

**Charles University in Prague**

Faculty of Social Sciences  
Institute of Economic Studies



MASTER'S THESIS

**The Effect of Family Size on Men and  
Women Wellbeing**

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Academic Year: **2015/2016**

## Declaration of Authorship

The author hereby declares that he compiled this thesis independently; using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, May 13, 2016

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Signature

## Acknowledgments

The author is grateful especially to Mgr. Barbara Pertold-Gebicka M.A.,Ph.D for her useful advises.

## Abstract

This paper uses data from The Survey on Income and Living Conditions (SILC) for year 2013 to estimate the effect of family size on parent's wellbeing. To address the possible endogeneity in family size we use "multiple births" as exogenous origin of variation in family size. First finding shows insignificant effect of the additional child on parent's wellbeing. However, when we examine if the effect of number of children is significantly different for men and for women, we receive significant results. The number of children positively influences mother's wellbeing, but for fathers, there do not exist clear result. Finally, we examine if big family is poor family and our finding reveals, that number of children positively increases income of household.

**JEL Classification**

D31, I31, J13

**Keywords**

wellbeing, family size, instrumental variable,  
income

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## Abstrakt

Tato práca využíva dáta z národného prieskumu životných podmienok domácností (SILC) pre rok 2013, aby sme odhadli vplyv veľkosti rodiny na šťastie mužov a žien. Endogenitu, ktorá je zachytená v počte detí v rodine, riešime pomocou tzv. “viacpočetných pôrodov”. Prvé zistenie ukazuje nevýznamný vplyv počtu detí na šťastie rodičov. Ak skúmame odlišný efekt na ženy a mužov, dostávame významné výsledky. Počet detí pozitívne ovplyvňuje šťastie žien, ale u mužov sa efekt nedá jednoznačne potvrdiť. Nakoniec skúmame či veľká rodina je chudobná rodina a zistenie odhaľuje, že počet detí pozitívne zvyšuje príjem domácností.

<b>Klasifikace</b>	D31, I31, J13
<b>Klíčová slova</b>	šťastie, veľkosť rodiny, inštrumentálna premenná, príjem
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# Master's Thesis Proposal



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Specialization:	Finance, Financial Markets and Banking	Defense Planned:	June 2016

*Notes: The proposal should be 2-3 pages long. Save it as "yoursurname\_proposal.doc" and send it to mejstrik@fsv.cuni.cz, tomas.havranek@ies-prague.org, and zuzana.irsova@ies-prague.org. Subject of the e-mail must be: "JEM001 Proposal (Yoursurname)".*

## Proposed Topic:

The effect of family size on men and women wellbeing

## Motivation:

The family size affects wellbeing of family members. Number of children can have impact on wealth of family, health, life situation, success at work, satisfaction with life. As Cáceres-Delpiano (2012) indicates in his paper, increasing fertility has negative impact on women. His findings reveal bigger likelihood of divorce, mothers are forced to live with other family members because of poor financial situation and also they face worse health status.

Because women's mission is to have children, these findings seem to be shocking. In my thesis I will find out, if these findings also apply to Czech mothers and fathers. It will be interesting to find out how they perceive family size and also how the family size affects job opportunities, living conditions and overall life satisfaction.

The previous literature on this topic concentrates only on mothers, not on fathers. There is missing research on what effect has family size on men wellbeing. I will investigate the link between family size and their wellbeing.

My aim is to reveal if family size affects more women or men, either positively or negatively. I will find out if fathers in small family have different wellbeing than fathers in bigger family. In my thesis I will focus on parents' decision about how many children will the family have as well. Gender composition can have significant impact on number of children.

Family size has decreased during the last 60 years. Reasons for this decrease are various, and one of them is that families want to live on higher level, what it means in many cases, that they don't want to spare money. Using micro data, I will be able to compare not only financial situations but also other aspects, which can have bigger impact than only money in households.

## Hypotheses:

1. Hypothesis #1: The effect of the family size on wellbeing is significantly different for men than for women.
2. Hypothesis #2: The number of children in family affects marriage stability.
3. Hypothesis #3: The family size affects development of family life situation.

**Methodology:**

In my thesis I will use cross-sectional data from Czech Statistical Office. These data will be collected from The sample survey on income and living conditions of Czech households for year 2013. The main unit of measure will be women and men between the ages of 20 and 45. After collecting and choosing the most proper data, I will choose explanatory variables, which will be used in a model, such as marriage stability, nominal family income, living conditions, etc.

For estimating of model, I will use OLS and instrumental variables. To address possible endogeneity in family size I will use multiple births as an origin of variation in family size. This will show me how significant impact it can has on number of children in family. Also I will include dummy variable into the model. I will use multiple regression model to I particularly could compare results for overall male and female wellbeing.

**Expected Contribution:**

Expected contribution is in knowledge, if family size significantly affects men and women wellbeing, if there exists a difference in men and women wellbeing depending on family size. I expected to find out, if the general knowledge that big family is poor family, is a rule. Wellbeing does not necessarily mean only financial situation. Many studies are focused on mothers and their satisfaction, but because I will focus also on fathers, it can bring new findings and new view how much family size affects men in their lives.

**Outline:**

The expected structure of the thesis:

1. Introduction
2. Literature Review
3. Empirical Analysis
  - a. Data, description of variables
  - b. Identification Strategy
  - c. Results
4. Conclusion

**Core Bibliography:**

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Browning M., Chiappori P.A., Weiss, Y. 2011: *Family Economics*. pdf. from cemmap.ac.uk, pp.525.

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# Chapter 1

## Introduction

In last decades, not only psychologists, but also economists try to define and explain human happiness. Finding answer on the question when person feels happy is old as humanity. Even the ancient philosophers were seeking answers when and how can man reach full state of wellbeing. Even though it looks like a very easy question, till this time the precise and complete definition of what wellbeing is does not exist (Dodge *et al.* 2012). On the basis of various tools, there are examined determinants which can have direct or indirect influence on person's wellbeing. There exist hundreds factors, which can influence happiness, such as the effect of income on wellbeing (Clark & Lelkes, 2005), or effect of unemployment on life satisfaction (Di Tella, MacCulloch, & Oswald, 2001) or various personal characteristics, such as age, marital status and so on (Helliwell, 2003) or (Blanchflower *et al.* 2004). One of the most significant determinants of wellbeing is fertility or parenthood. Last forty years, fertility is extremely decreasing and people look for causes of this declining tendency. There exist many reasons why families delay motherhood and children are seen as something undesirable in that moment. People want to focus on education or on career and children would be barrier to achieve it and subsequently it would mean not to attain full state of happiness. This is a general view of childless people, but what view do people having children have? Do they have one or more children because they want to be unhappy? Certainly not and this is reason of examination in this thesis.

The objective of this thesis is to present the effect of family size on parent's wellbeing. Cáceres-Delpiano *et al.* (2012) indicate that increasing fertility has negative impact on women. Their findings reveal bigger likelihood of divorce, mothers are forced to live with other family members because of poor financial situation and also they face worse health status. Effect of the number of children on parent's wellbeing is examined in many foreign researches, but nothing from the domestic environment. Thus, interest of this thesis is in the dataset from the Czech Republic. Because every person is different and have different views on life, there cannot exist global contention if family size influence parents positively or negatively. This thesis sets goal to find out how parents perceive children and if there

exist significantly different effect of wellbeing on men and women. Very often, the excuse for not having the children yet, or not having them more is financial situation of family. Thesis further examines if big family automatically means poor family. Expected contribution can confirm or refute findings from global researches. Wellbeing does not necessarily mean welfare and thus we will examine other personal characteristics which can have impact on wellbeing, such as age, gender, education or marital status.

The thesis is structured as follows: Chapter 2 gives theoretical background of selected topics. It is divided into two main sections. One represents definitions of wellbeing, its historical background, best way how to measure wellbeing and current researches related with wellbeing and its various factors. Second section gives us overview of current trend of fertility in the world and in the Czech Republic. Then our attention is focused on current literature, which deals with problem of fertility and general aspects of life as for example labor supply, health and so on.

Chapter 3 covers methodology and data description. In the part of methodology, we will explain models, which we will use for testing our hypotheses and some basic points, why this methodology is the most suitable one. In data description, we will present chosen variables, which best describe determinants of wellbeing and we will present descriptive statistics of chosen variables. Chapter 4 represents results from econometric analysis. It is divided into four subchapters according to hypotheses. First two hypotheses will examine the effect of family size on parent's wellbeing and the difference effect of family size on wellbeing of mothers and fathers. Third estimated hypothesis will cover results of examination, if family with more children automatically means poor family. Last subchapter will present robustness checks. Chapter 5 presents discussion of our results with findings of current literature. We will summarize the main findings from the chapter 4 and we will compare it with literature, which will be presented in chapter 2. Chapter 6 summarizes our findings and represents our main contribution of this thesis. We will present also possible focus on future work.

# Chapter 2

## Literature Review

### Concept of Wellbeing

Wellbeing is a concept which has many definitions. The question on how to define wellbeing is still unanswered. There are many researches that try to find the most suitable definition of wellbeing. If we want to find one word to explain it we can use words such as happiness or satisfaction. These two words are not synonymous but they are parts of the term we want to define. It follows the fact that the term wellbeing consists of several components or factors and accurate definition is very difficult to make. Dodge *et al.* (2012) in their work "*The challenge of defining wellbeing*" draw conclusions that in the rich literatures about happiness we can find many descriptions of wellbeing but never a clear and precise definition.

We can imagine wellbeing as a construction, which has many components and these components interrelate with each other. Once this construction is built, we can see what it represents. We have two main views on concept of wellbeing. One of them is material view and the second one is psychical view. Material view relates with welfare, whereas psychical view can relate with many aspects of man's everyday life. Concept of wellbeing underwent a long development and is treated differently in different fields.

#### 1.1. The development of the understanding of wellbeing

Every man focuses on attaining happiness. It is something everyone wants, but only few people know how to achieve state of happiness or full life satisfaction. Since time immemorial people were seeking an answer to the question of what happiness is and how it would be possible to reach a point in which a man feels happy and satisfied. As time has changed, people also changed their preferences and factors that bring them to the state of full satisfaction.

The concept of happiness or well-being was emerging in philosophy, theology and even in the economy. In the philosophical and ethical thoughts there exist two considerable directions of understanding of happiness. These are eudainonia and

hedonism approach. The most famous philosophical leader in the concept of happiness is Aristoteles with his notable work *Nicomachean Ethics*. He was a supporter of a thought that happiness lies in doing good works. The term he used was *eudainonia* in Greek that means to be under the protection of good (eu) demon (daimon). Aristoteles appointed two activities, in which people can attain happiness. It is a virtue and a good life by which he meant practicing of virtues in ordinary life. He emphasized that the human can attain state of happiness only in case he acts in sense of good and if his life is moral. This thought was followed by other important personalities in philosophy and theology.

Other important thinkers who influenced the understanding of happiness were Socrates, Epicurus, Kant, Nietzsche or Thomas Aquinas who considered happiness in the sense of perfect and imperfect bliss. In the history of philosophy we can find many significant thinkers for which seeking happiness was a lifelong pursuit. They believed that man can feel satisfied only if he lives a good moral life.

The opposite of Aristoteles's approach is hedonism. Hedonism is a philosophical direction which the main idea is that delight or pleasure is the main motivation of human life. It is not only about maximizing delight, but also to minimize pain. Negative hedonism means that you can reach full state of happiness only if there is no misery in the world or in human's life. The most important representative of this direction was Epicurus. His main idea was that human should have equilibrium between happiness and pain.

In the 19th century along the lines of hedonism originated new direction known as utilitarianism. The main leaders of this current were John Stuart Mill and his predecessor Jeremy Bentham. In the economic thinking thought of happiness began to transform into the concept of utility. The father of this significant thought was Jeremy Bentham, which is considered a founder of the theory of utilitarianism. The notion of utility was derived from utilitarianism philosophy. Utility is an instrument for measuring of well-being. Microeconomic theory defines utility as a maximally satisfying the needs of individuals or society.

