Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics

Master's Thesis

Causes of increasing income inequality

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

DIPLOMA THESIS ASSIGNMENT

Bc. Štěpán Hanyk

Economics and Management

Thesis title

Causes of increasing income inequality

Objectives of thesis

The diploma thesis will deal with income inequality in the chosen European countries.
The research question is:
Does income inequality increase in European countries?

Methodology

The preparation of the thesis can be divided into several sub-steps. The titles of the chapters may be different, but they must meet their objectives in terms of content.

In the introduction, the author briefly introduces the topic and explains why the topic is relevant for processing.

In the following chapter, entitled "Objectives", the author specifies the research question, the aim of the work and the hypotheses associated with the processing of the work. At the same time, he explains the potential contribution of his work to the current research or practical application.

The creation of a literary search will follow. This section will provide a detailed overview of the literature and the current state of knowledge, focusing on income inequality. It will include a critical analysis of the most important studies, including the methods used, the results found and, where appropriate, the problematic points. Methodically, this part of the work will be the analysis of documents.

The literary search will provide a basis for the author to specify the methods used for the analytical part of the work. The chapter entitled "Methodology" will present in detail all the methods used; it will also include the source of the data, their description and the process of their preparation for the analysis.

In the next step (analytical part), the author applies the knowledge gained during the literature study to analyse the obtained data using the methods specified in the methodology. This part is a core component of the thesis. This part of the thesis will contain the analysis results and a comparison of the results with other authors focused on the same topic (discussion). This part may also contain recommendations for policy makers or other interested parties.

In the final part (Conclusion), the author will summarise his findings, mention the limitations of the research and indicate possible possibilities for further research.

The proposed extent of the thesis
60 – 80 pages

Keywords
Income inequality, measurement, Gini index, Germany

Recommended information sources
Avram, S. and Popova, D. (2022) 'Do taxes and transfers reduce gender income inequality? Evidence from eight European welfare states', Social Science Research. Academic Press Inc., 102. doi: 10.1016/j.ssresearch.2021.102644

Bazillier, R., Héricourt, J. and Ligonnière, S. (2021) 'Structure of income inequality and household leverage: Cross-country causal evidence', European Economic Review. Elsevier B.V., 132. doi: 10.1016/j.euroecorev.2020.103629

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Peters, C., Sprout, R. and Melzig, R. (2010) 'Regional poverty disparity and economic performance in Central and Eastern Europe and Eurasia', Post-Communist Economies, 22(3), pp. 345–365. doi: 10.1080/14631377.2010.498684

Expected date of thesis defence
2023/24 SS – PEF

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Prague on 19. 11. 2023

Declaration

I declare that I have worked on my master's thesis titled "Causes of increasing income inequality" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the master's thesis, I declare that the thesis does not break any copyrights.

In Prague on 25.3.2024   _____

Acknowledgement

I would like to thank doc. Ing. Irena Benešová, Ph.D. for supervising and all other persons, for their advice and support during my work on this thesis.

Causes of increasing income inequality

Abstract

Income inequality has been a relevant topic for most of human history, but became increasingly discussed in the last two centuries, with debates, protests and even government changes made in the interest of lowering income inequality. However, have all these actions helped its development, or is it increasing despite them? In this thesis, the development of income inequality over the years 2011-2020 is analysed. Variables regarding the strength of institutions, gender pay gap, youth unemployment and use of equity, are examined to determine the direction and size of the impact they have on income inequality. The results show that in Germany and the Czech Republic and increase in the number of firms that use equity to finance their operations lead to reduction in inequality, while increased spending on passive tools of social policy lead to a poverty trap, exacerbating income inequality.

Keywords: Income inequality, the Czech Republic, Germany, gender pay gap, youth unemployment, trade union membership, safety net spending, number of stocks listed on a stock exchange, Gini index, P90/10 ratio.

Příčiny vzrůstající nerovnosti přímů

Abstrakt

Nerovnost příjmů byla relevantním tématem po většinu lidské historie, ale stala se intenzivněji diskutovanou v posledních dvou stoletích, s debatami, protesty i změnami ve vládě s cílem zmenšení nerovnosti příjmů. Avšak pomohly tyto akce ve vývoji příjmové nerovnosti, nebo se i přes ně zvětšuje? V této tezi je analyzován vývoj příjmové nerovnosti v letech 2011-2020. Proměnné vztahující se k síle institucí, genderovém platovém rozdílu, nezaměstnanosti mladistvých, a využívání ekvity jsou zkoumány s cílem zjištěním směru a velikosti jejich dopadu na příjmovou nerovnost. Výsledky ukazují že v České Republice a Německu je vzrůst ve firmách využívající ekvity k financování svých operací vede k redukci příjmové nerovnosti, zatímco zvětšené platby pasivních nástrojů sociální politiky vedou k pasti chudoby, zvětšující příjmovou nerovnost.

Klíčová slova: Příjmová nerovnost, Česká Republika, Německo, genderový platový rozdíl, nezaměstnanost mladistvých, členství v odborech, financování sociální záchytné sítě, počet firem registrovaných na burze, Gini index, P90/10 poměr

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1 Introduction

The struggle for income inequality is almost synonymous with the modern world, beginning with the "gilded age" in late 19th century, and periodically appearing throughout the 20th century as protests for better working conditions or more worker power, often as a response to, or the consequence of, large economic crises. How has this phenomenon developed in the age of information, where those with lower income have access to more knowledge than ever before and are able to compare their position to the rest of the world? Which factors exacerbate income inequality and which help alleviate it? And of these factors, which leave the most impact?

These and other questions are examined in this work, which focuses on Germany and the Czech Republic. The Czech Republic was selected as it is the country of the author's origin, and is often overlooked in the economic analysis, as most focus on larger countries with higher economic impact. After this selection, Germany naturally arose as a candidate for analysis, as the countries have a shared social and economic history, and their present is deeply related, as Germany is one of the main trading partners of the Czech Republic.

2 Objectives and Methodology

2.1 Objectives

As income inequality changes over time, it is important to understand what is causing these changes to develop policies that have the desired effect on changing income inequality. The aim of the thesis is to analyse several factors that can have an impact on income inequality and determine whether the relationship is positive or negative, and its severity. The objectives can be summarized as follows:

- Analyse the development of inequality in the Czech Republic and Germany.
- Determine factors that influence this development.
- Determine the relationship between the factors and income inequality and the severity of the impact the factors have on inequality.

2.2 Methodology

The data used in this thesis is collected from reputable sources such as the OECD, the World Bank and the statistical offices of Germany and the Czech Republic. During the process of data collection, there was a lot of missing data after the year 2020 and before the year 2011, so the thesis focuses on the ten-year period 2011-2020. The collected data is used to create graphs to analyse the overall state of the examined countries and see the development of the variables over the years. Later, these findings are used in the creation of econometric models.

For the measurement of inequality, Gini index and the P90/10 ratio are employed. For the creation and testing of the econometric models, Gretl software is used. In the process of creating the models, a preliminary model is created first – this model uses all the data available for the selected country, in order to understand which variables should be focused on in the actual test and to see how the models change with data from different years. Some discussion is already present in the practical part of the thesis, as it logically follows the analysis of the results.

Table 1: Examined variables

Variable	Classification	Model abbreviation	Units	Source	Expected impact on inequality
Gini index	Dependent	Gini	-	The World Bank 2023 (CZE, GER)	-
P90/10 ratio	Dependent	P9010	Ratio	MPSV 2023 (CZE), OECD 2024a (GER)	-
Gender pay gap	Independent	Gender	Percent	Czech Statistical Office 2022 (CZE), German Statistical Office 2022 (GER)	↑
Safety net spending	Independent	Safetynets	Percentage of GDP	OECD 2023d (CZE,GER)	↓
Number of stocks listed on the stock exchange	Independent	Stocks	-	Prague stock exchange 2024a, (CZE); Frankfurt stock exchange 2024b, (GER)	↑
Workers registered in a union	Independent	Uniondensity	Percent	OECD 2023d (CZE,GER)	↓
Youth unemployment	Independent	Youthunemployment	Percent	OECD 2024b (CZE, GER)	↑

Gini index and the P90/10 ratio are discussed in the theoretical part of this work and are used as the dependent variables in the models. The definition of independent variables follows:

- Youth unemployment is defined by the OECD (2024b) as people aged 15 to 24 without work, available for work and looking for work.

- Number of firms listed on the stock exchange examines the stocks that are traded on the Prague and Frankfurt stock exchange. In the case of Germany, the CDAX index is used, which is defined as comprising the stocks of all German corporations, representing the entirety of its stock market (Frankfurt stock exchange 2024a).

- The gender pay gap is defined by the percentage by which men's pay surpasses women's pay.

- Trade union density is defined as number of trade union members as a percentage to the total number of employees (OECD 2023d).

- Safety net spending is defined as the percentage of GDP that is spent on social support programs such as out of work income support, public employment services and training (OECD 2023d).

3 Literature Review

3.1 Existence of Income inequality in the modern world

The International Monetary Fund defines income inequality as "the extent to which income is evenly distributed within a population" (2022). In a world of perfect equality, everyone would receive the same income, whether a teacher, doctor, or CEO, proportional to the number of hours they worked. This would remove the financial incentive some have to pursue a particular field, as they would argue that the additional income represents compensation for the higher responsibility and strict requirements that a doctor has to meet in their work, compared to a warehouse worker. Not to mention long shifts and high-stress environment. There is still a need for highly skilled professionals that get compensated well for their work, so few would argue for this world of perfect equality.

