, scholarship have not been involved into spouse's income.

In the following four examples above mentioned changes in tax technique with respect to calculation of tax burden are presented. The impact of switching over deductible items, tax reliefs, tax rates and tax brackets are studied. All examples have formally the same instructions, but they differ on tax basis. The examples' instructions are follows:

[168] Article 35c, section 6 of the Act No. 586/1992 Coll., the Income Tax Act, as amended.

[169] Non-taxable amount for a spouse was transformed to tax relief in 2006.

[170] Article 35ba, section 1 of the Act No. 586/1992 Coll., the Income Tax Act, as amended. The law also defines tax relies with respect to a disabled family member.

"A private person, e.g. Mr. XY, who has two dependent children, submitted his tax return for a natural person income tax for the years 2004, 2005 and 2006. He reached tax basis XY Czech crowns. In addition, he applied a basic non-taxable amount for a tax-payer in an amount of 38 040 Czech crowns in the years 2004 and 2005. In the year 2006 he applied tax relief in an amount of 7 200 Czech crowns. Also, he utilized tax-deductible item per child in amount of 25 560 x 2 in the year 2004 and in the years 2005, and in 2006 he applied tax advantage per dependent child in an amount of 6 000 x 2 Czech crowns."

Example 1: Mr. Novák, the taxpayer with tax base 995 000 Czech crowns, who has two dependent children.

Table 4.35: Example 1, in Czech crowns

	Year 2004	Year 2005	Year 2006
Tax basis	995 000	995 000	995 000
Basic non-taxable amount (article 15)	− 38 040	− 38 040	x
Non-taxable amount per a dependent child (article 15)	− 51 120	x	x
Tax basis reduced by non-taxable amounts (article 16)	905 840	956 960	995 000
Tax basis rounded down to 100 crowns	905 800	956 900	995 000
Tax (4. tax bracket)*	250 292	266 644	273 628
Tax relief (article 35 ba)	x	x	− 7 200
Tax advantage per two children (article 35c)	x	− 12 000	− 12 000
Final tax (4. tax bracket)	250 292	254 644	254 428
Change considering previous year	x	4 352	− 216
Tax burden (Tax/Tax basis in %)	25.15 %	25.59 %	25.57 %

Notes: *Procedure of calculation:

Year 2004: 250 259 = 66 420 + 32 % from (905 800 – 331 200) = 66 420 + 183 875
Year 2005: 266 644 = 66 420 + 32 % from (956 900 – 331 200) = 66 420 + 200 224
Year 2006: 273 628 = 61 212 + 32 % from (995 000 – 331 200) = 61 212 + 212 416
Source: Pelcl, 2006, p. 20

By comparison of obtained results it is clear, that despite the same tax basis of Mr. Novák over period 2004-2006 (4. tax bracket) he was better off in the year 2006. In comparison with previous year a net saving was not so huge, but it points out that natural person income tax decreased. On the other hand, change of the year 2005, when non-taxable amount per a child was changed to tax relief, brought any improvement with respect to dependent children and increased final tax about 4 352 Czech crowns. With respect to calculation it is necessary to note, that tax income rate increases with tax base, but it is not applied for the whole base, but just for a segment of the base. In addition, final tax burden of Mr. Novák accounted in average for 25 %, although he is involved into the category with the highest tax income rate 32 %.

Example 2: Mr. Kroupa, the taxpayer with tax base 320 000 Czech crowns, who has two dependent children.

Table 4.36: Example 2, in Czech crowns

	Year 2004	Year 2005	Year 2006
Tax basis	320 000	320 000	320 000
Basic non-taxable amount (article 15)	− 38 040	− 38 040	x
Non-taxable amount per a dependent child (article 15)	− 51 120	x	x
Tax basis reduced by non-taxable amounts (article 16)	230 840	281 960	320 000
Tax basis rounded down to 100 crowns	230 800	281 900	320 000
Tax (3. tax bracket)*	41 320	54 095	58 412
Tax relief (article 35 ba)	x	x	− 7 200
Tax advantage per two children (article 35c)	x	− 12 000	− 12 000
Final tax (3. tax bracket)	41 320	42 095	39 212
Change considering previous year	x	775	− 2 883
Tax burden (Tax/Tax basis in %)	12.91 %	13.15 %	12.25 %

Notes: *Procedure of calculation:

Year 2004: 41 320 = 38 220 + 25 % from (230 800 – 218 400) = 38 220 + 3 100
Year 2005: 54 095 = 38 220 + 25 % from (281 900 – 218 400) = 38 220 + 15 875
Year 2006: 58 412 = 33 012 + 25 % from (320 000 – 218 400) = 33 012 + 25 400
Source: Pelcl, 2006, p. 21

In case of Mr. Kroupa, who had tax base in an amount of 320 000 Czech crowns and therefore was involved into third tax bracket in stated years, a net saving became significant in the year 2006 in comparison with two previous years. The fall in final tax considering previous year equalled to 2 883 Czech crowns. The final tax fall below to 40 thousand Czech crowns and total tax burden declined to 12.25 %.

Example 3: Mr. Fajmon, the taxpayer with tax base 250 000 Czech crowns, who has two dependent children.

Table 4.37: Example 3, in Czech crowns

	Year 2004	Year 2005	Year 2006
Tax basis	250 000	250 000	250 000
Basic non-taxable amount (article 15)	− 38 040	− 38 040	x
Non-taxable amount per a dependent child (article 15)	− 51 120	x	x
Tax basis reduced by non-taxable amounts (article 16)	160 840	211 960	250 000
Tax basis rounded down to 100 crowns	160 800	211 900	250 000
Tax (2. tax bracket in 2004/5; 3. tax bracket in 2006)*	26 700	36 920	40 912
Tax relief (article 35 ba)	x	x	− 7 200
Tax advantage per two children (article 35c)	x	− 12 000	− 12 000
Final tax (2. tax bracket in 2004/5; 3. tax bracket in 2006)	26 700	24 920	21 712
Change considering previous year	X	− 1 780	− 3 208
Tax burden (Tax/Tax basis in %)	10.68 %	9.97 %	8.68 %

Notes: *Procedure of calculation:

Year 2004: 26 700 = 16 380 + 20 % from (160 800 – 109 200) = 16 380 + 10 320
Year 2005: 36 920 = 16 380 + 20 % from (211 900 – 109 200) = 16 380 + 15 875
Year 2006: 40 912 = 33 012 + 25 % from (250 000 – 109 200) = 33 012 + 7 900
Source: Pelcl, 2006, p. 22

Comparison of tax technique within time revealed interesting finding. Although Mr. Fajmon became the taxpayer involved into third tax bracket in the year 2006, a net saving from a change deepened in comparison with previous years as well as other examples. In addition, obtained

results also disclosed that the change from non-taxable amounts to tax reliefs was beneficial to a person with low income. The decrease of natural person income tax was attained by introduction of new tax technique. Let's turn attention to the last example.

Example 3: Mr. Plesl, the taxpayer with tax base 112 000 Czech crowns, who has two dependent children.

Table 4.38: Example 4, in Czech crowns

	Year 2004	Year 2005	Year 2006
Tax basis	112 000	250 000	250 000
Basic non-taxable amount (article 15)	− 38 040	− 38 040	x
Non-taxable amount per a dependent child (article 15)	− 51 120	x	x
Tax basis reduced by non-taxable amounts (article 16)	22 840	73 960	112 000
Tax basis rounded down to 100 crowns	22 800	73 900	112 000
Tax (1. tax bracket)*	3 420	11 085	13 440
Tax relief (article 35 ba)	x	x	− 7 200
Tax advantage per two children (article 35c)	x	− 12 000	− 12 000
Final tax (1. tax bracket)	3 420	915	− 5 760
Change considering previous year	x	− 4 335	− 4 845
Tax burden (Tax/Tax basis in %)	3.05 %	0 %	0 %

Notes: *Procedure of calculation:

Year 2004: 3 420 = 15 % from 22 800
Year 2005: 11 085 = 15 % from 73 900
Year 2006: 13 440 = 12 % from 112 000
Source: Pelcl, 2006, p. 23.

The last example is the most interesting considering the others. Mr. Plesl had the lowest tax base in an amount of 112 000 Czech crowns, but the final taxation fall from initial 3 420 Czech crowns in 2004 to – 915 Czech crowns in 2005 and afterwards to – 5 760 Czech crowns in 2006. It is necessary to notice, that in the year 2006 tax rate for the taxpayers with the lowest tax base decreased to 12 %. With respect to the fact that tax advantage per two dependent children (12 000 Czech crowns) exceeded tax in accordance with the article 16 of the law, which was decreased by tax relief based on the article 35 ba (6 240 = 13 440 – 7 200) in 2006, particular case emerged. Mr. Plesel could decide whether advantages per dependent children would be in the form of tax relief or tax bonus. In case of tax advantage per two dependent children in an amount of 12 000 Czech crowns, children tax relief equalled to 6 240 Czech crowns and tax bonus 5 760 Czech crowns[171].

If all results of the presented examples are taken into account, than the fundamental changes in calculation of tax burden on citizens, i.e. replacing deductible items by tax reliefs and decreasing of tax rate for the first tax bracket in 2006, led to significance easement to Czech families. A summary of impacts with respect to dependent children in the family is covered in the Table 4.39 and Table 4.40. Positive number declares tax increase in a comparison and negative number decrease of tax burden.

[171] It is a situation described in the article 35c section 3 of the law on income tax.

Table 4.39: Changes in natural person income tax considering number of dependent children, the Czech Republic, in Czech crowns, selected year

Tax base	Net saving on income tax in 2006 compared to 2004 for a taxpayer with:			Net saving on income tax in 2006 compared to 2005 for a taxpayer with:		
Czech crowns	1 child	2 children*	3 children	1 child	2 children*	3 children
995 000	1 944	4 136	6 328	− 216	− 216	− 216
320 000	− 2 508	− 2 108	− 2 368	− 2 883	− 2 883	− 2 883
250 000	− 4 108	− 4 988	− 5 868	− 3 208	− 3 208	− 3 208
112 000	− 7 020	− 9 180	− 11 760	− 4 845	− 4 845	− 4 845

Notes: * examples 1,2,3,4.

Source: Pelcl, 2006, p. 24

Table 4.40: Natural person income tax, the Czech Republic, in Czech crowns, 2004-2006

	Income tax in Czech crowns for a taxpayer with:								
	2004			**2005**			**2006**		
Tax base	**1 child**	**2 children**	**3 children**	**1 child**	**2 children**	**3 children**	**1 child**	**2 children**	**3 children**
995 000	258 284	250 292	242 100	260 644	254 644	248 644	260 428	254 428	248 428
320 000	47 720	41 320	35 580	48 095	42 095	36 095	45 212	39 212	33 212
250 000	31 820	26 700	21 580	30 920	24 920	18 920	27 712	21 712	15 712
112 000	7 260	3 420	0	5 085	− 915	− 6 915	240	− 5 760	− 11 760

Source: Pelcl, 2006, p. 24-25.

Up to now, examples focused on a taxpayer who was responsible for dependent children. But in the family dependant can be also a spouse. Therefore two following examples consider a situation with additional dependant person in the family of Mr. Novák, who had the highest tax base, and Mr. Plesl, who had the lowest tax base. The instructions of the example 5 are follows:

"A private person, Mr. Novák had tax based 995 000 Czech crowns in each year of the period 2004-2006. He decreased the tax base by basic non-taxable amount per a tax-payer in an amount of 38 040 Czech crowns in 2004 and 2005. In 2006 he applied tax relief in total 7 200 Czech crowns. Also, he utilized tax-deductible item per a child in amount of 25 560 x 2 in the year 2004, and in the years 2005 and in 2006 he applied tax advantage per a dependent child in an amount of 6 000 x 2 Czech crowns. Furthermore, he reduced tax based by tax-deductible item per a wife in an amount of 21 720 Czech crowns in the year 2004 and in the years 2005. The following year 2006, he utilized tax relief for a wife in total 4 200 Czech crowns."

Example 5: Mr. Novák with tax base 995 000 Czech crowns had two dependent children and wife as a dependant.

Table 4.41: Example 5, in Czech crowns

	Year 2004	Year 2005	Year 2006
Tax basis	995 000	995 000	995 000
Basic non-taxable amount (article 15)	− 38 040	− 38 040	x
Non-taxable amount per a dependent child (article 15)	− 51 120	x	x
Non-taxable amount per a wife (article 15)	− 21 720	− 21 720	x
Tax basis reduced by non-taxable amounts (article 16)	884 120	935 240	995 000
Tax basis rounded down to 100 crowns	884 100	935 200	995 000
Tax (1. tax bracket)*	243 355	259 700	273 628
Tax relief for a taxpayer (article 35 ba/1a)	x	x	− 7 200
Tax relief for a wife (article 35 ba/1b)	x	x	− 4 200
Tax advantage per two children (article 35c)	x	− 12 000	− 12 000
Final tax (1. tax bracket)	243 355	247 700	250 228
Change considering previous year	x	4 345	2 528
Tax burden (Tax/Tax basis in %)	24.46 %	24.98 %	25.14 %

Notes: *Procedure of calculation:

Year 2004: 243 355 = 66 420 + 32 % from (884 100 – 331 200) = 66 420 + 176 935
Year 2005: 259 700 = 66 420 + 32 % from (935 200 – 331 200) = 66 420 + 193 280
Year 2006: 273 628 = 61 212 + 32 % from (995 000 – 331 200) = 61 212 + 212 416
Source: Author's calculation

The next example has the same instructions as the previous example no. 5, but the tax base falls in to the first tax brackets.

Example 6: Mr. Plesl with tax base 112 000 Czech crowns had two dependent children and wife as a dependant.

Table 4.42: Example 6, in Czech crowns

	Year 2004	Year 2005	Year 2006
Tax basis	112 000	112 000	112 000
Basic non-taxable amount (article 15)	− 38 040	− 38 040	x
Non-taxable amount per a dependent child (article 15)	− 51 120	x	x
Non-taxable amount per a wife (article 15)	− 21 720	− 21 720	x
Tax basis reduced by non-taxable amounts (article 16)	1 120	52 240	112 000
Tax basis rounded down to 100 crowns	1 100	52 200	112 000
Tax (1. tax bracket)*	165	7 830	13 440
Tax relief for a taxpayer (article 35 ba/1a)	x	x	− 7 200
Tax relief for a wife (article 35 ba/1b)	x	x	− 4 200
Tax advantage per two children (article 35c)	x	− 12 000	− 12 000
Final tax (1. tax bracket)	165	− 4 170	− 9 960
Change considering previous year	x	− 4 005	− 5 790
Tax burden (Tax/Tax basis in %)	0.14 %	0 %	0 %

Notes: *Procedure of calculation:

Year 2004: 165 = 15 % from 1 150
Year 2005: 7 830 = 15 % from 52 200
Year 2006: 13 440 = 12 % from 112 000
Source: Author's calculation

Comparing examples no. 1 and no. 5, which were calculated for the highest tax brackets, the impact of additional dependant was significant, total tax burden decreased, but difference was not so pronounced. On the other hand, if the examples no. 4 and no. 6, which was

constructed for the tax bases falling into the lowest tax bracket, are compared than the impact of additional dependent person was even considerable. Tax paid decreased from 3 420 to 165 Czech crowns in 2004 and amount overpaid increased from 915 to 4 170 Czech crowns in 2005 and from 5 760 to 9 960 Czech crowns in 2006. Not surpassingly, in both cases total tax burden decreased over time, but more importantly for Mr. Plesl with low income. With respect to additional dependent person as a spouse, it is necessary to keep in mind, that application of the tax-deductible item as well as tax relief was strictly limited by several conditions as stated above.

Apart from all changes in tax technique which have been already discussed and illustrated on examples, a joint tax base of married couple was introduced in the year 2005. This regulation was involved in the article 13 of the act on income tax and contained relatively simple idea. A married couple could create one tax base which was equally divided between them. Although it is not immediately visible, this approach led to lower tax burden. Disadvantage of the approach was in its administration. A lot of people have not been used to submit their tax return personally in the Revenue Office, because it has been done by their employers. But the joint tax base of married couple demanded their initiative considering at least submission of the tax return to the office. It is necessary to note, that utilization of this technique was voluntary and limited by the requirement that married couple took care for at least one dependent child who shared household with them.

Let's see in the next example no. 7, what an impact of the common taxation of married couple was in the year 2005. The example instructions are as follows:

"Mr. Nosek applied tax technique of the joint tax base of married couple in 2005. He had three dependent children and tax base equalled to 872 000 Czech crowns. From the tax base employer deduced social and health insurances in amount of 109 000 Czech crowns and utilized tax advantage per three children. Mr. Nosek's wife did not have income and received only parental allowance. Therefore, they both applied a basic non-taxable amount per a taxpayer in an amount of 38 040 Czech crowns (article 15, section 1a of the act on income tax) and he utilized also a non-taxable amount per a wife without own income in an amount of 21 720 Czech crowns (article 15, section 1b of the act on income tax)."

Table 4.43: Example 7, the joint tax base of married couple in 2005, in Czech crowns

	Husband	Wife	Without joint tax base, for husband
Partial tax base	763 000	0	763 000
Basic non-taxable amount (article 15, section 1a)	38 040	38 040	38 040
Non-taxable amount per a wife (article 15, section 1b)	21 720	0	21 720
Sum of non-taxable amounts	59 760	38 040	59 760
Sum of non-taxable amounts of a couple	97 800		0
A joint tax base of a couple, rounded down to 100 crowns	763 000 – 97 800 = 665 200		703 200
Tax base for a each spouse	332 600	332 600	x
Tax (article 16)	66 868	66 868	185 460
Tax relief for three children (3 x 6 000) (article 35c)	18 000	x	18 000
Tax (article 16) **deduced by tax relief** (article 35c)	48 868	66 868	167 460
Tax burden of the family	115 736		167 460
Difference in tax burden	51 724		

Source: Pelcl, 2006, p. 175-176

The example no. 7 revealed that the common taxation of married couple where income difference within a couple was profound and a couple took care of several dependent children brought significant net saving and decreased tax burden on the family. The difference in tax burden in amount of 51 724 Czech crowns corresponded to 12 % of net income in the family with three dependent children in the year 2005.

Although the joint tax base for married couple was in force in 2006 too, its impact was changed, because basic non-taxable amount 38 040 Czech crowns (article 15 section 1a) was abolished and replaced by tax relief 7 200 Czech crowns (article 35 ba section 1). Furthermore, non-taxable amount per a spouse 21 720 Czech crowns (article 15 section 1b) was substituted by tax relief for a spouse 4 200 Czech crowns (article 35 ba section 1).

The joint tax based for married couple was completely abolished by the Act No. 261/2007 Coll., on Stabilization of Public Budgets, coming into force 1. January 2008. Apart from that, the law introduced united tax rate for natural person income tax at the level 15 % and increased basic tax relief for a taxpayer in an amount of 24 840 Czech crowns for the year 2008. Advantage of the joint tax base of married couple became compensated by increased tax relief for a spouse also in an amount of 24 840 Czech crowns (article 35 ba) if his/her income did not exceed 68 000 Czech crowns. For the year 2008, tax advantage per a child increased from 6 000 to 10 680 Czech crowns.

Additional change was made with respect to definition of a partial tax base for taxation of income from employment and functional benefits (article 6) in the year 2008. A partial tax base was increased by an amount of social and health insurance and contribution to state policy of employment. A gross wage increased by 35 % which was paid by employer. In addition, contributions to social and health insurance, which have been obligatorily paid by employee in an amount of 12.5 % from his/her wage, discontinued to be tax expenditure of employee. This new approach was named a super-gross wage.

The following example no. 8 illustrates listed changes and compares situation in 2007, when the joint tax base for married couple took place but with changed non-taxable amounts, and state in 2008, when super-gross wage was applied.

Example 7: *"A tax-payer has income from employment in total 763 000 Czech crowns. His wife does not have income and together take care of three dependent children"*

Table 4.44: Example 7, in Czech crowns

	Joint tax base of married coupe, the year 2007		Husband, the year 2008
Partial tax base	763 000		763 000
Insurance employee 12.5 %	− 95 373		x
Insurance employer 35 %	x		267 050
Tax base	667 625		1 030 000
	Husband	**Wife**	x
Tax base for a each spouse	338 800	333 800	x
Tax*	62 044	62 044	154 500
Tax relief for a taxpayer	− 7 200	− 7 200	− 24 840
Tax relief for a wife	− 4 200	x	− 24 840
Tax relief for children**	− 18 000	x	− 32 040
Final tax	32 644	54 844	72 780
Total tax burden	87 488		72 780

Notes:

* Year 2007: 62 044 = 61 212 + 32 % from (333 800 – 331 200) = 61 212 + 832
Year 2008: 154 500 = 15 % from 1 030 000

** Year 2007: 18 000 = 3 x 6 000
Year 2008: 32 040 = 3 x 10 680

Source: Author's calculation

Results of the example no. 7 could be little bit unexpected with respect to general knowledge. The example compares situation of the common taxation of married couple with new tax reliefs in 2007 with the approach of the super-gross wage with increased tax reliefs and lower tax base. In case of the family with three dependent children and wife without her personal income, the tax technique of super-gross wage made the family better off in an amount of 14 708 Czech crowns. It is highly probable, that given technique was chosen with aim to minimize impact of common taxation removal and reduction of administrative burden. Another aspect which could contribute to the joint tax base disposal was the fact that also couples of foreigners who live separately, because one worked in the Czech Republic and the second took care of dependent children abroad, was entitled to apply this approach. Therefore, substantial amount of money could leave the country.

