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Pros and Cons of Minimum Wage

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature. This thesis was not used to obtain another academic degree.

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Abstract

This thesis examines the relationship between the minimum wages and the job market on the case of 17 EU member countries. We found that minimum wages are indeed generally contributing to lower employment rates among young workers. Particularly, it is the teenagers that are being affected most significantly by the increases in the minimum wage. It is in line with the expectations that if minimum wages have impact on the labour market, then this influence is most visible on the groups that are more frequently earning minimum wages. Employment rate is a better indicator of minimum wage effects on the labour market as the effect on the unemployment rate is much less visible due to various mechanisms that people use to adjust to the new situation.

Keywords: minimum wage, employment, labour market, jobs automation, income distribution

Abstrakt

Práca sa zaoberá vzťahom medzi minimálnou mzdou and trhom práce na prípade 17 členských štátov Európskej únie. Zistili sme, že minimálne mzdy skutočne prispievajú k nižšej miere zamestnanosti medzi mladými zamestnancami. Predovšetkým ohrození zvyšovaniami minimálnej mzdy sú tínedžeri. Táto skutočnosť odpovedá očakávaniam, že to budú práve tie skupiny zamestnancov, ktoré najčastejšie zarábajú minimálnu mzdu, kto budú najväčšmi ovplyvnení. Miera zamestnanosti je lepším indikátorom dôsledkov minimálnej mzdy na trh práce, pretože vplyvy na mieru nezamestnanosti sú menej viditeľné vďaka pôsobeniu viacerých mechanizmov, ktoré ľudia používajú na prispôsobenie sa k novej realite.

Kľúčové slová: minimálna mzda, zamestnanosť, trh práce, automatizácia, distribúcia príjmov

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Bachelor Thesis Proposal

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Proposed topic	Pros and Cons of Minimum Wage

Research question and motivation

Motivation for my thesis is the fact that the concept of minimum wage is at the center of a discussion among the economists and while theoretically the effects of minimum wage are relatively well understood, empirical analyses give ambiguous results. Stigler (1946) or Neumark and Wascher (2010) came to conclusion that increase in the minimum wage has adverse effects on low-skilled workers. The supporters of minimum wage (e.g. Card and Krueger, 1995; Dube et al., 2010) claim that the employment effects are at most minimal and minimum wage induces a rise in the income for low-income workers.

The thesis will attempt to answer questions like:
What are the consequences of minimum wage on the general labour market?
What are the effects of a minimum wage on an employment of different categories of workers, e.g. low-skilled, youth?
Does the minimum wage change the wage distribution?
What are its effects on the gender wage gap?

Contribution

There is a growing body of literature using cross-country comparisons to estimate the effects of labor market policies and out of them only a few studies analyze the minimum wage and its effects across the countries. Therefore, more research is needed in this respect and the thesis could bring more light to the highly-discussed debate which relates to the issues of income inequality and redistribution, another highly discussed topics nowadays.

Methodology

I intend to collect data for EU member states which have statutory minimum wage (some of them may be excluded due to the lack of data). The thesis will use cross-section time-series (panel) data set. Method will probably be panel data regression with fixed effects and will include a set of explanatory variables to control for differences in a macroeconomic environment and labour market institutions.

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Contents

Chapter 1

Introduction

Minimum wage is one of the most studied topics in the economics since its wider appearance at the beginning of the 20th century. Already Adam Smith in his masterpiece *Wealth of Nations* (1776) concluded that a man should earn enough to maintain himself and in most cases somewhat more to be able to bring up and sustain a family, noting that otherwise labourers would not reproduce (Smith, Bullock 2007). First introduction of the law about minimum wage can be traced back into New Zealand, where it was introduced on the national level in 1894[1]; in the United States, it was the Commonwealth of Massachusetts that first introduced a state-level minimum wage legislation in 1912 (Card, Krueger 2015). In the United Kingdom, starting from 1909, there have been established boards in low-paying sectors that set minimum wage levels; this system started from covering around 20,000 workers in the beginning and was widened in the following decades – at its peak in 1953 it covered around 3.5 million employees[2] (Edwards 1999). This development – minimum wage starting as a tool in a few sectors of economy and slowly expanding – was quite common. Similar development happened to the level of minimum wage as in the past it was relatively lower than it is today[3]. The US federal minimum wage[4] was introduced in 1938 while the country was still recovering after the Great Depression, but it was only after the Supreme Court of the United States changed its position on the issue and let President Franklin D. Roosevelt to implement it.

Like other contentious concepts it has its proponents and opponents that tend to highlight what they consider to be beneficial and negative about the concept and there is, of course, a wide ongoing discussion about the effects of the minimum wage on the labour market and the appropriateness of the minimum wage in the fight against poverty and rising income inequality[5]. The topic of the minimum wage is a highly-discussed topic not only among

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[1] New Zealand was progressive also in other societal aspects – in 1893, women were granted right to vote in parliamentary elections.

[2] These wage councils (as the boards were renamed in 1945) were abolished in 1993. National statutory minimum wage was introduced in UK by the Labour government of Tony Blair in 1999.

[3] The first US federal minimum wage was set at 25 cents, or $4.18 in 2015 dollars, while the federal minimum wage in 2015 was $7.25 (http://money.cnn.com/interactive/economy/minimum-wage-since-1938/).

[4] The federal minimum wage had actually biggest impact in the territory of Puerto Rico, where it was at the time estimated that it resulted in termination of 120,000 workers as it was set with regard to the mainland United States and it was too high for the agricultural island economy (Rustici 1985).

[5] For example, Jean-Claude Juncker said on 23 January 2017 that the European Commission would like to see that all member states introduce minimum wage to combat social inequality and poverty. See more:

economists, but as well among politicians and the general population although in many countries it is set on a such level that it directly applies only to a fraction of the employees.

This stems from the fact that the analyses and studies of the impact of the minimum wage continue to present rather contradictory results. The effect on the employment is generally considered to be negative, but whether this effect is significant and whether it is justified by other impacts of the minimum wage is subject of the discussions. Things are getting even more complicated and argumentative by the fact there is a significant overlap of politics and economics in this issue. Although this can be said about many topics in the science of economics, minimum wage stands out as the final decision whether minimum wage should be introduced or increased is made by politicians. Governments are the key agents setting the minimum wage, although in some countries (i.e. Western Europe) they more frequently rely on expert opinion and adjustments based on formulas (Raei et al. 2016). The costs of the minimum wages are primarily born by the employers, what makes it a rather useful talking point in political campaigns as at the face-value it is a costless promise to make and an inexpensive tool from the point of view of the government. In addition, due to the income taxes and social and health insurance deductions from gross wages it might even help the government budget.

In addition, there is a social aspect of the minimum wage that the proponents of the minimum wage use it to promote it as a tool to address the rising economic inequality and to ensure a liveable wage for everyone including low-earning workers and to eradicate existence of the working poor. When addressing problems like poverty, it is, according to the proponents of minimum wage, justifiable to give priority to the working poor rather than to the effects of minimum wage increases on the competitiveness of the affected companies or the employers' profitability. Nevertheless, the question is whether it is really the profitability of companies that gets hit by the minimum wage legislation.

Especially in the United States, this social aspect of the minimum wage is being promoted quite heavily as due to its internal administrative autonomy, there exists a differentiated system of state and city-level minimum wages. Proponents of the minimum wages and its relative increases either argue that the minimum wage does not have any effect on the employment or that this effect is only minimal and insignificant and thus the positive effects for those who earn about minimum wage outweigh the non-existent or minimal

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http://www.euractiv.com/section/social-europe-jobs/news/juncker-reiterates-support-for-minimum-salary-in-each-eu-nation/.

decreases in the employment rate. Moreover, the other implications of minimum wage are according to proponents of minimum wage indecisive as it brings positive and negative consequences that are approximately similar in size.

The economic theory suggests what the channels of adjustment of the businesses to the increases in the minimum wage look like. Efficiency improvement is one of the reactions that is commonly listed by the authors. This adjustment channel is getting a new dimension with the ongoing fourth industrial (technical) revolution[6] and the job automation that closely follows it. As the name suggests, this would not have been the first industrial revolution in the human history, but there are some aspects that make it more worrisome for the labour market than the previous ones. While previously the increased efficiency of the machines meant reducing of the workweek and the shift of employment into the sector of services, in the last several decades the decrease in hours worked does not reflect the profound technological progress and there are few areas where the number of jobs is increasing and those usually demand higher qualification than the jobs that are disappearing due to the robotization. The increasing swiftness of this process is already having huge implications on the labour markets or state budgets as industrial robots, understandingly, are paying no taxes while they are able to work 24 hours a day.