## 1.2. Happiness economics

In classical economy there existed only one view on individual's behavior for a long time. Classical economists created an economic man, so called homo oeconomicus. This individual deals rationally in conditions *ceteris paribus*. It means that he behaves rationally in all his decisions that means he maximizes utility and minimalizes costs under unchanged conditions. Gradually economists realized that this model cannot exist in real life and so they realized the necessity of examining the factors that influence individual's behavior.

The impact of psychology began to penetrate into the economy in the form of a new direction called "behavioral economy". Amos Tversky and Daniel Kahneman are considered to be the main representatives of this behavioral economy. In 1979 they published research titled "Prospect theory: An analysis of decision under risk" and publishing of this article meant formation of behavioral economy. In this article they criticized classical theory of utility and they created new model called "prospect theory". Prospect theory explains the systematic choices that most people do. Kahneman and Tversky (1979) defined three cognitive principles: the principle of reference point, the principle of diminishing sensitivity and the most important the principle of aversion to loss, which can have impact on evaluation of financial results. Their model works with the idea that people make decisions on the basis of limited rationality. The reason of limited rationality lies in factors, which influence economic choices. These factors are social, psychological and also economical.

Gradually from the behavioral economy grew the new area and it is the economics of happiness. The economics of happiness begins to develop in the 20th century. It is the empirical and the theoretical research about happiness, which uses combination of thoughts from the psychology, sociology, medicine or economics. It focuses on studying of wellbeing, life satisfaction, and overall happiness. Economics of happiness can be further specialized in fields like population economics, welfare economics, environmental and so on. Happiness of economics examines various factors which have direct or indirect impact on wellbeing. There are many fields in which observations of wellbeing can be undertaken and it permits us to study it from many different points of view, in case we have available data. The most important studies relates with examining correlation between happiness and income, happiness and impact of social or psychological factors, impact of institutions on wellbeing or impact of health state on happiness.



First substantial finding in the happiness economics was defining the Easterlin paradox. In 1974, Richard Easterlin in his economic papers „Does Economic Growth Improve the Human Lot? Some Empirical Evidence”, studied correlation between welfare and happiness. He found out that richer people are happier than poorer ones within one country, but if rich and poor countries are compared each other on the international level, it does not necessarily follows that richer countries are happier than poorer ones. One of the possible explanations is that people tend to compare with each other within the same society, but impact of comparison between different countries is not so significant. This paper caused the growth of new researches concerning happiness.

### 1.3. Subjective Wellbeing

Wellbeing has been studied mainly in the psychiatry and then later also in psychological field. Many psychologist and psychiatrist devoted their researches to cognition of wellbeing and factors which have direct or indirect influence on level of happiness. Great interest in study of wellbeing began in the beginning of the 20th century. Among the first who attempted to define wellbeing was Bradburn. He laid the foundation of psychological term of wellbeing. Bradburn (1969) claims that high psychological wellbeing is in case when positive effect exceeds the negative effect. This definition was inadequate and thus other researchers have tried to further define the structure of wellbeing.

Wilson (1967) directly defined which social characteristic should have happy man. His conclusion was that happy man is

*(...) young, healthy, well-educated, well-paid, extroverted, optimistic, worry-free, religious, married person with high self-esteem, job morale, modest aspirations, of either sex and of a wide range of intelligence.(p. 294)*

His paper was criticized because of small sample of observations and also he received criticism that the simple appointment of demographic characteristics has not high explanatory power. It is not important what people have or they have not, but how they view their own life. Thus, it is not good to claim that only rich or young people are happy. In many cases it is not a true. Other researches were cautious in appointment of characteristics when human is happy.

Diener et al (1999) define subjective wellbeing as “*person’s cognitive and affective evaluations of his or her life*”. These evaluations include positive or negative life’s experience, current emotions, set up life goals and so on. The main objective of study of wellbeing is examining the question of whether one is happy. Other researchers tried not to define wellbeing, but they focus on defining the life satisfaction. Shin and Johnson (1978) formulate life satisfaction as a “*global assessment of a person’s quality of life according to his chosen criteria*” (p. 478). Person’s quality of life can be again subjective assessment of life of every individual.

Researches about happiness met with many issues for example Norman Bradburn (1969), who claims that positive effect is not automatically the opposite of a negative effect and it is a necessary to study these two different states separately.

Diener (1984) suggests that happiness should be consisting of three criteria. The first criterion is that wellbeing is subjective. It means that every individual can judge what makes him happy. In the case of ten-member group we can find out that every one out of ten people has a completely different approach to his life and thus, also different approach to the definition of wellbeing. The second condition is that wellbeing should comprise only of positive measures and the last third condition should include global evaluation of person’s life.

For the last 30 years, concept of wellbeing was changed or added new terms into definition. But the logic remains still the same. Not only do academic researchers focus on definition of wellbeing, but there were established various foundations, which deal with thought of wellbeing and his aspects. The most recent published definition about wellbeing can be quoted from The New Economic Foundation (NeF):

*“The concept of wellbeing comprises two main elements: feeling good and functioning well. Feelings of happiness, contentment, enjoyment, curiosity and engagement are characteristic of someone who has a positive experience of their life. Equally important for wellbeing is our functioning in the world. Experiencing positive relationships, having some control over one’s life and having a sense of purpose are all important attributes of wellbeing” (Aked et al 2008).*

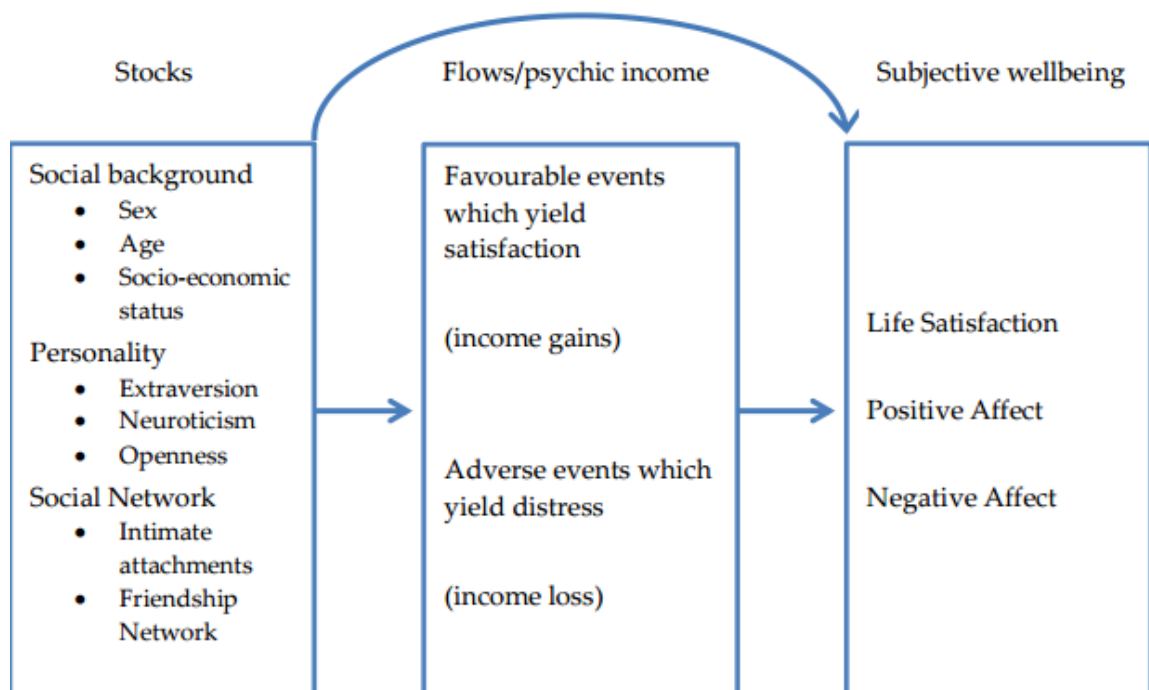
Every individual has his scale of values and it can affect his perception of wellbeing. Also, his perception of life satisfaction is changing over the time when he changes his expectations from the life. Significant role in the perception of life satisfaction plays comparison with other people. Everyone looks at other people and

compare what they have or what they have achieved in their life. It depends mainly in which society the individual lives. The biggest differences are to be found between people living in rich countries and between people living in poor countries.

There are many determinants which affect the level of wellbeing. The most significant is wealth, family life, ideal partner, children, health of individuals or members of community, position at work, etc. Dolan et al (2008) identify seven main factors which directly affect wellbeing such as “*personal characteristics, socially developed characteristics, how we spend our time, income, relationship, attitudes and beliefs towards self and other wider economic, social and political environment*”. These factors interact with each other in various directions. Every man has his own personal and subjective perception of what is positively influencing his wellbeing.

Headey and Wearing (1989) designed “Dynamic equilibrium theory of wellbeing” which represents the fact that subjective wellbeing has not changed significantly over time, but it remains stable. They take a stand that wellbeing should not be defined as a state variable, but as a flow variable. Their theory is supported by the following illustrative schema:

**Figure 1: Stock and flow framework of wellbeing**



Source: Headey & Wearing (1991, *Stock and flow framework of wellbeing* (p.56)

The main point of this scheme is that people have certain personal characteristics represented as stocks, which can influence their subjective wellbeing. Stocks are then established on life experience or events, which are represented as a flow. Equilibrium level then occurs on the basis of these personal and social characteristics. It is the so-called normal subjective equilibrium level of wellbeing of every individual. Equilibrium level is then different for each person. This theory supports also thought that wellbeing is not a state, but it is a process, which can change over the time.

Other researchers continue to work with the thought of this model in their further studies. For instance, Diener et al. (2003) claim that in general, extroverts are happier than introverts. This is not true for all situations, because there exists also situations, where extroverts can suffer from dramatic life changes. The big role in assessment of wellbeing plays culture. Diener and Lucas (2000) tried to explain differences in wellbeing between the nations and they find many factors, which influence differences.

This finding is supported by theory that personal characteristics play substantial role in evaluation of life satisfaction, but also life experience or some events in life can change wellbeing.

One thing is if someone is happy or satisfied with life and the other thing is if people, who are not happy or satisfied, are trying to change something in their life to increase their subjective wellbeing. Fleurbaey and Schwandt (2015) did research where they asked respondents what they would change in their life to increase their subjective wellbeing. They asked three subjective wellbeing questions from the area such as life satisfaction, life ladder ranking and recent emotions. The main idea of this research was to find out whether people try to maximize their subjective wellbeing or not.

### 1.3.1. Measurement of subjective wellbeing

As mentioned above wellbeing is influenced by various factors that are difficult to measure. We need to take into account each individual separately and find out all the factors causing that person have certain feeling of satisfaction with life.

In the microeconomic theory, in the theory of utility, we find two approaches how to quantify the utility. According to the cardinal utility theory, every consumer is able to measure his/her utilities. The opposite is the ordinary theory of utility, which

criticizes measurability of utilities. This theory is based on the assumption that a human is able to express what has greater utility for him and what smaller. He assesses and compares. Good resource for this assessing is using indifference analysis. For wellbeing this approach of measuring is not possible as measuring of wellbeing is very complicated. It is a combination of subjective feelings of every individual in the society.

The most proper way to measure subjective wellbeing is interviewing people how they feel in surveys on national or international level. In the literature we can find various types of measuring wellbeing, but many of them works on the same principle and it is individual's questionnaire survey. The difference is only in formulating of questions. Some authors rely on few general questions about happiness while others create more precise questions. More detailed questions and areas of questions can show what are the relations between wellbeing and certain factors, and show the relations of factors with each other. In general, self-reports can consist of single-item scales or multiple-items scales. A special case is then using of SWLS. The most commonly used method in many researches is using of multiple-items scales, because it measures more than only one item.