The example no. 7 was chosen deliberately to strengthen differences of the approaches and to sketch possible effects. On the other hand, the gross annual income in an amount of 763 000 Czech crowns has been exceptional considering overall financial situation of Czech families, because in this case monthly income corresponded to 63 583 Czech crowns. Therefore, let's see how given approaches affect incomes of the average Czech family with two dependent children and wife without personal income. To illustrate overall impact, husband taxation without the joint tax base for married couple is included.

Example 8: *"A tax-payer has income from employment in total 420 000 Czech crowns. His wife does not have income and together take care of three dependent children"*

Table 4.45: Example 8, in Czech crowns

	Joint tax base of married coupe, the year 2007		Husband, the year 2007	Husband, the year 2008
Partial tax base	420 000		420 000	420 000
Insurance employee 12.5 %	− 52 500		− 52 500	x
Insurance employer 35 %	x		x	147 000
Tax base	367 500		367 500	567 000
	Husband	**Wife**	x	x
Tax base for a each spouse	183 700	183 700	x	x
Tax*	26 419	26 419	71 548	85 050
Tax relief for a taxpayer	− 7 200	− 7 200	− 7 200	− 24 840
Tax relief for a wife	− 4 200	x	− 4 200	− 24 840
Tax relief for children**	− 12 000	x	− 12 000	− 21 360
Final tax	3 019	19 219	48 148	14 010
Total tax burden	22 238		48 148	14 010

Notes:

* Year 2007: 26 419 = 14 544 + 19 % from (183 700 – 121 200) = 14 544 + 11 875
Year 2007: 71 548 = 61 212 + 32 % from (367 500 – 331 200) = 61 212 + 10 336
Year 2008: 85 050 = 15 % from 567 000

** Year 2007: 12 000 = 2 x 6 000
Year 2008: 21 360 = 2 x 10 680

Source: Author's calculation

The average Czech household, with structure as defined above, improved its financial situation in 2008 in comparison with previous year 2007 regardless of applied tax technique. Net saving equalled to 8 228 Czech crowns considering joint tax base and 34 138 Czech crowns if taxation was calculated based on standard method. Profitability of the common taxation of married couple compared to standard method was obvious, because without such possibility tax burden would be doubled.

The last example in this series deals with the impact of changed tax technique on the family with minimum income. The example's instructions are the same, only the tax base of taxpayer decreased to 220 000 Czech crowns per year.

Example 9: *"A tax-payer has income from employment in total 220 000 Czech crowns. His wife does not have income and together take care of three dependent children"*

Table 4.46: Example 9, in Czech crowns

	Joint tax base of married coupe, the year 2007		Husband, the year 2007	Husband, the year 2008
Partial tax base	220 000		220 000	220 000
Insurance employee 12.5 %	− 27 500		− 27 500	x
Insurance employer 35 %	x		x	77 000
Tax base	192 500		192 500	297 000
	Husband	**Wife**	x	x
Tax base for a each spouse	96 200	96 200	x	x
Tax*	11 544	11 544	28 091	44 550
Tax relief for a taxpayer	− 7 200	− 7 200	− 7 200	− 24 840
Tax relief for a wife	− 4 200	x	− 4 200	− 24 840
Tax relief for children**	− 12 000	x	− 12 000	− 21 360
Final tax	0	4 344	4 691	0
Total tax burden	4 344		4 691	0

Notes:

* Year 2007: 11 544 = 12 % from 96 200
Year 2007: 28 091 = 14 544 + 19 % from (192 500 – 121 200) = 14 544 + 13 547
Year 2008: 44 550 = 15 % from 297 000

** Year 2007: 12 000 = 2 x 6 000
Year 2008: 21 360 = 2 x 10 680

Source: Author's calculation

The example no. 9 did not disproved previous results. Also the family with minimum income was better off in 2008 in comparison with the year 2007. If a couple applied technique of the joint tax base in 2007, than wife had to pay tax in an amount of 4 344 Czech crowns and husband could not utilized all tax advantages resulting from tax reliefs. His tax burden was lower than total tax relief. Therefore, tax bonus was generated in total 11 856 Czech crowns and could be demanded at the moment of tax return submission at the Revenue Office. If the common taxation of a couple was not utilized in 2007, than tax burden in an amount of 4 691 Czech crowns arose, but the taxpayer could avoid a visit at the office, because for his tax return was responsible employer. In sum, the approach of the year 2008 was more beneficial, tax burden equalled zero and tax bonus in total 21 360 emerged.

Although presented examples did not reveal that replacement of the joint tax base for married couple by other technique harmed financial situation of families regardless of income in the Czech Republic in 2008, it is necessary to note, that the common taxation introduced a choice in the system. Based on calculations, the financial situation of families in 2008 improved, but since then it has been highly dependent on political will if amount of tax relief increases or decreases. Therefore, it is questionable if those changes strengthen a position of the family within the economy. Considering the results, it seems that the position of the family was weakened, not in financial terms, but in bargaining position.

The transformation from a command economy to market economy introduced possibility of private business. But regulations with respect to income taxation differ from those related to employment. Previous examples cannot be applied to self-employed persons. With no doubt the work cannot deal with all possible sources of the family income and their taxation, but those from private family business should not be omitted. They have been frequently utilized

in the Czech economy since the beginning of the transformation and may significantly influence financial situation of the family.

The basic family business in accordance with the article 6 of the Act No. 586/1992 Coll., the Income Tax Act, as amended is a private enterprise of a married couple or enterprise of family members. For instance, the private family enterprise can be structured as follows:

- A private business is conducted by one of a spouse or both, while the second from a couple cooperates closely in business. Also other family members cooperate.
- A private business is conducted by one of a spouse and for a business jointed equity of married couple is utilized.
- Private businesses are run by both partners, but each of them has business in different areas and both utilized jointed equity of married couple.
- Business is conducted by any family member who employs other family members.

The following analysis is based on regulations effective from the year 2010. With respect to family private business it is necessary to understand who is a cooperative/contributing person. By the law a cooperative person is a husband/wife who need not share household with a taxpayer and other persons living in the same household with a taxpayer, i.e. son, daughter, brother, sister, mother, father, common-law husband/wife, uncle, aunt, etc. The blood or legal kinship is unimportant, but given person has to participate in a shared household[172]. If all assumptions about cooperative person are fulfilled, than the institute considering natural person income tax can be applied to optimize tax burden. It is important to note, that a cooperative person is allowed to have its personal income, for instance from employment or private business. His/her involvement in business is not established on a trade certificate. And in addition, division of costs and revenues with respect to a cooperative person need not respect real state of cooperation. But cooperation has to be real, not fictive. Furthermore, losses from business are shared with a cooperative person. Necessary condition for the institute application is coequality in transferred percentage of costs and revenues, i.e. if 25 % of costs are transferred on a cooperative person, than 25 % of revenues have to be transferred too. But the law defines limits of those transfers. For instance, in case of spouse cooperation only 50 % of costs and revenues can be divided if revenues do not exceed costs more than 540 000 Czech crowns. In case of other family members the percentage equals to 30 %, but in total 180 000 Czech crowns can be transferred per year. Let's see application of the institute on examples with following instructions.

Example 10: *"Husband had taxable income 680 000 Czech crowns from a private business in the year 2010. Furthermore, he had expenses in term of taxes in an amount of 740 000 Czech crowns. His wife ran her business too and had taxable income 950 000 Czech crowns in the same year. She had expenses in term of taxes in an amount of 750 000 Czech crowns. Her husband cooperated with maintenance of establishment. "*

[172] It is unrelated to permanent residence.

Table 4.47: Example 10, in Czech crowns

Without the institute of a cooperative person		
	Husband	**Wife**
Income	680 000	950 000
Expenses	740 000	750 000
Tax basis	− 60 000	+ 200 000
Tax 15 %	0	30 000
Tax relief for a taxpayer (article 35 ba)	x	24 840
Final tax	0	5 160
With application of the institute of a cooperative person, wife transfers 50 % of her income to husband		
	Husband	**Wife**
Own income	680 000	
Share 50 % of wife income	475 000	475 000
Own expenses	740 000	
Share 50 % of wife expenses	375 000	375 000
Tax base	40 000*	+ 100 000
Tax 15 %	6 000	15 000
Tax relief for a taxpayer (article 35 ba)	− 24 840	− 24 840
Final tax	0	0

Notes: * tax base calculated: 40 000 = (680 000 + 475 000) – (740 000 + 375 000)

Source: Author's calculation

The last example of the sub-chapter illustrates how tax technique may influence the family income with respect to private enterprise. If a married couple did not applied the institute of a cooperative person, than husband could not utilized tax relief for a taxpayer and wife had to pay tax in an amount of 5 160 Czech crowns. Taking advantage of the institute, none of them had to pay tax. With this respect tax technique improved financial situation of married couple who ran private business. On the other hand, one disadvantage of the approach is in its administrative burden. A husband as well as a wife has to submit their own tax returns separately. Another shortcoming is, that advances on social and health insurance has to be continuously paid and excluded from expenses in term of taxes. Nevertheless, given approach is one of a few in the tax system which support family private enterprise. In addition, this tax technique may stimulate entrepreneurship.

The sub-chapter provided insight into an issue of indirect financial support of Czech families since 1989, which has been provided via the tax system. Since the beginning of the transformation when new regulations with respect to the tax system were accepted, the support did not changed in the core so much for several years. Apart from other levies, the most important taxes significantly influencing the family budget have been property taxes (real estate tax, inheritance and gift tax) and income taxes. Considering property taxes changes were made in tax rates related to tax basis, but the evident preference of the family has been kept.

With respect to income taxes from employment fundamental changes were made in tax technique since 2004. Firstly, the deductible items per children were replaced by tax relief and tax bonus and the joint tax base for married couple was introduced. Secondly, non-taxable amount per a taxpayer was substituted by tax relief and amounts of reliefs were adjusted. Thirdly, the joint tax base for married couple was abolished and the super-gross wage and tax rate in an amount of 15 % for all taxpayers were stipulated. The last approach has been still

in force. All these changes and their impact on family budget were illustrated on examples reflecting different tax bases resulting from data in the Household Budget Survey. Obtained figures did not reveal that changed tax technique made Czech families financially worse off, but clearly pointed out, that families became dependent on political will and with respect to amount of all changes it is reasonable to assume that the general public were not capable to follow all changes and its impact on their income. In addition, because economic transformation allowed private business, the taxation of income from self-employment, in more detail from the family business, was also involved into the sub-chapter. The institute of a cooperative/contributing person in a private business has supported the family substantially. Although not all possible forms of family businesses and tax techniques were discussed in the sup-chapter, it is necessary to note, that support of this kind has existed in the indirect financial support in the Czech Republic too.

4.2.3.3 Simulations of the family financial situation in certain life careers

This sub-chapter combines information of the previous two sections with respect to demographic and economic development in the Czech Republic and financial situation of Czech families. As stated above, the family budget has been supported directly as well as indirectly via the state social scheme and the tax system. Although some examples of changes are illustrated in the preceding sections, they are focused on individual, but simulations in this sub-chapter mix certain life careers considering financial situation of the whole fictitious family. The fictitious family is formed on the base of analysed statistical data and the possibility of comparison. In total, financial situation of three made-up families in specific life careers based on its relevance is presented. Apart from that, an issue of financial improvements regarding direct and indirect support are discussed. Unless otherwise stated, the examples are related to legislative which was effective in the year 2010.

But, before detail discussion of the financial situations related to fictitious families, an issue of employee's illness, which is involved into simulations for its importance, has to be sketched. Illness of an economically active member of the family undoubtedly influences the family budget, but its real impact differs from obligatory levies, which are mentioned in the previous section. Therefore, the first three examples of the sub-chapter illustrate the issue of employee's illness with respect to available data. Considering figures involved in labor statistics as well as age at the first marriage and the age when the first child is born in the Czech Republic, the employee's age in the examples falls into age-groups of 30-34 years. The formal background of the examples is same, but employees are distinguished one from another by attained education level, which is related to obtained average monthly gross wage. The formal background of the examples is as follows:

Example S.1-3: *"An employee at the age of 30-34 years with XY education had average monthly gross wage in amount of XY Czech crowns. In addition, the employee was single without any dependent child. Due to illness he was incapable for work during fourteen calendar days of the given month."*

Table 4.48: Example S.1, secondary education without the certificate, 2010, in Czech crowns

	Income per month	Income with compensation for sickness***
Gross wage	22 334*	12 060
Health insurance employer 9 %	2 010	1 085
Social insurance employer 25 %	5 584	3 015
Super-gross wage	29 928	16 160
Rounded up to 100 crowns	30 000	16 200
Advance on tax 15 %	4 500	2 430
Tax relief for a taxpayer	− 2 070	− 2 070
Advance on tax after tax relief	2 430	360
Health insurance employee 4.5 %	1 006	543
Social insurance employee 6.5 %	1 452	785
Compensation for sickness		3 884
Net wage/income	17 446**	14 257**

Notes:

* Average monthly gross wage chosen based on the labor statistics, Struktura mezd zaměstnanců v roce 2010 provided by the Czech statistical Office.

**17 446 = 22 334 – 2 430 − 1 006 – 1 452
14 257 = 12 060 + 3 884 – 360 – 543 −784

***Calculation of a compensation for hours not worked

Source: Author's calculation

Table 4.49: Example S.2, secondary education with the certificate, 2010, in Czech crowns

	Income per month	Income with compensation for sickness***
Gross wage	29 551*	15 958
Health insurance employer 9 %	2 660	1 436
Social insurance employer 25 %	7 388	3 990
Super-gross wage	39 599	21 384
Rounded up to 100 crowns	39 600	21 400
Advance on tax 15 %	5 940	3 210
Tax relief for a taxpayer	− 2 070	− 2 070
Advance on tax after tax relief	3 870	1 140
Health insurance employee 4.5 %	1 330	718
Social insurance employee 6.5 %	1 921	1 037
Compensation for sickness		4 821
Net wage/income	22 430**	17 884**

Notes:

* Average monthly gross wage chosen based on the labor statistics, Struktura mezd zaměstnanců v roce 2010 provided by the Czech statistical Office.

** 22 430 = 29 551 – 3 870 − 1 330 – 1 921
17 884 = 15 958 + 4 821 – 1 140 – 718 – 1 037

***Calculation of a compensation for hours not worked

Source: Author's calculation

Table 4.50: Example S.3, university education, 2010, in Czech crowns

	Income per month	Income with compensation for sickness***
Gross wage	46 119*	24 906
Health insurance employer 9 %	4 150	2 242
Social insurance employer 25 %	11 530	6 227
Super-gross wage	61 799	33 375
Rounded up to 100 crowns	61 800	33 400
Advance on tax 15 %	9 270	5 010
Tax relief for a taxpayer	− 2 070	− 2 070
Advance on tax after tax relief	7 200	2 940
Health insurance employee 4.5 %	2 076	1 121
Social insurance employee 6.5 %	2 998	1 619
Compensation for sickness		6 161
Net wage/income	33 845**	25 387**

Notes:

* Average monthly gross wage chosen based on the labor statistics, Struktura mezd zaměstnanců v roce 2010 provided by the Czech statistical Office.

** 33 845 = 46 119 – 7 200 – 2 076 – 2 998
25 387 = 24 906 + 6 161 – 2 940 – 1 121 – 1 619

***Calculation of a compensation for hours not worked

Source: Author's calculation

In the year 2010, in accordance with the Act No. 262/2006 Coll., the Labour Code, sickness was a reason for work inability. Therefore, employers following the article 192 paid out a wage compensation for the first fourteen calendar days of the inability for work. The first three of fourteen days were without payment. In case that employee continued to be ill and incapable of work, than he/she was entitled for sickness benefit based on the Act No. 187/2006 Coll., on Sickness Insurance, as amended, which was provided by the Czech Social Security Administration. Apart from the all fundamental administrative changes evoked in the year 2007, sickness compensation has remained certain additional burden for entrepreneurs[173]. A positive aspect of the approach is that responsibility for personal health has been delegated to each individual. Nevertheless computation of all compensation for inability to work has been relatively complicated. Therefore, in case of sickness employee knows in general that his/her income decreases, but not in what amount. Employee still has had to remember that although the wage covers all his/her living costs, in case of illness it does not necessarily stand.

The first example illustrated the fall in income of the person with secondary education without certificate with respect to data 2010, which accounted for 3 189 Czech crowns. The methodology of procedure reflected the facts that the year 2010 encompassed 253 working days and employee worked eight hours per day and fulfilled condition of the first reduction boundary, which was defined by the law[174]. In case, that sickness would be serious and an incapacity for work would be extended over additional thirty calendar days, than his/her income decreased even more to 11 910 Czech crowns. In comparison with the net average wage the fall equaled to 5 536 Czech crowns. Therefore, in month of sickness benefit reaches

[173] From the 50's of the 20th century to the year 2008, employer was responsible for all sickness benefits and the Czech Social Security Administration was only supervisory authority.

[174] The first reduction boundary equals to 138.43 Czech crowns, therefore average hourly compensation is accounted as 90 % of the average hourly income 128.41 Czech crowns and 60 % of those 90 %.

approximately 68 % of initial net average wage. Not surprisingly, the fall in income was even pronounced for an employee with certificated secondary education and university degree. In the second example, the employee touched due to higher average monthly wage the second reduction boundary[175]. Therefore, the downswing in monthly income from employment in case of fourteen days of illness accounted for 4 566 Czech crowns. Considering additional thirty calendar days of incapacity for work, than the downswing equaled to 7 640 Czech crowns, because income involving sickness benefit reached only 14 790 Czech crowns. The sickness benefit accounted for 66 % of initial net average wage. In the last third example the employee, who attained university degree, his/her net average income was the highest in comparison with two previous examples and in case of sickness compensation reached the third reduction boundary[176]. Therefore, the net wage equaled to 33 845 Czech crowns and due to incapacity for work it was reduced to 25 387 Czech crowns. The fall accounted for 25 % of initial net average wage. With respect to additional thirty days of sickness, the percentage equaled to 44 %. This means, that sickness benefit accounted for 56 % of initial income.

With respect to reduced income caused by sickness it is necessary to note, although pensions are not primarily discussed in the work, that fall in income is also the fall of future basis of assessment in pension. For overcoming of future financial loses, several insurances provided on the market can be utilized. Based on the Act No. 586/1992 Coll., on Income Tax Code, as amended, tax deductions for life insurance and supplementary pension scheme have been allowed in total 12 thousand Czech crowns per year for both possibilities. Although utilization of additional insurance can be beneficial in long-term perspective, it contains, as other bank and non-bank credits, potential of indebtedness caused by fall in income due to long-term sickness. Another question is if people can utilize possibility of private insurances, because it does not seem that they have enough financial sources available in average.

The simulations of financial situation of the fictitious family are based on labour statistics with respect to a sector economy. The first bundle of simulations is focused on the family of worker employees with secondary education without the certificate, because this composition allows utilizing all possible techniques and approaches which are involved in the direct and indirect financial support. The family without dependent children, with a dependent child when mother is entitled to maternity benefit and later on to parental allowance are compared[177]. In addition, the family with two dependent children and mother receiving parental allowance is also involved. In this simulation, final income of the family is influenced by the all laws presented in the Chart 4.44.

[175] In this case, reduced hourly wage/average hourly compensation consists of a sum of 90 % from 138.43 Czech crowns and 60 % of a difference between average hourly income 169.91 Czech crowns and the first boundary which equals to 138.43 Czech crowns.

[176] In case of the third reduction boundary, reduced hourly wage/average hourly compensation equals to the sum of 90 % from 138.43, 60 % of a difference between the first and the second boundaries and 30 % of a difference between the average hourly wage and the second boundary 207.55 Czech Crowns.

[177] In all simulations, parental allowance in standard drawing in amount of 7 600 Czech crowns is considered. The parental allowance is ascribed to mother, because labour statistics 2010 revealed that women have lower wage than men. Therefore, it would be unprofitable for the family, if mother goes back to paid work and father stays at home with a child. Therefore, in all simulations it is assumed that mother is entitled to parental allowance.

Table 4.51: Simulation 1, 2010, in Czech crowns[#]

	Income per month		Income per month (maternity benefit)		Income per month (parental allowance)		
	Male	**Female**	**Male**	**Female**	**Male 1 child**	**Male 2 children**	**Female**
Gross wage	24 884	17 670	24 884	x	24 884	24 884	x
Health insurance employer 9 %	2 240	1 590	2 240	x	2 240	2 240	x
Social insurance employer 25 %	6 221	4 418	6 221	x	6 221	6 221	x
Super-gross wage	33 345	23 678	33 345	x	33 345	33 345	x
Rounded up to 100 crowns	33 400	23 700	33 400	x	33 400	33 400	x
Advance on tax 15 %	5 010	3 555	5 010	x	5 010	5 010	x
Tax relief for a taxpayer	2 070	2 070	2 070	x	2 070	2 070	x
Tax relief for a child	x	x	967	x	967	1 934	x
Advance on tax after tax relief	2 940	1 485	1 973	x	973	1 006	x
Health insurance employee 4.5 %	1 120	795	1 120	x	1 120	1 120	x
Social insurance employee 6.5 %	1 617	1 149	1 617	x	1 617	1 617	x
Maternity benefit	x	x	x	12 210**	x	x	x
Parental allowance	x	x	x	x	x	x	7 600
Net income per person	19 207*	14 241*	20 174*	12 210	20 174*	21 141	7 600
Net family income	33 448		32 384		27 774	28 741	

Notes:

[#] Average monthly gross wage chosen based on the labor statistics, Struktura mezd zaměstnanců v roce 2010 provided by the Czech statistical Office.