Furthermore, according to the new studies it is not only blue-collar jobs with repetitive tasks that are endangered, but in danger are as well many typical white-collar professions[7], including the jobs that due to their creativity were previously considered to be safe. The swiftness of this technological revolution dwarfs the previous revolutions, just like it was the case with the previous revolutions[8]. While this issue is not directly related to the minimum wage and a case could be made that the automation will come regardless of the increases of the minimum wage or its mere existence, the minimum wage existence and increases are speeding up this process especially in sectors with low-qualification jobs. It is the low-skilled employees earning the minimum wage or slightly above who are the first endangered by this development,

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[6] Fourth industrial revolution is the name of profound progress that encompasses advancement in fields of robotics, artificial intelligence, fusion of humans and machines, autonomous cars, and other fields of science and technology.

[7] For more details, see for example *Report Suggests Nearly Half of U.S. Jobs Are Vulnerable to Computerization* (https://www.technologyreview.com/s/519241/report-suggests-nearly-half-of-us-jobs-are-vulnerable-to-computerization/), PwC UK Economic Outlook (http://www.pwc.co.uk/economic-services/ukeo/pwc-uk-economic-outlook-full-report-march-2017-v2.pdf) starting from the page 30 or *Smart robots will take over a third of jobs by 2025, Gartner says* (http://www.pbs.org/newshour/rundown/smart-robots-will-take-third-jobs-2025-gartner-says/).

[8] Third industrial revolution is the name of the technological progress from the analog devices and machinery to the digital technology, starting in the 1980s and still ongoing.

but they will be closely followed by other professions. This is the reason why there are voices demanding taxing the robots, including Bill Gates[9], although the idea goes against conservative business principles.

Of course, the phenomenon of jobs automatization is a very complex and immense topic that is beyond the scope of this thesis. But it is beneficial to bear in mind that there is a giant elephant in the room that needs to be taken into consideration when assessing the state and the future of labour market in economy increasingly being dominated by automatization. It is hard to guess what specific effects this phenomenon will have in the short to medium term on the social systems of the countries all over the world and the understanding of work as a concept defining individuals and their position within the society. It is both developed and developing countries that are and will be impacted by this development and will have to deal with it in the foreseeable future. It is becoming an increasingly obvious that the amount of vacancies on the global scale does not suffice the number of the unemployed. In addition, it is frequently the case that there is a mismatch between what jobs are open and what are the qualifications of the unemployed as with the ongoing automation the requirements on employees´ skills are increasing.

Generally, the minimum wage laws exist in majority of the economies across the world[10]. When it comes to the developed nations, they almost in all cases tend to have either statutory minimum wage laws or practices that *de facto* mean minimum wages setting in at least some of the sectors. Currently in the European Union, 22 member countries out of the total 28 members have a statutory minimum wage that is generally applied, and in most of the rest[11] there are collective sectoral agreements that are in effect close to a minimum wage (Eurofound 2017). There are even initiatives in the EU about introduction of an EU-wide minimum wage; these initiatives are usually headed by France and are aimed at reducing the social dumping

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[9] For more details, see Bill Gates' interview in a website publication Quartz: *The robot that takes your job should pay taxes, says Bill Gates,* https://qz.com/911968/bill-gates-the-robot-that-takes-your-job-should-pay-taxes/. Other voices come from the lawmakers in the developed countries; for example, see *European parliament calls for robot law, rejects robot tax* (http://www.reuters.com/article/us-europe-robots-lawmaking-idUSKBN15V2KM).

[10] International Labour Organization says that 90 percent of its member states have for of minimum wage. For an exhausting list of countries with minimum wage and details see: https://en.wikipedia.org/wiki/List_of_minimum_wages_by_country.

[11] EU members without general statutory minimum wage are: Austria, Cyprus, Denmark, Finland, Italy, and Sweden.

occurring especially in the sectors like construction and road transport[12]. In the sector of road transport there have been even passed laws in France that aim to ensure that foreign drivers earn at least the French minimum wage. Similarly, in other countries there are various regulations aimed at protecting the local businesses.

Usually, these proposals for a minimum wage on the EU level have one drawback that is, however, necessary to make it feasible and that is that these proposals do not push for a uniform minimum wage in the absolute numbers, but understandingly attempt to set it in the relationship to the median or average wage in respective member countries. Consequently, due to the huge diversity in the incomes in the bloc, the "common minimum wage" would not be very different from the status quo[13] and the social dumping and relocation of production to EU countries with lower wages would not be affected. In addition, as wages are excluded from the competences of the EU institutions, there is a long way before something like an EU minimum wage could be adopted. The conditions thus do not favour establishment of EU minimum wage, especially with the differences between the EU economies being quite stable and not diminishing sufficiently.

Panel data analysis has recently become the most frequent method to analyse the effects of the minimum wage. The EU member states are a good group of entities to perform the analysis of the effects of the minimum wage using panel data method as they are developed countries with established statistical offices and thus there could be found data for many indicators collected by one institution (Eurostat, OECD and others) and while these states are diverse on the one hand; on the other hand, their economies are linked. As Baltagi (2008) notes it is the controlling for individual heterogeneity that is one of the main benefits of panel data usage. It is as well possible for these states to construct a long panel that would include both periods of economic growth and recession. Thesis will focus on the employment effects of minimum wages. The thesis has an added value as there are few studies that analyse the

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[12] For details, see http://www.euractiv.com/section/social-europe-jobs/news/paris-floats-plan-for-eu-wide-minimum-wage/. The report from the French Ministry of Finance: http://www.tresor.economie.gouv.fr/File/402603
[13] For example in 2015, the ratio of the minimum wage relative to the median wage was 0.548 in the Luxembourg, while in Romania the respective figure was 0.539. The monthly nominal minimum wages were 1922.96 euros in Luxembourg, while only 217.5 euros in Romania.

minimum wage effects in the EU countries, including the newer member states, using the panel data[14].

Chapter 2

Theoretical background

This chapter discusses the theoretical approaches to the topic of the minimum wage. The alternative theories provide different angles that are employed to explain the effects of the minimum wage on the labour market. These models differ with their assumption about whether the minimum wage is universal, or what is the market power of the employers and lead to different conclusions about what the effects of the minimum wage on the labour market are supposed to look like.

2.1 Basic perfectly competitive labour market model

The simplest model of the impact of the one the labour market assumes perfectly competitive market with homogenous labour and minimum wage that is universal (figure 2.1). The logic of this model is based on supply and demand analysis. If the minimum wage is set below or equal to the equilibrium level in the free market, then its introduction does not have any effects on the labour market.
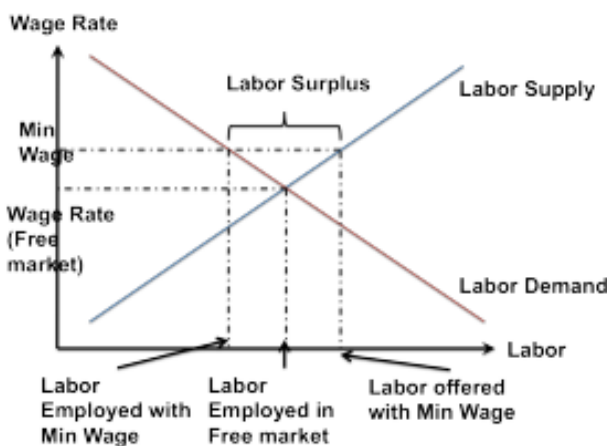

Figure 2.1: A perfectly competitive market in which there is a labour surplus (Source: Liu, Mueser 2015)

There is less labour demanded than is supplied if the binding minimum wage is set above the equilibrium level at which the demand for labour is equal to the supply (figure 2.1). The binding minimum wage above the equilibrium level leads to demand-determined employment

and the mismatch between demand and supply leads to the surplus of labour on the market as people are more willing to supply their labour than at lower equilibrium wage level. Employers in this situation react by increasing the capital intensity, hiring fewer workers, reducing the working hours, they might even try to shift workers into shadow economy using for example under-the-table wage supplements (Raei et al. 2016). The loss in the employment depends only on the elasticity of labour demand and the difference between the binding minimum wage and the competitive wage.

2.2 Labour mobility (two-sector model)

It is the case in many countries that minimum wage laws do not apply to all industries and sectors. Some segments of the economy are exempt from the minimum wage. Ashenfelter and Smith (1979) point out that non-compliance with the law is an important factor as it increases the actual size of the sector uncovered by the minimum wage legislation. Mincer (1976) provides the empirical and theoretical analysis to discuss the labour mobility between covered and uncovered sectors. In his analysis, he shows that increases in the minimum wage cause workers to move out of the covered sector into the non-covered sector and out of the labour market. Consequently, the wages in the uncovered sector decrease.

The theoretical reasoning can be shown on the model of two sectors in the labour market, out of which one is does have a minimum wage, and the other is uncovered sector. In the uncovered sector, there is a perfect competition and the wages are set at the equilibrium level, so there is no unemployment in this sector. Imposing a minimum wage in the covered sector can generate mobility between the uncovered and covered sectors; the direction of the mobility is not easily predictable. Theoretically the results of the minimum wage depend on labour demand elasticities in the two sectors, the inter-industry mobility, the minimum-wage coverage, the vacancy rate in covered sector, and the total labour supply elasticity (Mincer 1976). Mincer in his analysis provides empirical evidence showing that the negative employment (disemployment) effects are larger than the effects on the official unemployment rate. Consequently, the overall effect on the labour force is negative.