However, a world of high income inequality is undesirable as well. Research suggests that high inequality increases risk of financial crisis, lowers social cohesion, increases political polarization, decreases the availability of education and ultimately results in lower economic growth (Berg and Ostry 2011).

It is, therefore, in the interest of any long-term oriented government to promote equality and as time passes, more movements promoting social equality take place in the world, focusing on racial, gender and sexual orientation rights. Union and labour rights movements have also started proliferating around the globe, but how effective were they at reducing inequality?

The state of inequality in the Western world throughout the last few decades has been hard to narrow down to a central trend. In central Europe, for example, in the last decade of the 20th century some post-communist countries enjoyed the lowest Gini indexes ever seen, with the Czech Republic reaching an index of 20,7 in 1992 and Germany standing at an index of 28 in 1996, as can be seen in Figure 1.
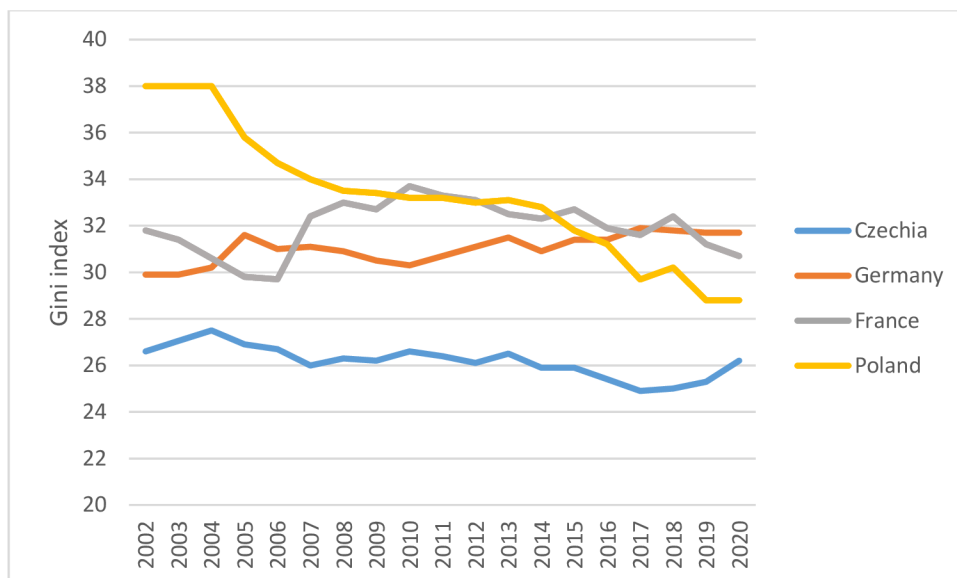
Figure 1: Gini index in selected countries, World Bank 2023

Both countries have seen an increase in inequality in the following years with index increases to 26,2 and 31,7, respectively. On the other hand, France and Poland have shown an overall decrease in inequality, with France's Gini Index shifting from 32,1 (1990) to 30,7 (2020) and Poland's from 38 (2004) to 28,8 (2019). (World Bank 2023b)

There are more ways to measure inequality than the Gini index, which will be discussed further into the literature review, but it is already plain to see that the answer to the research question will be more complicated than a simple yes or no.

3.1.1   Arguments for inequality

In the past, some argued that true equality is hard to obtain, that progressive taxation of the wealthy is unfair or that the notion stifles motivation, innovation, and growth. This section will examine the evidence for supporting inequality in the world.

In developing countries, capital markets and production centres are easier to develop in some regions first, to allow for pooling of resources, such as education, infrastructure, housing, and investment. This course of action can lead to other regions being economically and socially left behind in order to continue the growth of the state's economy through these hotspots. In theory, later in the country's development, the growth should spread to other parts of the country, and this initial sharp inequality should correct itself. This theory is often attributed to Simon Kuznet (1955) and labelled as Kuznet's curve.

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Some theories state that focusing wealth on the upper classes of society leads to better economic performance of a country, as the rich have a higher propensity to save and reinvest (Bourguignon 1981). There further is evidence to support these theories - high levels of poverty disparity between regions within a country increase overall saving rates. Each standard deviation increase in income disparity results in 0,9 percentage points increase in national savings and a 2% increase in economic performance (Peters, Sprout, and Melzig 2010).

Other evidence suggests that at very low income levels, economic reforms are less likely to occur in an economically unequal environment. However, as per capita income increases in upper-middle class countries, there is a positive relationship between poverty disparity and the adoption of economic reform (Peters, Sprout, and Melzig 2010). This may be due to the extremely low-income populace having no voting power in the country, and the few rich individuals delaying the adoption of reforms. Similar results are found for growth in low-GDP countries (Barro 2000)

When mean income exceeds a limit within a democratic country, the election process favours wealth redistribution from rich to poor. These welfare payments and tax breaks can discourage work effort and reduce investment (Barro 2000).

Another argument against the reduction of inequality are the ideas behind the Laffer curve (Laffer 1978) – a graph that shows that as taxation and transfers increase, the state gains increasing resources only up to a point. After this point it is more profitable for the taxed to commit fraud in order to hide their income or they become

Figure 2: Symmetric Laffer curve, own work

demotivated to earn income at all, as most of it is taken away regardless.

3.1.2 Arguments against inequality

A common theory accepted about inequality is that it augments socio-political instability and unrest. The lowest income individuals seek to increase their wealth through theft and dealings in a black economy. This not only deprives the country of the productivity that the workers could produce, but also of the taxes lost on the black market and funds that are spend on further law enforcement.

Robinson and Acemoglu (2000) claim that inequality is self-correcting towards equality through democratization. In highly unequal countries the perceived unfairness of wealth distribution leads to social unrest, which leads to democratization, which leads to redistribution of wealth because of increased education and access to information. Such information would mean that inequality in itself is unsustainable as the population gets educated and that it should not exist in the modern society. However, in an unequal democratic country redistribution can be halted by lobbying and corruption of elected officials. Disregarding the moral argument, this uses up funds that could be used for investment and growth, which is economically undesirable.

Some findings also suggest that benefits gained from inequality (such as savings rate mentioned above) may be harmful for long-term equilibrium growth, as they lead to policies that do not protect property rights and private appropriation on returns from investment (Persson and Tabellini 1991).

Concerning the proposition of the Laffer curve – since its publication some examination assign more asymmetrical proportions to the curve. Articles have suggested that the tipping point for maximal revenue lies around 65% (Pecorino 1995) or even as high as 70% (Trabandt and Uhlig 2011; Stuart 1981). This could mean that much more funding can be obtained through taxation for equalizing purposes without disincentivising production. Some developed countries employ rather low progressive taxation – for example Czech Republic deploys only two categories of income taxation – 15% for those that make less than 48 times the average wage in a year (e.g. 1 701 168 crowns for year 2021, or about 69 750 euros a year) and 23% for those that have an income above that line (Bártová and Kolářová 2022). If the Laffer curve is used as an argument in this debate, then many more income brackets could be set, with the highest ones reaching tax of 65-70% to allow for better redistribution of income and more plentiful public services, without sacrificing government revenue or incentives for entrepreneurs to earn more income.

Regarding the theory of advancement of developing countries and the Kuznets curve; first, they are summarized as follows: poor and developing countries have tendency to be highly unequal at the start of industrialization. Then, as a few skilled individuals start performing highly demanded work, their income grows much larger compared to workers left in the agricultural sector. As time passes, more people move to large, industrialized cities for higher paying jobs. This results in worker surplus and low wages, further increasing inequality. As more industries develop and the country transitions into a fully developed state, worker demand and supply meet, wages rise, and inequality is finally reduced.

If the progression of inequality to development is graphed, it creates an inverted U shape as shown in figure 3.

Proposed by Simon Kuznets (1955), this theory enjoyed some popularity from mid to late 20th century, suggesting that as the economy developed further, inequality would be reduced in most states around the world, as it did in the U.S.

Figure 3: Kuznets curve, own work

This, however, did not come to pass, as inequality continued to rise in most states developed states into the 21st century.

While the data from U.S. national accounts supported the Curve, the reduction in inequality that took place between years 1910 and 1950 was likely not because of development of the post-industrialized USA, but was mainly caused by two world wars and all the economic, social and political shocks they brought (Piketty 2014).

Throughout literature research, the theory of the Kuznets curve appeared several times in the reviewed literature. It was deemed necessary to explain this theory and show that it does not have as much merit as it is ascribed.

3.1.3 Equality and Equity

Something that should be noted is the difference between equality and equity. While equality is mainly understood as everyone having equal rights and being given equal
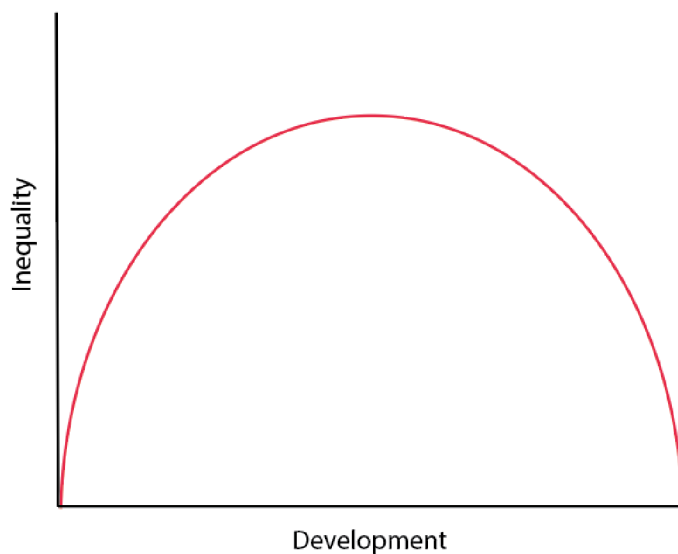
resources, it does not automatically mean equal opportunities, which is what equity represents. For example: when all group members receive a thousand dollars, it is equality. When the same members receive an amount that they need to live a happy life it is equity – some may have specific dietary restrictions, need visual or hearing aids, mobility assistance, learning disabilities, requiring vastly different levels of income.