Diener et al (1985) create evaluation questionnaire "The Five-Item Satisfaction with Life Scale (SWLS)". It is a short, simple and time-saving questionnaire. It includes five statements about satisfaction of life and participant can choice out of seven scales: 1-Strongly disagree, 2-Disagree, 3-Slightly disagree, 4-Neither agree, nor disagree, 5-Slightly agree, 6-Agree 7-Strongly agree. After the count of scores, they are divided into seven groups: 31 - 35 Extremely satisfied, 26 - 30 Satisfied, 21 - 25 Slightly satisfied, 20 Neutral, 15 - 19 Slightly dissatisfied, 10 - 14 Dissatisfied, 5 - 9 Extremely dissatisfied (Diener et al 1985).

<p>____ In most ways my life is close to my ideal.</p> <p>____ The conditions of my life are excellent.</p> <p>____ I am satisfied with my life.</p> <p>____ So far I have gotten the important things I want in life.</p>
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**Figure 2: The Five-Item Satisfaction with Life Scale**

Source: <http://internal.psychology.illinois.edu/~ediener/SWLS.html>

Other researchers had the similar approach for measuring wellbeing. Graham (2005) alleges that happiness is represented by the surveys of the overall wellbeing, which is reviewed by individuals around the world. The survey consists of very simple questions about life satisfaction, for example “how happy are you feeling?”, “how satisfied you are with your current life?” and so on.

Our feelings are changing every minute or eventually every day. If we claim that wellbeing is feeling of some state, then it means that wellbeing is changing every day as well. Now we can feel excellent and we can claim that our life is on the top level of satisfaction. But in a minute we can learn some devastating news and our sense of how we feel and what we think about our happiness can change dramatically. And then we get back to the problem of how to properly identify and measure well-being. Kahneman et al (2004) tried to solve this problem. They created a survey method for characterizing daily life experience, the so-called “The Day Reconstruction Method (DRM)”. The procedure of this method is as follows. Respondents fill general questions related with demographic and life satisfaction questions. In the next step, respondents are obligated to write a simple diary of their previous day, what they did and how much time these activities took and finally they were asked some personal information. On the basis of these questions and short diary, DRM evaluates if their activity has positive or negative effect.

Krueger et al (2006) propose to use U-index for measuring wellbeing. Authors define “*U-index as the fraction of time that is spent in an unpleasant state*”. People with higher U-index are less happy than people with lower U-index. Different view on measuring of wellbeing has the American psychologist Arthur C Brooks. He claims that there exists simple equation of happiness. This equation has a following form:

$$“H = S + C + V” \quad ()$$

where H represents happiness, S our biological set point, C represents conditions of living and V are our daily choices, which we act voluntarily. He indicates that 50% of happiness is derived from our biological set point, only 10% from living conditions and 40% from voluntary actions and preferences in our daily life.

Other similar and no less interesting approach how to measure wellbeing was created by the team of researchers from the University College London. The difference in approach of measuring happiness from previous researchers lies mainly in the fact that these scientists are not psychologists or economists, but they work in

neuralgic center. Thus, they can see how neurons in brains are changed. Their suggested equation represents momentary subjective wellbeing:

$$\text{Happiness}(t) = w_0 + w_1 \sum_{j=1}^t \gamma^{t-j} CR_j + w_2 \sum_{j=1}^t \gamma^{t-j} EV_j + w_3 \sum_{j=1}^t \gamma^{t-j} RPE_j,$$

Where  $w$  represents weights of influence of certain factors, CR certain rewards, EV represents expected values of chosen gambles (Rutledge *et al.* 2014). The whole explanations are a little complicated as it uses mathematical and neuralgic terms (see Rutledge *et al.* 2014).

The variables, which influenced wellbeing, can be divided into 2 main groups. First group consist of social and demographic variables (non-economic variables) and second group of economic variables. Economic variables comprise microeconomic and macroeconomic variables. Some of the variables are easily measurable, others are not. There exist three main components that can be used for proper measuring and that influence overall happiness. These are family, health and financial situation.

Like there exists Gross Domestic Product, there also exists Gross National Happiness (GNH). Thought of this concept came from Bhutan in 1972. Gross National Happiness does not measure only material things but also satisfaction in community, governance, environment in the country. They appoint 9 main domains, which have significant impact on level of happiness. It is psychological wellbeing, health, time use, education, cultural diversity and resilience, good governance, community vitality, ecological diversity and resilience and living standards. Every field has adjunct points, which totals 33 points. Then people are divided into 4 groups: unhappy people, narrowly happy, extensively happy and deeply happy. The main reason of measuring Gross National Happiness was that Bhutan represented still very low Gross Domestic Product and they wanted to show, that people can be happy despite the fact that the economic situation of certain country is not on higher level. GNH represents Easterlin paradox, which was mentioned above in the chapter 1.2.

Gradually, new and new national measurements originated, for example Gross National Well-being (GNW), Genuine Progress Indicator, Multidimensional Poverty Index (MPI). In 2011, OECD created “Better Life Index (BLI)” that represents comparison of wellbeing between countries. They realized that standard statistics about macroeconomic variables cannot show how satisfied and happy people are.

Due to boom of researches in happiness economics the importance of data collection about happiness and their possible determinants was growing. Thus, we can find different surveys dealing with measurement and detection of subjective wellbeing. The most important are The World Values Survey (WVS) or the European Values Survey (EVS). These surveys asked question “how satisfied are you with your life as a whole nowadays?” with scale from 0 to 10, where 0 represents dissatisfied and 10 represents satisfied. Other question relates with your overall feeling with scale from 1, that represents very happy feeling of life up to 4, that represented not at all happy.

Other surveys that deals with wellbeing are the Eurobarometer, the Gallup World Poll, the New Democracies Barometer, the International Social Survey Program or no less important the European Social Survey (ESS). These surveys creates own questionnaires and types of questions. In many cases surveys cooperate with professional psychologists. Eurostat created in 2003 the EU statistics on income and living conditions (SILC), where not only general information about households and individuals can be found, but also a section titled “wellbeing”, where respondents are asked to evaluate their wellbeing from 0 to 10. In this thesis, we will use survey similar to this, but from Czech Statistical Office.

### 1.3.2. Wellbeing and researches

Income is important part of life satisfaction. Most researches focus on relationship between income and wellbeing. If someone hears word wellbeing, he automatically imagines money and carefree life. Thus, researches about impact of income on wellbeing are not surprising for many of us. Higher income has positive effect on overall wellbeing or life satisfaction. But this effect is not so strong as many researchers suggest. There are stronger effects to be found in different determinants such as education, marital status and so on (Helliwell, 2003). One possible explanation of this weaker impact come from Veenhoven (1991) who claims that wellbeing can be influenced by the income only to a certain degree, when basic human needs are satisfied. The income as stronger determinant is present mainly in poor countries. As soon as we do not suffer from hunger, have routine access to education and employment and have a good health care, then income level does not affect significantly our happiness. Other interesting finding of relationship between income and wellbeing is that it has reverse causal relationship, which was confirmed by many researches. People with higher wellbeing achieve higher incomes in future (Diener *et al.*, 2002).



Age is one of the factors which can affect wellbeing by positive or negative direction. Blanchflower et al (2004) find negative relationship between age and wellbeing. Studies show that the lowest wellbeing is to be found among people in their middle-ages and higher among younger or older people. Worse level of wellbeing at middle-age people could be explained by the so-called midlife crisis. Age should not likely plays important role in finding of relationship between wellbeing and age. Age standing alone represents only a number, but life experience or life events over the time have impact on age and then automatically on wellbeing.

Findings from researches about gender and wellbeing are diverse as it depends on used dataset and also how explanatory variables were used in the model. There exist reports, where gender has no impact on happiness (Louis et al 2002) but on the other hand, there exist other researches stating that in general women are happier than men (Di Tella et al 2004).

It seems from finding that married people are happier (Blanchflower et al 2004, Zimmermann & Easterlin, 2006). Vice versa, people without partner or divorced/widowed people recorded lower level of wellbeing (Helliwell, 2003). There is no difference, if it is woman or man, findings are the same for both gender (Frey & Stutzer, 2000). Higher wellbeing of married people could be explained by some kind of certainties that marriage in general brings. The number of children and parent's wellbeing is discusses in chapter 1.4.2.

Every additional education has positive effect on wellbeing (Blanchflower et al 2004). This could be explained by many factors. For many people, higher education increases opportunities for finding a well-paid job. Education can have different strong power depending on country's development level. Higher education brings to people from poorer countries better life on higher level in comparison with their uneducated fellow citizens.

Health is significant determinant of wellbeing. Worse prolonged health status can cause many problems which automatically decrease level of overall life satisfaction. Dolan et al (2008) confirm existing findings where good mental and physical health positively influences wellbeing.

Researches on wellbeing are applied also in all sort of macroeconomic fields. The most numerous are studies which look for relationship between income and wellbeing (Graham, 2010), subjective wellbeing and unemployment (Winkelmann, 2006), (Binder, Coad, 2014) or various macroeconomic shocks on well-being with the findings that unemployment decrease wellbeing more than inflation

(Blanchflower et al 2013). Tella, MacCulloch and Oswald (1999) claim that “people's well-being is a decreasing function of the inflation rate and the unemployment rate, and it estimates the size of these effects”. Depression from job loss and subsequent decline in wellbeing is understandable. Frey and Stutzer (2000) focus their research on the question how big effect has political institutions on wellbeing.

## 1.4. Literature review about fertility

The question of family size is as old as humanity itself. Unlike today's perspective on family size, in past it was considered a blessing for men as well as for women to have abundant offspring. But society is changing and the role of family in society is changing too.

In the last decade, fertility was decreasing. Among the main reasons of this decline belongs not only infertility of couples but also the new life style, which has changed rapidly since the second half of 20th century. The lower fertility is the consequence of the new view on the role of women in society. This role has gradually begun to change from Second World War, when women were forced to work instead of men, who were abducted on the front. Women over time became independent from men and now they have option to influence their birthrate. They have greater opportunities for self-realization in education, in career, in political life and so on. Thus, women delay motherhood on later time. This obviously affects the overall rate of population.

For the Czech Republic, post-war period was period of rapid population growth. It was necessary to enhance population, which had suffered because of devastating war. Other significant factors were political changes. Governments proposed and adopted population policy, which was supposed to support families with children, extend maternity leave, ensure better working conditions for women with children and increase the number of nurseries and kindergartens. In the Czech Republic, fertility began to decline markedly after the 1989 and it is still falling. The most significant decline in fertility rates was between the years 1991 to 1996 (Burcin, Kucera, 2010). At present, the population state does not change significantly. As the Czech Statistical Office indicates, the number of births has decreased again since 2009.

Reasons of decreasing fertility are countless. Women delay motherhood on later time and they devote time to their hobbies, education, and work. Other significant reason is migration of young residents to developed countries because of job opportunities. People do not trust government and they do not have confidence in

social systems. There is a fear of job loss and subsequent financial problems. The current trend in population policy is postponing births, because on the first place is education, financial ensuring, career and average age of mothers is increasing. Families want to live on higher level and they want to ensure for their children better conditions for living. In present times, parents are more interested in children quality than it was in the past. They want to give their children more of their free time. They are aware of the fact that education, diverse hobbies or studying abroad will open gateway to the world for their children. It is generally known that a good education should be ensuring better paid jobs and parents know, that not always it is possible to afford to pay for education. Quality is costly and this is the main reason why parents tend to have only few kids, although they could have more. Becker and Lewis (1973) study parental trade-offs between the quality of children and the number of children in family. Parental trade-offs in this theory means, that parent have choice to decide if they prefer quality or quantity. In both cases, they have to give up one preference. Becker and Lewis (1973) analyze parental decision about spending time, which parents have to divide between more children. The low quantity of children in a family means their higher quality. In Becker's theory quality means, that parents have to spend their time, but also money on education, on clothing, on extracurricular activities and so on.

Another no less important problem in the declining of birth rate is also voluntary childlessness of partners. Again, reasons can be various. Declining fertility leads many researchers to find some relationship with other factors, which could explain smaller number of children in family.