2.3 Monopsony

In labour market with perfect competition, an increase in the minimum wage always reduces the units of labour demanded from the companies. There are economists who disagree with these results. They employ a monopsony model to explain their reasoning and to argue that the employment in the economy can actually increase following the increase in the minimum wage. There are economists arguing that a monopsonistic model approximates some labour markets better than the fully competitive model. Classic monopsony refers to the situation when there is a single buyer (called monopsonist) that faces many sellers. Consequently, the supply curve for labour monopsonist faces is upward-sloping, while in a perfectly competitive labour market, an individual firm faces a perfectly elastic labour supply curve. Therefore, monopsonist has some market power that it can use to its advantage.

In a monopsonistic market, the marginal cost of labour is higher than the wage rate, whereas in a market with perfect competition they are identical. Similarly, as in the case of monopoly, the equilibrium case means a deadweight loss as the monopsony has market power. With the binding minimum wage, however, company is obliged to increase the wage, and as long as the increase is not large and minimum wage is not higher than the competitive wage, the company has higher profit and the deadweight loss is lower (figure 2.2).
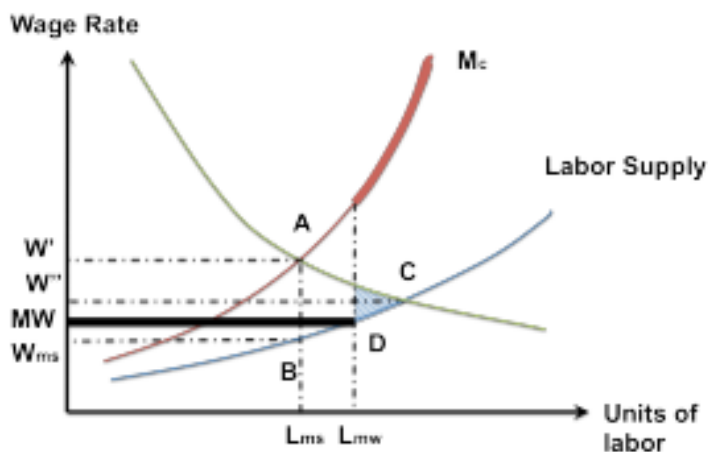
Figure 2.2: Monopsony Model with Minimum Wage (Source: Liu, Mueser 2015)

Critics dismiss the use of monopsony to analyse the minimum wage on the basis that it is a textbook curiosity and in real life the companies where workers earn do not have monopsonistic power as they are usually many of them and with few employees. In addition, some may hold labour market power due to some short-term phenomena, like imperfect information, geographic barrier or search friction on the labour market, which however in the

long-run either disappear or grow weaker (Liu, Mueser 2015). These aspects of the labour market favouring employers are crucial for the newer dynamic monopsonistic models.

2.4 Heterogenous labour

When assessing the effect of the minimum wages, it is not all workers that are directly affected as it is reasonable to expect that it is relevant mainly for relatively unskilled workers. Therefore, problems arise where to find the indicator for the skills of workers. This together with the fact that if the minimum wage is low enough, then it directly changes earnings of only a small share of employed complicates the analysis of the minimum wage on the labour market. This is the reason why it is more sensible to focus the analysis on the groups where those who earn exactly minimum wage is higher. This explains the dominance of teenagers as the most studied group in the empirical analyses as the logic is that if there are no significant effects found among this subcategory of workers, then the impact will be even less significant for the other groups on the labour market or the labour market in general (Brown 1999).

2.5 Offsets

Offsets can be used by the employers to reduce the impact of the minimum wage increase on their labour costs. The existence of benefits that are not prescribed by the legislation and are offered by the employers to their employees is an easy way for the companies to limit the effect of the minimum wage increases on the costs of running their businesses. Thus, when the minimum wage increases, they offset this development by reducing the non-obligatory benefits to the employees. Moreover, for the employees it is not particularly attractive development as depending on how they valued the benefits they lose compared to the increase in the minimum wage, their actual situation may even worsen. If they value the lost benefits more than the increase in wage, they would leave and thus forcing the company to curtail benefits not eliminate them. In conclusion, the existence of offsets lowers the value of the minimum wage increases and at the same time, it decreases the effect of the minimum wage rise on the employment loss.

When it comes to the research about this theoretical aspect of minimum wage effect, it is inconclusive. Olson (2002) studied the relationship between wages and health insurance on the sample of women working full-time. His conclusion is that an average woman from the sample would rather agree to 20 percent wage decrease than to be transferred to a job without health insurance. Simon and Kaestner (2004) studied the relationship between minimum wage and the employee benefits, such as healthcare and pension insurance. Nevertheless, their research hypothesis about offsetting the raises of minimum wage by eliminating non-financial and indirect benefits could not be proven by their study. On the other hand, Lee (2004) came to an opposite conclusion, he admits that minimum wage hikes can lead to decrease of unemployment, but they will suffer from scrapping of the various benefits in line with the expectations.

Chapter 3

Literature review

One of the first studies about the effect of the minimum wage was done shortly following its introduction in the United States. Stigler (1946) in his short study *The Economics of Minimum Wage Legislation* concludes that there are better ways to fulfil the stated objective of the minimum wage – the elimination of extreme poverty. Furthermore, he argues that minimum wage reduces the family income and increases unemployment; he as well calls for education programs as he recognizes that to eradicate negative phenomena related to poverty it is not sufficient to increase incomes. Lester (1947) rejected Stigler's reasoning and argued that Stigler showed inadequate understanding of wage determination process in American industry and criticizes him for failing to refer to the experience that United States have already had with the minimum wage laws. What might be of greater importance for us today is Lester's observation that many industries have relatively high shares of modern plants and equipment and hence the opportunities to substitute for labour are distinctly limited (p. 145).

This discussion brought the attention of the economists to the topic of the minimum wage and performing the empirical analyses, especially focused on the low-skilled workers. Stigler's conclusions were supported by many of these papers (Gramlich, 1976; Goldfarb, 1974; Burkhauser and Finnegan, 1993) what was somewhat expected as they were in line with the competitive model predictions. The negative effect of the minimum wage increases on the labour market, chiefly on the low-skilled and less experienced young workers, was the consensus among the economists until the 1980s. For example, confirmation came from the Minimum Wage Study Commission that has been doing for four years a revision of the research on the minimum wage in the USA and Canada; in 1981, it released a report confirming the established knowledge on the issue.

In addition, Brown, Gilroy and Kohen (1982), which were part of the Minimum Wage Study Commission concluded in their independent report that teenage employment decreases by 1 to 3 percent following a 10 percent increase in the minimum wage, while the unemployment rate increases between zero and 0.75 percentage points (p. 505, 524). In addition, they found that many studies show a disemployment effects, but no or minimal unemployment effects, what means that minimum wage causes population to drop out of the

labour force and thus the labour force participation rate decreases. Moreover, the effect on the older workforce is less visible and for the adults it is uncertain, what they explain by the possibility that minimum wage protects adults from less experienced young competition.

In the 1990s, the discussion about the minimum wage effects was renewed, partially because of the new research conducted and partially because of the internal development in the United States. Between 1981 and 1990, there was no change in the US federal minimum wage, what meant a renewed political discussion about the issue as at the same time many states decided to increase state minimum wages as they were disappointed by the inactivity of US Congress (Neumark, Wascher 2007a). The rising internal differentiation[15] in the United States was not only source for renewed discussion, but at the same time it provided cases for the research by the economists.

One of the most influential and controversial studies was published by Alan Krueger and David Card in 1994. Their paper was comparing the development of the fast-food employment in two neighbouring US states – New Jersey and Pennsylvania. They utilized the fact that New Jersey increased the state minimum wage, while in the same time there were no changes in the state of Pennsylvania, which served as their control group. They conducted their research telephonically on the sample of 410 restaurants. This paper led to so-called *new minimum wage research* and rekindled the discussion as they concluded that there is no evidence that the increase of the minimum wage in New Jersey led to the reduction of employment at fast-food restaurants in the state (p. 492). They even argued that the opposite is true and that if there was any effect, then it was positive. Furthermore, they did not find a negative effect on the number of restaurants.

Paper of Krueger and Card was pre-dated by David Card´s (1992a) paper in which he divided US states into three categories, based on the share of teenage workers that have been impacted by the 1990 and 1991 increases in the federal minimum wage. There he concluded that "there is no evidence that the rise in the minimum wage significantly lowered teenage employment rates…" (p. 36). In the same year, Card (1992b) published his results from research on the case of California, in which he concluded that the increase in minimum wage led to higher earnings without any adverse effects on the employment of workers or the subcategory of teenagers.

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[15] In 2012, only 5 US states (out of overal 50) did not have own minimum wage laws (Wilson 2012).