* 19 207 = 24 884 – 2 940 – 1 120 – 1 617
14 241 = 17 670 – 1 485 – 795 – 1 149
20 174 = 24 884 – 1 973 – 1 120 – 1 617
21 141 = 24 844 – 1 006 – 1 120 – 1 617

** maternity benefit from average wage 17 670 Czech crowns → daily basis of assessment 580.93 Czech crowns → the first reduction boundary (the limit 791 Czech crowns) → 70 % of 580.93 = 407 Czech crowns → for month 30 x 407 = 12 210 Czech crowns

Source: Author's calculations

The simulation no. 1 clearly revealed, that a new born child in the family implies fall in monthly family income. From a perspective of whole year, the monthly results are slightly modified, because further advantages of the system can be applied, if stated conditions of the system are fulfil. In case of the family without dependent children, the monthly income remain same in amount of 33 448 Czech crowns. But, in case of family with dependent child, who was newly born, the financial situation is changed, because maternity benefit is provided only 28 weeks and the family receives birth grand[178]. Therefore, taking into account that a wife worked five months, seven months was entitled to maternity benefit and her husband could utilized in a part of the year tax relief for a child, than the average monthly income increased to 33 830 Czech crowns[179].

If wife received parental allowance whole year, than the monthly family income decreased to 29 852 Czech crowns, in spite of the fact that husband could demand tax overpayment (See Table 4.55). The last part of the first bundle of simulations involves the case of two children when the second child is at the age up to three years in the family. Other parameters

[178] In 2011 the birth grand is income tested.

[179] In this case tax relief for a wife cannot be applied, because her income per year exceeded limit 68 thousand Czech crowns. Otherwise tax relief in amount of 24 840 Czech crowns can be applied.

remained unchanged. Therefore, mother was entitled to parental allowance[180] and father had income from employment. Considering procedure of calculations, mother had the same income as in previous case, but father could apply tax annual overpayment in amount of 24 945 Czech crowns. The total family income equalled to 369 837 Czech crowns what corresponded with monthly average family income in amount of 30 820 Czech crowns. The income was higher than in case of one child family, but lower than childless family. It is also necessary to take into account that number of family member increased and therefore, income per capita decreased.

Table 4.52: Annual adjustment of tax liabilities of husband in the first fictitious family, 2010, in Czech crowns

	Annual income			
	1 child		2 children	
Gross wage	12 x 24 884	298 608	12 x 24 884	298 608
Health insurance employer 9 %		26 875		26 875
Social insurance employer 25 %		74 652		74 652
Super-gross wage		400 135		400 135
Rounded down to 100 crowns		400 100		400 100
Advance on tax 15 %		60 015		60 015
Tax relief for a taxpayer		24 840		24 840
Tax relief for a wife		24 840		24 840
Total tax reliefs		49 680		49 680
Tax utilizing reliefs		10 335		10 335
Tax relief for children		11 604	2 x 11 604	23 208
Tax relief		10 335		10 335
Tax bonus		1 269		12 873
Amount paid	12 x 1 973	23 676	2 x 1 006	12 072
Tax overpayment		24 945*		24 945*

Notes:

* 24 945 = > 60 015 – 49 680 − 11 604 => 1 269 + 23 676
  24 945 = > 60 015 – 49 680 – 23 208 => 12 873 + 12 072

Source: Author's calculation

Taking into account possibility that a breadwinner from the couple was incapable for work in total one and half months and his wife was entitled to parental allowance due to care for dependent child up to three years for the whole year, than the family monthly income was changed as follows.

[180] In the case that the second child was newly born than mother could demand maternity benefit for 28 weeks. Considering simulation parameters the benefits was 12 210 Czech crowns. Therefore, the switch from parental allowance to maternity benefit would be undoubtedly beneficial for the family, because she received parental allowance in amount of 7 600 Czech crowns.

Table 4.53: Monthly income of husband with respect to his work incapability in the first fictitious family, 1 child, 2010, in Czech crowns

	Monthly income from employment	Income in the month involving compensation for sickness	Income in the month involving sickness benefit
Gross wage	24 884	10 984#	
Health insurance employer 9 %	2 240	981	
Social insurance employer 25 %	6 221	2 724	
Super-gross wage	33 345	14 599	
Rounded up to 100 crowns	33 400	14 600	
Advance on tax 15 %	5 010	2 190	
Tax relief for a taxpayer	2 070	2 070	
Tax utilizing reliefs	2 940	120	
Tax relief for a children	967	967	
Tax relief	967	120	
Tax bonus	0	847	
Tax utilizing tax advantages	1 973	0	
Health insurance employee 4.5 %	1 120	491	
Social insurance employee 6.5 %	1 617	708	
Compensation for sickness		3 508	
Sickness benefit			10 770
Net wage/income	20 174*	13 203*	10 770

Notes:

Gross wage correspond with 11.74 working days.

* 20 174 = 24 884 – 1 973 − 1 120 − 1 617

13 203 = 10 894 + 3 508 – 491 − 708

Source: Author's calculation

Table 4.54: Annual adjustment of tax liabilities of husband with respect to work incapacity in the first fictitious family, 1 child, 2010, in Czech crowns

	Annual income	
Gross wage from employment	10 x 24 884	248 840
Gross wage involving sickness	1 x 10 894	10 894
Total gross wage in the year		259 734
Health insurance employer 9 %		23 377
Social insurance employer 25 %		64 934
Super-gross wage		348 045
Rounded down to 100 crowns		348 000
Advance on tax 15 %		52 200
Tax relief for a taxpayer		24 840
Tax relief for a wife		24 840
Total tax reliefs		49 680
Tax utilizing reliefs		2 520
Tax relief for a children		11 604
Tax relief		2 520
Tax bonus		9 084
Amount paid	12 x 1 973	19 730
Tax overpayment		28 814*

Notes:

* 28 814 => 52 200 – 49 680 – 11 604 => 9 084 + 19 730

Source: Author's calculation

Results revealed that in case that the husband as the breadwinner with gross monthly wage 24 884 Czech crowns was incapable for work in total one and half months, than his monthly net income decreased from 20 174 Czech crowns to 13 203 Czech crowns in case of employer's compensation and to 10 770 Czech crowns considering sickness benefit provided by the Czech Social Security Administration. Because in this part of simulation wife was entitled to parental allowance in the whole year, she took care for a dependent child up to three years, than total income of the family equalled to 345 727 Czech crowns. In comparison with the previous case without impact of the illness, the difference in yearly family income accounted for 12 506 Czech crowns. Therefore, with respect to monthly family income the difference was not so profound. Average family income equalled in case of sickness 28 811 Czech crowns. The decrease in income due to illness was partly compensated by tax liability of husband, because tax overpayment was due to lower income higher.

Table 4.55: Summary results of the first bundle of simulations, 2010, in Czech crowns

	Childless family	Family with new born child	Family with one dependent child and parental allowance	Family with one dependent child, parental allowance and father's two months incapacity for work	Family with two dependent children and parental allowance
Annual family income	401 376	405 961	358 233	345 727	369 837
Monthly family income	33 448	33 830	29 852	28 811	30 820
Monthly income per capita	16 724	13 532[#]	9 951	9 604	7 705

Notes: # Number of persons in the family 2.5

Source: Author's calculation

The Table 4.55 summarizes results of the first bundle of simulations focused on the family of employees, who attained secondary education without the certificate. The descending trend in real income with additional child in the family is obvious. Because annual family income surpassed 2.4 multiple of the family living minimum, than children benefit could be provided to this family.[181] Furthermore, the family would have a problem with additional child to obtain mortgage or other advantages of insurance provided by the market. It seems that, the additional benefits provided in the market could be utilized only if no one in the family was ill or unemployed[182] in the long term and if mother returned to her work as soon as possible. The fall in monthly income per person has been pronounced with respect to family expansion. Therefore, the family might have financial shortage without support of broader family or other sources during a period of its dependence on provided state support.

The second bundle of simulations deals with the family of employees, who attained secondary education with the General certificate. To compare effect of education on the family income, the childless family, the family with a new born child, the family with a dependent child at the age between one and three years, and the family with two dependent children young

[181] For instance a monthly living minimum of a complete family with one dependent child equals to 7 080 Czech crowns.

[182] An issue of unemployment is illustrated in the second simulation.

enough for parental allowance provision are studied. The simulations are in the next step extended by the effect of unemployment.

Not surprisingly, the monthly family income with respect to education was higher in comparison with the first bulk of simulation irrespectively of given life career. Considering all available support to the family, the childless family had average income per month in amount 44 596 Czech crowns, the family with a newly born child 44 743 Czech crowns and the family with dependent child and wife receiving parental allowance 35 500 Czech crowns. The family with two dependent children had almost the same average monthly income as the family with one child, which means that the family was badly off, because monthly income per person due to additional child decreased from 11 833 Czech crowns to 9 117 Czech crowns (See Table 4.55 and Table 4.58).

Table 4.56: Simulation 2, 2010, in Czech crowns[#]

	Income per month		Income per month (maternity benefit)		Income per month (parental allowance)		
	Male	**Female**	**Male**	**Female**	**Male 1 child**	**Male 2 children**	**Female**
Gross wage	33 082	25 657	33 082	x	33 082	33 082	x
Health insurance employer 9 %	2 978	2 310	2 978	x	2 978	2 978	x
Social insurance employer 25 %	8 271	6 415	8 271	x	8 271	8 271	x
Super-gross wage	44 331	34 382	44 331	x	44 331	44 331	x
Rounded up to 100 crowns	44 400	34 400	44 400	x	44 400	44 400	x
Advance on tax 15 %	6 660	5 160	6 660	x	6 660	6 660	x
Tax relief for a taxpayer	2 070	2 070	2 070	x	2 070	2 070	x
Tax relief for a child	x	x	967	x	967	1 934	x
Advance on tax after tax relief	4 590	3 090	3 623	x	3 623	2 656	x
Health insurance employee 4.5 %	1 489	1 155	1 489	x	1 489	1 489	x
Social insurance employee 6.5 %	2 151	1 668	2 151	x	2 151	2 151	x
Maternity benefit	x	x	x	17 310**	x	x	x
Parental allowance	x	x	x	x	x	x	7 600
Net income per person	24 852*	19 744*	25 819*	17 310**	25 819*	26 786*	7 600
Net family income	44 596		43 219		33 419	34 386	

Notes:

[#] Average monthly gross wage chosen based on the labor statistics, Struktura mezd zaměstnanců v roce 2010 provided by the Czech statistical Office.

* 24 852 = 33 082 – 4 590 – 1 489 – 2 151
19 744 = 25 657 – 3 090 – 1 155 – 1 668
25 819 = 33 082 – 3 623 – 1 489 – 2 151
26 786 = 33 082 – 2 656 – 1 489 – 2 151

** maternity benefit from average wage 25 657 Czech crowns → daily basis of assessment 843.52 Czech crowns → the first reduction boundary (the limit 791 Czech crowns) → 60 % of 52.52= 31.51 Czech crowns → 70 % of reduced daily basis 823 Czech crowns → 577 x 30 = 17 310 Czech crowns

Source: Author's calculations

Table 4.57: Annual adjustment of tax liabilities of husband in the second fictitious family, 2010, in Czech crowns

	Annual income			
	1 child		2 children	
Gross wage	12 x 33 082	396 984	12 x 33 082	396 984
Health insurance employer 9 %		35 729		35 729
Social insurance employer 25 %		99 246		99 246
Super-gross wage		531 959		531 959
Rounded down to 100 crowns		531 900		531 900
Advance on tax 15 %		79 785		79 785
Tax relief for a taxpayer		24 840		24 840
Tax relief for a wife		24 840		24 840
Total tax reliefs		49 680		49 680
Tax utilizing reliefs		30 105		30 105
Tax relief for children		11 604		23 208
Tax relief		11 604		23 208
Tax bonus		0		0
Final tax		18 501		6 897
Amount paid	12 x 3 623	43 476	12 x 2 656	31 872
Tax overpayment		24 975*		24 975*

Notes:

* 24 975 = > 79 785 – 49 680 − 11 604 => 18 505 – 43 476
  24 975 = > 79 785 – 49 680 – 23 208 => 6 897 – 31 872

Source: Author's calculation

Table 4.58: Summary results of the second bundle of simulations without unemployment, 2010, in Czech crowns

	Childless family	Family with new born child	Family with one dependent child and parental allowance	Family with two dependent children and parental allowance
Annual family income	535 152	536 916	426 003	437 607
Monthly family income	44 596	44 743	35 500	36 467
Monthly income per capita	22 298	17 898#	11 833	9 117

Notes: # Number of persons in the family 2.5

Source: Author's calculation

As announced above, the simulations, related to the family of employees, who attained the secondary education with the General certificate, are extended to the case of unemployment. Not just illness, but as well unemployment may significantly influence the financial situation of the family. Unemployment reduces family income too, but in comparison with an issue of sickness further aspects of calculations have to be considered. Unemployment benefit has been regulated by distinct regulations.

Based on labour statistic 2010 the gross wage of male employee with given education level was 33 082 Czech crowns. Therefore, his net monthly wage accounted for 24 852 Czech crowns (See Table 4.56). Considering that unemployment benefit was limited to 13 280 Czech crowns

over the first two of total five months of unemployment when support has been provided[183]. The second two months unemployed has received 50 % of the net wage and the last month 45 % of net income has been provided. Taking into account net income of employee, who attained secondary education with the certificate, the total benefits in unemployment equalled to 62 595 Czech crowns in 2010. To calculate annual income of the family, tax liability of employee had to be calculated only in months of employment. The summary results with respect to number of children, wife's income and husband unemployment are presented in the Table 4.59. Obtained figures revealed that income of the family with a dependent child or children when wife was entitled to parental allowance was affected by unemployment significantly. Decrease in the family income accounted 11 833 and 7 997 Czech crowns respectively. In case of childless family and family with a newly born child, decline in the family income was less than third the size, because the loss was partly compensated by the income of wife. Nevertheless after five month of unemployment the family was entitled to assistance in material need if all requirements of the Act No. 111/2006 Coll., on Assistance in Material Need, as amended were fulfilled.

Table 4.59: Summary results of the second bundle of simulations with five months unemployment, 2010, in Czech crowns*

	Childless family	Family with new born child	Family with one dependent child and parental allowance	Family with two dependent children and parental allowance
Annual family income	473 487	470 416	287 893	299 497
Monthly family income	39 457	39 201	23 991	24 958
Monthly income per capita	19 728	15 608	7 997	6 239

* State support in material need is not involved.

[#] Number of persons in the family 2.5

Sources: Author's calculation

The second bundle of simulations was focused on the family of employees', who attained secondary education with the General certificates. The overall financial situation regardless of the life career was better than in case of less educated couple. The family had added chance to utilize the possibility of private insurances as well as a mortgage or bank credits. But also this utilization was conditioned by the stability of employment and prompt return of woman to work. In case of unexpected long-term unemployment or sickness the income could be low enough to obtain assistance in material need. Considering the family income with respect to additional child, the family could live in need without support of broad family or other financial sources.

The third and the last bundle of simulations is focused on the family of employees, who attained university degree, i.e. technician, schoolteacher, medic, etc. The life carriers without children, with a newly born child related to maternity benefit, a dependent child related

[183] Unemployment benefit is provided at the maximum of five months for a person up the age of 50 years, at the maximum of eight months for a person up the age of 55 years, and at the maximum of eleven months for a person older than 55 years.

to parental allowance and two dependent children when at least one child is at the age between one and three years in the family are studied. The average gross wages equalled to 44 111 Czech crowns for male and 33 597 Czech crowns for female based on labour statistics 2010.

Table 4.60: Simulation 3, 2010, in Czech crowns[#]

	Income per month		Income per month (maternity benefit)		Income per month (parental allowance)		
	Male	**Female**	**Male**	**Female**	**Male 1 child**	**Male 2 children**	**Female**
Gross wage	44 111	33 597	44 111	x	44 111	44 111	x
Health insurance employer 9 %	3 970	3 024	3 970	x	3 970	3 970	x
Social insurance employer 25 %	11 028	8 400	11 028	x	11 028	11 028	x
Super-gross wage	59 109	45 021	59 109	x	59 109	59 109	x
Rounded up to 100 crowns	59 200	45 100	59 200	x	59 200	59 200	x
Advance on tax 15 %	8 800	6 765	8 880	x	8 800	8 800	x
Tax relief for a taxpayer	2 070	2 070	2 070	x	2 070	2 070	x
Tax relief for a child	x	x	967	x	967	1 934	x
Advance on tax after tax relief	6 810	4 695	5 843	x	5 843	4 876	x
Health insurance employee 4.5 %	1 985	1 512	1 987	x	1 985	1 985	x
Social insurance employee 6.5 %	2 868	2 184	2 868	x	2 868	2 868	x
Maternity benefit	x	x	x	20 580**	x	x	x
Parental allowance	x	x	x	x	x	x	7 600
Net income per person	32 448*	25 206*	33 415*	20 580	33 415*	34 382*	7 600
Net family income	57 654		53 995		41 015	41 982	

Notes:

[#] Average monthly gross wage chosen based on the labor statistics, Struktura mezd zaměstnanců v roce 2010 provided by the Czech statistical Office.

* 32 448 = 44 111 – 6 810 – 1 985 – 2 868
25 206 = 33 597 – 4 695 – 1 512 – 2 184
33 415 = 44 111 – 5 843 – 1 985 – 2 868
34 382 = 44 111 – 4 876 – 1 985 – 2 868

** maternity benefit from average wage 33 597 Czech crowns → daily basis of assessment 1 104.56 Czech crowns → the first reduction boundary (the limit 791 Czech crowns), the second reduction boundary → 60 % of 313.56 = 188.14 Czech crowns → 70 % of reduced daily basis 980 Czech crowns → 686 x 30 = 20 580 Czech crowns

Source: Author's calculations

Table 4.61: Annual adjustment of tax liabilities of husband in the third fictitious family, 2010, in Czech crowns

	Annual income			
	1 child		2 children	
Gross wage	12 x 44 111	529 332	12 x 44 111	529 332
Health insurance employer 9 %		47 640		47 640
Social insurance employer 25 %		132 333		132 333
Super-gross wage		709 305		709 305
Rounded down to 100 crowns		709 300		709 300
Advance on tax 15 %		106 395		106 395
Tax relief for a taxpayer		24 840		24 840
Tax relief for a wife		24 840		24 840
Total tax reliefs		49 680		49 680
Tax utilizing reliefs		56 715		65 715
Tax relief for children		11 604		23 208
Tax relief		11 604		23 208
Tax bonus		0		0
Final tax		45 111		33 507
Amount paid	12 x 5 843	70 116	12 x 4 876	58 512
Tax overpayment		25 005*		25 005*

Notes:

* 25 005 = > 106 395 – 49 680 − 11 604 => 45 111 – 70 116
25 005 = > 106 395 – 49 680 – 23 208 => 33 507 – 58 512

Source: Author's calculation

Table 4.62: Summary results of the third bundle of simulations, 2010, in Czech crowns

	Childless family	Family with new born child	Family with one dependent child and parental allowance	Family with two dependent children and parental allowance
Annual family income	691 848	678 268	517 185	528 789
Monthly family income	57 654	56 522	43 099	44 066
Monthly income per capita	28 827	22 609[#]	14 366	11 017

Notes: # Number of persons in the family 2.5

Source: Author's calculation

As expected, the family consisted of employees, who attained university degree reached the highest incomes both annual and monthly in comparisons with two previous fictitious families. Therefore, it is reasonable to assume that only this family might utilized all insurances and credits provided on the market and might create financial reserves for unexpected events. With respect to individual, to be a mother corresponded with the income fall of 17 606 Czech crowns, what could be a relevant supplementary factor in decision to have family.

The three bundles of simulations presented real financial situations of the fictitious families, which were constructed based on available labour statistics 2010. Downswings in their incomes with additional child were presented regardless to their attained education. Therefore, the following paragraphs are focused on an issue, how the fall in income could be at least partly mitigated considering the given direct and indirect financial supports. Only presented framework is considered.

One possibility, how to cut down the income falls with the second child in fictitious families, is to reintroduce a tax technique of the joint tax basis for married couple. In case that this technique would be applied regarding conditions stated in the year 2010, than it is necessary to note that a joint basis is a husband's gross wage and not a super-gross wage which includes contributions of an employer to an employee's health and social insurances. If the super-gross wage was divided between husband and wife than tax evasion would be generated. The common taxation of married couple for the first fictitious family consisted of employees with secondary education without the certificate would be as follows.

Table 4.63: Application of the joint tax basis of married couple in the first fictitious family, 2010, in Czech crowns

	Tax liabilities of husband		Tax liabilities with respect to joined tax basis of married couple		
	1 child	**2 children**	**1 child**	**2 children**	**2 children**
Gross wage 12 x 24 884	298 608	298 608	298 608		298 608
Health insurance employer 9 %	26 875	26 875	26 875		26 875
Social insurance employer 25 %	74 652	74 652	74 652		74 652
Super-gross wage	400 135	400 135	400 135		400 135
Rounded down to 100 crowns	400 100	400 100	400 100		400 100
			Husband	**Wife**	**Husband**
Tax base for a each spouse			149 304	149 304	149 304
Health insurance employer 9 %			26 875		26 975
Social insurance employer 25 %			74 652		74 652
Rounded down to 100 crowns			250 800	149 300	250 800
Advance on tax 15 %	60 015	60 015	37 620	22 395	37 620
Tax relief for a taxpayer	24 840	24 840	24 840	24 840	24 840
Tax relief for a wife	24 840	24 840	24 840		24 840
Total tax reliefs	49 680	49 680	49 680	24 840	49 680
Tax utilizing reliefs	10 335	10 335	0	0	0
Tax relief for children 1 x 11 604 2 x 11 604	11 604	23 208	11 604	0	23 208
Tax relief	11 604	23 208	11 604	0	23 208
Final tax	0	0	0	0	0
Tax bonus	1 269	12 973	11 604	0	23 208
Amount paid 12 x 1 973 12 x 1 006	23 676	12 072	23 676	0	12 072
Tax overpayment	24 945	24 495	35 280	0	25 280
Tax overpayment per family			35 280		35 280
Difference			+ 10 335		+ 10 335

Source: Author's calculation

The results revealed that financial situation in the first fictitious family would be improved utilizing the common taxation of married couple by 10 335 Czech crowns regardless number of children in the year 2010. Furthermore, the second fictitious family consisted of employee with secondary education with the certificate would improve their annual financial income by 24 855 Czech crowns. Little bit surprisingly, the third fictitious family of university graduates would improve its budget at the same amount as the second fictitious family (See Table A.12 and Table A.13 in Appendix). Explanation is simple, because the method is sensitive to a dependant wife rather than number of children. Apart from that, it is clear that fall in income with respect to additional child in given family remained. The technique of joint tax basis of married couple was unquestionably beneficial for all studied types of families. Besides

that, it is reasonable to assume that the method would be beneficial for any family where difference between husband's and wife's incomes is substantial. More precisely, the method is advantageous in case when wife's income is negligible, for instance she receives parental allowance.