#### 1.4.1. Fertility researches

Nobel laureate Gary Stanley Becker created the theory of the fertility choice in 1960. Becker's theory lead to implications not only in economic approaches, but it also had impact on studies on sociology or demographic. His study is applied in investigation of fertility and labor supply, human capital, or relationship between fertility and education of mothers. Becker (1960) in his "*Economic analysis of fertility*" considers children as 'durable goods', which should provide 'utility' and pleasure for parents. He assumes that children should bring income to parents. In his theory, income is seen as a physical income. Becker (1960) argues that five determinants influence fertility. It is tastes, uncertainty, income, quality of children and child costs. For all these determinants Becker has explanation. He claims that children bring to parents utility and every parent can create his indifference curve according to "tastes". Taste has figurative meaning and it means for example that the one wants to select the

gender of children. Taste could be understood also as a wish of parents to have their children become doctors, lawyers, etc. Higher income permits parents to have more children when considering costs. Under uncertainty, his thought was that in many cases it is hard to predict fertility. There is divergence between desired fertility and current fertility. Quality of children and costs are similar determinants. It means that if parents offer their children not only primary education, but also their free time, it will positively influence their quality. All these activities mean additional expenditures, but it can increase quality of children. In the fertility economics, children can be perceived as a demand and parents can be in the role of supply. Parents can offer their children both material and nonmaterial goods. The problem is that children do not make their own choices.

In the fertility model equilibrium does not exist. It is very complicated model from the economic point of view. Easy example can be illustrated when very rich parents have only one child, but they could afford to have more children, as they can offer more time or more money. But in this case we also have to distinguish parents, who want to have more children, but they cannot have and parents, who can afford more children, but they do not want. In this idea parental role could be compared to the role of firms in the microeconomic theory. Parents have demand for children as firms have demand for manpower. Further, parents can offer children livelihood, education and so on, same as firms offer manufactured goods or provide services.

The family size affects all household members. It affects parents as well as their children. Growing literature about the effect of the fertility shows big quantity of researches dealing with fertility, respectively number of children in common household. The number of children has negative effect on female labor supply. This effect is smaller for high educated women or women who have husband with higher income (Angrist & Evans, 1998).

Also family size has significant effect on children. According to Becker (1973) more children in family negatively influence child quality what is presented below as tradeoff quantity-quality model. More children in family have negative effect on educational attainments (Black *et al*, 2004, Booth *et al*, 2005), but some studies show that there is no clear evidence on worse educational attainments (Caceres-Delpiano, 2006). There is a limitation to this assumption as comparison of educational opportunities is in every country different. For example, Caceres-Delpiano (2006) claims, that every additionally born child has less chance to attend private school. Private schools do not mean in all country high educational level. Their findings cannot be applied to all countries. For example in the Czech Republic

there exist only public schools with few exceptions. Private universities do not mean higher quality in education as it is for example in the United States.

If we want to study problematics of child quality more deeply, we can find also studies about interaction between siblings. The gender composition plays important role in children's life. Butcher *et al* (1994) found inconsiderable significance of gender composition in family. If girls grow up with one or more brothers, it has more positive effect on their educational attainments, than if there would be only sisters in family.

#### 1.4.2. Wellbeing and family size

Every individual differs from others, his attitudes and value system is obviously different. Also view on family can be significantly different. However, it is mainly number of children in family that can have significant impact on happiness of parents. On the other hand, this state can be different for women and for men. Although in developed societies there's a myth that big family is poor family or members in large families are automatically unhappy people, the opposite can be true.

Researches about relationship between wellbeing and family size are not numerous as it is in case in observation of relationship between fertility and labor supply or family size and child quality. The main reason is that wellbeing is very hard measurable quantity and in many cases it is not the primary field of current statistical surveys. In the last years, interest in wellbeing goes up and policymakers are beginning to realize that the satisfaction of people cannot be measured by economic variables such as an unemployment, inflation or gross domestic product. Overall satisfaction of people is influenced also by non-economic factors. Among considerable factors we can assign satisfaction with partner, job conditions, housing, sufficient time for leisure activities and so on.

We can find different surveys dealing with measurement and detection of subjective wellbeing. The list of some surveys is mentioned in the chapter 1.3.2. These surveys are not made so often as for example statistical surveys about economic situation and it can have more limitations for using in researches. Thus, we can find in the literature various views how to examine wellbeing of individuals. Some researchers replace wellbeing as a subjective feeling of happiness by variable of health conditions or financial situation of individuals (Cáceres-Delpiano *et al.* 2012). This approach may not have significant explanatory power. We can think that excellent health conditions can mean the higher degree of happiness. Or higher

income can represent higher satisfaction. But it does not have to be a general rule as every human is unique and his feelings are subjective depending on many factors. Thus, it is still better if we have available statistics about wellbeing.

The degree of happiness is influenced by various determinants, which were mentioned in chapter 1.3.1. One of them can be the number of children in family. Number of children can have positive or negative effect on parents and effect can be different for women and for men. Growing literature focus their researches mostly on women as children are connected with them from the beginning.

People perceive fertility in every country differently. Researches show different view on fertility in case of developing countries. Developing countries have increased fertility and effect of number of children is positive for both parents (Aassve *et al* 2015). These are mostly the countries, where women have only one aim in their life and it is upbringing children and caring about household. We can name countries of Africa or Middle East. In these countries women do not have opportunities to study or work and they enter into marriage at very young age. In contrast, developed countries have problems with low fertility, which is caused by greater freedom for women in terms of education, job opportunities and free option to enter a marriage. These factors can influence later planned of motherhood. As regards men, there do not exist any evidence about differences of perception of family size. Aasve *et al* (2015) claims, that fathers are still happier than men without children.

Studies show decreased happiness due to the higher number of children from global perspective (Margolis *et al* 2010). Margolis *et al* (2010) show that perceiving of motherhood is different for women above age 40, when the effect is positive and for younger mothers is effect positive in case of higher social support from the government for families with children. Children increase happiness, if they are up to two and effect is significantly higher in cases if parents postponed childbearing, (Myrskylä *et al* 2012).

Negative effect caused by increase of number of children is mentioned in many worldwide researches. Cáceres-Delpiano *et al.* (2012) indicate in their paper that increased fertility has overall negative impact on women. Their findings reveal that increased fertility leads to bigger likelihood of divorce, bigger likelihood that women are forced to live with their parents or other relatives in one household. Increased fertility then influences labor supply of women and subsequently their financial situation. Other findings reveal that women who have more children suffer worse health conditions, for example higher blood pressure or increased probability of obesity. This can be explained for example by mothers, who have higher number

of children and do not have time for themselves. Children are dependent on their mothers until they reach the age of greater independence and so mothers offer their children every free time. Consequently, mothers can forget to care about their own health.

Angrist and Evans (1998) show that higher number of children leads to reduction of labor supply of women. They find that the largest negative influence of childbearing is for less-educated women. When a woman has several children in a row, it is most likely, that she will spend more years on maternity leave. It will have for consequence that her working experience will be poorer than job experience of women with one child or without any child. If a woman decides or if the situation permits she can start to work. But due to lack of experience and knowledge she will look for any kind of work, though less paid. And all these facts can negatively influence happiness and life satisfaction once the children grow up.

On the contrary, there is very small evidence in case of well-educated women or women which have husbands with higher income. We believe there exists relationship between probability to pay babysitter and family with high income.

Regarding to men and the impact of children on their life, we do not find so many studies as they are for relation between women and family size. Angrist and Evans (1998) identify very little effect of children on male labor supply, chiefly on well-educated men. There is missing research on what effect has family size on men's wellbeing. Fathers are also persons that have to look after their children and ensure their daily or unusual needs. Men will more likely find a time for their hobbies and they are able to break away from children.

# Chapter 3

## Methodology & Data Description

In this section we present methodology and describe data which will be used for estimate of the model.

### 3.1. Methodology

In this section we describe the identification strategy, which will be used in the empirical analysis. The objective of our study is to estimate the causal effect of number of children in family on wellbeing of mothers and fathers. Family size can also influence financial situation of family. Our other aim is thus examining hypothesis if big family automatically means poor family. To estimate the effect, we use techniques of econometric analysis.

In our empirical analysis we use linear regression model to estimate the effect of family size on wellbeing. Graham (2005) indicates the simple general micro econometric equation of happiness as

$$W_{it} = \beta_0 + X_{it}\beta + \varepsilon_{it}, \quad (3.1)$$

where  $W$  is the reported wellbeing, which we want to examine,  $X$  is a vector of variables from sociodemographic or socioeconomic areas, which can have impact on our dependent variable  $W$ ,  $\beta$  is coefficient and in  $\varepsilon$  there are unobserved characteristics, which are not mentioned in the equation. Unobserved characteristics can contain various personal characteristics, life expectations, specific behavior and other properties, which can influence dependent variable. These attributes are not our principal goal of examining and thus they are included in the error term.

Equation (3.1) presents classical ordinary-least square (OLS) regression equation. Using ordinary-least square equation is appropriate only in case when explanatory variables are exogenous. This is the main condition for consistency of OLS estimation. Exogenous variables are variables uncorrelated with the error term. In general it means that  $x$  has an effect on  $y$  and  $\varepsilon$  has an effect on  $y$  as well, but between  $x$  and  $\varepsilon$  there is no association.



When we add explanatory variables, which are described in chapter 3.2, into the equation (3.1), our estimated model will contain seven explanatory variables. They are number of children, age and age-squared, income, health condition and then some dummy variables. Dummy variable for gender (“1” if woman, “0” if man), dummy variables for marital status (“1” if married and “0” otherwise - single, divorced or widowed), dummy variable for twins (“1” if twins, “0” otherwise), dummy variable for education (“1” if high school or university, “0” if elementary school).

When we check all variables included in the model, we can see the problem of endogeneity. It is highly probable that our main explanatory variable, which is the number of children, is endogenous. It means that in error term there is hidden some unobserved variable, which is correlated with the variable number of children. It can be social status, education, income, employment and so on.

In order to ensure that our estimation results will be unbiased and consistent, we need to remove endogeneity from the model. In the econometric theory there exist several ways how we can solve endogeneity. One could develop a model with structural specification. It is more laborious as we need to develop a model by adding specifying equations, which should explain the correlation between explanatory variables and the error of term. Other way is to use instrumental variable. In practice using instruments is the most often used method for solving of endogeneity problem in the model. It is easier and not a complicated econometric method (Greene p.222).

For solving endogeneity issue in our model, we use instrumental variable method. We identified endogenous variable in the model, and now we need to find a good instrument for the number of children. Instrumental variable should be correlated with the endogenous variable  $x$ , but it should be uncorrelated with the error term. Finding the correct instrument is not easy and therefore we look for inspiration in the literature, where problem of the endogeneity of number of children is solved. In growing literature we can find two most often used instrumental variables for endogeneity in family size. The most often used strategy for solving endogeneity is using multiple births (Rosenzweig&Wolpin 1980) or using gender mix (Angrist&Eva, 1998). It is possible to use twins or higher order births. Using twins as instrument variable is the most frequently method, which is mentioned in many studies as for example Bronars and Grogger (1994), Angrist and Evans (1998), Jacobsen et al. (1999) or Caceres-Delpiano (2006). Angrist&Evan (1998) recommend using gender mix as an instrumental variable for the fertility.

To address the possible endogeneity in family size we will use “multiple births” as exogeneous origin of variation in family size similarly as Rosenzweig&Wolpin (1980). In our model we use only twins, because triplets or quadruplets are not present in our data. Instrumental variable twin is correlated with the number of children, but it is not correlated with any other individual characteristics included in error term. Twins hardly influence characteristics as education, employment, social status, or environment where people live. We can imagine for example situation when some woman lives in environment, where the only one objective is taking care of children and household. This environment can be characteristics, which can significantly influence number of children of this woman. But it cannot influence that woman has twins.