Conclusions and research methods of Krueger and Card about the minimum wage effects has been criticized almost immediately. One of the most vocal counter-evidence was presented by David Neumark and William Wascher. These two authors later even decided to perform analysis on the same sample of restaurants that was used by Krueger and Card to disprove their conclusion. Therefore, they focused on the New Jersey and Pennsylvania cases, but used the payroll data instead of asking restaurants about their condition. Neumark and Wascher, however, concluded that the increase in the minimum wage in New Jersey had a negative effect on the employment compared to the development in the neighbouring Pennsylvania where there were no changes in legislation (Neumark, Wascher 2000). The answer of Card and Krueger to this paper was to perform a pay roll analysis on the same sample of the fast-food restaurants, that led to the confirmation of their earlier results (Card, Krueger 2000). This shows that part of the problem of minimum wage effect is the modelling of the data. Another issue that was being criticized on Krueger's and Card's paper was that it was a single case study and thus generalization of its findings is problematic.

On the other hand, there have been published papers that supported aspects of Krueger and Card results. For example, Lemos (2004) came to conclusion that companies do not respond to increases in minimum wage by reducing production or employment, but by raising prices. This brings us again to the other effects of the minimum wage, which are studied somewhat less frequently, such as the effects on the profitability, prices, competitiveness of companies. It could be argued, that companies that are operating on the domestic level are less motivated not to absorb the costs by raising prices as they know that their domestic competitors are under the same pressure. For example, paper of Sara Lemos from 2008 found the price adjustments in the restaurants industry (Lemos 2008). Similar findings were found by Jonathan Wadsworth (2010), where the sectors with relatively high price increases were the food, hotel and domestic services- The evidence from the UK following the introduction of national minimum wage legislation points that the profitability of companies was reduced, especially in industries with relatively high market power (Draca et al. 2011).

Neumark and Wascher (2007b) continued with their research and in 2007 they compiled a review of 102 recent minimum wage studies. In this overview work they criticize those saying that recent research does not give a satisfying answer on the employment effects of the minimum wage. They conclude that almost two-thirds of the reviewed studies show a relatively consistent negative employment effects, compared to only eight that indicate a positive effect (p. 121). They outline that among the studies that they consider to be the most scientifically

credible and sound, the number of studies that point to negative effects is 28 (85 percent of those credible). In addition, they emphasise that evidence is even more convincing in the case of effect on the least-skilled and young workers.

Neumark and Wascher continued with their argumentation in their 2008 publication *Minimum Wages* in which they summarize their previous work and assertions and develop them further. They later joined economist Ian Salas and in their 2013 study focused their attention on the criticism of the methods and data modelling, especially the design of the control groups, used mainly by existing studies that claim minimum wage to have positive effects on the labour market. In addition, they conclude that there is a trade-off between higher wages for some of the workers covered by the minimum wage legislation against job losses for the rest of the low-earning workers.

Furthermore, there is a stream of literature about the hours worked effect of the minimum wage increases. Authors of this strand of minimum wage literature argue that without considering the hours worked effect, the knowledge about the impact of minimum wage increases is incomplete and thus the real effect of the minimum wage is being underestimated by the scholars. Couch and Wittenburg (2001) conclude that minimum wage increases have adverse effect on number of workhours demanded among teenage workers, what is in line with the neoclassical theory. Furthermore, they come to conclusion that alternative estimates understate the overall impact of minimum wages as they tend to overlook the hours-of-work effect. This seems to be confirmed by Sabia (2009), who did a research on the US retail industry and found that minimum wages have negative effects both on employment and weekly hours.

One of the first wider studies that was focused on the European countries was published by Dolado et al. (1996) in which the authors react mainly on the *OECD Jobs Study* from 1994 that recommended member countries to review the role of the statutory minimum wage and try to minimise its negative effects on the labour market by indexing it to prices and to ensure higher differentiation between age groups and geographical regions; another impulse was being the spill over of the American discussion following the Card and Krueger papers into Europe. Dolado et al. focus on 4 cases: France, Netherlands, Spain and the United Kingdom and conclude that the "importance of the minimum wage has probably been exaggerated" (p.357). The basis for their conclusion is that there was minimal change in the relative size of the minimum wage to the average earnings over the previous three decades. As well the effect on

the overall employment is uncertain, while they admit that there is an effect on the youth employment.

Moreover, there is a study from Dube, Lester and Reich published in 2010 in *Review of Economics and Statistics* aimed at comparing bordering US counties with and without minimum wage changes, in which the authors found no employment effects of minimum-wage increases. This study from Dube, Lester and Reich (2010) tried to bridge the new minimum wage research and its critics (Smith 2013). The authors took the method of Card and Krueger from the New Jersey/Pennsylvania case study and replicated their experiment by comparing the development in the 1,381 US counties in the time frame between 1990 and 2006 and compared outcomes in the subset of 318 pairs of bordering counties with different minimum wage.

Their methodology generalizes Card and Krueger study with the advantages of a much larger distribution of outcomes than a single case, secondly the time period they used in their analysis is sufficient to test for longer-term effects; moreover, the pairs of counties could have had different relative levels of minimum wage over that time (Schmitt 2013). Thanks to the fact that they could control for the region of the US (spatial heterogeneity), they could claim that the negative impact of minimum wage in the traditional specification is due to primarily regional and local differences not related to minimum wage policies (p. 962).

There is as well growing discussion about the effect of minimum wage on income redistribution. However, many scholars tend to point out that many low-wage earners do not earn minimum wage for a long time as they are often teenagers. For example, in the United States in 2010, almost half (49 percent) of those getting paid federal minimum wage were workers under 24 years old (Wilson 2012). The supporting evidence comes from the United Kingdom where minimum wage workers tend to come from the 3rd to 6th deciles of the household income distribution as the poorer households usually do not comprise workers, in the UK they are mainly composed of pensioners and people on out-of-work benefits (Low Pay Commission 2014).

On the other hand, studies from Teulings (2003) and Autor et al. (2010) found that minimum wages have an important role on development of wage inequality. Teulings (2003) found that relative decreases of minimum wages that occurred in the US in 1980s were behind the "whole increase in wage inequality in the lower half of the wage distribution" in the studied time period. In addition, Autor et al. (2010) found that minimum wage decreases inequality in

the lower tail of the wage distribution, but they point out that the effect is lower than previous estimates suggested; they also note that the data point to existence of spill-overs into the percentiles above the binding minimum wage.

When it comes to the effects on the competitiveness of companies and staff turnover, Card and Krueger (2015) claim that minimum wage helps to lower turnover that would be in place in its absence. In addition, Bruce Kaufman (2009) operates with the term of social cost of labour and when wages do not cover it, the result is economic inefficiency and thus minimum wage can improve fairness and productivity. In addition, Kleinknecht (1998) and Kleinknecht et al. (2014) opposes cutting down on minimum wages as he and his co-writers claim that coordinated market economies with rigid labour market enjoy higher productivity gains benefitting from longer job duration and from higher expenses on research and development as it is difficult to compete based on low-cost strategy.

Chapter 4
Data

The thesis aims to examine the effect of the minimum wage on the employment, particularly on the employment of young adults (15-24 years of age) and teenagers (15-19 years old) in the selected cases of the European Union member states. Therefore, the analysis in the thesis uses the data for 17 EU countries for which the time series data of 16 years from year 2000 till 2015 for the ratio of minimum wage relative to the median wage was available. It means that out of the current 22 countries in the EU with statutory minimum wage, 5 cases were excluded due to various reasons. In the case of Germany, the basis for the exclusion was that it adopted minimum wage only in 2014 and thus there are no historical data for years before 2014 for this indicator available. In addition to Germany, the time series for the ratio of minimum wage relative to the median wage was not available for 4 more cases: Malta, Bulgaria, Croatia, and Slovenia. The data for this ratio were taken from OECD.Stat database. Eurostat does not publish this ratio – it publishes the ratio of the minimum wage as a proportion of the average earnings, due to the revisions in the collecting of the data, it provides access to two time series – one from 1999 to 2009 (NACE[16] Rev. 1.1) and the second one from 2008 (NACE Rev. 2).

Ratio of the minimum wage to the median wage is a more widely used statistical indicator for the analysis of minimum wages. It is used more often than the ratio to the average earnings, as those are more influenced by extreme values and thus it provides a better indicator and point of reference (ILO 2017). It is true, that the income inequality in the European Union is low in the international comparison, but there are still rather significant differences between median and average earnings in the 17 countries.

Additionally, data for the employment rate of 15-19 year olds used in the first model covering the 16 years from 2000 to 2015 were also taken from OECD.Stat database. Furthermore, data used for the 15-24 age group employment were also taken from OECD.Stat. On the webpage of Eurostat, these data are available only for period 2007-2015[17], though. Nevertheless, for the new years the number from Eurostat and from OECD.Stat are the same,

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[16] Abbreviated from French expression *Nomenclature statistique des activités économiques dans la Communauté européenne* – Statistical classification of economic activities in the European Community.
[17] The data for the previous years are available on a quarterly basis, but in many cases data for some quarters are missing and there are breaks in the time series.

what points to the fact that these institutions have the same sources, that is why it is good to use the database that is more user-friendly and with less breaks in time series as Eurostat with its quarterly data have not done annual calculations for the earlier years.