Today's political goals are also shifting towards equity, with the current Biden administration of USA even adopting the ideas of equality into executive orders (Minow 2021). Evidence shows, that eliminating lawful discrimination is not enough to undo the disadvantageous positions some social groups face (Cohen 2021). Therefore, the shift from the fight for equality to one for equity is an indication of further social progress.

With all of this in mind, even though equity is more desirable to reach in a society, it is, much harder to achieve because of its idiosyncratic definition. In today's world, where many countries struggle to reach even equality, discussing equity seems like building castles in the air.

The focus of this thesis is equality, but it needs to be said that even if the world reaches a desirable level of equality, its work would still not be done, as equity should be the ultimate goal in trying to give everyone the same opportunities for success.

3.2   Inequality measurement tools

First, it should be mentioned that there are some problems with indexes in general. Indexes largely abbreviate – and do not show inequality between centiles or indeed deciles. While there might be little to no difference between the upper and lower class, the upper 20% may own most of the wealth while still being shown as a somewhat equal society. Also, they do not show the difference in income wage and capital income, which is of interest because of Piketty's theories, which will be discussed later.

Gini index

The Gini index is closely tied to the Lorenz curve, as can be seen in Figure 4. The Lorenz curve represents how far the chosen group is from "perfect equality" – the more it deviates from the line of equality, the more unequal the group.

Figure 4:Lorenz curve illustration, own work

Gini index expresses this inequality in numbers, as it measures area found between the line of equality and the Lorenz curve (area A) and the area below the Lorenz curve (area B). Gini coefficient is then calculated as A/(A+B) (Tipoe and Becker 2023). Lower numbers of the index correspond to lower inequality.

It should be noted that countries experiencing different types of inequality (normal distribution compared to broader lower class and narrower upper-class), would return very similar Gini coefficients, as the areas would be similar. As stated above, this index cannot be divided for examination of subgroups.

Theil index

The Theil index was proposed by Henri Theil, who based it on Claude Shannon's theory of information. The nature of the index allows it to partition subsets of data for more detailed information (Conceicao and Galbraith 1999).

It is sensitive to high amounts of concentrated wealth, increasing sharply as income is transferred from the poor to the rich. Provides a measure of the discrepancies between the distribution of income and the distribution of population between groups. When this ratio is one for some group, then this group's contribution to inequality is zero. When all groups have a share of income equal to their population share, the Theil index returns zero (Conceicao and Ferreira 2000).

P90/P10 Ratio

Ratio between the ninetieth percentile of income distribution and the tenth percentile. If the 90th percentile earn more than 10 000 dollars a month and the bottom 10th percentile earn less than 500 dollars, then the ratio is equal to 10 000/500 = 20. While other ratios are also used (P50/P10, using the 50th percentile as the numerator), P90/P10 is among the most popular.

3.3   Causes of inequality

In this chapter, some of the factors causing inequality in the modern world will be discussed. The selected factors are by no means comprehensive, as there are multitudes of others: country's development, regional disparities, distribution of economy's sectors,… Analysing them all is out of the scope of this thesis, so it will only focus on some of the more popularly discussed.

3.3.1   Gender and defamilization

The term defamilization emerged in the early to mid-nineties. It is most often defined as the degree to which state welfare support allows one to be less reliant on their family and more economically autonomous (Lohmann and Zagel 2016; Lister 1994).

Other definitions also exist, but are less prominent – some describe it as the goal of a process, which results in women's labour force participation and wages being on par with men, care work being externalized or split with men and the state supporting care provided by women (Sainsbury 1999), while others wish to split the economic aspect from the social and emotional aspect into separate terms – with the former keeping the label of defamilization and the latter being named dedomestication (Kröger 2011).

While women have enjoyed some increase in their rights, the voices calling for defamilization insist that their position is not where it should be, especially in the most vulnerable members of society – mothers or people caring for others (whether children, disabled people or pensioners) have a higher chance of experiencing interruptions to their career progression, lowered working hours and employment in lower-paying jobs. This is especially true in continental Europe, with mothers in the Netherlands and Germany earning 42 to 63 percent of non-mother's earnings. It is much less prevalent in Nordic countries,

where mothers receive 80 to 91 percent of non-mothers pay (Sigle-Rushton and Waldfogel 2007). Comparison of mothers and non-mothers may show less disparities when comparing wages and living standards of women and men. Women's income falls more often below the poverty line, the unemployment rate is higher for women and, even in Western countries, women still earn 10 to 20 percent less than men do (Bastos et al. 2009; OECD 2023c).

Throughout the 1990s new policies emerged in Europe that indirectly supported defamilization. They mainly concerned women's participation in the labour market (especially targeting mothers), encouraging part-time work through benefits and the creation of part-time job positions. Though this increased the number of women in the labour force, it resulted in women working these jobs having an inferior economic position – part-time jobs generally have fewer working hours and lower pay then full-time jobs (Sigle-Rushton and Waldfogel 2007). These reforms also did little to ease care responsibilities provided by women, fulfilling only the economical part of defamilization.

Lohmann and Zagel (2016) mention public care institutions, such as preschool and public retirement homes as good instruments for defamilization, as they work both ways – reducing the need for parents to care for their children (or vice versa in retirement homes) but also reduces the dependency of children (or the elderly) to rely on family for care. On the other hand, they also state that some policies support familization – tax breaks and financial welfare aimed at families increases the dependency on the family structure and reduces the autonomy of individual members.

Some policies may appear to be beneficial to women, but only affect a minority, lessening the beneficial effect. For example, subsidizing private children care only extends the number of parents that can afford it further into the middle class. The lower classes, that are the ones most in need of subsidies, are unlikely to benefit. Other programs can become a double-edged sword – extending maternity leave, or increasing pay received during it, may lead to better quality of life for some, but it also may disincentivise employers to hire young women, for fear of large costs in case they will have children in the future.
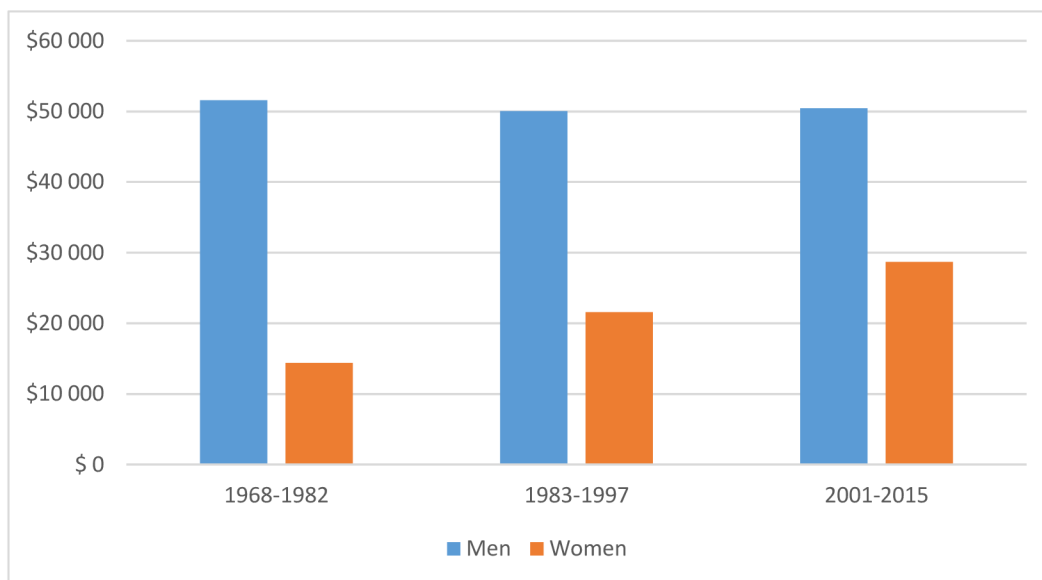
Figure 5: Average annual earnings, own work based on McCarthy (2018)

However**,** as can be seen in the data of figure 5 (McCarthy 2018) the main cause in income inequality between genders is still smaller wages earned by women. While taxes and transfers can help offset the inequality, and indeed are the most consistently helpful instrument in doing so, they alone cannot make up for the low or absent earnings. Therefore, if the state wishes to deal with gender income inequality, it must support women's employment, either by further provision of public care services to reduce unpaid work done at home, or through other subsidization of this work (Avram and Popova 2022).

Lastly, just to mention other inequalities that do not relate directly to income, Cantillon (2013) says that about 4,5% out of women questioned in Ireland ate less to ensure that their husband or children have enough to eat, while only 1,2% of men did the same. Concerning leisure activities two thirds of men had a regular hobby while only a third of women did, and women had cited childcare three times as often as men did as the reason for not socializing in the last fourteen days.

3.3.2 Capitalism and financialization

Piketty (2014) states that diffusion of skills and knowledge is the foremost factor in productivity growth and inequality reduction within and between countries and names these as forces of convergence. He also states the factors that increase inequality, mainly focusing on the private rate of return on capital, naming it a force of divergence. Under the term rate of return on capital, Piketty understands sources of income such as profits, dividends, interest

and rent. Opposed to this is the growth rate, which he describes as annual increase in income or output, in this case concerning the increase macroeconomic entities like states or continents/regions.