Our instrumental variable method can be represented by equations (3.2) and (3.3). First stage of the IV estimation presents equation (3.3) and the second stage of IV is presented by equation (3.2).

$$Wellbeing = \beta_0 + X\beta_1 + \beta_2 no.children + \varepsilon \quad (3.2)$$

$$No.children = \alpha_0 + X\alpha_1 + \alpha_2 Multi.birth + v, \quad (3.3)$$

Where vector X from both equations consists of sociodemographic characteristics such as an age, income, gender, marital status, education, health condition and  $\alpha$  and  $\beta$  are coefficients. In the equation (3.2) and (3.3) are  $\varepsilon$  and  $v$  random variables. Number of children is instrumented by multiple births. Instrument multiple births is a good instrumental variable for the number of children as it is something not planned, it is very random and in many cases it is very hard to affect. In the literature we can meet two opinions about casualness of multiple births. There exist two types of twinning, one is dizygotic and second is monozygotic. Monozygotic twins are considered as a random (Tong & Short, 1998), but dizygotic not, because they can depend mainly on increasing age of mothers or fertility treatments (Fauser *et al.*, 2005, Reddy *et al.*, 2005).

One big disadvantage for this instrument is that if partners give preference to assisted reproduction, there is a big chance, that mother will give birth to twins or triplets. As we do not have evidence about parents, who have children due to this medical help, we cannot restrict them from the model. As the Institute of Health information and Statistics of the Czech Republic indicates in their publication of Assisted Reproduction in the CR 2013, the percentage of births of one embryo from all births is 88.3% for women under 34 years old. For older women is this percentage a little higher. The percentage of births of two embryos from all births is 11.6% and

the percentage of births of three embryos from all births is 0.1 %for women under 34 years old. We suppose, this findings do not have significant impact on our research and it will not distort the overall analysis.

Our origin hypothesis tests different effect of the number of children on women and men. To found out the difference between the effect of children on women and men, we extend model about other variable, what is “*the number of children x female*”. On the basis of this model we can interpret effect for women and separately effect for men. Other possible solution is to estimate models separately for women and for men. In the section robustness checks are these models estimated, separately for men and for women, but we discuss reasons, why this solution is not optimal and why is better to use model with interaction “*number of children x female*”.

In the previous model we have a single endogenous explanatory variable, but now we have multiple instrumental variables. Thus we use 2SLS estimation as we have two instrumental variables: “*multiple births*” and “*multiple births x female*”. The first stage is to estimate the regressions in (3.5 and 3.6) and second stage is the OLS estimation (3.4). Our new 2SLS model has following form:

$$Wellbeing = \beta_0 + X\beta_1 + \beta_2 no.child \ x \ female + \beta_3 no.children + \varepsilon \quad (3.4)$$

$$No.child \ x \ female = \alpha_0 + X\alpha_1 + \alpha_2 Multi.birth\_female + v \quad (3.5)$$

$$No.child = \gamma_0 + X \gamma_1 + \gamma_2 Multi.birth + u \quad (3.6)$$

Where vector X from equations (3.4), (3.5) and (3.6) consist the same characteristics described in the equation (3.2), and  $\alpha$ ,  $\beta$ ,  $\gamma$  are coefficients. In the equation (3.4), (3.5) and (3.6)  $\varepsilon$ ,  $v$ ,  $u$  are random variables.

Our other interest is in estimating the effect between income and number of children. We test the hypothesis whether the big family automatically means poor family. Our sample contains 1298 households. We use linear regression model to estimate the effect of family size on income of parents. Equation (3.9) presents classical ordinary-least square (OLS) regression equation

$$y_{it} = \beta_0 + X_{it}\beta + \varepsilon_{it}, \quad (3.9)$$

where  $y$  is the household income,  $X$  is a vector of variables such as number of children, education separately for men and for women and health condition separately

for men and for women,  $\beta$  is coefficient and in  $\varepsilon$  there are unobserved characteristics, which are not mentioned in the equation.

Because our key explanatory variable is again the number of children, we run OLS model, and also IV model. For this estimation we use again instrument twins as a variation in family size. Our estimated equation has the following form:

$$Income = \beta_0 + X\beta_1 + \beta_2 no.children + \varepsilon \quad (3.10)$$

$$No.children = \alpha_0 + X\alpha_1 + \alpha_2 Multi.birth + v \quad (3.11)$$

### 3.2. Data and variables description

This paper uses data from The Survey on Income and Living Conditions (SILC) provided by the Czech Statistical Office. There are non-public micro data. We are interested in year 2013, because only in this year, survey was extended about questions relating with wellbeing. The Survey collected information about socio-demographic characteristics of individuals and households, housing characteristics, household amenities and data on labor, financial and health conditions of adults and children.

The SILC data contains two types of observations. First dataset contains information about households and second about individuals living in these households. Dataset contains 8275 households and 19105 individuals. Both datasets contains much useful information, which are usable for analysis. Dataset households includes information as the number of members in the household, household type, type of flat/house, housing costs, information about equipment of flat, income of households, work activity of head of family and so on.

Dataset individuals contain more detailed information about individuals within household. It includes information about individuals, type of employment, relationship to the head household (husband, wife, children, other relatives living in common household), if he/she is parent or not, age of all members of household, gender, marital status, nationality, education, economic activity, income of all worked individuals and for us important module wellbeing. Module “wellbeing” is divided on more questions. There is question on overall wellbeing, but also questions on level of satisfaction with living, with employment, with free time, with relationships, with financial situation and so on. Also it contains questions about meaningfulness of life,

expected life situation, how feeling they had for last four weeks, and other interesting questions about life satisfaction.

For our analysis, we use only data for individuals. The main units of observations are women and men between the ages of 20 and 46. Younger mothers and fathers are restricted from the sample, because there is high probability that they live in the same household with their parents. Mothers and fathers, which are older than 46, are restricted as well, because there is possibility their children are adults and independent. Our interest is only in people, who have at least one child living in their household and children are not older than 19 years old. Older children are removed. There is high probability that they are already employed and parents care for them no longer, although they can live in one household. Other reason of removing older children is that they can have only permanent address at parents, but they can live in different town or country. In case human has one child till 19 years old and one child older than 19 years old, we deleted older child and left only younger child.

The data used in the empirical part are cross-sectional micro-empirical data. After restrictions and adjusting data we chose 3209 units of observations including men and women. These observations satisfy requirements for our research. Observed people are in the age between 20- 46, they are parents and they have at least one child no older than 19 years old. We also adjusted data to receive information if there exist multiple births in family. This edit ensures using multiple births as a source of variation in family size. In case children have the same age, we assume they are twins. Probability that in one household living children with the same age and they are not blood relatives is negligible.

## **Variables Description**

### ***Dependent variable***

In our research, dependent variable is “wellbeing” particularly for men and women. The module wellbeing measures the level of satisfaction with selected areas of life using the scale starting from 0 (completely dissatisfied) up to 10 (completely satisfied). This variable reflects the overall satisfaction of respondents with their life. Our sample of observations consists of 3209 individuals, 1408 men and 1801 women. More women means that we did not consider only full traditional families, but also single parents, who are usually mothers. We are interested only in individuals, who are parents, because our main research is to find out relationship between number of children and parent’s wellbeing. We are interested in family size.

***Key explanatory variable***

To find out which determinants have significant effect on wellbeing, we chose from SILC data seven variables which are expected to affect wellbeing. Our first explanatory variable is the number of children. By this variable we explain if family size has positive or negative effect on wellbeing of individuals. To avoid endogeneity of this variable in the model, we chose twin birth as an instrumental variable. In our sample, we have 116 respondents who have twin births.

***Other independent variables***

Other variables are age and age squared. We assume feeling of happiness is changing with the age. Age plays important role in satisfaction of life. Gender is other variable in case of our model, which includes men and women together. Variable income is another variable, which markedly influences happiness. Income represents net income of household.

Marital status (married, single, divorced and widowed), education and health conditions are other independent variables, for which we suppose they have considerable effect on satisfaction. Our sample includes 75.13% married people, from that 70.18% married women and 81.46% married men. Single people make up 14.49% of the sample; divorced 9.69% and 0.69% are widowed.

We consider three degrees of education, elementary school, high school and university. The largest percentage generates people with high school (42.16%), then people with elementary school (41%) and the smallest percentage form university educated people (16.84%).

Health condition is divided into three groups as great health condition, good health condition and bad health condition.

## DESCRIPTIVE STATISTICS

**Table 1: Descriptive statistics**

Variables	Mean	Std. dev.	Min.	Max.
Wellbeing	5.15	3.66	0	10
Number of children	1.72	.74	1	7
Age	36.93	5.32	20	46
Married	0.75	0.43	0	1
Single	0.14	0.35	0	1
Divorced	0.10	0.29	0	1
Widowed	0.00	0.08	0	1
Education	0.76	0.72	0	2
Health	1.34	1.06	0	5
Income	233338	166388.4	5000	2488959

*Notes: N=3290.*

### 3.3 Validity of the instrumental variable

Before the estimation of results, we discuss the validity of the selected instrumental variable. As we mentioned above, in the literature we can find two types of instrumental variables, which are used for models dealing with the fertility. We decided to use twins as an instrumental variable. To obtain unbiased estimates, we need a valid instrument. Otherwise, we could get unreasonable and erroneous results. In general, a good instrument has to satisfy two assumptions:

**Assumption #1 Instrument relevance:**  $Cov(Z_i X_i) \neq 0$

Valid instrument is highly correlated with the endogenous variable. This assumption is tested in the first-stage of regression using the F-statistic. For this assumption it is important to have large sample size. In other case, instrument explains only small variation in X, and instrument can become a weak instrument.

In our case, twin instrumental variable is valid instrument with p- value equal to 0.00 and t-value with 11.12. The problem is with our  $R^2$  what is quite low with value 0.1206. It means that our model is explained only in 12.06%. Simple rule of thumb says that if F-statistic exceeds the value 10, then, instrumental variable is not weak. In our case the F-statistic in the first stage is 40.53 for married people and 33.21 for single, divorced and widowed individuals and thus we do not worry about weak instrument.

**Assumption #2 Instrument exogeneity:**  $Cov(Z_i \varepsilon_i) = 0$

Valid instrument is uncorrelated with the error term. To say that our instrument satisfies this requirement, we need to have very strong theoretical arguments. In general this assumption cannot be tested. Only in case we have more instruments than repressors, we can use Hansen J-test for over identification test. Our model contains only one instrument, so we cannot use J-test and we cannot test this assumption. We can only rely on previous studies, where twin is considered as a valid instrument. Twins are in general random and it is unlikely that they are correlated with other determinants.



# Chapter 4

## Results

In this section we present the main results of the econometric analysis which was obtained based on the methodology outlined in the chapter 3.1. We test three hypotheses. First two hypotheses relate with the effect of family size on parent's wellbeing, where in the first hypothesis is examined the effect on parent's wellbeing and second hypothesis examines the different effect on wellbeing on men and on women. Our assumption about expected results is different in comparison with the literature. Third hypothesis test the effect of the number of children on income of household. Last part of this section includes robustness checks.

Hypothesis # 1 *"The family size has significant effect on parent's wellbeing."* In contrast with the current researches, which say that children have a negative impact on the well-being of parents, our assumption is just the opposite. We suppose that children positively influence parent's wellbeing.

Hypothesis # 2 *"The effect of family size is different for men and for women."* We assume that how women perceive children, is significantly different than how men perceive them. We suppose that number of children has positive effect on wellbeing of mothers and neutral effect on fathers. For fathers it means that children do not have any impact on how they perceive overall life satisfaction.

Hypothesis # 3 *"Big family is poor family."* We assume, that in the case that family has more than 2 children, it means for household higher cost of living. Also children present higher time costs on their upbringing and parents have not so much time on their career, especially women. Our expectation from the result of this hypothesis is the same as we can find it in the literature.

Below are our results and comments if our hypotheses are valid and they confirm our assumptions about family size and wellbeing and family size and income of households.