The level of statutory minimum wages in the EU differs significantly (figure 4.1). The lowest nominal minimum wages can be found in the new member states, perhaps with exception of Slovenia and Malta. Apart from these 2 cases, the remaining 10 new member states (except of Cyprus with no statutory minimum wage) have minimum wage set below 500 euros (figure 4.2) what is even after adjustment for different price levels still very low from the point of view of Western European countries.

Country	Since	Level	Reference period	Equivalent in EUR
Belgium	01 June 2016	€1,531.93	Month	1,531.93
Bulgaria	01 January 2017	BGN 460.00	Month	235.62
Croatia	01 January 2017	HRK 3,276.00	Month	436.91
Czech Republic	01 January 2017	CZK 11,000.00	Month	407.64
Estonia	01 January 2017	€470.00	Month	470.00
France	01 January 2017	€1,480.27	Month	1,480.27
Germany	01 January 2017	€8.84	Hour	8.84
Greece	14 February 2012	€586.08	Month	586.08
Hungary	01 January 2017	HUF 127,500.00	Month	412.91
Ireland	01 January 2017	€9.25	Hour	9.25
Latvia	01 January 2017	€380.00	Month	380.00
Lithuania	01 July 2016	€380.00	Month	380.00
Luxembourg	01 January 2017	€1,998.59	Month	1,998.59
Malta	01 January 2017	€169.76	Week	169.76
Netherlands	01 January 2017	€1,551.60	Month	1551.60
Poland	01 January 2017	PLN 2,000.00	Month	454.52
Portugal	01 January 2017	€557.00	Month	557.00
Romania	01 February 2017	RON 1,450.00	Month	321.17
Slovakia	01 January 2017	€435.00	Month	435.00
Slovenia	01 January 2017	€804.96	Month	804.96
Spain	01 January 2017	€707.60	Month	707.60
United Kingdom	01 April 2017	GBP 7.50	Hour	8.80

Table 4.1: Nominal minimum wages in 22 EU states in 2017 as determined by the legislation (source of data: Eurofound)

Figure 4.2: Nominal monthly minimum wages in the EU member states in 2017, in EUR (source of data: Eurofound)

On the other hand, when considering minimum wage relative to the incomes in the respective countries, the differences between the member countries are less prominent and are not organized along the Old-New (West-East) axis. They are in the range found usually in the developed countries, that is between 35 and 60 percent of the median wage (ILO 2017).

Country	2000	2002	2004	2006	2008	2010	2012	2014	2015
Belgium	0.531	0.523	0.508	0.498	0.508	0.507	0.509	0.494	0.492
Czechia	0.324	0.391	0.403	0.424	0.383	0.377	0.364	0.372	0.388
Estonia	0.342	0.368	0.417	0.370	0.378	0.404	0.383	0.399	0.413
France	0.617	0.632	0.658	0.634	0.630	0.621	0.631	0.626	0.623
Greece	0.471	0.456	0.441	0.454	0.480	0.477	0.438	0.466	0.474
Hungary	0.365	0.570	0.473	0.477	0.460	0.474	0.539	0.536	0.525
Ireland	0.675	0.512	0.526	0.524	0.524	0.441	0.433	0.446	0.444
Latvia	0.355	0.369	0.463	0.363	0.404	0.490	0.488	0.492	0.518
Luxembourg	0.516	0.518	0.519	0.542	0.537	0.555	0.563	0.557	0.548
Netherlands	0.528	0.483	0.473	0.499	0.494	0.474	0.470	0.465	0.459
Poland	0.396	0.417	0.432	0.422	0.427	0.453	0.482	0.510	0.513
Portugal	0.456	0.470	0.467	0.474	0.486	0.528	0.522	0.549	0.569
Slovakia	0.420	0.418	0.442	0.445	0.428	0.457	0.451	0.451	0.473
Spain	0.365	0.354	0.354	0.387	0.392	0.377	0.380	0.370	0.368
UK	0.409	0.426	0.431	0.454	0.461	0.461	0.474	0.479	0.487
Lithuania	0.496	0.475	0.471	0.437	0.423	0.498	0.483	0.512	0.498
Romania	0.253	0.371	0.409	0.371	0.390	0.426	0.462	0.511	0.539

Figure 4.3: Development of the ratio of minimum wage relative to the median wage in the 17 EU countries used in the empirical part of the thesis (source of data: OECD.Stat).

The changes in the minimum wage levels point to the convergence of both minimum wages and of earnings between new and older member states (table 4.4). The change in minimum wages adjusted to the price changes in the time period of 2010–2017 shows that in the real terms minimum wages in the countries of EU-15 either decreased or increased by single digits, while in the new member states the increases have been greater, being highest in Bulgaria (+84 percent) and Romania (+79 percent).

Country	Change	Country	Change
Belgium	-4.3%	Lithuania	39.0%
Bulgaria	83.6%	Luxembourg	4.8%
Croatia	7.0%	Malta	-1.4%
Czech Republic	24.6%	Netherlands	-0.7%
Estonia	42.9%	Poland	38.3%
France	1.3%	Portugal	4.3%
Germany	N/A	Romania	79.1%
Greece	-24.3%	Slovakia	29.3%
Hungary	50.1%	Slovenia	23.5%
Ireland	3.1%	Spain	1.1%
Latvia	26.8	United Kingdom	4.6%

Table 4.4: Change in statutory minimum wages in real terms between 1 January 2010 and 1 January 2017 in the 22 EU member countries with statutory minimum wage (Source of data: Eurofound)

In some of the EU countries, there are adjusted rates of minimum wage for younger workers, trainees, for employees in their first job or for the disabled[18]. The differences in some of the cases are quite significant among the various groups of young and/or inexperienced workers, while in other cases the difference is minimal. Some of the studies of the effect of the minimum wage on young workers add a dummy variable into the regression to account for this. In this thesis, it will not be the case, as these mechanisms are very individual and there would have been very different cases included in this group with special rates of minimum wage. For example, Laporšek (2013) included this dummy variable and concluded that the estimates of differences between the two groups of countries – having and not having subminimum wage – were not significant. The development of the employment rate in the 17 countries used in this analysis shows that the employment rate for young workers was in overall decrease before the economic and financial crisis of 2008/2009 (figure 4.5 and 4.6). The crisis contributed to another decrease which was halted only in 2014 for 15-19 old and in 2013 for the 15-24 years old.
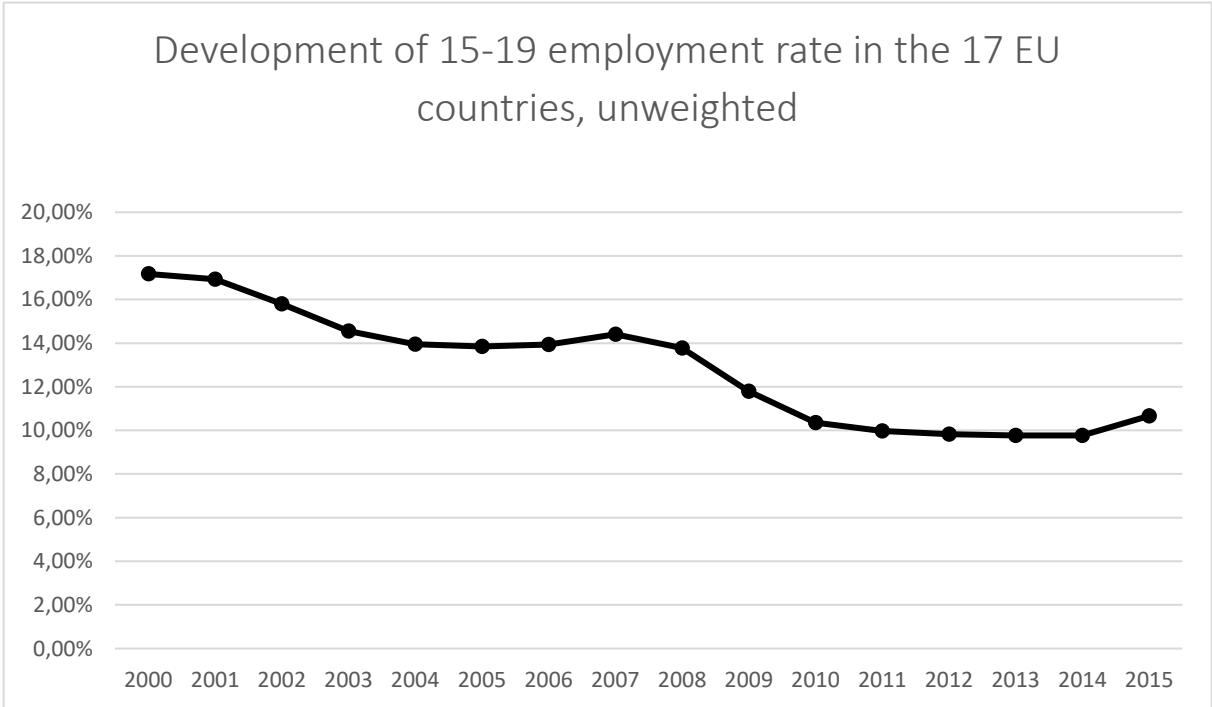