He then provides his thesis statement: if rate of return on capital remains significantly above growth rate for extended periods risk of divergence increases sharply – inherited growth grows faster than output and income. This increases inequality as the rich, who can compound their income, outpace the income of the others. As mentioned before, this also increases savings rate – but only that of the few rich – the median savings rate is still low.

Later on, Piketty presents the difference between labour income and capital income; the upper 10 percent of earners in labour income receive 25-35 percent of total labour income, while the upper 10 percent of earners in capital-based income receive 50-70 percent of total capital income. If we look on the other side of the spectrum, the bottom 50 percent in labour income receives 40-25 percent of the total, but the bottom 50 percent of capital income receives only 10-5 percent of the total capital income (with resulting Gini coefficient of 0,6-0,75). For most of history, the disparity was even higher, as feudal lords or industrial magnates owned just about every technological device that could be classified as capital – from windmills to looming devices and steam powered machines.

In the last decades, there has been a rise of extremely high paying positions, with the income of some CEOs being 262 times higher than the average worker's (Kus 2013). Observing this, Piketty (2014) summarizes two main ways of achieving high inequality of total income:

- Society of rentiers – the top earners dominate with income from capital, wealth concentrate in the upper classes and remains there as it is inherited across generations.
- Hypermeritocratic society – the top earners are in high executive positions (so called "supermanagers"), earn their income through labour, receiving high wages or bonuses. This source of income is not inherited directly, and wealth has somewhat smaller tendency to concentrate.
- These two types of societies are not mutually exclusive, in fact the most wealthy individuals employ both sources of income, which further pushes them into unequal positions, even among the wealthy. While the previous

two societies both have members that fall within the 1%, a person that employs both methods of income can be in a category of 1‰.

Having made Piketty's thesis statement of income from capital outpacing growth, it will be examined from the perspective of the real world.
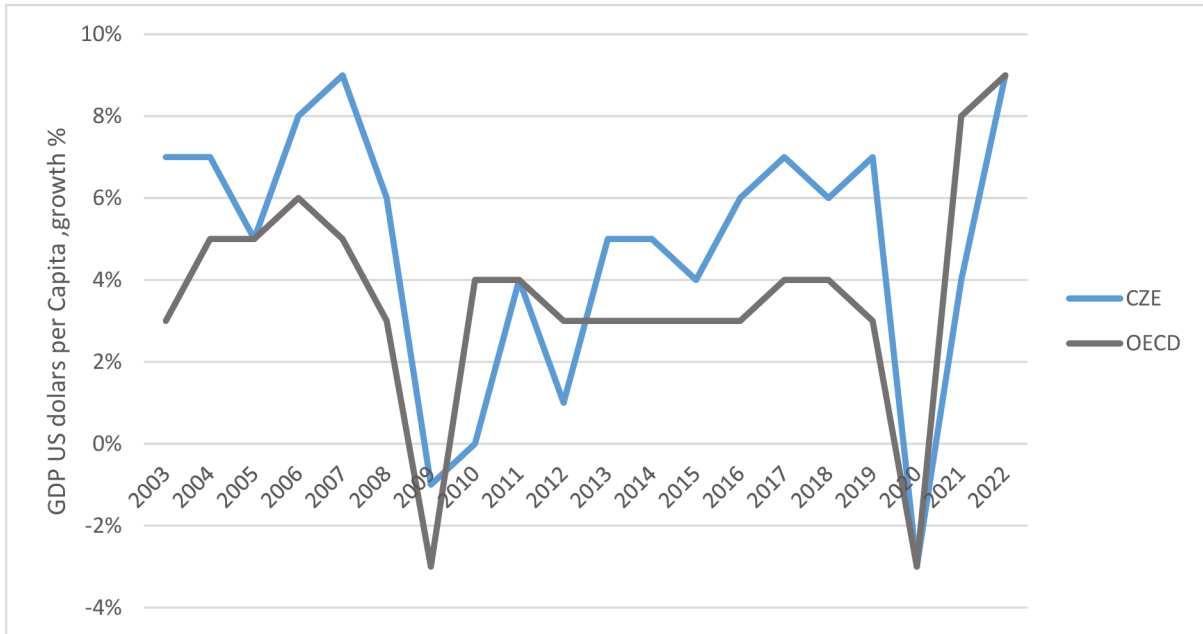

Figure 6: Adjusted world income per capita (annual % growth), own work based on the World Bank data, (2023)

Data from the World Bank (2023) in figure 6 shows that the annual growth rate rarely increases beyond 4 percent and is often negative. On average, the world growth rate is 1,06882 percent annually. When compared to the growth rate of, for example, the S&P 500, it has a long term unadjusted average growth rate of 8,5 percent (Ycharts 2023; Yahoo finance 2023). After adjusting for average world inflation of 5,36 (World Bank 2023a) over the same period there is still three times greater growth in the stock, rather than the annual income. This also does not account for the fact that the growth rate of income is much higher in countries who are rapidly developing and "catching up" do fully developed economies, who experience slower growth, meaning that the world average might experience some bias.

According to these results, Piketty's conditions for increasing inequality would be met. This of course only examines one stock, while there are innumerable options for receiving capital-based income, but the role of stocks, and instruments like them, will be paramount in this chapter. Baker et al. (1998) state that in the last several decades the role of government in directing of the economy has been steadily decreasing, while the role of markets has increased, with domestic and international transactions growing immensely.

Epstein (2005) describes this changing environment by rise of neoliberalism, globalization and, the focus of the next several pages, financialization.

Epstein (2005) defines financialization as the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies. Huber et al. (2022) describe the impact of financialization as lesser market regulation, expanded credit access, greater participation of non-financial firms in financial markets, the rise of the shareholder value model of corporate governance, and higher shares of national income and employment generated by the financial sector.

Epstein (2005) describes the main effects of financialization as significant increase in financial transaction, real interest rates, the profitability of financial firms, and the shares of national income accruing to the holders of financial assets. The start of this process was around the 1970s and 80s where rapidly growing stock prices in a stagnant economy called for increased profits that were hard to obtain in said economy. As a result, most corporation employed one of three strategies, all of them harmful in the long run: cutting wages and benefits to employees, engaging in fraud to display higher profits, moving into financial operations for increased profits.

One of the key mechanisms that links financialization to growing inequality is the shareholder value model of corporate governance, which drives incomes at the top. Strength of labour institutions can help change the intensity of this change, reducing inequality for the top earners or exacerbating it (Huber, Petrova, and Stephens 2022). Flaherty (2015) points toward the relationship between labour and financialization being mutual, as labour strength is being undermined by globalization of capital, but with financialization being the key element in the globalization of said capital. This would mean that, in conjunction with the findings of Huber et al., a vicious cycle is created where a decrease in the bargaining power of labour increases prevalence of financialization, which further globalizes capital, leading into diminishing labour power. As such, Flaherty points to trends suggesting that era of financialization is among the highest in potential to enhance inequality.

Movahed (2023) finds that there is a relationship between income inequality and the number of companies listed on the stock market. As the number increases, meaning more companies use equity to raise money rather than debt, levels of income inequality increase respectively – further linking financialization to income inequality. Movahed (2023)

mentions this effect is seen across all countries examined, but the impact on income inequality was larger in liberal market economies.

Tomaskovic-Devey et al. (2015) estimate that financialization has had an overall negative impact on non-financial sector output, reducing total economic growth in the U.S. The negative consequences impacted mostly labour force (through unemployment and low wages) and government (low tax revenues). They conclude that financialization has led to lower standards of living as well as weaker state investment capacity for both the population and infrastructure than what would have been possible under a more production-focused regime.

When dealing with excessive financialization, the standard answers are unlikely to do the job, as Flaherty (2015) mentions that when dealing with the banking sector, liberalization, supervision and financial reform are all associated with increasing the share of top incomes and furthering inequality. He explains that all of these measures were simply outpaced by the growing complexity of financial instruments, making the past approach to banking governance less impactful. Grabel and Epstein (2005) name preventative financialization and crisis policies that have shown potential: taxes on domestic asset and foreign exchange transactions, reserve requirements on capital inflows, foreign exchange restrictions and other early warning systems that inform and prevent excessive inflows/outflows of capital.

3.3.3 Institutions

Institutions are one of the most decisive factors in solving inequality. Under the term institutions, mostly government bodies are understood - their decisions affect everything from living standards and civil rights to tax and growth macroeconomic policies. Other definitions also exist, focusing on small scale establishments and public services, such as public transit and religious institutions. Concerning large scale institutions, in the Western world, these consist mostly of parliaments or similar system where officials are elected through democratic process (Hartmann et al. 2017)

Wolf (2023) states that the form of democracy that was prevalent in the Western world over the last 50 years focused mainly on the interests of the rich and omitted the middle and lower class. Deployment of globalization and deregulation favoured capital, rather than

labour. While the rich reaped the benefits, the poor suffered the costs and paid for the mistakes that were made along the way.

It is no surprise that many people are turning away from democracy, following authoritarian and nationalist forms of government, as they feel that the current system has failed them. Wolf (2023) sees this as a consequence of failing democracy and its institutions, rather than the cause. Acemoglu (2023) says that globalization also plays a major role in the increase of nationalism, as it creates new inequalities, through tax evasion in tax heavens, outsourcing jobs to other countries and challenging societal norms through new ideas spread through internet and media.