The second possibility, how to reduce fall in income with respect to additional child and discussed indirect tax techniques, is to switch between the tax reliefs for a dependent child to tax deductible item from tax basis. In case of the first fictitious family with two dependent children, three changes are studied. Firstly, the tax relief for children of the year 2010 are substituted by the tax deductible item per children in the same amount, i.e. 23 208 Czech crowns. Secondly, the tax deductible item per children 23 208 Czech crowns is increased to 51 120 Czech crowns, which corresponds with the parameters of the year 2004[184]. Thirdly, the technique of joint tax basis of married couple with tax deductible item per children in amount of the year 2004 is calculated (See Table 4.64).

If the tax relief per children was substituted by the tax deductible item, the monthly family income equalled to 29 176 Czech crowns and the monthly income per family member reached 7 294 Czech crowns. Furthermore, in case of increased tax deductible item, the monthly income in the first fictitious family correspond to 29 525 Czech crowns. Therefore, income per capita in the family slightly increased to 7 381 Czech crowns. By application of the common taxation of married couple the monthly family income remained relatively unchanged in an amount of 29 747 Czech crowns. Thus, the monthly income per family member equalled to 7 437 Czech crowns. The similar pattern without significant improvement was observed considering the second and third fictitious families too (See Table A.14 and Table A.15 in Appendix). In sum, the switch between the tax relief and the tax deductible item as well as the joint tax basis did not lead to financial improvement of the family with two dependent children. The figures depended on amount of subtracted items, what implies that established changes evoked since 2004 were chosen in a way so as to have minimum effect on family incomes.

The third possibility with respect to minimization of financial loss with additional child in the family is relatively similar to previous case. The switch between the tax relief for a wife and tax deductible item per a wife can be utilized. The impact is studied for the first fictitious family keeping previous switch for dependent children. Therefore, firstly the tax relief for a wife of the year 2010 is replaced by the tax deductible item per a wife in the same amount, i.e. 24 840 Czech crowns. Secondly, the tax deductible item per a wife 24 840 Czech crowns is decreased to 21 720 Czech crowns, which corresponds with the parameters of the year 2004. Thirdly, the technique of joint tax basis of married couple with the tax deductible item per children and a wife in amount of the year 2004 is captured (See Table 4.65).

[184] The year 2004 was chosen as a benchmark because that year tax rate for the low income person equals to 15 %.

Table 4.64: Replacement of tax relief for children by tax deductible item, the first fictitious family with two dependent children, 2010, in Czech crowns

	Income 2010 #	The 1st case*	The 2nd case**	A joint tax basis for married couple***	
	2 dependent children				
Gross wage 12 x 24 884	298 608	298 608	298 608	298 608	
Health insurance employer 9 %	26 875	26 875	26 875	26 875	
Social insurance employer 25 %	74 652	74 652	74 652	74 652	
Super-gross wage	400 135	400 135	400 135	400 135	
Non-taxable amount per children at the level of tax relief 2010		23 208			
Non-taxable amount per children at the level of tax deductible item 2004			51 120		
Rounded down to 100 crowns	400 100	376 900	349 000	400 100	
				Husband	Wife
Tax base for a each spouse				149 304	149 304
Health insurance employer 9 %				26 875	
Social insurance employer 25 %				74 652	
Non-taxable amount per children at the level of tax deductible item 2004				51 120	
Rounded down to 100 crowns				199 700	149 300
Advance on tax 15 %	60 015	56 535	52 350	29 955	22 395
Tax relief for a taxpayer	24 840	24 840	24 840	24 840	24 840
Tax relief for a wife	24 840	24 840	24 840	24 840	
Total tax reliefs	49 680	49 680	49 680	49 680	24 840
Tax utilizing reliefs	10 335	6 855	2 670	0	0
Tax relief for children 2 x 11 604	23 208				
Tax relief	10 335			0	0
Tax bonus	12 973			0	0
Amount paid 12 x 1 006 12 x 2 655 12 x 2 295	12 074	31 860	27 540	27 540	
Tax overpayment	24 945	25 005	24 870	27 540	0
Family income					
Wife 12 x 7 600	91 200	91 200	91 200	91 200	
Husband 12 x 21 141	253 692				
Husband 12 x 19 492		233 904			
Husband 12 x 19 852			238 224	238 224	
Adjustment of tax liabilities	24 945	25 005	24 870	27 540	
Total annual income	369 837	350 109	354 294	356 964	
Monthly family income	30 820	29 176	29 525	29 747	
Monthly income per capita	7 705	7 294	7 381	7 437	

Notes:

Real state, conditions of the year 2010.

* Income 2010, relief 2010 → non-taxable amount 2010.

** Income 2010, non-taxable amount 2010→ non-taxable amount 2004.

*** A joint tax basis for married couple with non-taxable amount per children 2004.

Source: Author's calculation

Table 4.65: Replacement of tax relief for a wife by tax deductible item, the first fictitious family with two dependent children, 2010, in Czech crowns†

	Income 2010 #	The 1st case*	The 2nd case**	A joint tax basis for married couple***	
	2 dependent children				
Gross wage 12 x 24 884	298 608	298 608	298 608	298 608	
Health insurance employer 9 %	26 875	26 875	26 875	26 875	
Social insurance employer 25 %	74 652	74 652	74 652	74 652	
Super-gross wage	400 135	400 135	400 135	400 135	
Non-taxable amount per children at the level of tax relief 2010		23 208			
Non-taxable amount per children at the level of tax deductible item 2004			51 120		
Non-taxable amount per a wife at the level of tax relief 2010		24 840			
Non-taxable amount per a wife at the level of tax deductible item 2004			21 720		
Rounded down to 100 crowns	400 100	352 000	327 200	400 100	
				Husband	Wife
Tax base for a each spouse				149 304	149 304
Health insurance employer 9 %				26 875	
Social insurance employer 25 %				74 652	
Non-taxable amount per children at the level of tax deductible item 2004				51 120	
Non-taxable amount per a wife at the level of tax deductible item 2004				21 720	
Rounded down to 100 crowns				177 900	149 300
Advance on tax 15 %	60 015	52 800	49 080	26 685	22 395
Tax relief for a taxpayer	24 840	24 840	24 840	24 840	24 840
Tax relief for a wife	24 840				
Total tax reliefs	49 680	24 840	24 840	24 840	24 840
Tax utilizing reliefs	10 335	27 960	24 240	1 845	0
Tax relief for children 2 x 11 604	23 208				
Tax relief	10 335	0	0	0	0
Tax bonus	12 973	0	0	0	0
Amount paid 12 x 1 006 12 x 2 655 12 x 2 295	12 074	31 860	27 540	27 540	
Tax overpayment	24 945	3 900	3 300	27 540	0
Family income					
Wife 12 x 7 600	91 200	91 200	91 200	91 200	
Husband 12 x 21 141	253 692				
Husband 12 x 19 492		233 904			
Husband 12 x 19 852			238 224	238 224	
Adjustment of tax liabilities	24 945	3 900	3 300	25 695	
Total annual income	369 837	329 004	332 724	355 119	
Monthly family income	30 820	27 417	27 727	29 593	
Monthly income per capita	7 705	6 854	6 932	7 398	

Notes:

†Replacement of tax relief for children by tax deductible item is kept.

Real state, conditions of the year 2010

* Income 2010, relief 2010 → non-taxable amount 2010

** Income 2010, non-taxable amount 2010→ non-taxable amount 2004

*** A joint tax basis for married couple with non-taxable amount per children 2004

Source: Author's calculation

The results of the switch from the tax relief for a wife to tax deductible item per a wife calculated for the first fictitious family revealed that neither this change lead to financial improvement of the family with two dependent children. While the monthly family income equalled 27 417 Czech crowns and income per capita corresponded to 6 854 Czech in the first case of tax deductible item, in the second case of increased amount of the deductible item the monthly family income slightly increased to 27 727 Czech crowns. Therefore income per family member also increased to 6 932 Czech crowns. The third case of the common taxation of married couple was for the family the most beneficial, because the monthly family income reached 29 593 Czech crowns and income per capita equalled to 7 398 Czech crowns. The total positive effect of joint taxation per capita was 466 Czech crowns. The same pattern was obtained regarding the second and the third fictitious families. The common taxation of married couple improved monthly income per capita about 518 Czech crowns for both types of families, while the first two changes did not have significant impacts (See Table A.16 and Table A.17 in Appendix). Therefore, tax concession for a wife in tax had impact on all families and its effect was even pronounced if the common taxation of married couple was applied.

The fourth possibility related to mitigation of income fall occurring with additional child in the family is focused on tax advantage for the second child. As previous calculations showed, improvement in financial situation of the family with two dependent children regardless parents' education cannot be attained by poor replacements of method in indirect technique. Therefore the fourth possibility deals with the increased tax relief for the second child in the family. The Table 4.66 presents the results for the first fictitious family. Although the tax relief for the second child was increased by a half of the initial amount, i.e. from 11 604 Czech crowns to 17 406 Czech crowns, the final impact on monthly income per capita was marginal, i.e. 121 Czech crowns. In addition, the tax relief for the second child in twice the amount of initial value had also insignificant impact. The income per person in the family increased from 7 705 Czech crowns to 7 947 Czech crowns. Therefore, the contribution equalled to 242 Czech crowns. Because the procedure of calculation remained unchanged, the same trends were obtained in case of the second and the third fictitious families. In addition, it is necessary to take into account, that although the increased tax reliefs were unimportant in presented examples, the approach can be beneficial. But, it is questionable in what amount to keep whole system balanced.

Table 4.66: Tax advantages with respect to birth order, the first fictitious family with two dependent children, 2010, in Czech crowns

	Year 2010	The 1st change*	The 2nd case**
	2 dependent children		
Gross wage 12 x 24 884	298 608	298 608	298 608
Health insurance employer 9 %	26 875	26 875	26 875
Social insurance employer 25 %	74 652	74 652	74 652
Super-gross wage	400 135	400 135	400 135
Rounded down to 100 crowns	400 100	400 100	400 100
Advance on tax 15 %	60 015	60 015	60 015
Tax relief for a taxpayer	24 840	24 840	24 840
Tax relief for a wife	24 840	24 840	24 840
Total tax reliefs	49 680	49 680	49 680
Tax utilizing reliefs	10 335	10 335	10 335
Tax advantages for children 2 x 11 604 1 x 11 604 + 1 x 17 406 1 x 11 604 + 1 x 23 208	23 208	29 010	34 812
Tax relief	23 208	29 010	34 812
Final tax	0	0	0
Tax bonus	12 873	18 675	24 477
Tax amount paid	12 072	12 072	12 072
Tax overpayment	24 945	30 747	36 549
Family income			
Wife 12 x 7 600	91 200	91 200	91 200
Husband 12 x 21 141	253 692	253 692	253 692
Adjustment of tax liabilities	24 945	30 747	36 549
Total annual income	369 837	375 639	381 441
Monthly family income	30 820	31 303	31 787
Monthly income per capita	7 705	7 826	7 947

Notes:

* Tax relief for the second child 1.5 multiple of initial value 11 604 Czech crowns.

** Tax relief for the second child 2 multiple of initial value 11 604 Czech crowns.

Source: Author's calculation

The last possibility how to influence downswing in the family income with additional child is via direct financial support. Therefore, possibility of increased parental allowance for a wife taking care for the second child is considered. More precisely, it is assumed that amount increased by 400 Czech crowns, i.e. from 7 600 to 8 000 Czech crowns. The results for the all fictitious families, summarized in the Table 4.67, revealed that application of this possibility improved financial situation to all families [185]. The gap between incomes per capita in the families with one child and two depended children was significantly narrowed. Therefore, only this possibility in comparison with previous four was capable to ensure positive effect.

[185] Procedure of calculation follows all rules for the year 2010.

Table 4.67: Summary results of the doubled parental allowance for the second child, all fictitious families, in Czech crowns

	The 1st fictitious family		The 2nd fictitious family		The 3rd fictitious family	
	1 child*	2 children**	1 child	2 children**	1 child*	2 children**
Annual family income	358 233	465 870	426 003	533 607	517 185	624 789
Monthly family income	29 852	38 823	35 500	44 467	43 099	52 066
Monthly income per capita	**9 951**	**9 705**	**11 833**	**11 117**	**14 366**	**13 002**

Notes:

* Real data of the year 2010

** Parental allowance for the second child equals 8 000 Czech crowns.

Source: Author's calculation

The sub-chapter dealt with simulations focused on real financial situations of three fictitious families with respect to the direct and indirect financial supports provided in the Czech Republic. The families were contracted based on real data of labour statistic 2010 and obtained knowledge of population development. Apart from that, all simulations reflected changes in certain life carriers in the family. The childless family, the family with a newly born child, the family with one dependent child at the age between one and three years, and the family with two dependent children, if one child is at the age between one and three years, were studied. The simulations followed the regulations in force for the year 2010.

The basic results revealed that the fall in income with a child has been substantial and even pronounced by the additional child. In addition, obtained numbers also pointed out that families of employees, who attained secondary education either with or without the certificate, could not fully utilize all advantages available in private market. Their incomes were relatively low and in case of some unexpected event as unemployment or sickness, the fall in income could not be overcome without supplementary support of broad family or other financial sources (e.g. inheritance, lottery prize, etc.). Further simulations applying changes in the indirect and direct support were calculated to find a way in which the income fall with additional child could be mitigated. The outcomes demonstrated that tools of indirect technique highly have depended on their amount. Only the joint tax basis for married couple had positive effect regardless of family type. This approach can be advantageous only if one of the partners has negligible income. The direct financial support revealed to be more suitable.

4.2.3.4 Discussion considering the analysis in a micro perspective

Although family policy can be understood as measures or arrangements with respect to the family, the clear definition of the term has not existed in literature. Applied family policies broadly differ considering their goals and utilized tools [186]. For instance, while developed economies have been employing family policy to combat population ageing, developing economies have been applying family policy to limit substantial population growth. In general, the family policy is defined in narrow and broad senses. The narrow sense

[186] Family policies also differ in their specification with respect to related population and social policies. While in one case a family policy can be synonym for a population policy, in another case the population policy is superior to a family policy. In general, the population and family policy frequently overlap each other, while a social policy which involves also health and pension policies is superior.

of the family policy involves support devoted to a couple with dependent child/children or a single parent with dependent child/children via services, benefits, levies, allowances, taxes, family law, etc. On the other hand, the family policy in broad sense is interconnected with other public policies which affect institution of the family (Gauthier, 2002, p.452).

In addition, due to long-term research in comparative studies of welfare states several typologies of the policy applied with respect to the family exist. The basic typology created by Titmus (1974) involves three categories: the residual welfare model, the institutional redistributive model, and the industrial achievement-performance model (Cook, 2006, p.15). *The residual welfare model* is based on liberal ideas and assumptions, that basic needs are supplied by the family and market. Therefore, social support can be provided only if one of them fails, otherwise state should not intervene (e.g. the United States of America). The counterpart of this category is *the institutional redistributive model*, which provides support to individual or group to guarantee basic needs via a general social scheme. Social equality and redistribution are the goals. The last category, *the industrial achievement-performance model* comes out of the principle which prefers productive and efficient individuals. The social welfare institutions are important.

Based on analysis of fourteen countries, Kamerman and Kahn (1978) stated the explicit and implicit family policy. While *the explicit family policy* clearly defines goals with respect to the family and can be specified in narrow or broad senses, *the implicit family policy* does not. Therefore, the goals of the implicit family policy are realised through other policies involved in education, health, social systems. Countries with the explicit approach as Germany, Belgium, France can have as good measurements as those with implicit approach as the United Kingdom, Italy, Denmark (Matějková et.al, 2005, p.12).

Esping-Andersen (1990) formulates the well know typology considering relationship of an individual and the labour market, i.e. how much individual's living depends on employment. He recognizes four basic types*: Liberal, Conservative/Corporatist, Social Democratic and Mediterranean*[187] (Cook, 2006., p.15; Matějková et.al, 2005, p.13-16). The typology has been broadly accepted and adjusted by new knowledge of welfare states. The Table 4.68 focuses on basic characteristic of given typology. Furthermore, it includes new type added for the post-communist countries.

[187] This type was formulated later.

Table 4.68: Regimes of welfare state based on Esping-Andersen's work

"Welfare state" type	Liberal (Anglo-Saxon)	Social democratic (Nordic type)	Conservative (Bismarck's type)	Mediterranean (Family oriented)	Post-communist
Basic features	the market is overriding; state support provided to needy persons/groups; minimum redistribution	social rights guaranteed to everyone; state creates jobs, were are not provided by market, high taxation and degree of redistribution	professional associations guarantee basic social rights; high degree of resource redistribution	differentiation according to economic activity; minimal wage does not exist	high degree of resource redistribution; sequential shift from state paternalism to state support provided to the needy
Social impact	inequality between the rich and the poor; private insurance available	universalism; solidarity; considerable middle class; general social insurance guaranteed	social hierarchy present; loyalty; state support provision of minimum life standard	social hierarchy present; loyalty	sequential differentiation
Family support	the minimum wage influencing subsistence income does not exist; responsibility for child care rely on parents and private institutions	general benefits provided to all families; other social benefits at high level; parental leave relatively long; institutional care for children spread	traditional family is a background of the society; a breadwinner main source of family income; less developed institutional care for children	low level of benefits; marginal state support to families with dependent children	high involvement of women in paid work; relatively long parental leave; developed child care system; claim to benefits income tested; amount of benefit often discourage to work
Impact on gender roles	Policy of non-interference	gender equity; support to two-income family	tradition one-career model	tradition one-career model	support to two-income family
State provision of institutional care of children	not substantially developed	substantially developed	substantially developed	not substantially developed	developed
Form of family benefits	tax relief/ concessions	universal benefits	benefits, non-taxable amounts	benefits, non-taxable amounts	predominantly benefits
Population policy	neutral	child-friendly policy	often defined population goals	neutral	often defined population goals
State	Australia; Canada; the USA; Japan; the UK; Switzerland	Denmark, Finland; Norway; Sweden	Germany; Austria; Belgium; Ireland; France; Luxembourg; the Netherlands	Spain; Greece; Italy; Portugal	the Czech Republic; Poland; Hungary; the Slovak Republic; Slovenia

Source: Matějková et.al, 2005, p. 14

The typology considering impact of institutional structure on gender and class inequalities was established by Korpi (2000). The inequalities were studied via the family as the basic social unit on the sample of eighteen OECD countries. Three types of welfare state were recognized: the general family support model, the dual-earner gender policy model, and the market-oriented model. *The general family support model* is placed in the countries where long-term influence of religion and corporatist regime of welfare state have been present (Italy, Germany, Belgium, France, and Austria). The gender and class inequalities are middle or high. The contrary holds for *the dual-earner gender policy model*, where both inequalities touch low levels. The model is located to the countries where substantial social policy has been present (Sweden, Finland, and Norway). The last type of the welfare state, *the market-oriented model*, is ascribed to countries where the social support is provided to socially needy population/families or the basic social system of protection is established (Australia, Switzerland, Canada, the UK, and the USA) (Munková, 2005, p.54-55).

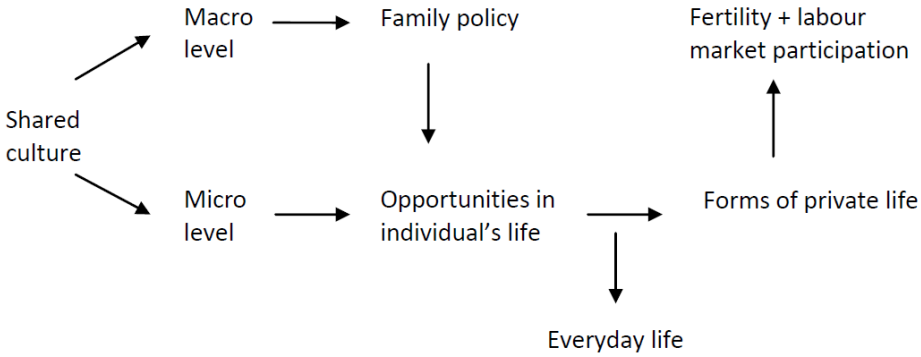
Mlčoch (2009a, 2010) introduced the most recent typology of the family policy. The classification is based on the clusters of culturally, historically and ideologically related countries. The approach reflects knowledge of previous typologies as well as development in economics of the family. Mlčoch (2009a, 2010) specifies nine types of the family policy: the abandoned Czechoslovak version of the socialist model, the Czech part of the transformation saw the family as only "dependently variable", the conservative continental pro-family approach, the liberal British system of support, the Scandinavian social democratic de-familism approach, the Mediterranean model of the traditional family, the American religious neo-conservative model, French market etatism, and Subcultures and "wild cards" in the family sphere. As mention above, some types are involved in the previous classification therefore only new aspects of this classification are considered.