Figure 4.5: Development of the unweighted employment rate (15-19 age group) in the considered 17 EU member states (Source of data: OECD.Stat)

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[18] In 2017, special rates for young workers were in place in Belgium, Greece, France, Ireland, Luxembourg, Malta, the Netherlands and the UK (Eurofound 2017).
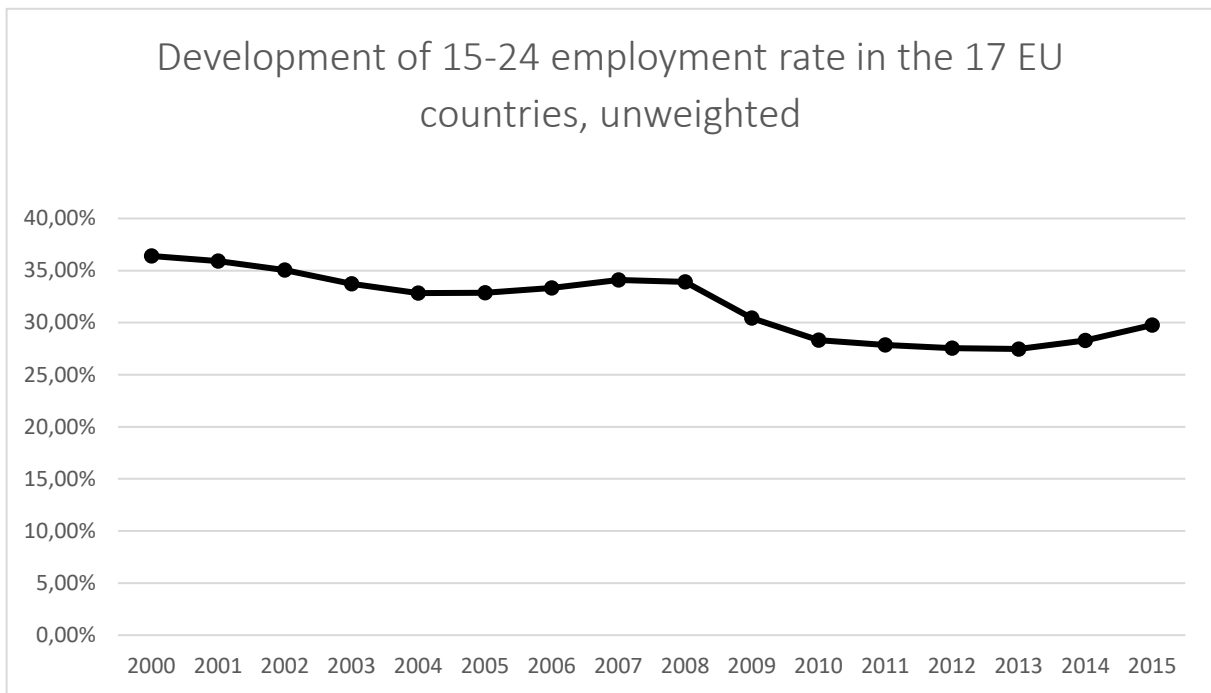
Figure 4.6: Development of the unweighted employment rate (15-24 age group) in the considered 17 EU member states (Source of data: OECD.Stat)

The development of the employment rate of 25-64 year olds (figure 4.7) in the studied 17 nations shows that the employment rate for older workers was trending differently from the 15-19 and 15-24 age groups. The decrease after the crisis was halted already in year 2010; in year 2015, the employment rate was higher than in year 2000, what cannot be said about the previous age groups.
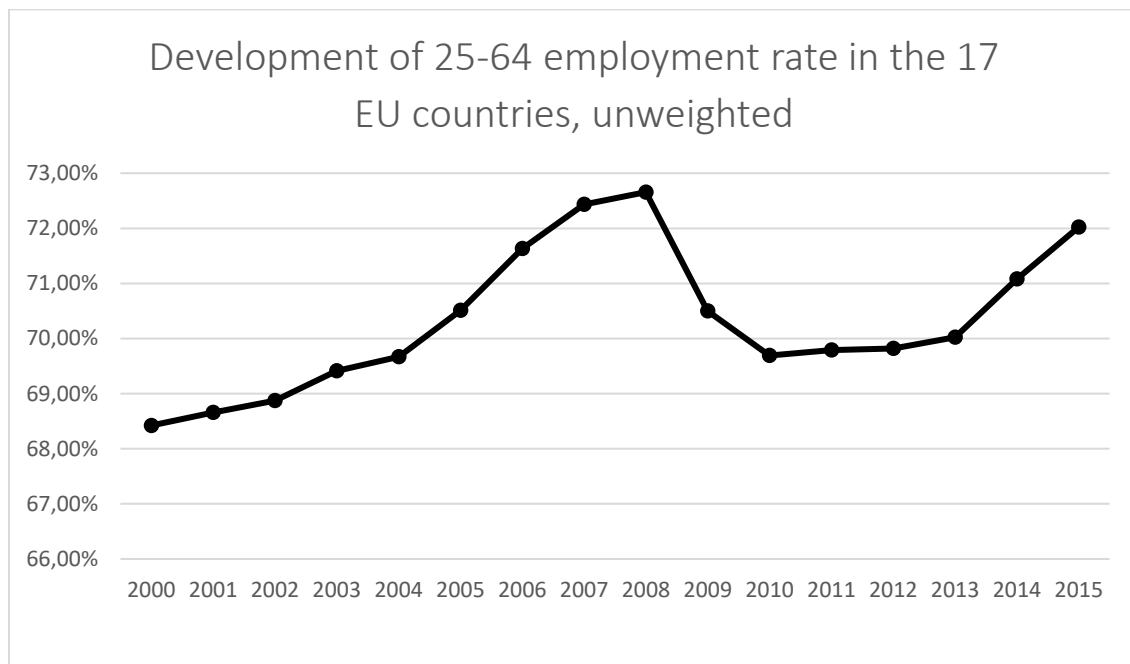

Figure 4.7: Development of the unweighted employment rate (25-64 age group) in the considered 17 EU member states (Source of data: OECD.Stat)

Coverage of the minimum wage also varies significantly in the EU countries; while in some countries it is estimated that it is around the fifth of the full-time employees, like in the case of Portugal or even a third of all wage-earners in Greece; in other countries, the figures go to the lowest shares possible, such as 3 % – case of Belgium or Czech Republic (Eurofound 2017).

Chapter 5

Methodology in literature

5.1 Time series

Time series was used traditionally in the minimum wage analysis and was predominant even when there was already a trend in labour economics towards the cross-sectional and panel-data studies. This fact stemmed from the predominance of the research that was originating in the United States and the fact that in the US the state minimum wage laws have not been that important until recently. The basic models usually used the so-called Kaitz index[19] as the main explanatory variable and the employment rate as the dependent variable. They were often logarithmic in order to get estimate of the elasticity of the relationship between minimum wages and the independent variable.

There have been several issues with time series models as they usually neglected the number of hours per worker or it has usually related employment and minimum wage both at time *t,* this was done mainly because of unavailability of the sufficient data to answer what are the long-term effects of minimum wage. However, with more data available the popularity of time-series models was surpassed by cross-sectional and panel-data.

5.2 Cross-sectional (cross-country and cross-state) and panel-data

The development in the minimum wage research generally followed with some delay the trend in the labour economics towards cross-sectional data, and as these data on the US states became more widely available, there have appeared more cross-state analyses of the minimum wage. The difference compared to the time-series analyses was that while in the time-series models the minimum wage index varied because of variation in coverage and due to the re-adjustments of the level of the minimum wage, in cross-sectional studies of the US states the

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[19] Kaitz index represents the ratio of the minimum wage to the average wage. Minimum wage was sometimes weighted by its coverage and other indicators.

source of variation has been mainly the variation in the average wages across states (Brown 1999).

Later new type of state-level (in the US) or country-level (for example OECD) data models – the panel-data models[20] – appeared and in the estimating equation fixed effects for the states (countries) were added so that the possibility that the minimum wage coefficient will have mainly regional variation would be minimized. There are several studies that used panel data to study youth employment that were using the cross-country variation in the minimum wages and employment, for example OECD (1998) for seven OECD countries, Neumark and Wascher (2004) for 17 OECD countries or Dolton and Rosazza Bondibene (2012) for 33 OECD member countries. Panel data have become widely accessible in both developed and developing countries, what is one of the reasons behind their increasing usage (Hsiao 2003).

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[20] Also known as cross-sectional time-series or longitudinal data.

Chapter 6

Methodology and empirical analysis

6.1 Used methodology

The objective of this thesis is to study minimum wage effects on employment, and focusing on the EU countries could bring additional light into the minimum wage effect problematic.