Movahed (2023) refers to variation within capitalism as a cause of subsystems within it, institutions which regulate capital and labour relations. When done correctly they increase aggregate welfare by reducing income and social inequalities. These systems can sometimes take extraordinary form. Usually, social security programs and unemployment benefits come to mind when discussing these terms, but educational programs and higher learning showcases can help students discover new opportunities and lower inequality somewhat indirectly.

OECD (2017) reports that since 1985, on average, the percentage of workers in trade unions has decreased from 30 percent to 17 percent across the OECD countries, with only slightly increasing membership found in Iceland, Belgium and Spain. Collective bargaining varies greatly across OECD countries, with Scandinavian countries having sectoral agreements that leave room for bargaining at the firm level, while Germany, Austria and Spain leave much less room for firm level negotiations. There is a third group which has very limited bargaining power in both environments. It includes Italy, Slovenia and Portugal. Lastly from the limited data OECD was able to find, it estimates that enforcement in wage floor is "far from perfect".

Krieger and Meierrieks (2016) state that the elite, most unequal part of a population usually holds most power. They have a decision to make – support higher or lower levels of economic freedom. Higher levels of freedom lead to larger markets and higher potential profits. Lower levels of freedom lead to reduction in competition and threat from new innovations. Throughout history, the upper class chose to restrict economic freedom, as the benefits of reduced competition, and therefore more stable power, outweigh the potential profits stemming from greater freedom for all (Sokoloff and Engerman 2000). Krieger's and

Meierrieks' research also suggests that the economic elites have created an environment with institutions that favour them, meaning the elite's decisions cannot be easily overturned.

Chong and Gradstein (2007) mention that inequality can cause a vicious cycle; growing inequality results in higher political power gained by the elite, which allows them to circumvent and weaken institutions. Weak institutions grant little social and judicial support for lower classes, which in turn leads to more inequality. Reforming institutions could lead to reduced equality, but as stated above, elites favour restriction of freedom in favour of power and reduced inequality is not in their interest so they have little incentive to promote its implementation. This force is opposed to the one mentioned in arguments for inequality, where educated people often eliminate inequality through the democratic process. However, if the strength of institutions is greatly undermined and elected officials have little power (or desire, if corruption is rampant) to change inequality, it is hard to overturn the status quo.

3.3.4 Youth employment & mental health

Recently, there has been much of positive development in mental health transparency - disorders are being less demonized and mental health professionals are being treated much like physicians are for bodily health issues, a service that is sometimes necessary for wellbeing, rather than the taboo topic which it was several decades ago.

The mental health of youths may be critical in further improving their overall wellbeing as research suggests that up to 75% of mental disorders manifesting in adulthood have their cause rooted in childhood (Kessler et al. 2005; Burcusa and Iacono 2007). But the prospect of children's wellbeing may be threatened by recent events.

The pandemic has especially struck the lives of adolescents and children. Foregoing the obvious impact on quality of education for the moment, many youths form first friendships and develop social skills during pre-school and primary school education which was also hampered by the employment of remote learning, making socialization difficult. Research has shown that such changes can have large impact on the psyche of adolescents, with some youths developing post-traumatic stress disorder as a result of epidemics (like the Spanish flu pandemic) and lockdowns in the past (Sprang and Silman 2013; Gruber et al. 2021). A meta-analysis showed increase in symptoms of depression, mood disorders, anxiety, stress and externalizing behaviours (such as hyperactivity, agitation, aggression,

opposition or defiance) when compared to pre-pandemic occurrences of the symptoms (Zolopa et al. 2022).

As will be mentioned in the vocational rehabilitation chapter, people with mental illnesses are among the most likely to find themselves unemployed and possibly seek disability support from the state. This would mean that long-term employment prospects are both decreased by lesser quality of education received during the pandemic, as well as the declining mental health caused by the pandemic.

(Solga et al. 2014) mention that after the financial crisis of 2009 youth unemployment increased sharply in many European countries, but Germany has retained much higher employment of teens partly thanks to its vocational system (Austria, Denmark and Switzerland engage in similar systems and enjoyed similarly high youth employment). Also called the dual-system, students in secondary education acquire apprenticeships at local firms to gain work experience. They attend most subjects in school normally – like math, language education or history – while receiving pay (leading into defamilization effect and bolstering financial literacy) and with prospects of getting hired by their apprenticeship employer once they finish school, greatly smoothing school-to-work transition.

However, even this system is not without flaws, as in smaller firms, the apprentices get hired up to 40 percent less often after their internship ends (Solga et al. 2014). They are often seen just as extra helping hand in production that has to be paid less than a full-time worker (even though they have just as much skill by the second or third year of apprenticeship) (Thelen 2014). Another problem is low-achieving youths. While those with excellent results frequently seek tertiary education and those with good results receive apprenticeships and job offers, students with lower academic performance struggle to find training employment. When they do, it is more often than not found in positions offering low wages and high health and unemployment risk (Solga et al. 2014). While bringing a lot of positives, the system should not be considered as a cure-all for youth unemployment, while also being quite demanding on institutions that supervise and support it as well as on the firms who would have to create many new positions for apprentices in countries wishing to adopt this practice.

3.4 Dealing with inequality

3.4.1 Universal basic income

Universal basic income (UBI) is a means of providing each member of society with enough money to sustain all, or at least some of their basic necessities. This income is provided to everyone equally, regardless of their social status or employment. The system has already undergone testing in Finland, is undergoing further testing in the United Kingdom and has been used in Alaska since 1982 (Torkington 2023)

It is a controversial policy, as some feel that people would be getting money for nothing or that certain members of society would just spend this money on drugs and alcohol. This section's goal is to dispel some of these doubts and bring the many advantages of this system.

According to Evans (2023), the most often voiced reasons for implementing UBI are

1. Ongoing automation will put UBI into necessity, as there will not be enough jobs for everyone, and wages will stagnate.
2. UBI could improve the perceived inadequacy of current welfare systems.
3. Universal targeting of UBI would provide for those, who do not receive any benefits under current welfare policy by need them the most.

Some propose that implementation of UBI would be a revolution among the likes of the likes of the industrial revolution of the 19th century and the corporate, mass-production revolution of the 20th century (McGaughey 2022)

Bidadanure (2019) defines UBI is a regular allowance of cash that is distributed universally, unconditionally and individually.

The fact that it is provided in cash, or its equivalents, gives individuals freedom to choose what they wish to spend their money on. Some will buy necessities such as food or pay rent, others will spend it on transportation and others still spend this money on education or helping raise their family. Whereas food stamps and other kinds of welfare support create the need for institutions to issue and oversee them and require restaurants and grocery stores to take on additional administrative workload to have the money paid out. They also limit what the support can be spent on – while some may have enough food, perhaps having a

readily available source from a family member, they could struggle with paying rent or medical bills.

Universality refers to the idea that no matter a person's age, location, race, gender, income or other factors, they will receive the benefits of this policy (Hasdell 2020).

Unconditionality is somewhat similar to universality, in that it again disregards and requirements that would stand in their way of receiving UBI (Gibson, Hearty, and Craig 2018). Conditionality that is set in other forms of support refers to requirements such as necessity to perform certain activities (unemployed must be seeking a job, have a certain number of interviews per month, or their support is withdrawn).

Whereas some policies depend on the entirety of the income of the household in which one resides, UBI focuses on the individual, without any ties to others. In other policies a person cannot be eligible for welfare benefits, even though they do not have a job, or other forms of income, because their spouse creates enough income for both people to live above a poverty line set by this policy (Bidadanure 2019). Traditional forms of support do not consider the fact that the spouse may not be sharing the income equally, so even though they are above poverty line, UBI would grant both of these people reliable income.

One of the most prevalent arguments against UBI are the concerns that the extra money provided by government will simply be spend towards drugs, cigarettes, alcohol, and other undesirable goods.

This was disproven in a meta-analysis of cash transfers, which showed that increased cash transfers instead have a significant negative effect on consumption of such goods (D. K. Evans and Popova 2017). This could mean that consumption of such goods is a mere coping mechanism for the unfortunate circumstances the individuals consuming them find themselves in. The deployment of UBI would therefore be advantageous to society, as less money would be spent on healthcare and law enforcement as a result of this reduced consumption.

With increased income for everyone, politicians and budget organizers may be concerned with decreased revenues this would bring, as they may think people would quit work or reduce their working hours to have more free time while maintaining the same level of income.

A meta-analysis found that there is no significant impact on work behaviour with increased transfer payments, such as UBI (A. V. Banerjee et al. 2017). Some forecasts actually indicate that implementing UBI will instead increase output which in turn enlarges the labour force, providing more jobs to the economy (Nikiforos, Steinbaum, and Gennaro 2017). It is worth noting that so far, all UBI programs were mere trials, limited by time in their duration. Therefore, the recipients knew that quitting their job or compromising their standing within it would be undesirable in the long term, when the trial period was over. Only real data could be collected when UBI is put into broad practice.

Often called out as one of the main pillars of arguments against such programs, affordability is more attainable than it could appear. UBI could either be implemented on top of existing welfare programmes or simply replace some or all existing programmes to finance it.

A study in UK examined 3 different schemes through which UBI was proposed. Scheme 1 provided relatively low support, with the intent of being fiscally neutral – the payments of UBI would be financed through tax and support changes within the system, while scheme 2 and scheme 3 granted more financial benefit through external financing (Reed et al. 2023).