The first type of the family policy, *the abandoned Czechoslovak version of the socialist model*, comes out of the central planned economy, significant participation of women in the labour market and a substantial net of institutions providing daily care for children of the employed women (crèches, kindergartens, so-called "after school clubs" at primary school). In addition, the type is characterised by dichotomy, because on the one hand the state provided general support to families via maternity leave, paid child benefits, income tax exceptions, etc., on the other hand the state approved termination of unwanted pregnancies via abortion committees. The second type *the Czech part of the transformation saw the family as only "dependently variable"* is specified by the fact that changes in the family were not followed by any elaborated conception. The adjustments in the system were forced by economic development rather the certain concern for the family. Therefore, the family was only "dependently variable". The following four types of the family policy in Mlčoch's classification correspond with Easping-Andersen's regimes of welfare state. The seventh type, *the American religious neo-conservative model*, points out the effect of support via the tax system, impact of religion and provision of daily care for children in informal sector. The informal sector has been utilized more frequently in the USA in comparison with European countries. The eighth type is *French market etatism* which is characterised by broad infrastructure to care for children and substantial support of the family via the tax system. In addition, the most important feature

of the policy is its stability, which is relatively exceptional on European framework. The last type, *Subcultures and "wild cards" in the family sphere*, emphasizes essentiality of policy adjustment to existing sub-populations in given state.

Kocourková (2002) highlights that population policy is academic terminology rather than the term applied in ordinary policy. It is reasonable to assume, that the same statement holds for the family policy. Willingness to family/population policy application is reduced by the fact that it is not clear what policy impact is. The policy has to consider broad range of variables, but due to their interconnections the effect's measurability is limited. Sirovátka (2006) points out that policy at macro level may influence opportunities in individual's life at micro level, which consequently may have impact on fertility and labour market participation (See Chart 4.45).

Chart 4.45: The model of family policy impact on family behaviour



Notes: Public policy influences family behaviour via life in household. In addition, policy is affected by micro-social, macro-social, cultural and structural factors.

Source: Sirovátka, 2006, p.88

Valuation of policy is sensitive to defined goals of given policy, which may vary from country to country. Nevertheless, Sleebos (2003), in her work focused on an issue of low fertility level in OECD countries, summarizes the fundamental results of studies concerning policy impact. It is necessary to note, that her conclusion, reflecting all available studies that time, is based on broad range of multivariable statistical methods and data at distinct levels, areas and periods. Despite this fact, the studies revealed strong positive impact of broad infrastructure to care for children up to the age of three years on reproduction. In addition, weak positive effect of provided direct and indirect financial support to families on reproduction was significant too. Mix effect was found with respect to maternity leave and parental allowance, because requirements as well as obtained support varied substantially in applied policies.

Table 4.69: Qualitative findings from empirical studies on the impact of policies on fertility

	Total fertility rates	Timing of births	Specific birth order	Age of mothers	Other individual characteristics
Family cash benefits	Small positive effects in most countries	Larger effects of policies on the timing of births than on completed fertility	Contradictory results on whether effects of policies are larger for first or subsequent births Small or no effect on probability of having a first child	Small positive effects, or contradictory results, on the effects of welfare benefits on teenage births (but evidence limited to few countries)	Some evidence that effects of policies differ among ethnic groups
Tax policies	Positive effects in the US and Canada				
Family-friendly policies	Positive effect of part-time and flex-time work Weak or contradictory effects of maternity leave				
Child care availability	Positive effect, weak in some countries				Some evidence that effects of child-care availability and costs differ according to the employment status of mothers

Source: Sleebos, 2003, p.45

Taking into account results of analysis in a micro perspective, which is focused on financial supports of Czech families via the social scheme and the tax system, than the family policy applied in the Czech Republic is characterised by the features captured in the Post-communist regime of welfare state introduced in the extended Esping-Andersen's typology and in the second type of Mlčoch's classification, where the family is only dependent variable. The both systems of financial supports to Czech families have been undergoing rapid and substantial changes since the beginning of the transformation.

In the core, the whole system of direct support has remained unchanged from previous socialist regime. The child benefits, birth grant, maternity leave, parental allowance, etc. have been still provided. But their amounts as well as requirements for their entitlement changed profoundly (See Table A.7 and Table A.9 in Appendix). Some benefits became income tested, per child irrespective to birth order and focused on socially needy families. On the other hand, with the process of economic transformation from a command to market economy, the indirect financial support via the tax system was newly established. At the very beginning, non-taxable amounts per a dependent child and wife from a tax base of natural income tax from employment and private business were introduced. This tax technique was applied to the year 2004, because afterwards tax deductible item per a child was replaced by tax advantages per child in the form of tax relief and tax bonus. Apart from that, the technique of the common taxation for married couple was introduced in 2005. Nevertheless, it is necessary to notice that tax rates according to tax brackets as well as amounts of non-taxable amounts were changed relatively frequently over period 1993-2004 (See Table A.10 and Table A.11 in Appendix). The following year 2006, tax deductible item per dependent person was abolished and substituted by tax relief. Afterwards, the joint basis for married couple was canceled and concept of super-gross wage was introduced. Furthermore, amounts of reliefs and tax rates were also changed (See Table A.10 and Table A.11 in Appendix).

With no doubts, the common taxation of married couple established in 2005 was beneficial for the family with dependent children if difference between spouses' income was noticeable. This tax technique was especially helpful for the family where one parent was entitled to maternity leave or parental allowance. Considering general income levels, the approach brought significant supplementary income to families with low and middle incomes. Apart from that, the common taxation of married couple made more advantageous couples with formal and binding commitment of marriage. Therefore, this aspect of the policy could promote the family stability in long-term. In a simplified way, to be married would be profitable in comparison with cohabitation and the state would provide a clear signal to the public about its preferences. Furthermore, a part of costs related to the family dissolution, both financial and psychological, could be saved. Besides that, the technique created the system more flexible, because it introduced the possibility of choice.

On one hand, it is questionable why the joint tax basis of married couple was abolished, on the other hand it is clear based on obtained results of the examples and simulations that the change in tax technique did not make the family regardless income worse off. The changes in amounts of tax reliefs in combination with the concept of the super-gross wage were set up to keep gained financial support via the tax system at the same level. In addition, the concept of super-gross wage revealed how much employer contributes to employee income, what was relatively new information for the general public, and mitigated the fall in state budget related to the unified income tax rate. One of the reasons, which could lead to the common taxation replacement, was in additional administrative burden. According to available data of the Czech Tax Administration, the number of tax returns increased by 33.5 % in the tax period 2005/2004 and declined by 25.9 % in the tax period 2008/2007 (the Czech Tax Administration, 2011). Also the technique could be applied by foreigners working in the Czech Republic, while the family resided abroad. Therefore, relatively substantial amount of many could leave the country. The amount could be even higher than had been expected, because it was administratively costly to prove that number of dependent children was correct in tax return submitted by foreigner. In general, it is reasonable to assume that the state has been losing some money via tax advantages for a child due to imperfections in control process and dishonesty of taxpayers.

The results of the examples and simulations based on tax technique also revealed that although tax technique can be useful tool of applied family policy, it is highly dependent on political will. Therefore, if the techniques as well as size of tax advantages are adjusted frequently, than the general public will not be able to capture all changes and will recognize only system instability. Considering frequency of all changes, it is reasonable to assume that it has been case of the Czech Republic since 1989. It is highly probable that general knowledge of Czech citizens with respect to state indirect financial support is low. The Czech tax system has involved the family with dependent children relatively broadly. In addition, the relationships based on blood and marriages are preferred. But, the darker side of the indirect financial support to families has been in its instability in the Czech Republic. As Mlčoch (2009a, 2010) points out in case of *French market etatism*, the indirect approach of the state support can

be in combination with infrastructure to care for children effective in keeping fertility at relatively high level, if it is stable in long-term.

A lot of changes were also documented with respect to direct financial support, which has come out of the state social scheme. The shift from a general support to the family to support provided the socially needy family is obvious. For instance, while birth grant was provided to all live births regardless the order at the beginning of the transformation process, currently the benefit is provided only for the first birth to low income families. Child benefit as well as housing benefit is devoted to low income families too. Nevertheless, the system of direct financial support became more flexible. Maternity leave can be also partly drawn by father and parental allowance can be ascribed either mother or father with respect to their decision. In addition, parental allowance can be drawn in different amount with respect to period of support. Although it can be difficult for parents to choose which amount would be the most convenient for them considering all unknown aspect of their future and the fact that their decision is irreversible, at least the possibility of choice makes the system friendlier.

Besides that, it is necessary to notice that parental allowance causes significance fall in family income. The simulations revealed that fall in the family income with the second child cannot be compensated utilizing former or present-day amounts of tax deductible items or tax relies of indirect tax technique. As mentioned above, the common taxation of married couple can be beneficial, but not enough to cover all the fall. The only feasible way of the compensation, considering presented methods, was in combination of tax technique of the year 2010 with increased parental allowance for the second child in amount of 8 000 Czech crowns per month. In this case, income per capita in family with one child and with two children almost equalled.

The transformation process of the economy introduced a lot of changes in the Czech Republic. Although not all aspects of the changes related to both direct and indirect financial supports to families are discussed (for instance an issue of disability or student, mixture of employment with self-employment etc.), the state support based on two sources revealed to be a good choice. The flexibility of the support to the family increased. By combination of direct and indirect approaches, the provided assistance may reflect more easily certain life cycles of the family. While the direct financial support can be applied in the short-term, the indirect financial support can be utilized in the long-term by its nature. In addition, the analysis points out that the family has been considered relatively broadly in the system. Nevertheless, the general public cannot recognize that, because adjustments have been done too often.

Chapter 5

Conclusion

The family has been considered as the oldest, general and the basic unit of human society where reproduction is realized. Although everyone is familiar with the term an idea, what the family is, broadly differ. Usually, the family is identified with personal experience. Therefore, while in Europe people narrow the family to closer relatives, in Africa the family frequently involves people unrelated via kinship, i.e. closer friends. The simple definition of the term does not exist. The family specification is influenced by both culture and biology and therefore it is important what in given society prevails. In addition, the family is relatively floating institution which reflects changes in given society. For instance, the family in present-day so-called developed countries underwent unprecedented transformation in the recent past. The family became smaller considering average number of members, a wide range of family forms occurred and formation of new families of young adults with dependent children was postponed to higher ages. The interesting fact is that the transformation took place alongside extraordinary economic development based on a free market structure.

Taking into account demographic and economic development globally in the last century, the family size as well as its potential for reproduction shrank as economy based on the free market principle spread. The similar pattern was observed by anthropologists in traditional societies where a quid pro quo mechanism of the free market structure was introduced and replaced the initial economy structure involving reciprocity principle. The roots of present-day market economy are in the 19th century, but important turn in human society came to pass even earlier, when people turned their attention from God to sense as a major factor responsible for their welfare in earthly life. The turn induced a path of technological progress, which consequently led in combination with strengthen market structure to pressure on the family as unit of production. In the 19th century the family was relatively self-sufficient and independent on the market. But as market generated additional pressure on technological advancements, which gradually came into practice, the family became less and less competitive. A broad range of consumption goods came up to be available for a price which made home production uncompetitive. Currently it seems that the market is powerful to convince consumers that given goods or services are necessary for their life and deepen the family reliance on the market. Considering that, it is assumed that the family is in unbalanced relationship with economy arising out of the free market principle these days. In addition, it is hypothesized that this imbalance, when the family has been significantly dependent on the market, has generated obstacles which have affected either directly or indirectly fertility level.

Therefore, the thesis has been devoted to an issue of fertility decline in developed countries from a perspective of relationship between the family and the market economy. In addition, population economics, which is situated on the borderland of demography and economics, provided methodological framework. From this point of view, the family has been perceived as an externality with respect to theoretical economic approaches as well as to real economy of the Czech Republic in the period of transition from a command to market structure. The Czech Republic was chosen owning to high quality data and the fact of reintroduction of the free market principle.

Families, or households in economic terminology, form an integral part of economy. Households for satisfaction of their needs demand goods produced by firms and supply their available production factors as capital, land, and labour to obtain sources for their purchases. Furthermore, families are sui generis for their potential capability of human reproduction, as well as reproduction of human and social capital. Human capital is specified as a stock of competences, knowledge and personality attributes embodied in the ability to perform tasks, which is obtain via education and experience. Social capital is ascribed to connections within and between social networks, as well as to shared values, and reciprocal trust, commitments and obligations to others. Considering the fact that main forces of economy have been technological innovations, the market demands rational agent abundant in human and social capital. To fulfil requirements arising from the market, to be competitive and get enough sources for purchases following personal preferences, the agent has to focus on gaining knowledge, skills, experiences, and reputation which can be afterwards sold at market with profit. To be competitive also means that the agent is going to be flexible in time and space.

Considering all listed requests and mutual dependence between the agent and the economy, it seems rational to avoid own family formation, because the family demands time, investments, altruism and decrease flexibility in space. To move all family to a new place has been relatively costly. Therefore, the agent is relatively disadvantageous, if he/she does not have any specific knowledge highly appreciated in the market, in comparison with those without commitments to partner and dependent children. Even though the family formation remains to be priority for the rational agent, it is highly probable that its establishment is going to be postponed to his/her higher age. To obtain sufficient human and social capital which would keep him/her relatively competitive needs time. Thus, it would be also irrational to form family immediately after graduation, because firstly the value of capital should be increased in the labour market not to miss an opportunity coming from long-term investment to education. In sum, although the market needs labour force, which is produced in family, requirements of high qualification limit possibility of reproduction. The basic discrepancy between the family and the economy has been in time horizon. While the reproduction of human and social capital is conducted in the long-run, market exchange and consumption is performed in the short-run.

In theoretical perspective, the Chicago school of economics is well-known school for its concern with the family. The fundamental principles of the approach come from classical political economy and marginal analysis. The consumer decision following self-interest is in the spotlight of the research. The Chicago school is characterised by micro-economics utilitarian models established on individualism, maximization, and rationality. The work

of a Nobel Prize laureate G. S. Becker has been ground-breaking for its involvement of decision about marriage, divorce, number of children, etc. into economic framework. Becker (1986, 1993) assumes that rational individual compares costs to benefits resulting from his/her decision and if benefits preponderate than e.g. marriage can be solution. The costs and benefits are not necessarily in pecuniary terms, the psychological costs and benefits are also considered. Therefore, decision about children is related to utility resulting from their upbringing and altruism involved in the family with respect to other family members. Apart from that, Becker (1986, 1993) claims that population policy is a useful and effective tool, because in countries where women participate in the labour market and their incomes are relatively significant, the tendency towards reduced number of children is observed in case of diminished financial support provided to families or if costs of rearing and education increased. But he also points out that, state social support declared to individual as a member of the family can negatively affect natural principle of solidarity present in the family.

A weak point of the approach is in its maximization of utility function with respect to the family income. The family is consisted of several members who have their own preferences and needs. Besides, they influence each other in their decisions. As the model of decision making and redistribution in the family revealed, the approach is suitable only to the case if parents do not cooperate and difference in their income is marginal. If parents cooperate than income levels determine their position within negotiating and therefore maximization of utility with respect to family income cannot be utilized. Another presented approach perceives children as capital goods. Although it provides alternative insights to an issue of the family in economics, the approach is also incapable to capture the family in its essence.

Not only microeconomic concepts but as well macroeconomic approaches consider the family as an important factor. In general, macroeconomics is focused on economy as a unit and studies its performance, structure, behaviour and decision-making. A fundamental issue is to understand causes, impacts and dynamics of economic growth. Although the roots of the growth theory are placed into classical economics, a breakthrough came with the work of a Nobel Prize laureate R. Solow (1956), who made the first attempt to model long-run growth analytically. He specified exogenous growth model where the long-run rate of growth is determined by the rate of technical progress. Population growth is also involved, but neither the growth nor other considered variables explain its origin. Therefore, economies with higher rates of population growth should have lower levels of capital per worker and lower level of income.

The extensions of the Solow model are the Ramsey-Cass-Koopmans model and the Diamond model. While the Ramsey-Cass-Koopmans assumes that economy is consisted of identical firms and identical private households, the Diamond model takes into account relationship between generations. The models go further to the economic structure and attempt to reflect complicated nature of reproduction in comparison with the Solow models, still they remain too general. Further development in growth theory involves the production of new technologies and human capital into consideration. For instance, the Jones model, presented in the thesis, is composed of three sectors, i.e. households, firms and research and development. Although the approach captures formation of technological advancement in mathematical formalism, labour force is

identified with whole population present in given economy. Neither endogenous nor semi-endogenous growth models are not capable to reflect e.g. household structure or aspects of reproduction. In sum, a broad range of economic approaches both micro and macro level exists, but despite effort the family remain to be an externality in the conventional economic framework. In fact it is not so surprising, because the family is also characterised by attributes which can be hardly grasp by mathematical formalism.

As mentioned above, analyses involved in the thesis are narrowed to data of the Czech Republic since 1989, when a new path of history has begun for the country. The Velvet Revolution in Czechoslovakia in 1989 was the turning point that led to the swift demise of the state socialist regime and reintroduction of the free market principle into economy. The change in economy structure is basically a natural experiment which allows studying the basic aspects of relationship between the family as a unit of reproduction and market economy. Therefore, the analysis in a macro perspective deals with an association between fertility and economic patterns and the analysis in a micro perspective focuses on financial situation of Czech families with respect to financial support provided via the social scheme and the tax system. To grasp comprehensiveness of the transformation process, population and economic developments are discussed too.

Between the years 1989 and 2009, the total population increased by 1.2 % to 10.5 million inhabitants in the Czech Republic. Although, these days the total increase as well as the natural increase are positive numbers, in the period from 1994 to 2002 migration inflows did not compensate the population decline. One relevant factor of this development is an improvement in mortality. The life expectancy at birth for men increased from 68.1 years in 1989 to 74.2 years in 2009, while for women from 75.4 years to 80.1 years respectively. The second factor, which contributed to this increasing trend in population size of the Czech Republic, is fertility change. However, from 2000 the period total fertility rate has increased, the growth started from a really low level. The period total fertility rate fell from the value of 1.87 children per woman in 1989 to 1.13 in 1999. The considerable part of this decline is due to a turn in timing of childbearing. During a socialist regime the majority of women had their first child a short time after a marriage, while the contemporary fertility pattern corresponds to increasing mean age at the first birth as well mean age at the first marriage. A new pattern in fertility has been also accompanied by higher diversity in family and household forms. The cohabitation has become a standard and in spite of the fact that, entrance into marriage has been less frequent, the number of divorces has increased. In summary, the population development in the Czech Republic has moved towards the pattern observed in developed countries; improvement in mortality in combination with the fertility below replacement level and regressive age-pyramid.

The economic development in the Czech Republic is inseparably connected to the transformation from a centrally planned to market oriented economy from the very beginning of the 1990's. The transition process was primarily focused on liberalization of prices and foreign trade, macroeconomic stabilization, privatization, and social net. A price mechanism establishment was a key issue, because in general the mechanism is powerful to eliminate ineffective productions, which were broadly presented in the command economy.

On the other hand, the price system as a basic market principle may induce the rise of prices, which could result in case of inefficient macroeconomic stabilization in hyperinflation and consequently in economic crisis. Therefore, the price liberalization in the present-day Czech Republic was followed by borders opening for foreign trade. Liberalization of external trade should increase competitiveness in the market and reduce possibility of additional growth of widespread monopoles. In spite of the fact that, the price liberalization in 1991 decreased the living standard of inhabitants, the inflation growth was kept under control. Inflation fluctuated around 10 % till the year 1998, later on decreased below 5 %.

Further step to decentralised economy was privatization, which should transform the state ownership into private one. The economy suffered by a shortage of capital, therefore several strategies had to be utilized. In total 15 800 state companies with a value of 780 milliards Czech crowns underwent privatization. The standard privatization technique as a public contract or a sale to chosen subject was employed for 14 000 firms, for the rest the voucher privatization was applied. With respect to magnitude the voucher privatization was not so relevant, but the important fact was that citizens older 18 years could participate. On the one hand, direct involvement of the public into privatization supported the belief about better future prospect. On the other hand, the subsequent development characterised with tunnelling, corruption and misappropriation increased economic uncertainty and decreased willingness for the reforms. Apart from that, it is necessary to notice that the social net was functioning over all period of transformation what did not hold for all transforming post-communist economies. The pensions were paid and health services were maintained without private contributions for a long-time. In addition, education has been available at any level without fees. Although poverty and income inequality increased among citizens, the impact of transformation was not as severe as in other post-communist countries.

The Czech transformation has been judged as relatively successful process. In spite of the initial decline in economic performance and economic crisis 1996-1997, the economic growth was positive to the year 2009 and unemployment was kept to a certain extent al low levels. Till the year 1997 the unemployment rate maintained below 5 %, afterwards increased to 9 %. Nevertheless, the Czech transformation has also its weaknesses, i.e. the transformation of a bank sector and the reform of a legal system. Due to several reasons, as a default on debts from previous regime, lack of experience resulting in support of inferior projects or misappropriation, the private banks had financial losses running in total to hundred milliards of Czech crowns. In comparison with other businesses, the bank sector was privatized tardily and costly. Another shortcoming has been seen in the legal system, because in general the law enforceability had been relatively low. It is reasonable to assume that, the slow transformation of justice in combination with an unstable political environment has contributed to higher uncertainty and distrust of a new system.