In the thesis, we apply the panel regression function that has in the general form:

$$y_{it} = \beta_0 + \beta_1 x_{it1} + u_{it} \; ; \; u_{it} \sim N(0,\Sigma)$$
$$t = 1,2,...,T; \; i = 1,2,...,N$$

In the empirical analysis, it is employed for the 17 EU countries that had a minimum statutory wage over the period 2000 to 2015 and available data about the ratio to the median wage. The panel regression function was used in similar context by Neumark and Wascher (2004), Dolton and Rosazza Bondibene (2012) or Laporšek (2013). The regression function will try to explain the employment rate of younger workers with the level of the minimum wage. The advantage of panel data compared to cross-sectional data set is that microdynamic and macrodynamic effects cannot be usually estimated using cross-sectional data; a single time series data has the same problem (Hsiao 2003). Another advantage of panel data is that they allow for resolving or at least reducing the problem that arises with the omission of variables that correlate with explanatory variables (Hsiao 2003).

For the analysis, the software program R was employed. Stanila et al. (2013) note that the first question that needs to be answered is whether to use fixed or random effects model; if the individual effects are expected to correlate with explanatory variables, then fixed effects model is better. On the other hand, individual effects can be included into the error term if they are assumed not to correlate with explanatory variables, that is the random effects model. If there is no correlation, then both random and fixed effects are consistent, but fixed effects model is inefficient. On the other hand, if there is the correlation then only fixed effects model is consistent. The decision can be made using different tests or argumentation. In R, Hausman test

can be used for the testing. Its null hypothesis is that unique errors are uncorrelated with the regressors.

In the random effects model, the β_0 from the general panel regression is incorporated into the error term and assumed uncorrelated with the explanatory variables:

$$y_{it} = \beta_1 x_{it1} + u_{it} \; ; \; u_{it} \sim N(0,\Sigma)$$
$t = 1,2,...,T; \; i = 1,2,...,N$

Another problem following the decision between fixed and random effects is that the model is estimated assuming homoscedasticity of residuals, otherwise the standard errors are biased and should be corrected by computing robust standard errors (Stanila et al. 2013). Additional problem is the autocorrelation of the idiosyncratic error terms[21].

The most common test for heteroscedasticity in R is the Breusch-Pagan test, whose null hypothesis is homoscedasticity. Testing for serial correlation can be done by using Breusch-Godfrey/Wooldridge test for serial correlation in panel models where the null hypothesis is that there is no autocorrelation. In the case of autocorrelation and heteroscedasticity, there exist tools to correct for it, for example robust covariance matrix estimation (Sandwich estimator) and other robust estimators.

6.2 Empirical analysis

Lnratio stands for the natural logarithm of the ratio of the minimum wage compared to the median wage in the country. *Lnempteen* stands for the natural logarithm of the employment rate of 15-19 year olds. *Lnempadult* stands for the natural logarithm of the employment rate of 15-24 year olds. *Lnempall* stands for the natural logarithm of the employment rate of 25-64 year olds. *Gdp* stands for the real GDP growth. The employment rate of older workers was added to substitute for the business cycle, together with the real GDP growth rate.

The first regression regresses *lnempteen* on *lnratio + gdp + lnempall*. P-value of Hausman test was not very significant, but due to the nature of the data we decided to go with

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[21] Error term that changes both over time and across the entitites, in our case EU countries.

fixed effects model (appendix A). The Breusch-Godfrey/Wooldridge test for serial correlation shows that there is indeed an autocorrelation and Breusch-Pagan test showed that there is heteroscedasticity. The remedy for this could be so-called *arellano*[22] heteroscedasticity-consistent covariance estimator that deals with heteroscedasticity and autocorrelation and it is advised to use it on fixed effects model. The results of this robust estimates are the following:

```
t test of coefficients:

          Estimate Std. Error t value  Pr(>|t|)
lnratio  -1.1981335  0.5372065 -2.2303  0.026608 *
gdp       0.0228431  0.0050916  4.4865 1.102e-05 ***
lnempall  3.1104153  1.1099340  2.8023  0.005467 **
```

Thus, it could be concluded that all the coefficient are statistically significant at 5% level and while the employment rate among the 25-64 year olds and GDP growth have positive effects on the employment rate on the 15-19 age group, the effect of the ratio of minimum wage relative to the median has a negative effect: 1 percent increases in the ratio leads to the decrease of employment rate (lnempteen) by 1.2 percent. The robust coefficient are not that different from the coefficients before the controlling (in appendix A), the biggest difference is in their p-values.