First scheme provided 45% of income needed to meet poverty line, while schemes 2 and 3 provided 102% and 163% respectively (Padley et al. 2021; Reed et al. 2023). Even if only the first level of support would be implemented, many families would readily welcome this new source of support, while remaining financially neutral for the state. If the other two levels are considered (as many feel that should UBI be implemented, it should, by itself, provide enough so that the individual recipients do not have to ever experience poverty), financing should be provided by a progressive, wealth or demerit goods tax, as normal income or consumption tax would just lead to increasing the poverty threshold, further complicating the system.

Different study which examined the situation in Germany found that a monthly income of €1000 (exceeding the poverty threshold at the time) is entirely feasible and could be financed through transformation of expenditure of the current social security system (Straubhaar 2017).

As can be observed, UBI is not the utopian dream some think it to be, but a reality that could be possibly implemented, while even having minimal impact on state's finances.

As mentioned above, some programs set in place currently demand that the recipients conduct some activities monthly – take educational courses (which may be limited and not provide the knowledge the recipient would need) attend job interviews (even if the job is below their qualifications, unfit for the person or even dangerous) and accept any job offer, which sometimes leaves recipients worse off than they used to be on welfare:

If a recipient earns 20 000 CZK on welfare benefits, and then, because of the conditions of the system, accepts a job offer for 22 000 CZK their actual income is less than it used to be on state support. In Czech Republic the amount is reduced by income tax of 15%, or 3 300 CZK, resulting in total income earned: 18 700 CZK.

This phenomenon is called "poverty trap"; the recipient is incentivized not to try as hard to get hired for a job, or only a really well paying one, as they may end up with less money than they started, not to mention having less time to find a job that would actually suit them (Azariadis and Stachurski 2005). With UBI all income acquired is added to the baseline, so a recipient may take any job they find, if they wish for additional income, continue to search for a well-fitting job, or further their education to reach a better position.

In a recent study in Kenya noted positive effect of UBI transfers to mental and physical health of the recipients, despite the ongoing pandemic. It also reduced hospitalization and overall danger of contracting illness, likely due to the fact that the recipients were not forced to attend dangerous jobs or be in physical contact with other people. (A. Banerjee et al. 2020). Further studies indicate that having a safety net that is accessible to all could reduce anxiety and depression. Results showed that there is no better alternative to solve the mental health crisis affecting the young generation (Johnson et al. 2022)

Bidadanure (2019) places the reduction of income inequality as one of the foremost reasons why UBI is being discussed. By its universal nature it equalizes gender disparities by providing low-earning spouses with an exit out of a relationship. As mentioned above, welfare support is often calculated per household, so some spouses depend entirely on their partner for support and have little options if they wish to end a long relationship. UBI can provide enough funds to meet basic needs, resulting in fewer people being trapped in bad relationship because of economic reasons.

Some people may be working in a job with unfavourable or exploitative conditions. Those people may feel that they need to continue working under such conditions despite this,

because of financial pressure, little bargaining power and, in some countries, lacking unemployment support. UBI would grant leverage necessary for negotiation to these people (Perkins et al. 2022).

While, also by its universality, UBI is given to everyone, resulting in no redistribution of income on paper, citizens with lower income are bound to notice the presence of new funds, which sometimes even double their income, much more than high-income individuals, where UBI would only represent a small fraction of their monthly income. Low-income individuals therefore have much more freedom and can seek education or, as mentioned above, negotiate or find better work environments.

In conclusion, while universal basic income may at first glance appear to be riddled with drawbacks and risks, many of these are unfounded and simply lie in stereotypes. In the cases presented here, the perceived drawbacks turned out to be more advantages UBI would bring.

If UBI carried only the advantages presented in this section, it would already appear as a positive change, both to individual citizens and the overall economy, but many benefits have not been discussed here or have not yet been discovered – and can only be found after implementation.

This also holds true for concerns however – if UBI replaces all other forms of welfare it will become much easier to control, granting more power to policy makers, for better or worse. There are some that were not discussed and are hard to quantify – some people need more to function in everyday life than others – starting with obvious things such as dietary restrictions, hearing and visual aids or medication, but also some non-trivial matters like transportation. In this sense, UBI is a tool for equality, but not equity,

Adopting UBI may be risky, holding on to faulty systems of the past may be riskier.

3.4.2 Vocational rehabilitation

Chamberlain et al. (2009) define vocational rehabilitation as a process in which those with a disability (whether temporary or permanent) are enabled to return to employment or gain the possibility of new employment. They further divide vocational rehabilitation into two stages: assessment and interventions.

In assessment, an individual's disabilities, as well as their functioning abilities are evaluated. Then, they are compared to the demands of their work and workplace, the possibility and requirements of the individual's return to their previous work is examined, as that is presented as the most desirable outcome. Another outcome is that the person returns to their work in a different capacity – with reduced working hours, assistance on some tasks or with devices enabling them to work. Last outcome is the possibility of the person being trained for a new working position, if the previous two outcomes are impossible to achieve. In interventions, the actions planned in assessment are undertaken – workplace is equipped to accommodate the disabilities, training and medication for mental illnesses is provided and new skills taught. Furthermore, to ensure lasting success of the program, counselling, job coaching, and workplace supervision should be made available for the individual (Chamberlain et al. 2009).
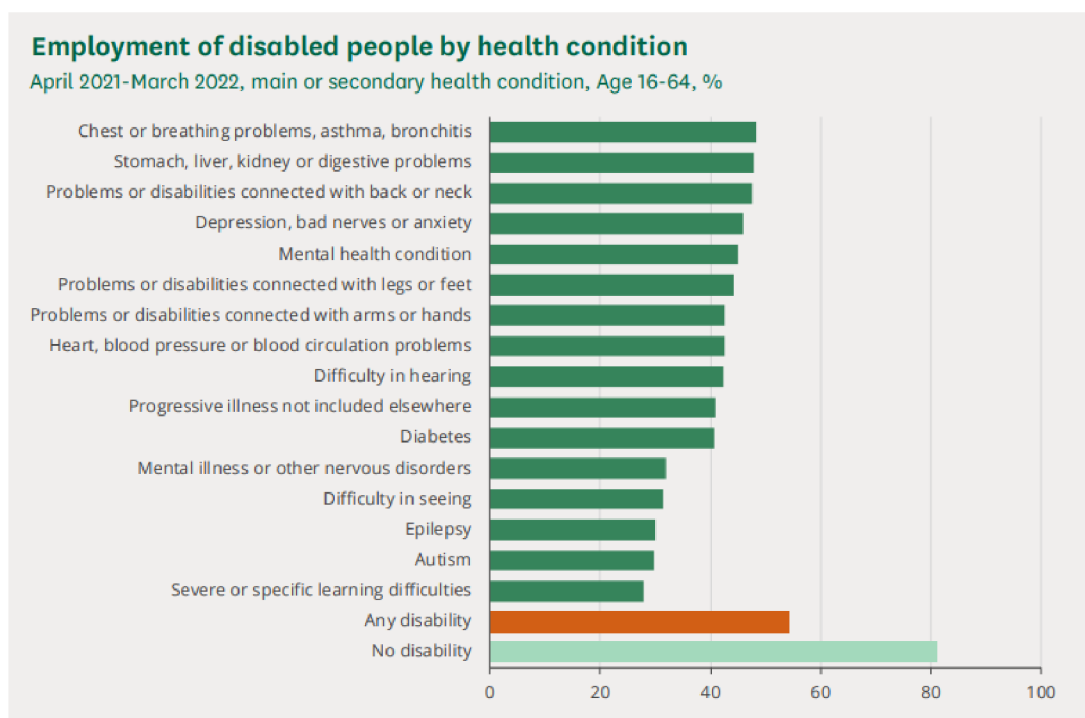

Employment of disabled people by health condition
April 2021-March 2022, main or secondary health condition, Age 16-64, %

Figure 7: Employment of disabled people by health condition, Powel, (2023)

OECD (2009) defines the goals of programs dealing with vocational rehabilitation as public expenditure aimed at enabling individuals with disabilities which prevent their current employment to reintegrate into the labour force. (Movahed 2023) found that public expenditure on such programs has a strong negative relationship with income inequality.

With some countries have up to 23 percent of their working age (16-64) population reporting some sort of disability, with signs pointing an increasing tendency in reports over

the last few years (Powell 2023). Powel also reports that people with disabilities have 19 percent higher rate of unemployment in the UK. As shown in figure 7 most affected are people with learning-related disabilities, having a 72 percent unemployment rate, followed closely by epileptics and mental illnesses at around 70 percent.

It is almost certain that the economy would benefit from increasing the workforce by people newly enabled to work again. Social support programmes would also have to spend much less on people with disabilities after their vocational rehabilitation, freeing up funds. Though there is an initial investment into the assessment, and the much longer and costly interventions, in a report done by the Swedish Ministry of Health and Social Affairs (2000) it was estimated that for every 1 Swedish crown invested into vocational rehabilitation 10 crowns would be given back to society. This results in rehabilitation being a sort of investment, as, on average, OECD countries spend 1.2 percent of GDP on disability benefits (OECD 2009) (for comparison this is around the same amount that is spend on unemployment benefits). This also does not account for the physical and mainly mental health improvements the disabled would enjoy from having increased financial freedom and autonomy.

(OECD 2009) also mentions that some people suffer from the unemployment/poverty trap mentioned in the universal basic income section – while they would be able to perform some kind of work, finding a job would mean losing some or all of their benefits they have as a disabled person receiving state support, so in the end they would spend more time working, while receiving same or lower income than they were on support. With vocational rehabilitation they could once again find full-time employment complimenting their newly acquired skills and providing meaningful income.