## 4.1. Wellbeing and number of children

Standard procedure for instrumental variable regression is running also OLS regression before we start with the interpreting results from IV estimation. This provides us comparison of results between OLS and IV estimation. We test the hypothesis if “*The family size has significant effect on parent’s wellbeing.*” Table 2 shows results from regression of ordinary-least square and table 3 represents results from instrumental variable regression. To check if there is further endogeneity problem in the model resulting from omitted variables, we gradually add other variables into model. We can see how coefficient of our key explanatory variable “number of children” is changed by adding other variables into the model. In case the coefficient changes significantly, for example it changes sign, then it would mean that added variable was truly missing in the previous model and caused endogeneity. The coefficient for “number of children” could incorporate some effects of the omitted variable. This approach is the same for OLS and for IV regression.

In table 2 we can see estimated outputs of six models. Our interest is in the variable “*number of children*”. Gradually adding variables into model, we can see how this coefficient was changing. Values of this coefficient are not significantly different, so we do not assume that some of added variable were causing endogeneity, when omitted from the model. First model includes four variables. When we add variable income into second model, the negative effect of the number of children increases from -0.016 to -0.019, what is really negligible change. By adding other variables such as “*marital status*”, “*education*” and “*health*”, our key coefficient has stronger negative effect, but it is not significantly changed. In the next text, we interpret only the full model (with all variables included), which is shown in columns 5 and 6.

At first we focus our attention on checking the goodness-of-fit of the model, what is represented by R-squared. In our model with all included variables (column 5 and 6), R-squared is 0.49. This means that the model explains about 50% of the variability in reported wellbeing. This result is satisfying, especially, that our analysis is from behavioral economics field. A human feeling is difficultly predictable and lower R-squared does not mean that our model is not sufficiently explained. In comparison with our small sample is our R-squared adequate.

**Table 2: OLS estimation**

	1	2	3	4	5	6
No child.	-0.016 (-0.18)	-0.019 (-0.22)	-0.031 (-0.36)	-0.037 (-0.41)	-0.075 (-1.09)	-0.075 (-1.09)
Gender	1.954*** (15.10)	2.158*** (15.30)	1.999*** (13.56)	1.956*** (13.12)	0.615*** (5.20)	0.616*** (5.20)
Age	0.363*** (2.74)	0.326** (2.46)	.0311** (2.36)	0.287** (2.17)	0.251** (2.54)	0.250** (2.52)
Age <sup>2</sup>	-0.005*** (-2.75)	-0.005** (-2.52)	-0.004** (-2.41)	-0.004** (-2.27)	-0.004*** (-3.22)	-0.004*** (-3.20)
Income		1.440*** (3.32)	5.380 (1.12)	4.780 (0.99)	9.970*** (2.90)	1.000*** (2.91)
Married			0.260* (1.84)		0.540*** (4.64)	
Single				-0.509*** (-2.79)		-0.548*** (-3.57)
Divorced				0.067 (0.35)		-0.519*** (-3.09)
Widowed				0.102 (0.16)		-0.700 (-1.30)
Educ-high			0.553*** (3.96)	0.547*** (3.92)	0.854*** (8.24)	0.853*** (8.23)
Educ-un.			1.179*** (6.18)	1.188*** (6.22)	1.526*** (11.03)	1.525*** (11.02)
Health					2.318*** (39.51)	2.318*** (39.19)
R-squared	0.073	0.076	0.089	0.091	0.490	0.490

Notes: N=3209. T-statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%, (\*\*\*) significant at 1%;;

When we look only at the full model (columns five and six in table 2), we can see that our key explanatory variable “*number of children*” shows negative effect on wellbeing. It says that every additional child decreases wellbeing by about 0.075. This number is close to zero, thus we can say that the effect is negligible. P-value of this coefficient is 0.275, what means that our variable is not statistically significant.

This higher p-value combined with low point estimate demonstrates that number of children does not have significant impact on parent's wellbeing, on average. Possible explanations about insignificance of this coefficient are discussed in chapter 5. Other coefficients are statistically significant.

Because we know, that in our model the variable "*number of children*" is endogenous, thus our deeper interest is interpreting results from the instrumental variable estimation. R-squared is 0.49 what is the same as in OLS estimation. This value is for us satisfying. Table 3 shows again six models into which we add gradually explanatory variables. Also in IV models, we do not see any significant change after gradually adding variables into models.

Our full model (columns five and six in table 3.) shows negative effect of the "*number of children*" on wellbeing. It says that every additional child decreases wellbeing by about 0.003. But this value is extremely low and it is factually zero. From SILC survey we know, that evaluation scale of wellbeing is from 0 to 10 and decreasing wellbeing by about 0.003 means very little impact. P-value of this coefficient is higher than in OLS estimation. P-value is 0.989, representing very high value and it means that our variable is not statistically significant. Insignificance of this coefficient can have four possible explanations. 1) First explanation, which just shows high p-value, is that family size has no effect on wellbeing of parents, on average. 2) Other possible explanation is that we have small sample of households with twins and thus it shows statistically not significant coefficient. 3) Other no less important reason is that there is different effect for men and for women and thus we believe that our extended model from the second hypothesis will help to shed some light. Extending model with other variable allows us estimating the effect separately for women and for men. Second hypothesis with extended model is discussed in the chapter 4.2. 4) The last possible explanation can be that we have weak instrument, but we disclaimed already this assumption in the chapter 3.3 where we examine validity of the instrumental variable. In this chapter we incline to the explanations 1) and 2).

**Table 3: IV estimation**

	1	2	3	4	5	6
No.child	-0.137 (-0.37)	-0.186 (-0.50)	-0.215 (-0.57)	-0.235 (-0.62)	-0.003 (-0.01)	-0.003 (-0.01)
Gender	1.946*** (14.82)	2.148*** (15.09)	1.99*** (13.58)	1.951*** (13.12)	0.617*** (5.21)	0.618*** (5.21)
Age	0.402 ** (2.30)	0.380** (2.18)	0.367** (2.14)	0.346** (2.03)	0.229* (1.88)	0.228* (1.87)
Age <sup>2</sup>	-0.006** (-2.32)	-0.005** (-2.23)	-0.005** (-2.18)	-0.005** (-2.11)	-0.004** (-2.42)	-0.004** (-2.41)
Income		1.450*** (3.37)	5.620 (1.18)	5.020 (1.05)	9.870*** (2.86)	9.920*** (2.87)
Married			0.299* (1.83)		0.525*** (4.11)	
Single				-0.558*** (-2.74)		-0.530*** (-3.21)
Divorced				0.033 (0.16)		-0.506*** (-2.92)
Widowed				0.083 (0.14)		-0.693 (-1.28)
Educ-high			0.538*** (3.78)	0.530*** (3.73)	0.860*** (8.17)	0.859*** (8.16)
Educ-univ			1.171*** (6.12)	1.179*** (6.16)	1.529*** (11.04)	1.528*** (11.04)
Health					2.318*** (39.45)	2.317*** (39.16)
R-squared	0.072	0.075	0.077	0.089	0.490	0.490

Notes:  $N=3209$ .  $T$ -statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%, (\*\*\*) significant at 1%;

In table 3, we can see other explanatory variables, which have impact on wellbeing. All these variables are statistically significant except for variable “widowed”. The variable age shows that with each added year human’s wellbeing is increasing. Variable age is significant at 10% significant level ( $p=0.061$ ). Because we have small sample size we can consider this 10%-significance level as adequate. For wellbeing this variable has positive effect. Wellbeing increases by about 0.228 with each added year. Age-squared shows that if person is older, then wellbeing is decreasing. This variable is significant at 5% level ( $p=0.016$ ). Age and age-squared represent typical inverted U-curve. Positive effect of age on wellbeing is positively increased till the certain age, then it is decrease and it can have negative effect. Only as an interesting fact, we calculated the top of the inverted U-curve. The result is that in 54 years, wellbeing start to decrease. Because we have people from 20 to 46 years

old, this computation is only hypothetical. In case we would have sample with people till 60 years old, we can assume that the top of inverted U-curve would change and probably age would increase.

Other statistically significant coefficient is gender ( $p=0.000$ ). It indicates that women are on average happier than men and their happiness is higher by about 0.618 points in comparison with men. Income is other variable, which is statistically significant at 1% on significance level ( $p=0.004$ ). This result is understandable. If incomes are growing, people are more likely to meet their needs and preferences and consequently their satisfaction is higher. We can say that if income raises by about 10 000 CZK, wellbeing increases by about 0.00987. Interestingly, income does not seem to have large impact on the wellbeing.

In table 3 we can see the impact of marital status on wellbeing. We examined four states: married, single, divorced and widowed. All coefficients are statistically significant except for widowed status. We do not think that widowhood does not have any impact on wellbeing. It certainly has and we believe that very significant. The reason why our coefficient is not significant in this estimation is that we have in our small sample only few widowed people. In case we would have more widowed people in the sample, we suppose that this coefficient would be significant and it would have negative effect on overall happiness. We can see that negative effect is in OLS and IV estimation. Variable “*Married*” is significant at 1% significance level ( $p=0.000$ ). It means that if people are married, then their wellbeing increase is by about 0.525 against people who are not married.

In case parents have status “single” or “divorced”, than wellbeing is lower than it is in case they are married. It can have many logical explanations, mainly for women. Single or divorced mothers face financial problems; they are bringing up children without partner’s help and so on. We suppose that if we would have in the sample childless single or divorced people, their wellbeing might not to be negative.

Education is in both models significant at 1% significance level. IV method gives us better results. Education has positive impact on overall wellbeing. People with university degrees and with high school are happier than people only with elementary school. It can be influenced also by the fact, that people with university degree have lower risk of unemployment than people with elementary school. University education in average increases wellbeing by about 1.528 against people who have only elementary school.

All these variables seem to be logical except for health variable. We obtained interesting result about relationship between health condition and wellbeing. Worse health status appears to positively affect wellbeing. Both estimations shows us statistically significant coefficient at 1% significance level. There does not exist a logical explanation, why people, who suffer from poorer health, are feeling with their life happily. We checked raw data, and really, people with worse health status, marked their wellbeing with higher number. Other explanation can be that people understood oppositely the scale of health in questionnaire and they confused what numbers mean. In the SILC survey, respondents should mark their health condition on scale from 1 (good health) to 5 (very bad health). Our coefficient shows that if our health worsen about one degree, than our wellbeing increases by about 2.318. Another possible explanation is that people with worse health state tend to appreciate so-called little things of life more than people with normal health condition and they are very happy for these things.

We also tested Hausman test in order to find out if it is necessary to use instrumental variable estimation. We do not see any significant difference between these two estimations and thus we cannot reject null the hypothesis on the basis of Hausman test. Null hypothesis represents the situation that both the OLS and IV estimation provide similar results. On the basis of this test, we can see that our results seem to be similar. It can be either because there was no endogeneity or because the IV estimation does not work as we expected. Other reason is that the instrumental variable, in our case “*twins*” is also endogenous or because we have weak instrument. We disclaim last assumption as the validity of the instrumental variable was solved in the chapter 3.3 and we found out that our instrument is not weak.

Result of this Hausman test is surprising, because we expected that the variable “*number of children*” is endogenous. In the literature we can find many researches where number of children is proved to be an endogenous variable. Thus we continue with the assumption that number of children is endogenous variable. The coefficients in IV estimation are much stronger, they are much more negative coefficients, than in OLS in all specifications, but the one with health not. As health variable is problematic, we would not consider this. So the difference between OLS and IV seems to exist.

## 4.2. Wellbeing and number of children with interaction

This section test hypothesis “*The effect of family size is different for men and for women.*” We want to examine if effect is significantly different for women and for men. In the previous chapter, our key explanatory variable “*number of children*” appears statistically not significant. Thus, we want to research possibilities, why this coefficient is insignificant, to greater extent. We extend the current model with other variable. We create other variable “*number of children x female*” which represents the effect of children on women’s wellbeing. Adding interaction into the model, we can see the difference between effect of children on women’s and men’s wellbeing. In the previous model, in the variable “*number of children*” averaged the effect of men and of women together and we were not able to say if the effect on women is the same as the effect on men. The negative effect could exceed positive effect. This interaction helps to find out it.