The fertility decline in post-communist countries has been explained predominately by three concepts, i.e. the Second Demographic Transition, the Postponement Transition, and the Hypothesis of an economic crisis. Although channels through which fertility has been affected by economy are not clearly specified in all listed concepts, the approaches consider them. Therefore, the analysis in a macro perspective tested by utilization of the multi-variable

vector autoregressive models (VAR) whether the economic changes had a significant impact on fertility decision of the Czech population in short run. The VAR technique assumes endogenous variables and studies their interactions. The models specification was chosen based on Wang et al. (1994), Petrucci (2003), and Maksymenko (2009). Thus, interactions of changes in fertility, money holdings, unemployment, and output were under investigation. Considering critique of the approach in literature, three models with distinct approximation of fertility were set up. The first model captures changes in fertility by the crude birth rate, the second model by the total fertility rate and the third model by the adjusted total fertility rate according to Bongaarts-Feeney approach. Because data from the very beginning of the transformation process have not been available, only quarterly data in the period 1. January 1996–31. December 2008 were tested. All models fulfilled specification requirements of time series, i.e. stationarity, no serial correlation, normality of an error process, and heteroscedasticity.

The results of the impulse response functions and the forecasts of the variance decomposition revealed that macroeconomic variables were interdependent, while no significant response of fertility variable was present. Therefore, the Hypothesis of an economic crisis for the explanation of fertility development in the Czech Republic from the year 1996 is not justified. But it is necessary to notice that it does not imply that the economic variables have not shaped the fertility pattern. The obtained results indicate that the development of the Czech fertility has been forced by different mechanisms than just by basic economic forces. Considering different approximation of fertility the results pointed out legitimacy of distinct measures utilization, because employed measures led to modified model specification and results. Models with the crude birth rate and with the adjusted total fertility rate were relatively similar to each other. Besides that, according to general features of population and economic development and assumptions of listed approaches, the concept of the Postponement Transition appears to be more appropriate for the fertility development in the Czech Republic over period of transformation rather than the Second Demographic Transition. But, due to heterogeneity in population it is reasonable to assume that sub-populations which would fulfil assumptions of other two approaches have been in Czech population too. The last remark regarding the analysis in a macro perspective is devoted to shortcomings. Undoubtedly, it would be more appropriate to study whole monthly time series since the beginning of the transformation. Furthermore, the models could reveal additional information if data about economic output would be replaced by data about expectations of economic performance. Unfortunately, neither monthly data nor time series of expectations since 1989 have been available for the Czech Republic.

The analysis in a micro perspective was focused on financial support to families with dependent children provided by the sate via the social scheme and the tax system in the Czech Republic over the period of transformation. The social security system has been established on three fundamental law acts, i.e. on State Social Support, Sickness Insurance, and Assistance in Material Need. The system has been focused, except for some benefits, on the families and individuals in need since the 90's. Within a time the structure of the system has been relatively unchanged, but the aspect of destitution was emphasized. The amounts of provided benefits as well as prerequisites for their entitlement were several times changed.

Considering maternity leave and parental allowance the system became more flexible, because possibility of choice was introduced. Nevertheless, fall in income remained well-marked. Therefore, general support to the family has been more noticeable in case of indirect financial support. For instance, inheritance and gift taxes prefer family relationships over unbinding commitments.

The most important taxes with respect to financial situation of the family are income tax. The analysis dealt with income tax from employment and private family business. Especially, income tax from employment underwent an evolution recent years. Although tax rates and brackets were changed several times since the beginning of the transformation, the applied tax technique maintained unaffected till the year 2004. But in 2005, the technique of non-taxable amount from tax base per a child was replaced by tax advantages per a child in the form of tax relief and tax bonus. In addition, the common taxation of married couple was introduced. One year later, the non-taxable amount per a person was substituted by tax relief. Afterwards in 2008, concept of a super-gross wage was established and the joined taxation of married couple was abolished. On the one hand, the induced changes imply recognition of demand for system adjustment what could be perceived as a positive signal. On the other hand, with increasing frequency of the changes the system became confusedness for the general public. In addition, people do not know what to expect in future and what is the state approach to the family. Therefore, considering system instability both direct and indirect support, it is more probable that people have perceived state's financial support to families as a nice pocket money, but not as an income, which would predominately influence their fertility decision.

Remarkable result was obtained with respect to the common taxation of married couple replacement. The figures revealed that by change in tax technique the families with dependent children were not worse off in 2008 in comparison with the year 2007, quite the contrary. If the tax burden of the year 2007 based on the joint taxation of married couple was compared to the year 2008 but with lower tax rate, supper gross wage and new tax reliefs, than families were in 2008 better off. Therefore, it is assumed that the replacement was constructed to minimize impact of the change, decrease administration burden and potential losses caused by taking state money out of the Czech Republic. The further calculations involved in simulations supported the fact that the common taxation of married couple was the institute from which all families with dependent children, where difference between spouses's incomes was profound, benefited. In addition, this tax technique made the system more flexible, because additional choice was introduced, and it directly signalled to the general public that relationships based on binding commitments of marriage were preferred. Although financial situation of families has been slightly improved by a new tax technique in following years, families became more dependent on political will which has determined amounts of tax reliefs and benefits.

The simulations based on fictitious families illustrated how the family income was affected by certain life careers. Although the simulations due to specification of fictitious families according to knowledge provided by statistical data captured just a part of reality, they revealed how substantial fall in family income can be caused by unexpected events as sickness and unemployment. Significant fall was also documented with respect to additional child

in the family. Therefore, an issue how to mitigate this downswing in the given framework was discussed. The results revealed that tax technique was not capable to reduce the impact and the only feasible way of fall mitigation was via increased parental allowance for the second child from 7 600 to 8 000 Czech Crowns. Afterwards, income per person in the family with one and two dependent children was relatively similar. Undoubtedly, both approaches direct and indirect financial support provide additional possibilities, but to be at least partly realistic they should be considered with respect to capability of the state budget. From this point of view, a broader framework of simulations would be convenient choice for further research. Apart from that, it is necessary to notice that tax technique of tax deductible items and tax reliefs can be utilized with respect to harmonization of work and private lives. For instance, in case that, entrepreneurs could apply the technique with respect to support of non-profit organizations supplying services for children during holidays, to contribution for kindergartens or for baby-sitter, to contribution to transportation costs, etc., it is reasonable to assume that a part of pressure and labour market inflexibility could be removed.

In sum, the relationship between the family, as a basic social unit where reproduction is realized, and economy has been reciprocal. Nevertheless, from a perspective of population economics and data for the Czech Republic the family has been an externality. The full contribution of the family to whole society has not been reflected. The fall in family income with a new born child is obvious and possibility of smoother combination of private and work lives seems to be insufficient. The major discrepancy between the family and economy is in time horizon. While the market economy is predominantly focused on short-term, reproduction of human and social capitals is realized in long-term. With respect to this it would be interesting to study time consumption of Czech population.

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The Act No. 187/2006 Coll., on Sickness Insurance

The Act No. 111/2006 Coll., on Assistance in Material Need

The Act No. 110/2006 Coll., on Living and Subsistence Minimum

The Act No. 357/1992 Coll., on Inheritance Tax, Gift Tax and Real Estate Transfer, as amended

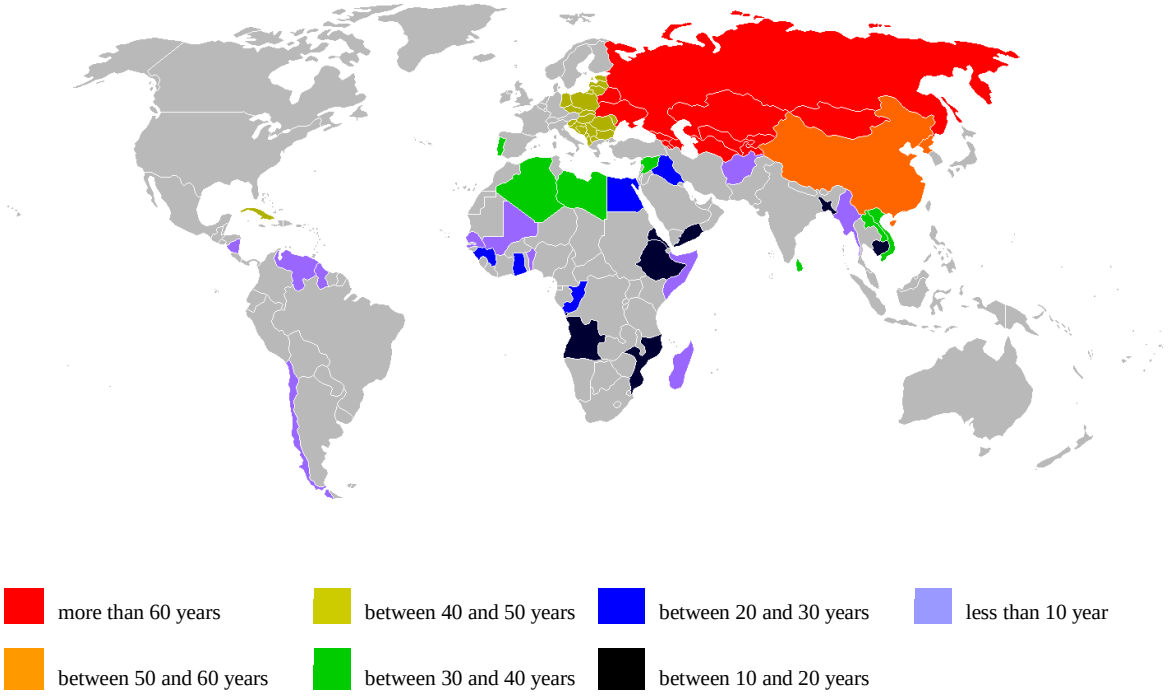
The Act No. 586/1992 Coll., the Income Tax Act, as amended

The Act No. 589/1992 Coll., on Social Security Premiums and Contribution to State Employment policy, as amended

The Act No. 262/2006 Coll., the Labour Code

APPENDIX

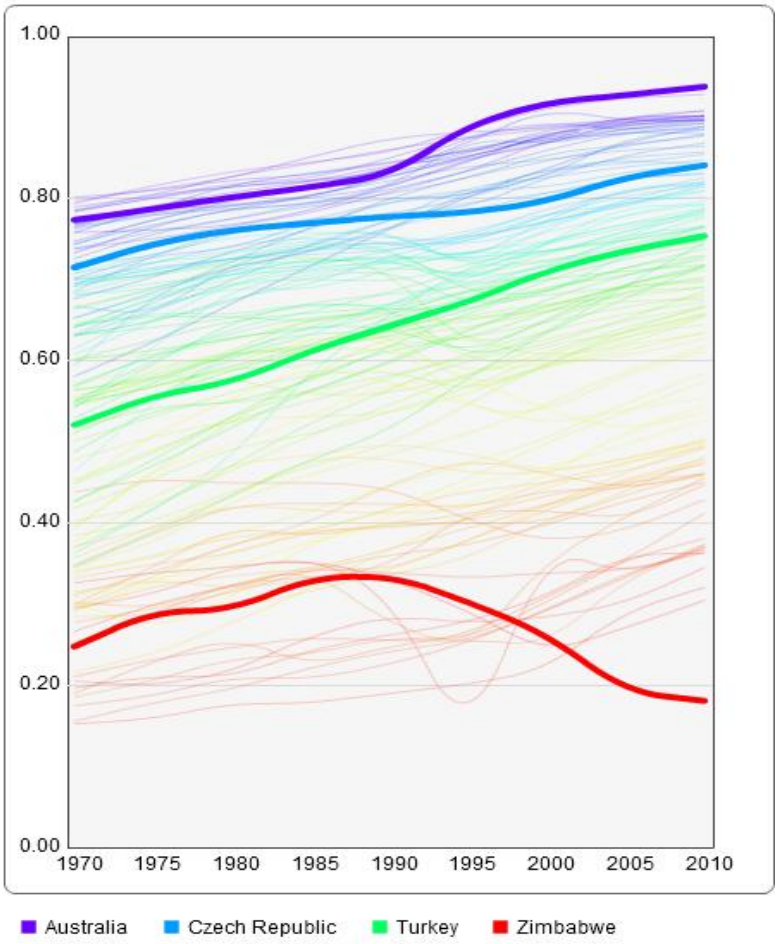
Chart A.1: Socialist states by duration



Notes: A map of countries (using present-day borders) that have constitutionally declared themselves to be "socialist", under any definition of the term, at some point in their history.

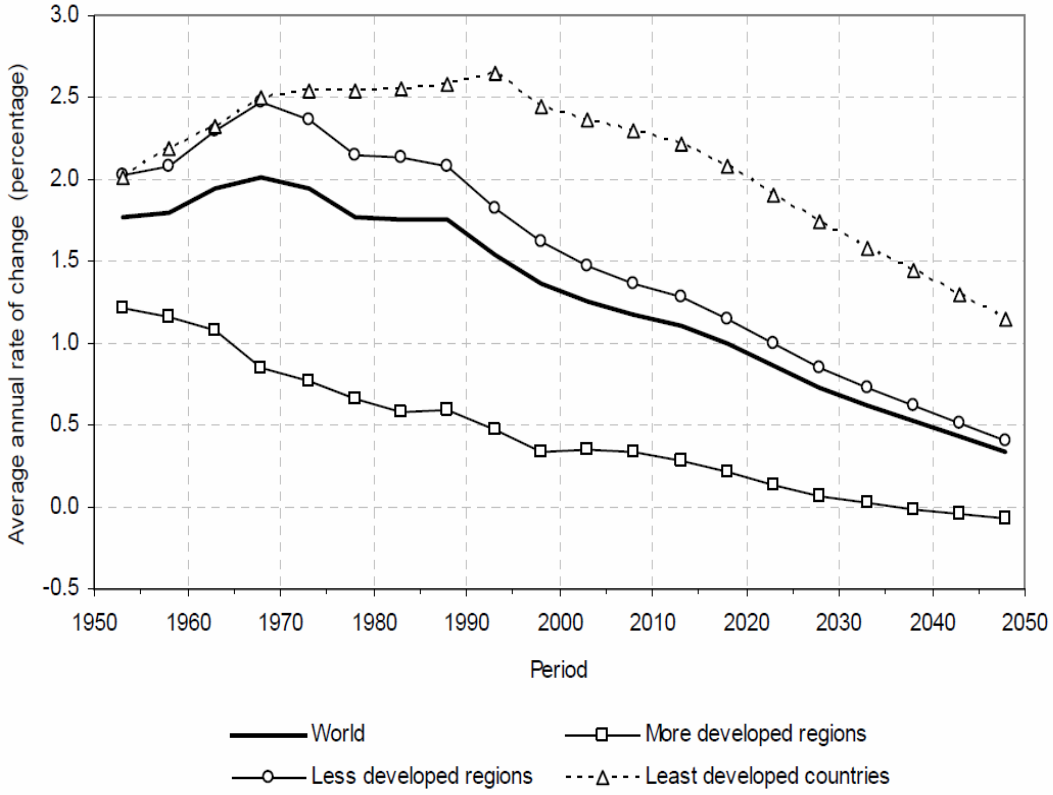
Source: Wikipedia, 2009

Chart A.2: Worldwide Trends in the Human Development Index 1970-2010



Source: Human Development Reports, the United nations, <http://hdr.undp.org/en/>

Chart A.3: Average annual rate of change for the world and the major development groups, 1950-2050, medium variant



Notes: More developed regions: They comprise all regions of Europe plus Northern America, Australia/New Zealand and Japan (see definition of regions).

Less developed regions: They comprise all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia (see definition of regions).

Least developed countries: The group of least developed countries, as defined by the United Nations General Assembly in its resolutions (59/209, 59/210 and 60/33) in 2007, comprises 49 countries, of which 33 are in Africa, 10 in Asia, 1 in Latin America and the Caribbean, and 5 in Oceania. The group includes 49 countries - Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, São Tomé and Príncipe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen and Zambia. These countries are also included in the less developed regions.

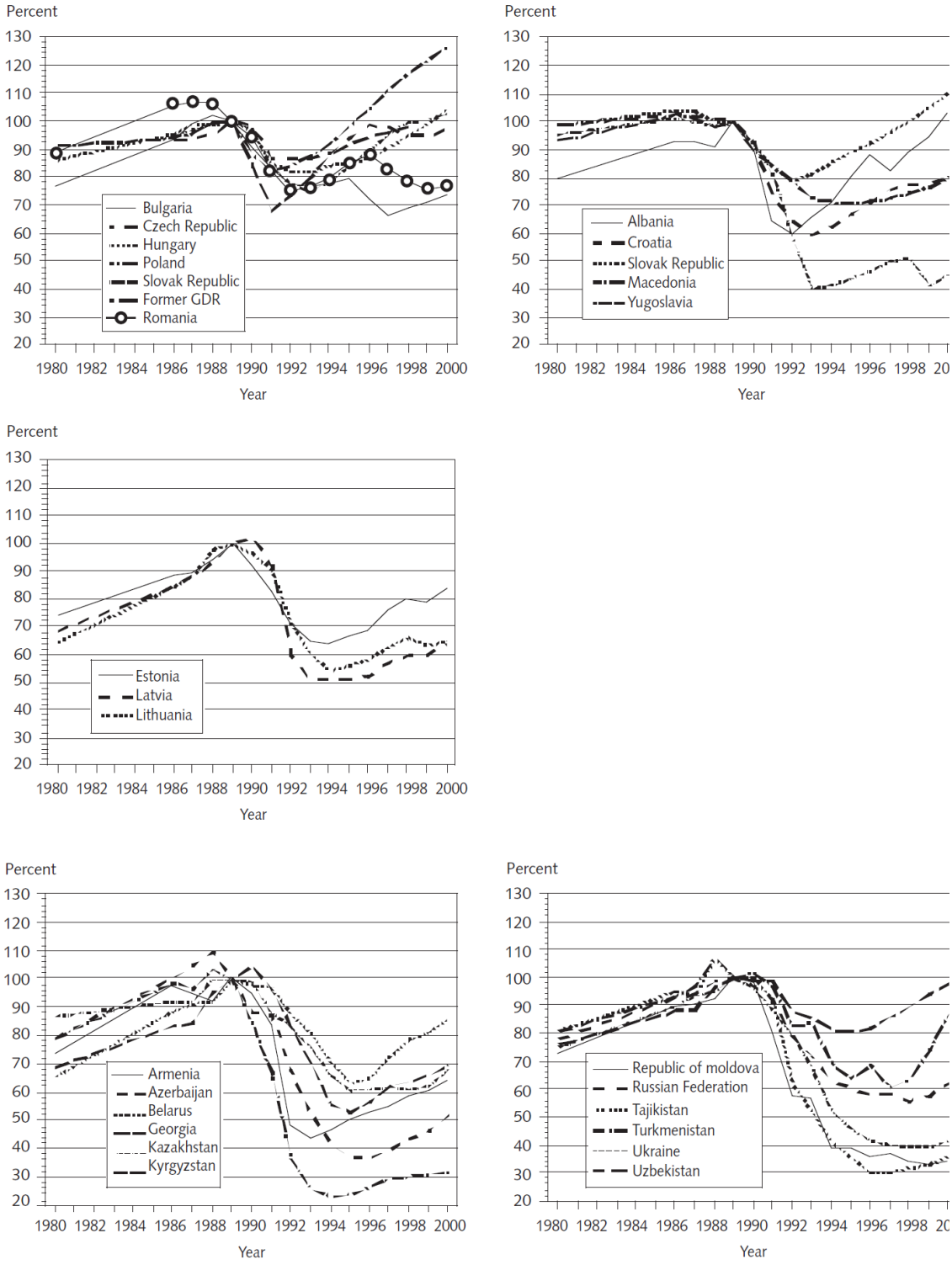
Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2009). World Population Prospects: The 2008 Revision. New York: United Nations

Table A.1: Range of turnover tax rates within industrial branches

Branch code	*Branch*	*Lowest percentage rate*	*Highest percentage rate*
0	Agriculture, forestry	–240	66
I	Fuels, coal, oil	–189	76
II	Heat, electricity	–181	0
III	Iron and steel	–33	25
IV	Non-ferrous metals	–27	33
V	Chemicals, rubber, asbestos	–216	71
VI	Engineering and metalworking	–291	83
VII	Building materials	–171	20
VIII	Wood-working	–75	46
IX	Paper and pulp	–80	52
X	Glass, china, ceramics	–69	69
XI	Textiles	–137	70
XII	Clothing	–44	79
XIII	Leather, footwear	–222	52
XIV	Printing, culture	–111	76
XV	Foodstuffs	–224	88
XVI	Other industrial products	–100	62
XVII	Building and construction	0	0
	All branches	–291	88

Source: Heady et al., 1994, p. 68

Chart A.4: Real Gross Domestic Product in transition economies, 1988-2000, indices 1989 = 100 %



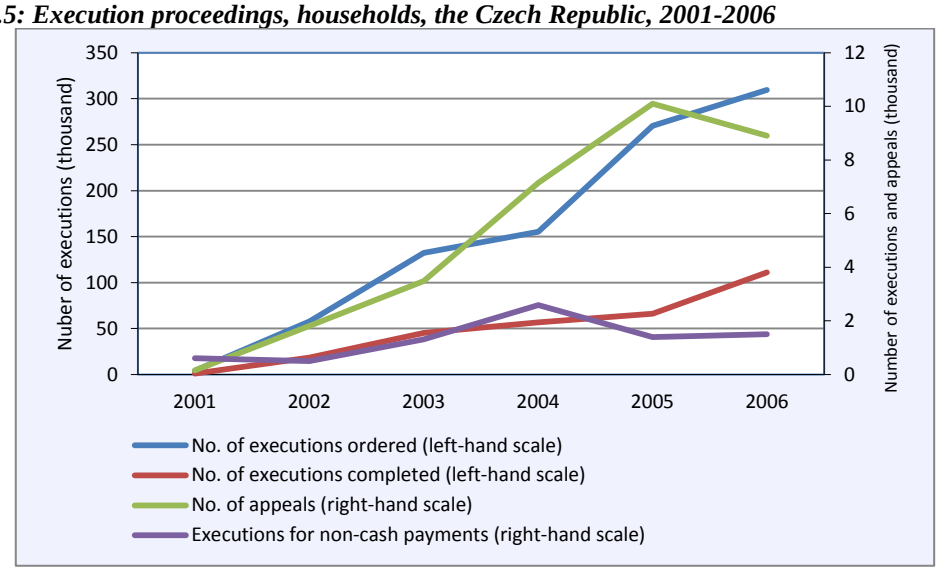
Source: Philipov, D. and J. Dorbritz, 2003