The second model studies the effect on the general group of young adults (15-24 years age group). Its regression regresses *lnempadult* on *lnratio + gdp + lnempall*. P-value of Hausman test was this time very significant, pointing towards the use of fixed effects model (appendix B). The Breusch-Godfrey/Wooldridge test for serial correlation shows that there is autocorrelation and Breusch-Pagan test showed that there is heteroscedasticity. Just as in the previous model, the so-called *arellano* heteroscedasticity-consistent covariance estimator that deals with heteroscedasticity and autocorrelation was used to control for these problematic aspects. The results of this robust estimates are the following:

```
t test of coefficients:

          Estimate Std. Error t value  Pr(>|t|)
lnratio  -0.3157700  0.2174363 -1.4522  0.14768
gdp       0.0072728  0.0031048  2.3425  0.01994 *
lnempall  2.1926922  0.5449750  4.0235 7.586e-05 ***
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[22] Named after the economist Manuel Arellano.

It shows that 1 percent increase in the ratio leads to the decrease of employment rate (lnempadult) by 0.32 percent However, it could be concluded that while other coefficients are statistically significant; the minimum wage is insignificant at commonly used 5% level. This points towards the weakening effect of the minimum wage on bigger and older groups of workers that are less exposed towards the minimum wage. These results are in line with most of the studies on the topic. For example, Laporšek (2013) found –0.74 to –1.05 percentage decreases for the 15–19 age group following 1 percent change in the ratio of minimum wage to median, while the elasticities for older workers were smaller.

Chapter 7
Discussion

Minimum wages are used to protect employees against inappropriately low wages. The problem with such meagre wages is that although that there would be some people willingly working under those conditions, there could be cases where the result of this would be abuse, poverty, and the existence of so-called working poor. Therefore, many countries decided to regulate the minimum amount of money that an employer is required to pay as a remuneration. Effectiveness of the minimum wages compared to other policy tools is subject of a public discussion. Another promoted aspect of the minimum wages legislation that has become more prominent relatively recently is the objective to reduce income inequality in the society, including between the gender gap inequality.

Recently, there has been growing voices about alternative ways how to eradicate poverty that could make minimum wage obsolete. For example, there is a growing discussion about the concept of basic income. Basic income would serve as a universal income grant for every citizen without any requirements. This way the amount of excessive bureaucracy that is needed to run a modern welfare state could be cut and the free-rider problem that plagues every social benefits system would be eliminated, too. If the basic income would have been set in such a way that its recipients would be above the level of poverty, then there would have been no need for minimum wage laws as its stated objectives would have been achieved even beforehand. Nobody would have to work under conditions that would he/she consider to be abusing and the problem of low wages would become a private matter of individual persons.

The concept of basic income is still evolving and much of a discussion is needed as was proved by the June 2016 referendum in Switzerland[23]. The reasons for this decisive defeat of the initiative might have been the well-known conservatism of Swiss voters, relative unfamiliarity with the concept, worries about free-riders without Swiss citizenship that would be able to apply due to the Swiss-EU treaties, and concerns that the proposed level of basic income would have been too high. The truth is that basic income was never attempted on a larger scale and thus the effects on the motivation to work or the real economic costs are only

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[23] In the referendum, only 23.1% of the Swiss voters agreed with the proposal, while more than three quarters were against it. For results see: https://www.admin.ch/ch/d/pore/va/20160605/det601.html

to be estimated. It is highly probable that the experiments with the basic income will continue and that this topic will become much more important in the coming years. It has definitely potential to replace minimum wage and whole social nets by simpler system in which it would have been more difficult to cheat.

Another problem that goes in hand with minimum wage is that its level is in the case of many countries uncompetitive relative to the social benefits and thus frequently the relatively small additional income from working and earning minimum wage is considered to not be worth of getting up in the morning, travelling to work and performing. Some countries try to solve this problem by providing some of the social benefits for a limited period when the person is employed. This solution, it could be said, is halfway on the path towards the basic universal income.

With the increasingly rapid changes in technology, there are important implications for many established principles of economy. For example, it could be said that jobs automation is making immigration obsolete. There is at least one country in the world that is attempting to prove the sentence, and that is Japan. Japan is leading the global innovations in jobs automation and although its economy is for the last 25 years in a permanent stagnation; its GDP per capita is matching the development of American GDP per capita, although US is the world leading country in absolute immigration (figure 7.1).
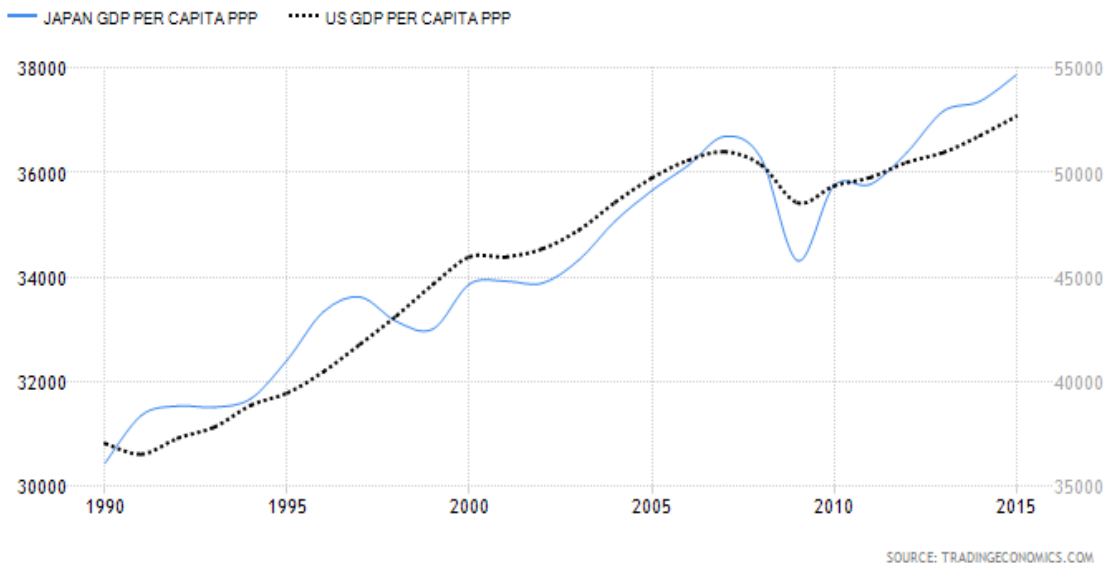

Figure 7.1: Comparison of US and Japanese GDP per capita in purchasing power parity (1990-2015; source: tradingeconomics.com)

It is in the absolute numbers where Japan appears to be lagging, but that is due to the population decrease. While Japan has plenty of economic problems, its relative development matches other developed economies. It is true that Japan suffers from extraordinary debt, but these problems started when age structure of Japanese population was much younger – the central government debt reached 108.4 % of GDP in 1997[24].

The implications of these changes for the labour market and the concept of minimum wage are significant. Particularly, because it is frequently young workers earning minimum wage, gaining experience and work skills in their first jobs whose future on the labour market is heavily linked with the entry conditions; and as it is said that there is a growing "lost generation" in the southern EU countries with high youth unemployment following the economic and financial crisis, the minimum wage increases might be in a small scale harming the prospects of young adults on the labour market and contributing towards this problem.

The empirical analysis of this thesis appears to confirm the negative effects of minimum wage on the employment rate of teenagers and generally young adults. The effect on the labour market is diluted by the fact that many workers drop out of the labour market and the rest becomes unemployed. In the countries with free tertiary education, it is an easy way how not to be unemployed and frequently get various student benefits. Nevertheless, analyses of the employment rate agree on the negative effects of minimum wages on young workers and are better reflecting the real implications that analyses of the unemployment rates.

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[24] The figure for year 2015 is 234 % of GDP, which is decisively the highest government debt in the world (https://data.oecd.org/gga/general-government-debt.htm).

Chapter 8
Conclusion

The topic of minimum wage is an interesting topic that, even though the amount of research done on the issue is remarkable, still deserves attention of scholars and policymakers. Especially in the era of jobs automatization at an unprecedented scale, it is important that we get more insight and understanding about the effects of the minimum wage and its benefits and drawbacks.

The empirical estimates based on the panel data from 17 EU countries points that minimum wage tends to reduce youth employment. When it comes to the employment of older workers, the effect of minimum wages is much less significant. This goes in line with the established knowledge on this aspect of the employment effect of the minimum wage.

The thesis adds to the existing literature on panel regression analysis. However, as was noted by other scholars in the field, there is still plenty of questions that are still not sufficiently answered when it comes to the minimum wage. A more detailed research is needed and scholars should focus their attention not only on panel data, but as well on the individual cases to better understand the implications of minimum wages and the tools how to make it more efficient; there is still a few studies that control for education or occupation status, partially because the amount of data mining needed for such studies is much higher. Combination of the insight acquired by these new studies could help governments to pursue their goals with higher effectiveness.

There are definitely trade-offs when determining the minimum wage and these trade-offs have become sharper with the increases in the minimum wage and with the technological progress. This contributes to the discussion about the relative effectiveness of minimum wage compared to other policy tools. More insight is needed to determine what is the right balance when determining minimum wage and weighing the pros and cons. For example, the relocation of companies among the EU member countries due to the increases in minimum wage looks quite feasible. But does it really happen? Even though the countries are geographically very close in most cases and the bureaucracy needed to relocate is much lower than anywhere in the world, it does not seem to be happening, because many industries with minimum wage are in

the sector of services which are most difficult, and in some cases even impossible, to relocate. It is not coincidence that it is the single market for services that is the last of the "single markets" in the EU being put into practice. In addition, the decision-makers in the companies know that relocation is a lengthy process during which it might be passed legislation in the target country that would make the whole process pointless.

Furthermore, the minimum wage has important implications for young, less experienced and less qualified workers. Increased understanding of the implications for this group of workers could help limit the negative impact of minimum wage on their situation. It is crucial, with regards to the aging of the European population, that young workers will be successfully integrated into the job market. Due to all the mentioned reasons, minimum wage research can bring much positive for the European and global economy as it is an issue that practically all countries around the world are dealing with.

Chapter 9
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Appendix

A. First Model (15-19 age group)

phtest(fixed,random)

```
        Hausman Test

data:  lnempteen ~ lnratio + gdp + lnempall
chisq = 5.9796, df = 3, p-value = 0.1126
alternative hypothesis: one model is inconsistent
```

pbgtest(fixed)

```
        Breusch-Godfrey/Wooldridge test for serial correlation in panel
models

data:  lnempteen ~ lnratio + gdp + lnempall
chisq = 152.99, df = 16, p-value < 2.2e-16
alternative hypothesis: serial correlation in idiosyncratic errors
```

bptest(fixed, studentize = F)

```
        Breusch-Pagan test

data:  fixed
BP = 33.89, df = 3, p-value = 2.09e-07
```

summary(fixed)
```
Oneway (individual) effect Within Model

Call:
plm(formula = lnempteen ~ lnratio + gdp + lnempall, data = Data_panel,
    model = "within")

Balanced Panel: n=17, T=16, N=272

Residuals :
   Min. 1st Qu.  Median 3rd Qu.    Max.
-1.1000 -0.1980  0.0113  0.1860  0.9680

Coefficients :
          Estimate Std. Error t-value  Pr(>|t|)
lnratio  -1.1981335  0.2393914 -5.0049 1.050e-06 ***
gdp       0.0228431  0.0048377  4.7219 3.881e-06 ***
lnempall  3.1104153  0.5014621  6.2027 2.261e-09 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    32.577
Residual Sum of Squares: 23.746
R-Squared:       0.27106
Adj. R-Squared: 0.2161
```

F-statistic: 31.2363 on 3 and 252 DF, p-value: < 2.22e-16

B. Second Model (15-24 age group)

phtest(fixed1, random1)

```
        Hausman Test

data:  lnempadult ~ lnratio + gdp + lnempall
chisq = 14.232, df = 3, p-value = 0.002606
alternative hypothesis: one model is inconsistent
```

pbgtest(fixed1)

```
        Breusch-Godfrey/Wooldridge test for serial correlation in panel
models

data:  lnempadult ~ lnratio + gdp + lnempall
chisq = 167.19, df = 16, p-value < 2.2e-16
alternative hypothesis: serial correlation in idiosyncratic errors
```

bptest(fixed1, studentize = F)

```
        Breusch-Pagan test

data:  fixed1
BP = 33.792, df = 3, p-value = 2.192e-07
```

summary(fixed1)

```
Oneway (individual) effect Within Model

Call:
plm(formula = lnempadult ~ lnratio + gdp + lnempall, data = Dataset,
    model = "within", index = c("country", "year"))

Balanced Panel: n=17, T=16, N=272

Residuals :
    Min.  1st Qu.   Median  3rd Qu.     Max.
-0.52500 -0.08070 -0.00171  0.08270  0.37100

Coefficients :
           Estimate Std. Error t-value  Pr(>|t|)
lnratio  -0.3157700  0.1115066 -2.8319  0.005002 **
gdp       0.0072728  0.0022533  3.2276  0.001414 **
lnempall  2.1926922  0.2335770  9.3874 < 2.2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    7.4294
Residual Sum of Squares: 5.1521
R-Squared:       0.30653
Adj. R-Squared: 0.25424
F-statistic: 37.1296 on 3 and 252 DF, p-value: < 2.22e-16
```