Also in this section we proceed as in the previous subchapter. We estimate six models by gradually adding variables into model. At first we run OLS regression, which is represented in the table 4 and then 2SLS regression what is represented in table 5. In OLS model we can see that coefficients “number of children” and “number of children for women” are statistically significant at 1% significance level. Also other variables are significant as well. Because we tested also Hausman test and we received again similar results as in the chapter 4.1, we also report OLS results only for comparison. However, our deeper interest is in 2SLS results.



**Table 4: OLS estimation with interaction**

	1	2	3	4	5	6
No.child	-0.263* (-1.82)	-0.299** (-2.07)	-0.316** (-2.18)	-0.317** (-2.18)	-0.273*** (-2.77)	-0.273*** (-2.77)
Child_fem	0.442** (2.46)	0.502*** (2.77)	0.512*** (2.85)	0.504*** (2.81)	0.356*** (2.63)	0.356*** (2.63)
Gender	1.193*** (3.54)	1.309*** (3.87)	1.132*** (3.35)	1.103*** (3.26)	0.014 (0.05)	0.014 (0.06)
Age	0.341*** (2.57)	0.299** (2.25)	0.283** (2.15)	0.261** (1.97)	0.232** (2.35)	0.231** (2.33)
Age <sup>2</sup>	- 0.005*** (-2.57)	-0.004** (-2.30)	-0.004** (-2.19)	-0.004** (-2.06)	-0.004*** (-3.01)	-0.004*** (-3.00)
Income		1.560*** (3.64)	6.480 (1.38)	5.890 (1.25)	1.070*** (3.14)	1.080*** (3.15)
Married			0.249* (1.75)		0.532*** (4.56)	
Single				-0.491*** (-2.68)		-0.535*** (-3.47)
Divorced				0.070 (0.37)		-0.516*** (-3.07)
Widowed				0.076 (0.12)		-0.718 (-1.33)
Educ-high			0.561*** (4.03)	0.555*** (3.99)	0.859*** (8.31)	0.859*** (8.30)
Educ-univ			1.188*** (6.25)	1.196*** (6.28)	1.532*** (11.11)	1.530*** (11.09)
Health					2.315*** (39.46)	2.315*** (39.14)
R-squared	0.074	0.078	0.092	0.093	0.49	0.49

Notes: N=3209. T-statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%, (\*\*\*) significant at 1%;

In case of extended model in 2SLS estimation, our other explanatory variable “*number of children x female*”, is statistically significant at the 10% significance level (p=0.063 for model with variable married and p=0.062 for model with variables single and divorced). Our sample contains 3209 observations, what seems not to be very large sample and thus we consider significance at the 10% significance level as relevant. In this model we can see that number of children positively influences wellbeing of their mothers. Every additional child increases wellbeing of mothers by about 0.469. This value is mathematical subtraction of coefficient “*the number of children*” and “*the number of children x female*”. For instance, if mothers evaluate their wellbeing by the number “6” on the scale from 0 to 10, then additional born

child increase their wellbeing almost to the number “6.5”, being an important growth. Consequently, the negative coefficient for variable “number of children” must be driven by the effect on wellbeing of fathers. Moreover, it seems plausible that the different effect on wellbeing of mothers and fathers causes the insignificance of the coefficient “*number of children*”. With regard to the relatively small sample size, p-value is, however, low enough to suggest that negative effect on father’s wellbeing exists. However, we examine it more in the chapter 4.4 Robustness checks.

**Table 5: 2SLS estimation with interaction**

	1	2	3	4	5	6
No.child	-0.738 (1.29)	-0.866 (-1.49)	-0.880 (-1.48)	-0.901 (-1.52)	-0.478 (-1.40)	-0.478 (1.40)
Child_fem	1.211 (1.63)	1.349* (1.78)	1.326* (1.74)	1.331* (1.75)	0.944* (1.86)	0.947* (1.86)
Gender	-0.133 (-0.10)	-0.127 (-0.10)	-0.249 (-0.19)	-0.299 (-0.23)	-0.977 (-1.13)	-0.978 (-1.13)
Age	0.319* (1.80)	0.283 (1.60)	0.274 (1.59)	0.255 (1.48)	0.163 (1.28)	0.163 (1.28)
Age <sup>2</sup>	-0.004* (-1.80)	-0.004 (-1.62)	-0.004 (-1.60)	-0.004 (-1.53)	-0.003** (-1.76)	-0.003* (-1.76)
Income		1.760*** (3.89)	8.390* (1.73)	7.870 (1.62)	1.180*** (3.36)	1.190*** (3.38)
Married			0.254 (1.53)		0.492*** (3.76)	
Single				-0.491** (-2.37)		-0.484*** (-2.84)
Divorced				0.055 (0.27)		-0.489*** (-2.80)
Widowed				0.021 (0.03)		-0.735 (-1.35)
Educ-high			0.566*** (3.98)	0.559*** (3.94)	0.879*** (8.27)	0.879*** (8.26)
Educ-univ			1.197*** (6.26)	1.204*** (6.29)	1.546*** (11.14)	1.544*** (11.13)
Health					2.309*** (38.98)	2.309*** (38.71)
R-squared	0.069	0.071	0.073	0.086	0.487	0.487

Notes:  $N=3209$ .  $T$ -statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%, (\*\*\*) significant at 1%;

Other discussions about our estimated results of family size are mentioned in the chapter 5. When we look on other variables, only gender, age, and widowed are statistically insignificant. Other variables remain statistically significant as in the previous model without added interaction.

### 4.3. Income and number of children

Our second hypothesis which we test is “*The big family is poor family*”. We expect that if family has more children, then their income of household decreases. It is a general view on large families. In our model we omitted incomplete families and leave only complete families. Our sample contains 1298 households. Our dependent variable is “*income of household*” and explanatory variables are *number of children, education of men and of women and health also separately for men and for women*. Our results from the estimation are surprising and our hypothesis is not confirmed. We assumed that every additional child decreases income of household, but the opposite is true.

**Table 6: Income and number of children**

	OLS	IV
No of children	14089.13* (1.78)	40776.24 (1.46)
Women_educ_high	44691.97*** (4.19)	48126.98*** (4.47)
Man_educ_high	65373.16*** (5.45)	64290.97*** (5.39)
Women_educ_univ	118830.40*** (5.45)	124492.30*** (5.59)
Men_educ_univ	177468.30*** (7.86)	172261.20*** (7.59)
Women_health	-13338.91** (-2.35)	-14328.87** (-2.50)
Men-health	2202.26 (0.47)	2251.94 (0.48)
R-squared	0.179	0.172

Notes:  $N=1298$ .  $T$ -statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%,

(\*\*\*) significant at 1%;

Table 6 shows comparison between OLS and IV estimation. For this model we do not add gradually other variables. Our variables are different than in previous models and we do not expect that coefficient “*number of children*” should significantly change by gradually adding other variables.

OLS estimation shows significant results with the positive effect. It is significant at 10% significance level ( $p=0.075$ ). It means that if a family has more children, then they have higher incomes. In this case it means that every additional child increases income of family by about 14089 CZK. On the other hand, IV estimation shows positive effect, but with insignificant results. We can interpret this insignificance as a situation in which additional child does not have impact on family’s income. The p-value of number of children is 0.146 that is not as high value as to ignore the fact that if people have more children, it motivates them to increase their incomes. Every additional child increases income of household by about 40776 CZK, being really high value. This value seems to be unreal. Probably in case we have larger sample size, our coefficients would be significant but with lower value.

When we leave stereotypical thinking about big families and if we meditate about sample of people in our model, then our results can make a sense. If it is true that twins from our sample are more likely to be born to people undergoing artificial insemination, then this insemination will probably undergo most probably educated couples with more career opportunities. It would explain the positive effect on the wellbeing of mothers. Other conceivable explanation is Planned Parenthood. At present there is a trend to plan family and children in advance. People have opportunity to study, find a well-paid job. They can decide how many children they want and how many children they can afford. We again claim that if we would have a larger sample size of people, our results might become statistically significant.

Table 6 presents effects of other variable, which are statistically significant. Results of variable education confirm general rule about education. The higher educated person is the higher salary he has. Other general rule is confirmed in case of wage discrimination of women. When we compare educated men and women, we can see significant difference between their wages. Variable health has negative impact on income for women, meaning in this case that with worse health condition, income is decreasing. This coefficient is logic, because if people are ill long term, it is influencing income in the form of lower amount on pay slip or in the form of purchased medications. For men, variable health is positive, but insignificant.

Also for this model we test Hausman test and again we receive insignificant difference between OLS and IV model.

## 4.4. Robustness checks

In this section we present additional regressions, which help us to check results of our previous estimated models. First two models are regressions separately for men and for women. In third model we test if there is any significant difference if we remove income from our regression. We were worried about the fact that income can be endogenous variable and our results could be biased. Other reason of this check is that in our dataset we have some people who have income with zero value and it is questionable if certain person has or has not any income. Thus we exclude incomes with zero values from the previous models.

In Table 7 and Table 8 we present robustness check for model examining effect of wellbeing separately for men and for women. We can see only statistically significant effect for men in OLS estimation. Also for this separate model, we can see negative effect for fathers. We can conclude that our previous estimations correctly show negative effect for men. Regards to women's wellbeing, we have statistically insignificant coefficients for both estimations. Our previous estimation was correct as we identify positive effect for women. Disadvantage of these models is that our sample size is divided on half of sample size and thus we can expect generally lower significance of coefficients.

This check can also help us to see differences between men and women, not only for variable number of children. We can look at other variable and we can see surprising finding. In table 7 we can see statistically significant coefficient "*widowed*" which has positive effect. It is surprising, because it means that widowed men have higher level of wellbeing than married. When we checked our dataset, we see only few widowed people and our conclusion is that these people can be exceptions. We do not have information, how many years they are widowed. We believe that after longer time, wellbeing of people can change and return back to the previous state.

**Table 7: Comparison of OLS and IV estimation for men**

	OLS	IV	OLS	IV
No of children	-0.239** (-2.50)	-0.376 (-1.28)	-0.242** (-2.52)	-0.353 (-1.20)
Age	0.171 (1.19)	0.205 (1.31)	0.175 (1.23)	0.203 (1.30)
Age <sup>2</sup>	-0.003 (-1.50)	-0.003 (-1.59)	-0.003 (-1.51)	-0.003 (-1.56)
Income	1.38e-06*** (3.50)	1.42e-06 *** (3.55)	1.39e-06*** (3.48)	1.42e-06 *** (3.52)
Married			0.119 (0.64)	0.138 (0.71)
Single	-0.307 (-1.31)	-0.329 (-1.37)		
Divorced	0.284 (1.01)	0.260 (0.91)		
Widowed	4.037*** (18.57)	3.975*** (15.68)		
Education-high school	0.594*** (4.00)	0.589*** (3.98)	0.596*** (4.01)	0.592*** (3.99)
Education -university	0.935*** (4.69)	0.936*** (4.71)	0.927*** (4.67)	0.928*** (4.68)
Health	2.777*** (28.85)	2.775*** (28.96)	2.783*** (29.00)	2.78*** (29.09)
R-squared	0.590	0.590	0.589	0.802

Notes:  $N=T$ -statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%, (\*\*\*) significant at 1%;

**Table 8: Comparison of OLS and IV estimation for women**

	OLS	IV	OLS	IV
No of children	0.066 (0.69)	0.416 (1.04)	0.065 (0.69)	0.411 (1.03)
Age	0.379*** (2.86)	0.247 (1.27)	0.378*** (2.87)	0.244 (1.25)
Age <sup>2</sup>	-0.006*** (-3.47)	-0.005* (1.65)	-0.006*** (-3.47)	-0.005 (-1.64)
Income	1.53e-06** (2.34)	1.66e-06** (2.47)	1.51e-06** (2.34)	1.62e-06** (2.46)
Married			0.699*** (4.71)	0.629*** (3.71)
Single	-0.683*** (-3.38)	-0.585** (-2.55)		
Divorced	-0.708*** (-3.61)	-0.662*** (-3.23)		
Widowed	-0.827* (-1.65)	-0.826 (-1.59)		
Education-high school	0.987*** (7.09)	1.026*** (7.05)	0.987*** (7.10)	1.026*** (7.06)
Education -university	1.822*** (9.90)	1.849*** (9.89)	1.823*** (9.92)	1.852*** (9.89)
Health	1.883*** (23.22)	1.876*** (22.83)	1.882*** (23.40)	1.874*** (22.93)
R-squared	0.347	0.342	0.347	0.342

Notes:  $N=T$ -statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%, (\*\*\*) significant at 1%;

Our other check is, if variable “*income*” is endogenous variable and our interest is to find out if our key explanatory coefficient “*number of children*” significantly changes if we exclude variable income. In previous models we gradually added variables to found out if there is any endogenous variable, and we investigated that there are not. Now we consider all variables are exogenous, only income not. Table 9 represents comparison of IV models in case we exclude income from the model (columns 1 and 3) and models, where income is included (columns 2 and 4).