Table A.2: Income inequality during the Transition, by Region, Selected Years 1987-99

Region and Country	Gini coefficient for income per capita		
	1987-90[a]	**1993-94[a]**	**1996-99[b]**
Central Europe			
Czech Republic	0.19	0.23	0.25
Hungary	0.21	0.23	0.25
Slovenia	0.22	0.29	0.25
Poland	0.28	0.28	0.33
South Eastern Europe			
Albania	-	-	0.27[c]
Bulgaria	0.23	0.38	0.41[d]
Croatia	0.36	-	0.35
Macedonia, FYR	-	-	0.37
Romania	0.23	0.29	0.30[c]
Baltic States			
Lithuania	0.23	0.33	0.34
Latvia	0.24	0.31[e]	0.32
Estonia	0.24	0.35	0.37
Slavic countries			
Russian Federation	0.26	0.48	0.47
Ukraine	0.24	0.47[e]	0.33[c]
Moldova	0.27	-	0.42
Belarus	0.23	0.28 [c]	0.28[c]
Caucasus and Central Asia			
Armenia	0.27	-	0.59
Georgia	0.29	-	0.43
Kyrgyz Republic	0.31	0.55	0.47
Kazakhstan	0.30	0.33	0.35[c]
Tajikistan	0.28	-	0.47
Turkmenistan	0.28	0.36	0.45[c]

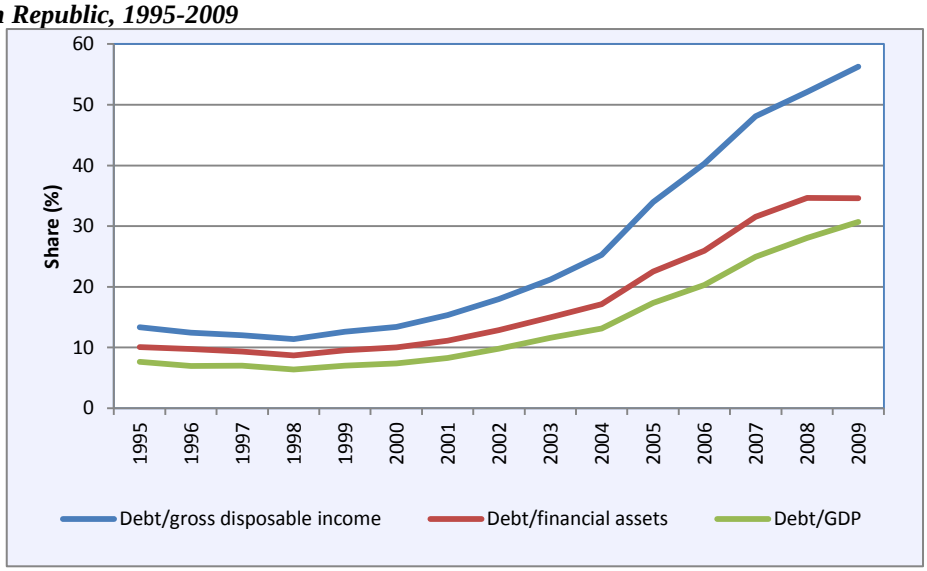
Notes: - Not available.
Income refers to disposable income- after-tax earned income. Identical calculations were performed for incomes per equivalent adult (theta=0.75) and using the OECD equivalence scale (theta=0.5)
a. The source was the Family Budget Surveys in Milancovic (1998) these expectations: the source for the Slavic republics in 1990 was Alexeev and Gaddy (1993); the source for the Czech Republic in 1994 was Flemming and Micklewringht (1999); and the source for Poland for 1990 to 1994 was Keane and Prasad (2000).
b. The source was the authors' own computations from the latest representative national household surveys. Incomes included in-kind consumption.
c. A consumtion Gini was used because of a lack of data on incomes.
d. For 1995 because of problems with 1997 data.
e. For 1995.
Source: The World Bank, 2000

Chart A.5: Execution proceedings, households, the Czech Republic, 2001-2006



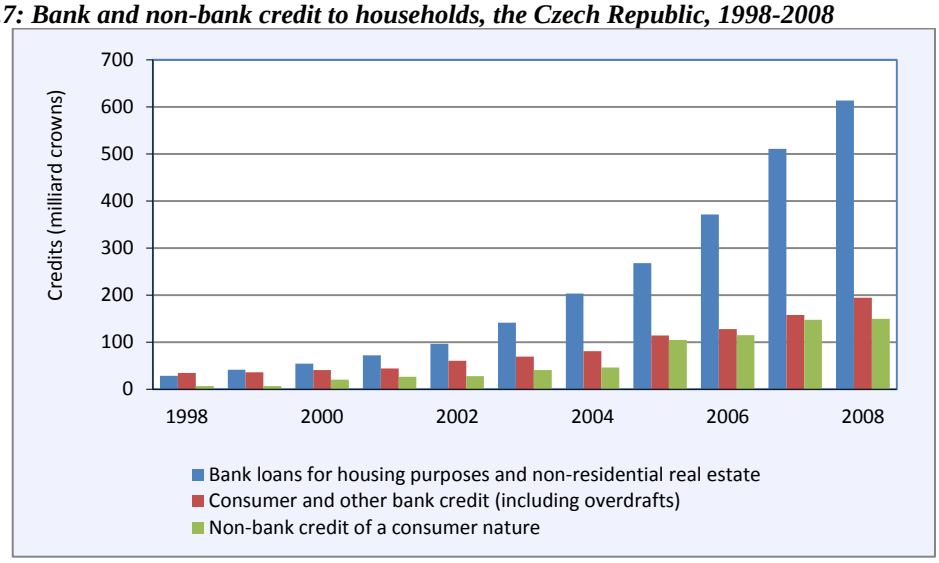
Source: The Czech National Bank, 2006

Chart A.6: Ratios of household debt to gross disposable income, financial assets and GDP, the Czech Republic, 1995-2009



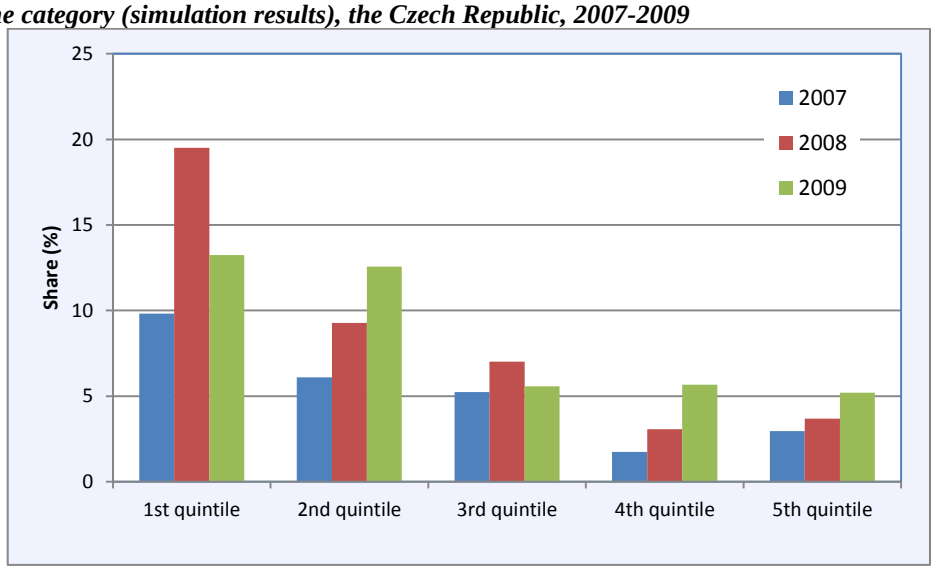
Source: The Czech National Bank, 2010

Chart A.7: Bank and non-bank credit to households, the Czech Republic, 1998-2008



Source: The Czech National Bank, 2009

Chart A.8: Shares of insolvent households in total number of indebted households broken down by income category (simulation results), the Czech Republic, 2007-2009



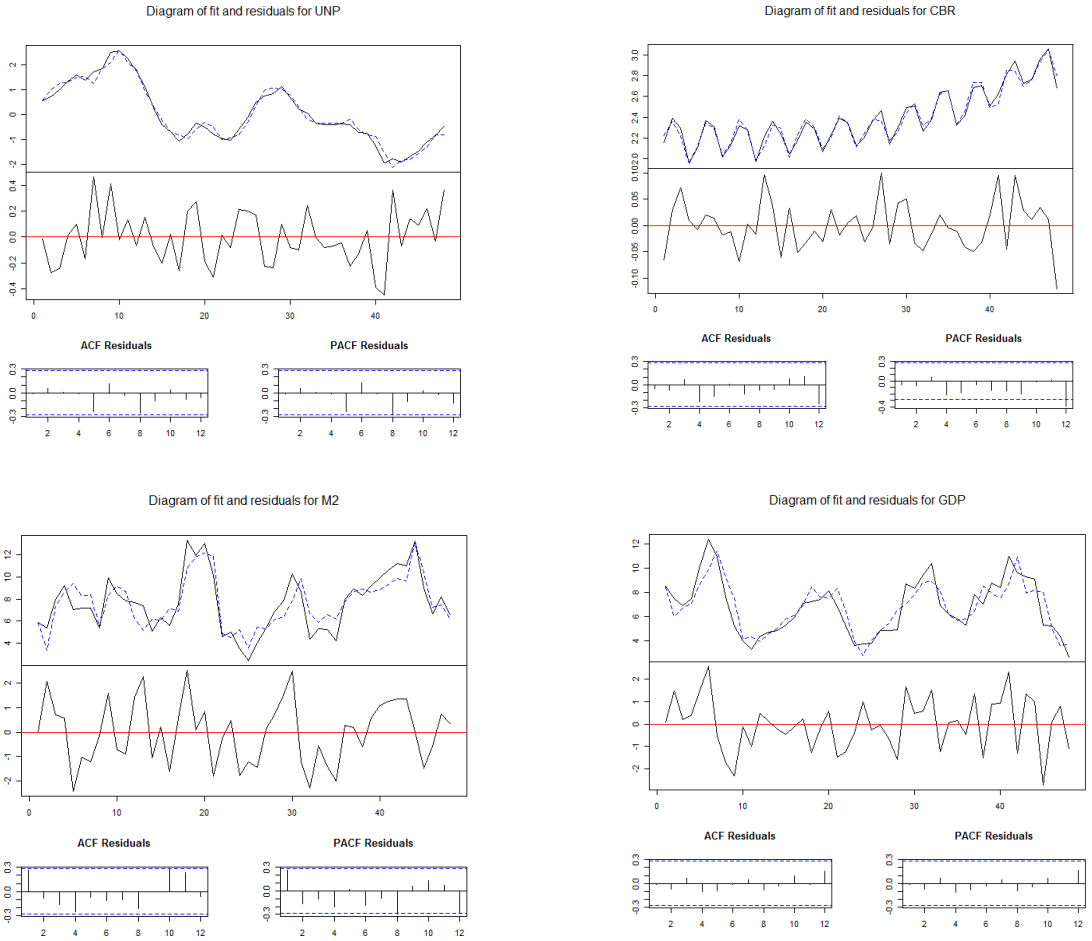
Source: The Czech National Bank, 2011

Table A.3: Relative frequency of mortgage (left) and inability to meet obligations (right) among households, the Czech Republic, 2009

Categories	Household has mortgage (%)	Household has difficulties meeting obligations (%)	Household has difficulties meeting obligations – change from 2008 (p.p.)
Income category			
1st quintile	2.6	7.2	1.3
2nd quintile	5.9	6.2	0.4
3rd quintile	10.7	6.1	2.9
4th quintile	18.3	3.9	0.1
5th quintile	21.1	3.0	0.9
Age of head of household			
19 or below	x	6.6	1.0
20–39	25.5	7.6	1.2
40–59	13.4	6.3	1.7
60 or above	2.1	1.8	0.3
Education attained by household			
Primary	3.2	10.5	1.1
Secondary	12.2	4.7	0.8
Tertiary	20.1	3.6	2.5
Housing type			
Owner-occupier	16.3	3.2	0.5
Open-market rent	x	14.4	2.4
Regulated rent	x	10.5	3.4
Marital status of head of household			
Single	15.1	7.6	0.1
Married	15.2	3.9	1.1
Divorced	9.4	9.3	1.6
Widowed	2.5	2.3	1.0
Overall economic activity of household			
Employed full time	17.7	4.3	1.0
Unemployed	3.1	10.5	2.0
Partially employed	17.8	7.6	1.6
Retired	0.9	0.9	0.5
Total	11.7	5.3	1.1

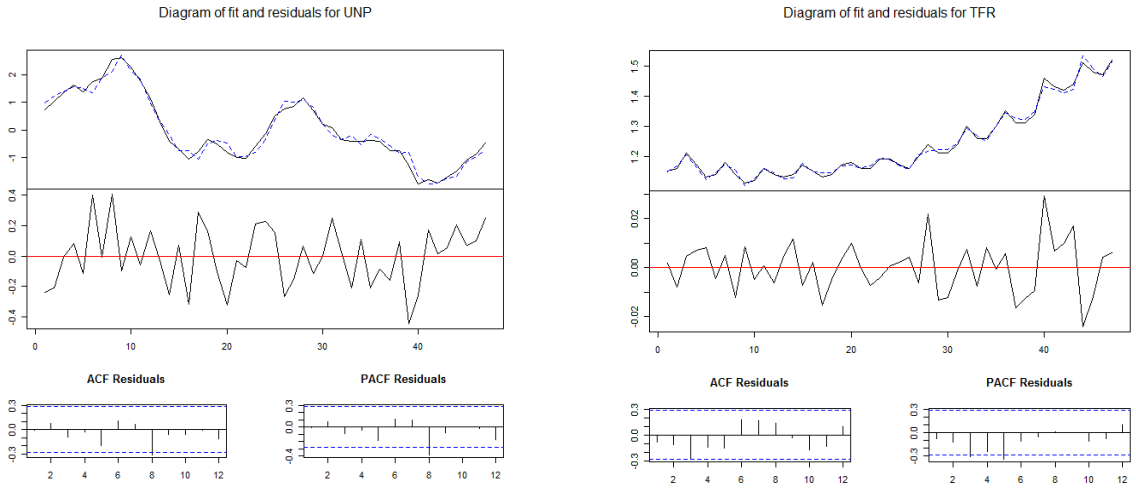
Source: The Czech National Bank, 2011

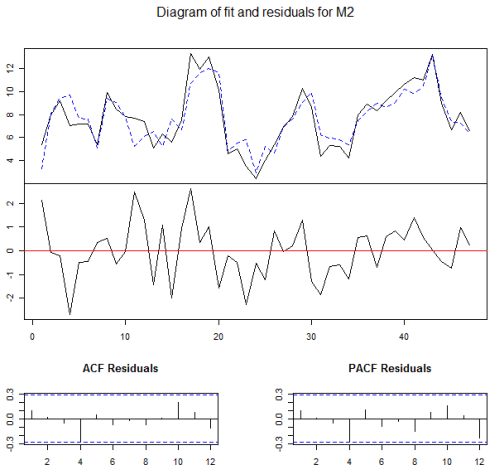
Chart A.9: The diagram of fits and residuals for the model 1

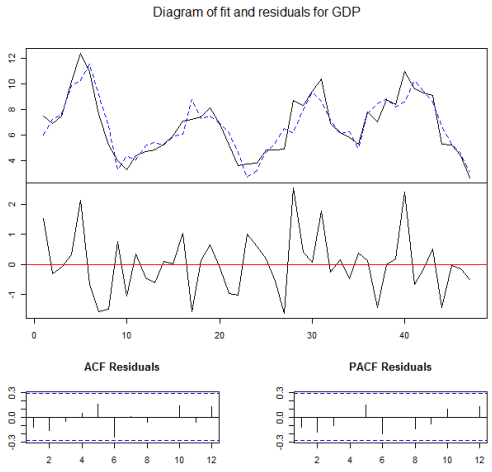


Source: Author's calculations

Chart A.10: The diagram of fits and residuals for the model 2

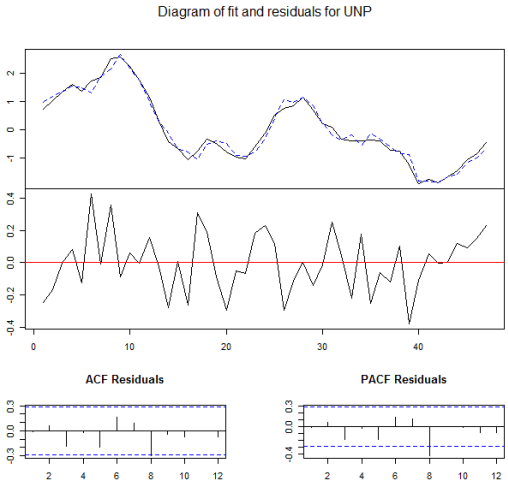


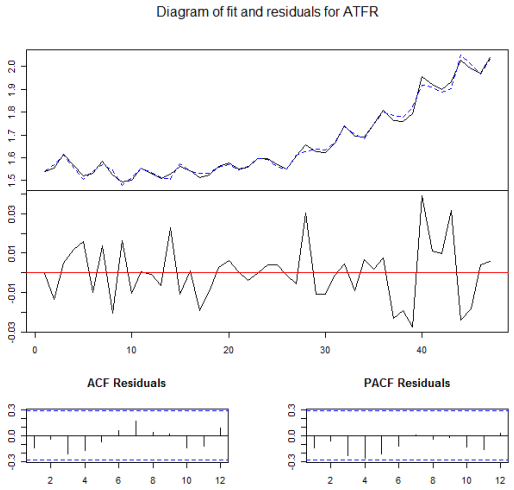


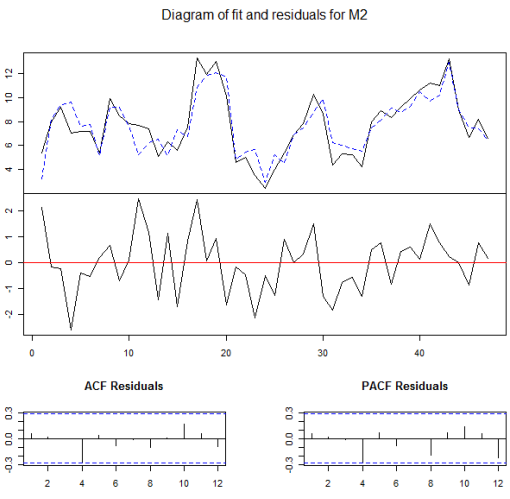


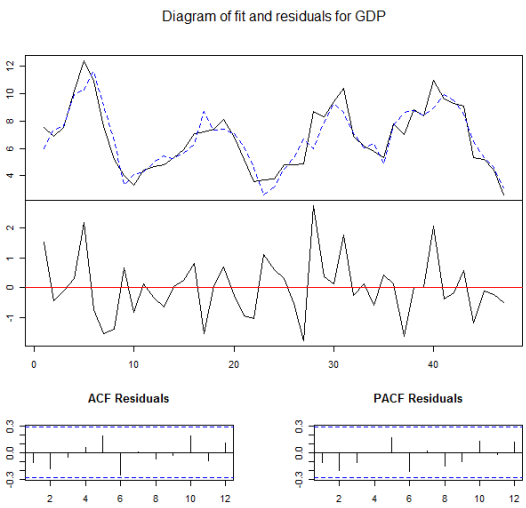
Source: Author's calculations

Chart A.11: The diagram of fits and residuals for the model 3









Source: Author's calculations

Table A.4: Forecast Error Variance Decompositions

Model	Variable	Quarter	Unemployment shock	Fertility shock	Monetary shock	Technology shock
(1) with CBR	UNP	1	100	0	0	0
		10	58.4	0.2	38.9	2.5
	CBR	1	6.5	93.5	0	0
		10	15.6	69.3	1.9	13.2
	M2	1	2.1	2.1	95.8	0
		10	32.8	3.0	50.4	13.8
	GDP	1	8.7	5.4	0.1	85.9
		10	29.0	4.4	7.0	59.5
(2) with TFR	UNP	1	100	0	0	0
		10	57.1	1.8	38.8	2.4
	TFR	1	4.9	95.1	0	0
		10	37.7	46.7	10.1	5.5
	M2	1	2.9	0.2	97.0	0
		10	34.6	2.9	52.8	9.7
	GDP	1	6.1	25.0	0.7	68.2
		10	43.8	10.9	8.1	37.1
(3) with ATFR	UNP	1	100	0	0	0
		10	56.8	7.7	32.8	2.7
	ATFR	1	2.1	97.9	0	0
		10	35.8	44.5	6.1	13.6
	M2	1	2.5	0.06	97.4	0
		10	31.6	2.7	52.4	13.3
	GDP	1	3.4	26.6	0.9	69.2
		10	40.8	7.8	9.7	41.7

Source: Author's calculations

Table A.5: Numbers of crèches, the Czech Republic, selected years

1980	1989	1990	1996	2000	2005	2007
2 151	1841	1476	172	65	54	47

Source: Institute of Health information and Statistics of the Czech Republic

Table A.6: Number of nursery schools, the Czech Republic, selected years

1989/90	1992/93	1996/97	2000/01	2004/05	2005/06	2008/09
7 328	6 828	6 343	5 776	4 776	4 710	4 694