4 Practical Part

In the practical part, two case studies are conducted. In each case study, econometric variables for testing are first introduced and their development evaluated. Then they are tested for their impact on the dependent variables of the Gini index and the P90/10 ratio.

4.1 Case study of the Czech Republic

The Czech Republic's economy sits in a rather unique position arising from its history and geographical location. Even though it was part of the communist block, it retained its strong manufacturing capabilities throughout the 20th century and even today, the country is still strongly oriented towards industry. Thanks to its location in the centre of Europe, bordering the strong economies of Germany, Austria and Poland, its part in European land trade cannot be understated, specifically focusing on the export of industrial goods like cars and heavy machinery.

4.1.1 Econometric variables

In this chapter, the econometric variables which will be tested to see their impact on income inequality are examined and displayed in graphs. Some other economic indicators are also shown to inform of the general state of the Czech Republic.
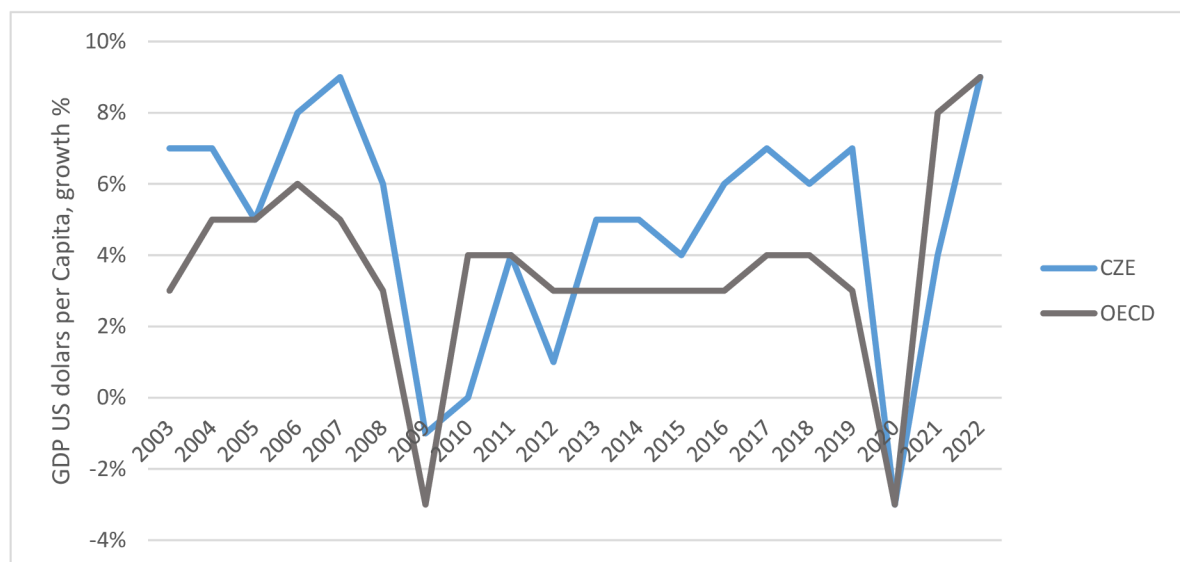

Figure 8: GDP per capita growth, own work based on OECD data (2023).

According to OECD (2023a), the growth of GDP follows the same general trend as all of the OECD countries, suffering significant setbacks in the 2008 financial crisis and the

COVID-19 pandemic, as shown in figure 8. Another interesting point is the 2011/2012 debt crisis that is much more noticeable in the Czech Republic – at the end of 2011, worry about the financial situation of Greece and the state's ability to manage debt spread to other European countries and compromised trust of investors in state issued bonds, resulting in fewer available finances and increase in bond interest rates to promote demand – which only moved the problem of financing further down the line, resulting in decreased growth (Frait and Komárková 2021).

Though, overall GDP per capita experiences faster growth than in other countries. This is likely because the Czech Republic is a developed state with strong industrial capabilities. Although the amount of GDP generated through industry is much higher than in other developed states (Kučera 2015), it allows for further expansion in to the service sector.

Staying on the topic of employment, data from the OECD (2023b) regarding the development of unemployment is displayed in figure 9 and compared to that of all OECD countries.
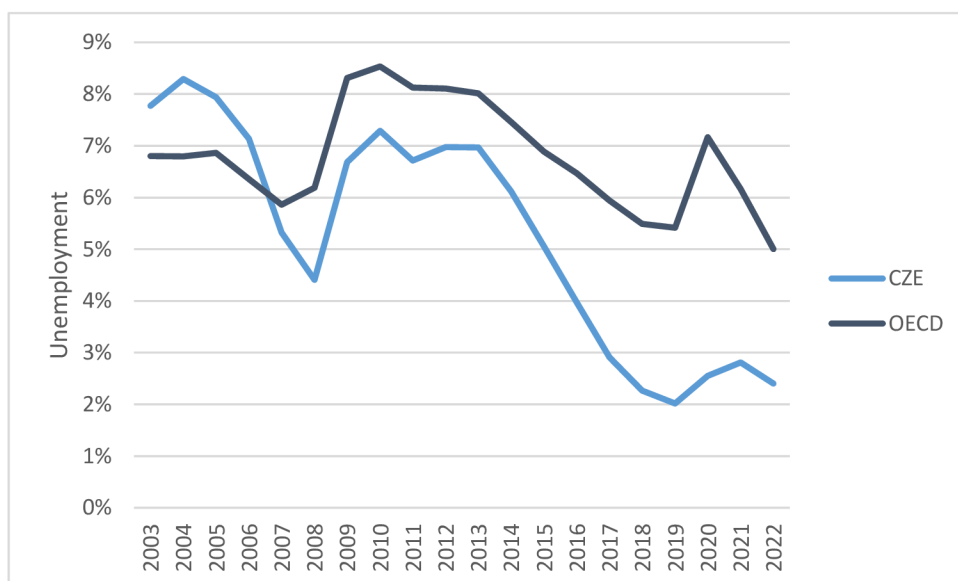

Figure 9: Unemployment % in job seeking population, own work based on OECD data (2023b)

Figure 9 informs that the Czech Republic follows the general trends that all OECD countries do. It suffered an increase in unemployment in the 2008 financial crisis and the COVID-19 pandemic. However, it should be noted that the long-term unemployment rate in the Czech Republic is much lower than in the rest of the OECD. Though the increases in times of crisis are very similar (2008: 2,28% CZE, 2,13 OECD), the Czech Republic has a

much lower long term unemployment baseline. Unemployment reached all time low in 2019 at 2,02%, which can prove advantageous for the workers, as employers have a much more limited supply of labour and have to entice workers with benefits and higher pay. This results in stronger bargaining power for workers who can negotiate better conditions even for entry-level jobs, lowering income inequality.

Furthermore, in figure 10 the development of youth unemployment in the Czech Republic is displayed. The OECD (2024b) defines youth unemployment as people aged 15 to 24 without work, available for work and looking for work.
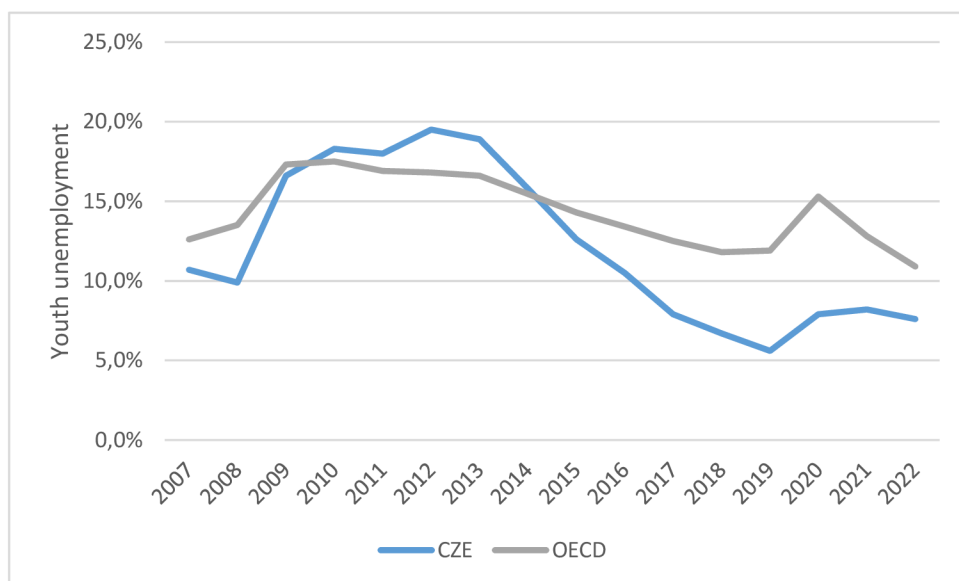

Figure 10:Youth unemployment in the Czech Republic, own work based on OECD (2024b)

When the figure is compared to the overall unemployment data, it can be observed that it follows the same general trends, with 2008 being one of the years with the highest employment, followed by a surge in unemployment, which receded after 4 or 5 years. This surge was perceived as especially problematic – in this period, many people lost their jobs, but the inability of new workers entering the labour force to find jobs resulted in them not acquiring experience in the workplace, further worsening their prospects in the future. Moreover, in the Czech Republic some unemployment benefits are not paid to new graduates, as they are based on income acquired from employment in the previous years, or on the amount of social insurance paid, which students are exempt from paying. Comparing figures 9 and 10, the unemployment of young people is 5-10% higher than the overall unemployment. While this may be attributed to employers seeking experienced workers it

creates a vicious cycle – young workers cannot get experienced because experienced workers are hired in their stead.