We can see that sign of the coefficient changes after adding income into model and now variable “*number of children*” has negative effect on wellbeing. However, the effect on wellbeing is negligible (close to zero) and, importantly, coefficients are highly insignificant in all cases.

**Table 9: Comparison of IV estimation**

	IV-excluded “income”	IV- included “income”	IV- excluded “income”	IV-included “income”
No of children	0.019 (0.09)	-0.075 (-1.09)	0.018 (0.08)	-0.003 (-0.01)
Age	0.223* (1.94)	0.615*** (5.20)	0.225* (1.92)	0.618*** (5.21)
Age <sup>2</sup>	-0.004** (-2.45)	0.251** (2.54)	-0.004** (-2.44)	0.228* (1.87)
Gender	0.476*** (4.58)	-0.004*** (-3.22)	0.474*** (4.56)	-0.004** (-2.41)
Income		9.970*** (2.90)		9.920*** (2.87)
Married	0.489*** (3.91)	0.540*** (4.64)		
Single			-0.507*** (-3.12)	-0.530*** (-3.21)
Divorced			-0.46*** (-2.72)	-0.506*** (-2.92)
Widowed			-0.544 (-1.01)	-0.693 (-1.28)
Education-high school	0.943*** (9.20)	0.854*** (8.24)	0.943*** (9.19)	0.859*** (8.16)
Education -university	1.672*** (12.64)	1.526*** (11.03)	1.672*** (12.63)	1.528*** (11.04)
Health	2.291*** (38.98)	2.318*** (39.51)	2.29*** (38.72)	2.317*** (39.16)
R-squared	0.4831	0.490	0.4831	0.490

Notes:  $N=3290$  for model excluded income,  $N=3209$  for model included income. *T*-statistics in parentheses. (\*) significant at 10%, (\*\*) significant at 5%, (\*\*\*) significant at 1%;

Including variable “income” into model, it has a little effect on the model as a whole. Since income logically belongs to the model and it is important, the estimates of the main models in the previous section are adequate. As we mention on the beginning of this subchapter, other reason why we exclude variable “income” was, that we have in our dataset also people with zero income and thus we want to see what happens if “income” will be excluded and if dataset with twins will increase. We expected that people who marked zero income could have twins in family. But when we look at table 9 difference is really negligible. Thus we are satisfied that our models include important variable as is income.



We know that our dataset is limited and cannot afford to examine more types of regressions and check how wellbeing is changing. For example, in case we would have larger sample, we could investigate, how different is parent's wellbeing, if they have one child, two children, three children or more children. Interesting results would be in case we have panel data, and we could observe how wellbeing is changing by years. We believe that we would see the different effects in case parents have children in preschool age, teenage age or older. In case of larger simple size it is possible to divide model on more observations and look for differences between parent's wellbeing.

# Chapter 5

## Discussion

In this section we summarize our estimations from the previous chapter and we compare our results with the results of current researches. Based on these results from our estimations, we can see how different is our sample and how difficult it is to predict human behavior. Our research is focused on people and their characteristics. In case our results are different from results of current researchers, it merely proves the fact that every individual is unique with specific characteristics and with specific view on life and his wellbeing. This chapter is divided according to estimated variables on wellbeing.

Variable “*number of children*” is our key explanatory variable. We supposed that the number of children has significant effect on mother’s wellbeing and neutral effect on father’s wellbeing. We estimated several models, in order to make sure about informative power of our estimations. In the first model (table 2) we tested wellbeing together for women and men and we can see statistically insignificant coefficient with the negative effect. However, it is very bold statement to claim that this effect is negative. Value of this coefficient is close to zero, so we can expect zero effect. On the other hand, this coefficient could be significant different in case of larger sample size. We can look on this result by two views. First view is that we accept insignificance of this coefficient. It can mean that the number of children does not have any impact on wellbeing of mothers and fathers. One possible explanation can be that social system in the Czech Republic is on high level and children do not influence significantly parent’s life. This hypothesis is very bold and we do not incline to it.

We suppose second view representing assumption that our coefficient is insignificant because of small sample size. When we check the validity of the instrumental variable in the chapter 3.3, we can see that our R-squared of the first stage is low and it can cause issue with insignificance of the coefficient in the second stage of the estimation. Also, in our dataset, we do not have big sample of families which have multiple births. We assume that in the case we would have larger sample size, our coefficient would be statistically significant. When we estimate second model with the interaction (table 3) we receive better results. Interaction the “*number of children x female*” is statistically significant and it has positive effect on mothers.

It significantly influences their wellbeing. In contrast, the coefficient “*number of children*”, which represents effect on fathers’ wellbeing, is not statistically significant. Estimation shows that the number of children negatively influences father’s wellbeing.

In the chapter 4.4 we provide some robustness checks in order to confirm our results. We divide our sample on two samples. One sample represents fathers and second only mothers. Although both models show insignificant results caused by especially divided sample, we can see and confirm the same effect. Children positively influence mother’s wellbeing, but negatively father’s wellbeing. Our hypothesis “The effect of the family size on wellbeing is significantly different for men than for women” is confirmed. We can see different effect. We supposed positive effect for mothers, what is confirmed and neutral effect on fathers, what we cannot confirm with certainty. Because we received for all models statistically not significant coefficient for men, we can suppose that children do not influence fathers and thus the effect is neutral. On the other side, we can suppose that in the case of larger simple size, our coefficient would be significant and our hypothesis would not confirm neutral effect. We incline again to opinion that we have small sample size.

In comparison with literature, our results are different. Cáceres-Delpiano *et al* (2012) claim, that children negatively influence mother’s wellbeing. We consider their results for limited, because they examine only financial situations or health condition of mother, not overall evaluation of life. If every additional child causes obesity or higher probability of high blood pressure of women, it does not mean, that women are unhappy with their life. Or if mothers live with their other relatives in one household, it does not need to negatively affect their happiness. Margolis *et al* (2010) say that from the global perspective fertility decreases happiness of women. Kohler *et al.* (2005) find out that women with more than one child show negative effect on wellbeing and in case of men, there is no effect. Others our difference with literature relates with father’s wellbeing. Aasve *et al* (2014) claim, that fathers are still happier than men, who do not have any children. These different results show one important thing and it is that every human is unique and it is not possible to globally claim if fertility has or has not negative effect.

Our other examined hypothesis, which is tested in the chapter 4.3, was not confirmed. We supposed “The big family is poor family” and our results surprise our expectations. In IV model we do not have statistically significant coefficient, but we can see positive effect of the number of children on income of household. It can represent again two views. One view is that every additional child does not have any

impact on income because of insignificance of coefficient. From logic it is incorrect. Every additional child has to influence income of household. Of course, in the case of very rich families, where expenditures are negligible in comparison with incomes, this result makes sense. Second view is that children positively influence income of household. In present times, people plan family in advance and till this time they have opportunity to build career and find well-paid jobs. Our result is markedly different from Cáceres-Delpiano *et al* (2012) who claims that more children cause financial problems and big probability of poverty.

Our other examined explanatory variables confirm the same effect as it is presented in the literature. Age positively influences wellbeing till the certain age and then wellbeing decreases. Other finding relates with variable gender. Our sample shows that women are on average happier than men and it is confirmed also by Di Tella *et al* (2004). It is hard to say why, because there exist many explanations. We can name at least one. Results are dependent on sample what we have and in the case we have more unhappy men and more happy women in our sample, then our model shows that women are happier than men.

Our models show fact that married people are happier than single or divorced. The same findings we can find in papers of Blanchflower *et al* (2004) or Zimmermann & Easterlin, (2006). Married people have more certainty in life than people who are not married, especially, if they are children. When we run other regression including single, divorced and widowed people, we get result, that these people are less happy than married. The same findings we can find in paper from Helliwell (2003). Our result about higher education is consistent with finding from Blanchflower *et al* (2004).

Variable health conditions were the only results that were not consistent with the current literature. For instance, Dolan *et al* (2008) confirm existing findings where good mental and physical health positively influence wellbeing. Our findings are different and it is questionable why our respondents feel happier, if their health condition is not good.

# Chapter 6

## Conclusion

The aim of our thesis was to find out how the family size affects the wellbeing of women and men. We set one main hypothesis to find out if number of children in family has any impact on the wellbeing of parents. The second goal that came out of the first one was to determine if there is any difference on how family size affects woman and men, both positively or negatively. We also thought that the income and number of children in family are correlated and thus we were analyzing how the family size affects income. We used data from the survey on income and living conditions (SILC). We were interested in the year 2013 because the survey contained wellbeing modul. For analysis we used OLS estimation and 2SLS estimation. We estimated several models in order to make sure about informative power of our estimation. Since the number of children is endogeneous variable we used multiple birth as an instrumental variable.

The first model assessed the number of children on parent's wellbeing which resulted in the finding that every additional children negatively affects their wellbeing by -0.003. This coefficient is statistically insignificant. Since respondents had to asses their overall wellbeing on a scale 1-10 this negative value is extremely low which is close to zero. To further study the insignificance of this coefficient we decided to extend the model by another variable which will involve only women and children interaction. Thanks to this additional variable we could much easier compare the different effect the number of children has on women and on men. We found out that for women there is statistically significant coefficient of number of children which positively affects women. Every additional child increases wellbeing of mothers by about 0.469. This represents more important shift on the wellbeing scale. As regards to men, the coefficient was statistically insignificant and every additional child decreased men's wellbeing by 0.478. Consequently, there are two views on result. The first view is that since the wellbeing is statistically insignificant the number children do not affect wellbeing of men. The second one is that we have small sample size and subsequently the coefficient is insignificant. We assume that if we would have larger sapmle size the coefficient would be statistically significant and it would confirm negative effect on men's wellbeing.

In comparison with literature, our results are different. Cáceres-Delpiano *et al* (2012) claim, that children negatively influence mother's wellbeing. Our results show that number of children positively affects wellbeing of women. The difference is caused by different dataset and also by different view on dependent variable wellbeing. Cáceres-Delpiano used health condition and financial situation in family indicators of wellbeing. In contrary to this view respondents of our dataset assessed the overall wellbeing on a scale by themselves and thus we think it is not appropriate to suppose that health condition is replaced by overall wellbeing. Another reason for this difference is that wellbeing is a subjective feeling of each individual and subsequently it is not possible to claim with certainty (from global perspective) if children positively or negatively affects wellbeing of both men and women.

We were examining also other determinants which can affect wellbeing and our findings are same as we found in the literature. We further wanted to find out if number of children automatically means that family is poorer. In comparison with literature our results are again different. According to our findings, every additional child increases family's income. This is quite surprising but in our times planned parenthood is current trend and people focus more on education and career. Consequently, the family's income is not so much affected by family size.

The aim of our thesis was achieved since our results show that there is different effect of influence on family size on both women and men. Our thesis is also unique in the Czech region since this is for the first time that relation between number of children and wellbeing is examined. Further studies could focus on examination of the relation of children's age on wellbeing of parents, for instance how different effects there is if parents have children in school age and teen age. It would be also interesting to further examine how the wellbeing of women and men is changing over time – using panel data for ten or twenty years.

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