Source: The Czech Statistical Office

Table A.7: Parental allowance, the Czech Republic, selected years

Validity from	Max. age of child for valid claim to parental allowance	Amount of parental allowance, in Crowns	Average gross monthly wage, in Crowns	Ratio Parental allowance/average gross monthly wage (%)	Maximal amount of earnings besides the parental leave, in Crowns
1. 10. 1990	3 years	900	3 286	27.4	800
1991	3 years	900	3 792	23.7	800
1. 4. 1992	3 years	1 200	4 644	25.8	1 000
1. 5. 1993	3 years	1 360	5 904	23.0	1 000
1. 2. 1994	3 years	1 500	7 004	21.4	1 800
1. 10. 1994	3 years	1 740	7 004	24.8	1 800
1. 10. 1995	4 years	1 848	8 307	22.2	1 680
1. 1. 1996	4 years	1 980	9 825	20.2	1 800
1. 10. 1996	4 years	2 112	9 825	21.5	1 920
1. 7. 1997	4 years	2 222	10 802	20.6	2 020
1. 4. 1998	4 years	2 343	11 801	19.9	2 130
1999	4 years	2 343	12 797	18.3	2 130
1. 4. 2000	4 years	2 409	13 614	17.7	2 190
1. 10. 2001*	4 years	2 552	14 793	17.3	3 480
2002	4 years	2 552	15 866	16.1	3 480
2003	4 years	2 552	16 917	15.1	3 480
1. 5. 2004**	4 years	3 573	18 041	19.8	***
1. 5. 2005	4 years	3 635	19 024	19.1	***
1. 1. 2006[#]	4 years	3 693	20 219	18.3	***
1. 1. 2007	4 years	7 600	21 694	35.0	***
1. 1. 2008[##]	3 years	7 600	22 691	33.5	***
1. 1. 2009	3 years	7 600	23 488	32.4	***

Notes:

*The number of days which child can spend in a nursery school was increased from three to five days and the limit for parent's earnings, who receive support, increased into the 1.5 multiple of the subsistence income.
** Parental allowance increased into 1.54 multiple of the subsistence income.
*** Since 1. 1. 2004 the limit for parent's earnings, who receive support, was abolished.
[#] Since 1. 2. 2006 the children up the age of three may stay in a nursery school in total 4 hours a day without the loss of parental allowance.
[##]The basic scheme. Two modifications are available:
1) 11 400 Czech crowns, which corresponds to 48.5 % of average gross monthly wage, till the child age of 24 months;
2) 7 600 Czech crowns till the child age of 21 months and thereafter 3 400 Czech crowns till the child age of 48 months.
Source: Kocourková, 2006; author's actualization

Table A.8: Living minimum per month, the Czech Republic, 1991-2006, in Czech Crown

	1991	1993	1994	1995	1996	1996	1997	1998	2000	2001	2005	2006
	(29.10.)	(1.3.)	(1.2.)	(1.1.)	(1.1.)	(1.10.)	(1.7.)	(1.4.)	(1.4.)	(1.10.)	(1.1.)	(1.1.)
CHILD												
up to 6 years of age	900	1020	1120	1230	1320	1410	1480	1560	1600	1690	1720	1750
6-10 years	1000	1130	1240	1360	1460	1560	1640	1730	1780	1890	1920	1950
10-15 years	1200	1360	1500	1620	1730	1850	1940	2050	2110	2230	2270	2310
15-26 years	1300	1470	1620	1780	1900	2030	2130	2250	2310	2450	2490	2530
ADULTS	1200	1360	1500	1680	1800	1920	2020	2130	2190	2320	2360	2400

Source: The Research Institute for Labour and Social Affairs

Table A.9: Child benefit per month and its change, the Czech Republic, 1990-2011, in Czech Crown*

Year	Benefit	Change in %
1990-1992	200-1720	x
1993-1995	340-490	x
1996	0-650	x
1997	0-682	0.0-4.9
1998	0-608	0.0-(-10.9)
1999	0-720	0.0-18.4
2000	0-740	0.0-2.8
2001-2004	0-784	0.0-5.9
2005	0-797	0.0-1.7
2006-2007	0-810	0.0-1.6
2008	0-700	0.0-(-13.6)
2009	0-750	0.0-7.1
2010-2011 (1.1.)	0-700	0.0-(-6.7)

Notes:

*Till 1992 according to number of children (1-4 children, for each additional child 350 Czech crowns); since 1993 till 1995 for each child according to his/her age; since 1996 according to age of a child and according to income of the family (expressed maxim. in a form of coefficients of the subsistence level: as a 3 times equivalent of the subsistence level (till 2006), 4 times (in 2007), 2.4 times (in 2008), 2.5 times (in 2009), 2.4 times since 2010.

Source: The Research Institute for Labour and Social Affairs

Table A.10: Tax rates and tax brackets, the Czech Republic, 1993-2005

	Tax rate					
	15 %	**20 %**	**25 %**	**32 %**	**40 %**	**47 - 43 %** *
1993-1995						
Tax brackets from - to Thousand CZK	**0-60**	**60-120**	**120-180**	**180-540**	**540-1 080**	**1 080 and more**
Maximum tax *	9 000	21 000	36 000	151 200	367 200	more than 367200
1996						
Tax brackets from – to Thousand CZK	**0-84**	**84-144**	**144-204**	**204-564**	**564 and more**	
Maximum tax	12 600	24 600	39 600	154 800	more than 154 800	
1997						
Tax brackets from - to Thousand CZK	**0-84**	**84-168**	**168-252**	**252-756**	**756 and more**	
Maximum tax	12 600	29 400	50 400	211 680	more than 211 680	
1998						
Tax brackets from - to Thousand CZK	**0-91.4**	**91.4-183**	**183-274.2**	**274.2-822.6**	**822.6 and more**	
Maximum tax	13 716	32 028	54 828	230 316	more than 230 316	
1999						
Tax brackets from - to Thousand CZK	**0-102**	**102-204**	**204-312**	**312-1104**	**1 104 and more**	
Maximum tax	15 300	35 700	62 700	316 140	more than 316 140	
2000						
Tax brackets from – to Thousand CZK	**0-102**	**102-204**	**204-312**	**312 and more**		
Maximum tax	15 300	35 700	62 700	more than 62 700		
2001-2005						
Tax brackets from – to Thousand CZK	**0-109.2**	**109.2-218.4**	**218.4-331.2**	**331.2 and more**		
Maximum tax	16 380	38 220	66 420	more than 66 420		

Notes: * 1993 = 47 %; 1994 = 44 %; 1995 = 43 %

Source: The Research Institute for Labour and Social Affairs

Table A.11: Non-taxable amounts of the tax base, the Czech Republic, 1993-2011, in Czech crown[#]

Year	A	B	C	D	E	F	G
1993	20400	9000	12000 (21600)	6000	12000	36000	
1994	21600	10800	12000 (21600)	6000	12000	36000	6000
1995	24000	12000	12000 (24000)	6000	12000	36000	6000
1996	26400	13200	12000 (26400)	6000	12000	36000	6000
1997	28800	14400	12000 (28800)	6000	12000	42000	9600
1998	32040	18000	18240 (32040)	6000	12000	42000	9600
1999-2000	34920	21600	19884 (34920)	6540	13080	45780	10464
2001-2003	38040	23520	21720 (38040)	7140	14280	50040	11400
2004	38040	25560	21720 (38040)	7140	14280	50040	11400
2005	38040	0	21720 (38040)	7140	14280	50040	11400
2006-2007[*]	7200	6000	4200 (38040)	1500	3000	9600	2400
2008-2009	24840	10680	24840 (68000)	2520	5040	16140	4020
2010	24840	11604	24840 (68000)	2520	5040	16140	4020
2011 (1.1.)	23640	11604	24840 (68000)	2520	5040	16140	4020

Notes:

[#] tax base is income after costs deduction

[*] from 1. January 2006 non-deductible item replaced by tax relief (in case of B - dependent child in household in amount of 6 000 Czech crowns since 1. January 2005)

A − Tax payer
B – Dependent child
C – Wife in household with own income lower than (...Czech crowns)
D – Tax payer with partial disability
E − Tax payer with full disability
F − Tax payer with full disability, disabled person with assistant
G – Taxpayer up to the age of 26 year, student

Source: The Research Institute for Labour and Social Affairs

Table A.12: Application of the joint tax basis of married couple in the second fictitious family, 2010, in Czech crowns

		Tax liabilities of husband		Tax liabilities with respect to joined tax basis of married couple		
		1 child	**2 children**	**1 child**	**2 children**	**2 children**
Gross wage	12 x 33 082	396 984	396 984	396 984		396 984
Health insurance employer 9 %		35 729	35 729	35 729		35 729
Social insurance employer 25 %		99 246	99 246	99 246		99 246
Super-gross wage		531 959	531 959	531 959		531 959
Rounded down to 100 crowns		531 900	531 900	531 900		531 900
				Husband	**Wife**	**Husband**
Tax base for a each spouse				198 492	198 492	198 492
Health insurance employer 9 %				35 729		35 729
Social insurance employer 25 %				99 246		99 246
Rounded down to 100 crowns				333 400	198 400	333 400
Advance on tax 15 %		79 785	79 785	50 010	29 760	50 010
Tax relief for a taxpayer		24 840	24 840	24 840	24 840	24 840
Tax relief for a wife		24 840	24 840	24 840		24 840
Total tax reliefs		49 680	49 680	49 680	24 840	49 680
Tax utilizing reliefs		30 105	30 105	330	4 920	330
Tax relief for children	1 x 11 604 2 x 11 604	11 604	23 208	11 604	0	23 208
Tax relief		11 604	23 208	11 604	0	23 208
Final tax		18 501	6 897	0	4 920	0
Tax bonus		0	0	11 274	0	0
Amount paid	12 x 3 623 12 x 2 656	43 476	31 872	43 476	0	31 872
Tax overpayment		24 975	24 975	54 750	− 4 920	54 750
Tax overpayment per family				49 830		49 830
Difference				+ 24 855		+ 24 855

Source: Author's calculation

Table A.13: Application of the joint tax basis of married couple in the third fictitious family, 2010, in Czech crowns

		Tax liabilities of husband		Tax liabilities with respect to joined tax basis of married couple		
		1 child	**2 children**	**1 child**	**2 children**	**2 children**
Gross wage	12 x 44 111	529 332	529 332	529 332		529 332
Health insurance employer 9 %		47 640	47 640	47 640		47 640
Social insurance employer 25 %		132 333	132 333	132 333		132 333
Super-gross wage		709 305	709 305	709 305		709 305
Rounded down to 100 crowns		709 300	709 300	709 300		709 300
				Husband	**Wife**	**Husband**
Tax base for a each spouse				264 666	264 666	264 666
Health insurance employer 9 %				47 640		47 640
Social insurance employer 25 %				132 333		132 333
Rounded down to 100 crowns				444 600	264 600	444 600
Advance on tax 15 %		106 395	106 395	66 690	39 690	66 690
Tax relief for a taxpayer		24 840	24 840	24 840	24 840	24 840
Tax relief for a wife		24 840	24 840	24 840		24 840
Total tax reliefs		49 680	49 680	49 680	24 840	49 680
Tax utilizing reliefs		56 715	56 715	17 010	14 850	17 010
Tax relief for children	1 x 11 604 2 x 11 604	11 604	23 208	11 604	0	23 208
Tax relief		11 604	23 208	11 604	0	23 208
Final tax		45 111	33 507	5 406	0	0
Tax bonus		0	0	0	0	6 198
Amount paid	12 x 3 623 12 x 2 656	70 116	58 512	70 116	0	58 512
Tax overpayment		25 005	25 005	64 710	− 14 850	64 710
Tax overpayment per family				49 860		49 860
Difference				+ 24 855		+ 24 855

Source: Author's calculation

Table A.14: Replacement of tax relief for children by tax deductible item, the second fictitious family with two dependent children, 2010, in Czech crowns

	Income 2010 #	The 1st case*	The 2nd case**	A joint tax basis for married couple***	
	2 dependent children				
Gross wage 12 x 33 082	396 984	396 984	396 984	396 984	
Health insurance employer 9 %	35 729	35 729	35 729	35 729	
Social insurance employer 25 %	99 246	99 246	99 246	99 246	
Super-gross wage	531 959	531 959	531 959	531 959	
Non-taxable amount per children at the level of tax relief 2010		23 208			
Non-taxable amount per children at the level of tax deductible item 2004			51 120		
Rounded down to 100 crowns	531 900	508 700	480 800	531 900	
				Husband	Wife
Tax base for a each spouse				198 492	198 492
Health insurance employer 9 %				35 729	
Social insurance employer 25 %				99 246	
Non-taxable amount per children at the level of tax deductible item 2004				51 120	
Rounded down to 100 crowns				282 300	198 400
Advance on tax 15 %	79 785	76 305	72 120	42 345	29 760
Tax relief for a taxpayer	24 840	24 840	24 840	24 840	24 840
Tax relief for a wife	24 840	24 840	24 840	24 840	
Total tax reliefs	49 680	49 680	49 680	49 680	24 840
Tax utilizing reliefs	30 105	26 625	22 440	0	4 920
Tax relief for children 2 x 11 604	23 208				
Tax relief	23 208			0	0
Tax bonus	6 897			0	0
Amount paid 12 x 2 656 12 x 4 290 12 x 3 945	31 872	51 480	47 340	47 340	
Tax overpayment	24 975	24 855	24 900	47 340	− 4 920
Family income					
Wife 12 x 7 600	91 200	91 200	91 200	91 200	
Husband 12 x 26 786	321 432				
Husband 12 x 25 152		301 824			
Husband 12 x 25 497			305 964	305 964	
Adjustment of tax liabilities	24 975	24 885	24 900	42 420	
Total annual income	437 607	417 879	422 064	439 584	
Monthly family income	36 467	34 823	35 172	36 632	
Monthly income per capita	9 117	8 706	8 793	9 158	

Notes:

Real state, conditions of the year 2010
* Income 2010, relief 2010 → non-taxable amount 2010
** Income 2010, non-taxable amount 2010→ non-taxable amount 2004
*** A joint tax basis for married couple with non-taxable amount per children 2004
Source: Author's calculation

Table A.15: Replacement of tax relief for children by tax deductible item, the third fictitious family with two dependent children, 2010, in Czech crowns

	Income 2010 #	The 1st case*	The 2nd case**	A joint tax basis for married couple***	
	2 dependent children				
Gross wage 12 x 44 111	529 332	529 332	529 332	529 332	
Health insurance employer 9 %	47 640	47 640	47 640	47 640	
Social insurance employer 25 %	132 333	132 333	132 333	132 333	
Super-gross wage	709 305	709 305	709 305	709 305	
Non-taxable amount per children at the level of tax relief 2010		23 208			
Non-taxable amount per children at the level of tax deductible item 2004			51 120		
Rounded down to 100 crowns	709 300	686 000	658 100	709 300	
				Husband	Wife
Tax base for a each spouse				264 666	264 666
Health insurance employer 9 %				47 640	
Social insurance employer 25 %				132 333	
Non-taxable amount per children at the level of tax deductible item 2004				51 120	
Rounded down to 100 crowns				393 500	264 600
Advance on tax 15 %	106 300	102 900	98 715	59 025	39 690
Tax relief for a taxpayer	24 840	24 840	24 840	24 840	24 840
Tax relief for a wife	24 840	24 840	24 840	24 840	
Total tax reliefs	49 680	49 680	49 680	49 680	24 840
Tax utilizing reliefs	56 715	53 220	49 035	9 345	14 850
Tax relief for children 2 x 11 604	23 208				
Tax relief	23 208			0	0
Tax bonus	33 507			0	0
Amount paid 12 x 4 876 12 x 6 510 12 x 6 165	58 512	78 120	73 980	73 980	
Tax overpayment	25 005	24 900	24 945	64 635	− 14 850
Family income					
Wife 12 x 7 600	91 200	91 200	91 200	91 200	
Husband 12 x 34 382	412 584				
Husband 12 x 32 784		392 976			
Husband 12 x 33 093			397 116	397 116	
Adjustment of tax liabilities	25 005	24 900	24 945	49 784	
Total annual income	528 789	509 076	513 261	538 101	
Monthly family income	44 066	42 423	42 772	44 842	
Monthly income per capita	11 017	10 606	10 693	11 210	

Notes:

Real state, conditions of the year 2010
* Income 2010, relief 2010 → non-taxable amount 2010
** Income 2010, non-taxable amount 2010→ non-taxable amount 2004
*** A joint tax basis for married couple with non-taxable amount per children 2004
Source: Author's calculation

Table A.16: Replacement of tax relief for a wife by tax deductible item, the second fictitious family with two dependent children, 2010, in Czech crowns†

	Income 2010 #	The 1st case*	The 2nd case**	A joint tax basis for married couple***	
	2 dependent children				
Gross wage 12 x 33 082	396 984	396 984	396 984	396 984	
Health insurance employer 9 %	35 729	35 729	35 729	35 729	
Social insurance employer 25 %	99 246	99 246	99 246	99 246	
Super-gross wage	531 959	531 959	531 959	531 959	
Non-taxable amount per children at the level of tax relief 2010		23 208			
Non-taxable amount per children at the level of tax deductible item 2004			51 120		
Non-taxable amount per a wife at the level of tax relief 2010		24 840			
Non-taxable amount per a wife at the level of tax deductible item 2004			21 720		
Rounded down to 100 crowns	531 900	483 900	459 100	531 900	
				Husband	Wife
Tax base for a each spouse				198 492	198 492
Health insurance employer 9 %				35 729	
Social insurance employer 25 %				99 246	
Non-taxable amount per children at the level of tax deductible item 2004				51 120	
Non-taxable amount per a wife at the level of tax deductible item 2004				21 720	
Rounded down to 100 crowns				260 600	198 400
Advance on tax 15 %	79 785	72 585	68 865	39 090	29 760
Tax relief for a taxpayer	24 840	24 840	24 840	24 840	24 840
Tax relief for a wife	24 840				
Total tax reliefs	49 680	24 840	24 840	24 840	24 840
Tax utilizing reliefs	30 105	47 747	44 025	0	4 920
Tax relief for children 2 x 11 604	23 208				
Tax relief	23 208			0	0
Tax bonus	6 897			0	0
Amount paid 12 x 2 656 12 x 4 290 12 x 3 945	31 872	51 480	47 340	47 340	
Tax overpayment	24 975	3 735	3 315	33 090	− 4 920
Family income					
Wife 12 x 7 600	91 200	91 200	91 200	91 200	
Husband 12 x 26 786	321 432				
Husband 12 x 25 152		301 824			
Husband 12 x 25 497			305 964	305 964	
Adjustment of tax liabilities	24 975	3 735	3 315	28 170	
Total annual income	437 607	396 759	400 479	425 334	
Monthly family income	36 467	33 063	33 373	35 445	
Monthly income per capita	9 117	8 266	8 343	8 861	

Notes:
†Replacement of tax relief for children by tax deductible item is kept.
Real state, conditions of the year 2010
* Income 2010, relief 2010 → non-taxable amount 2010
** Income 2010, non-taxable amount 2010→ non-taxable amount 2004
*** A joint tax basis for married couple with non-taxable amount per children 2004
Source: Author's calculation

Table A.17: Replacement of tax relief for children by tax deductible item, the third fictitious family with two dependent children, 2010, in Czech crowns†

	Income 2010 #	The 1st case*	The 2nd case**	A joint tax basis for married couple***	
	2 dependent children				
Gross wage 12 x 44 111	529 332	529 332	529 332	529 332	
Health insurance employer 9 %	47 640	47 640	47 640	47 640	
Social insurance employer 25 %	132 333	132 333	132 333	132 333	
Super-gross wage	709 305	709 305	709 305	709 305	
Non-taxable amount per children at the level of tax relief 2010		23 208			
Non-taxable amount per children at the level of tax deductible item 2004			51 120		
Non-taxable amount per a wife at the level of tax relief 2010		24 840			
Non-taxable amount per a wife at the level of tax deductible item 2004			21 720		
Rounded down to 100 crowns	709 300	661 200	636 400	709 300	
				Husband	Wife
Tax base for a each spouse				264 666	264 666
Health insurance employer 9 %				47 640	
Social insurance employer 25 %				132 333	
Non-taxable amount per children at the level of tax deductible item 2004				51 120	
Non-taxable amount per a wife at the level of tax deductible item 2004				21 720	
Rounded down to 100 crowns				371 700	264 600
Advance on tax 15 %	106 300	99 180	95 460	55 755	39 690
Tax relief for a taxpayer	24 840	24 840	24 840	24 840	24 840
Tax relief for a wife	24 840				
Total tax reliefs	49 680	24 840	24 840	24 840	24 840
Tax utilizing reliefs	56 715	74 340	70 620	30 915	14 850
Tax relief for children 2 x 11 604	23 208				
Tax relief	23 208			0	0
Tax bonus	33 507			0	0
Amount paid 12 x 4 876 12 x 6 510 12 x 6 165	58 512	78 120	73 980	73 980	
Tax overpayment	25 005	3 780	3 360	43 065	− 14 850
Family income					
Wife 12 x 7 600	91 200	91 200	91 200	91 200	
Husband 12 x 34 382	412 584				
Husband 12 x 32 784		392 976			
Husband 12 x 33 093			397 116	397 116	
Adjustment of tax liabilities	25 005	3 780	3 360	28 215	
Total annual income	528 789	487 956	491 676	516 531	
Monthly family income	44 066	40 663	40 973	43 044	
Monthly income per capita	11 017	10 166	10 243	10 761	

Notes:
†Replacement of tax relief for children by tax deductible item is kept.
Real state, conditions of the year 2010
* Income 2010, relief 2010 → non-taxable amount 2010
** Income 2010, non-taxable amount 2010→ non-taxable amount 2004
*** A joint tax basis for married couple with non-taxable amount per children 2004
Source: Author's calculation