Another reason youths experience higher unemployment is that they are less networked in the job sector than long time workers. This fact is hard to put into numbers, or change. Though there are programs that help students find jobs (some large companies, such as Škoda Auto, have their schools which employ students directly during and after graduation) it is hard to emulate work networking. Though the advent of social networks, and websites made specifically for finding jobs such as LinkedIn helps the process, it is still far from universal adoption – data shows that there is 1,8 million users of linked in in the Czech Republic, from which only 14,3 percent are 18-24 (NpC 2021). Compared to the active users of Facebook of 6,78 million (Statista 2024), it shows that not many young people take advantage of these tools, further lowering chances of employment, even though they participate in other social media.

In the theoretical part of this work, it was suggested that the number of companies listed on a country's stock exchange (which is tied to financialization) is correlated with income inequality, this observation will be tested for this work's case studies. Number of companies listed on the stock market was extracted from the annual reports provided by the Prague stock exchange (2024a) and can be seen in figure 11.
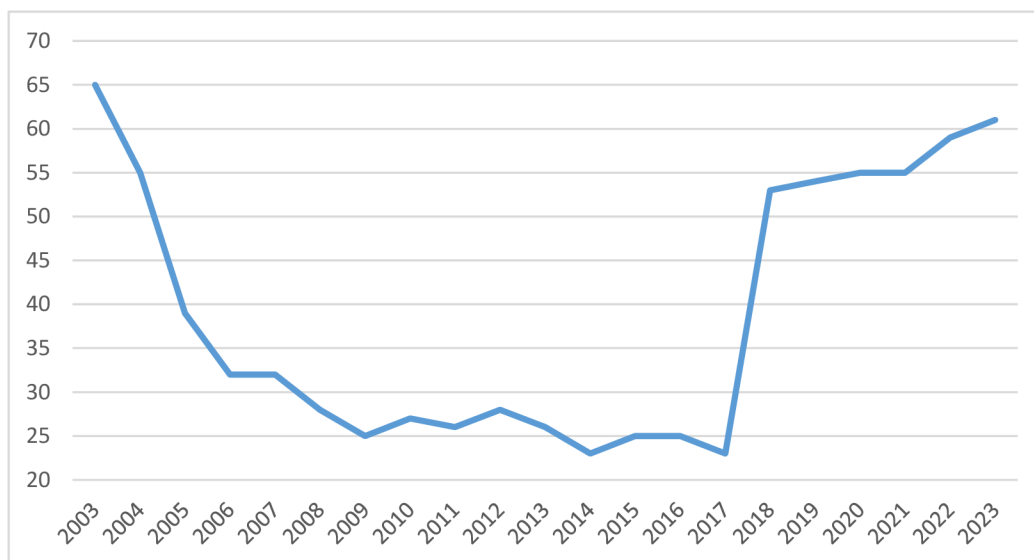

Figure 11: Number of stocks listed on the Prague stock exchange; own work based on Prague stock exchange (2024a)

At the start of the observed period, the number of firms listed steadily decreased until 2009. The only explanation that arises was by ČSÚ (2009), which states that it may be due

to the fact that the number of firms and entrepreneurs was very high in the 1990s, so many of the firms that started after the Velvet revolution failed in the following ten years.

The number of companies listed saw a large increase in year 2018, likely due to the fact that a new market department called "Free Market" opened in the respective year. This Free Market more than doubled the number of listed firms (23 to 53) and increased end of year market capitalization by an order of magnitude (1 252 billion CZK to 21 261 billion CZK). The Prague Stock Exchange (2024b) mentions that whereas the EU regulates the Prime market, the Free Market is regulated by the stock exchange itself, and has lower barriers for new entrants.

As the difference between average wage for men and women is also a part of income inequality studied in this work, its developments are displayed in figure 12 and are taken from data provided by ČSÚ (2022)
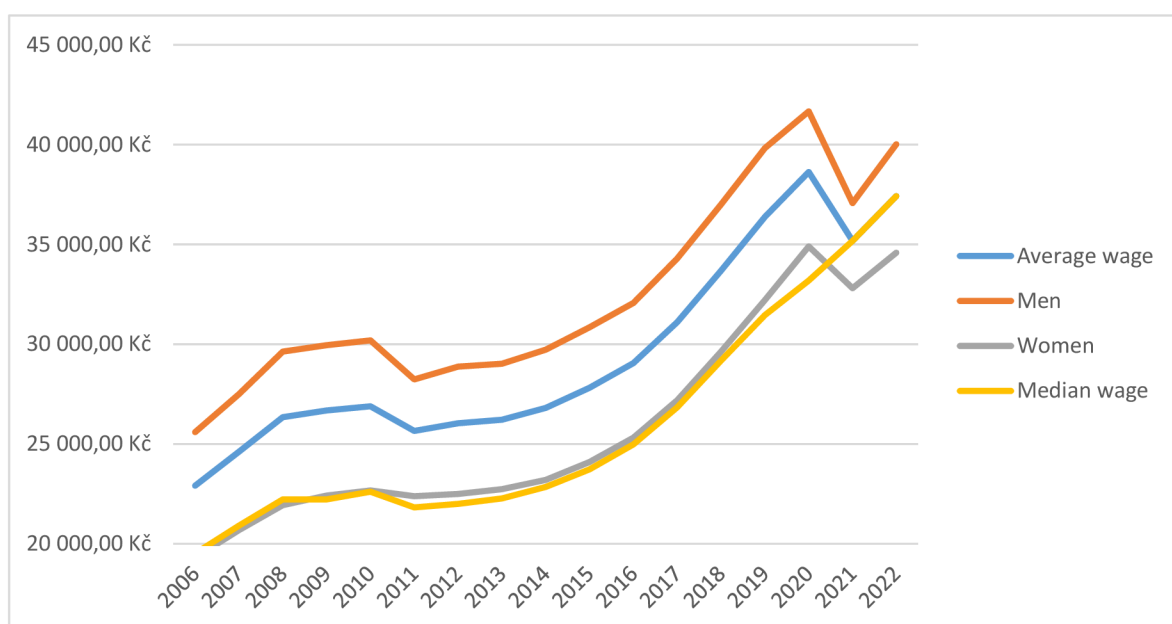
Figure 12: Wage by gender, own work based on ČSÚ (2022)

There is a consistent increase in median wage over the observed period, which cannot be said about the average wages. In 2021, all average wages experienced a fall while median wage increased instead. This could mean that above median wages were decreased, which results in lower average but higher wage equality.

The pay gap between men and women has steadily decreased over the years, with the difference in 2009 being men receiving 34% higher pay (which is also the all-time high for

the observed period), while in 2022 men receiving 16% higher pay, with the lowest difference being in 2021 at 13%.

As previously shown, the Gini index, one of the two indicators of inequality observed in this paper, remains consistently low in the Czech Republic, being one of the five lowest in Europe in regards to the Gini index (World Bank 2023b). While it experienced changes over the observed period, its starting value of 26,6 in 2002 does not greatly differ from its ending value at 26,2, as can be seen in figure 13.
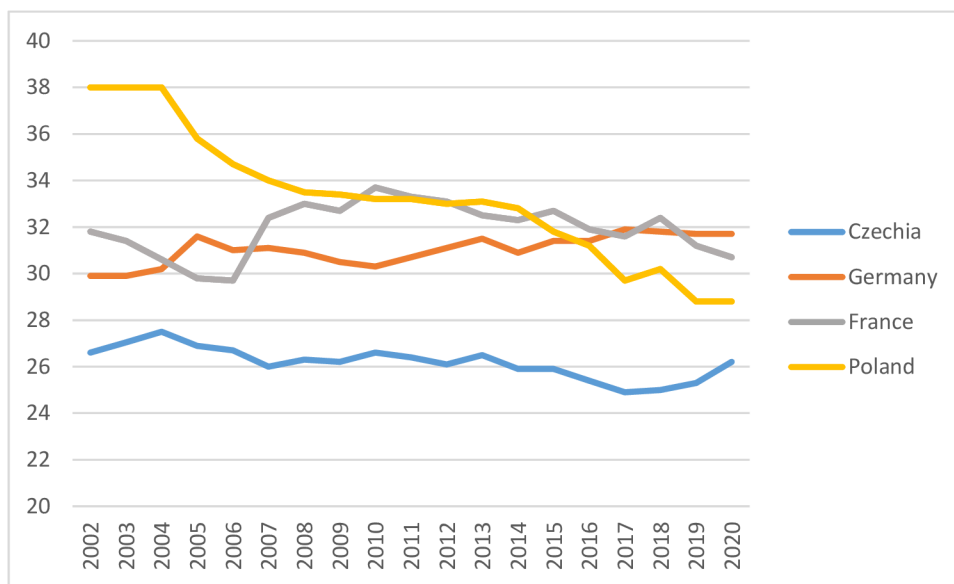

Figure 13: Gini index of selected countries, own work based on the World Bank (2023b)

The Gini index however only informs of the overall inequality of the studied area, for more depth, the P90/P10 ratio is employed, based on data provided by the MPSV (2023). It displays the difference in incomes between the ninetieth and tenth percentile and is shown in figure 14 and put into perspective with P50/10 and P90/50 ratios. Figure 14 shows no tremendous changes over the years but displays a downwards tendency since 2015, and an overall decrease in the P90/10 ratio, from 3,44 in 2005 to 3,16 in 2022 . Another interesting point is the relatively small effect the 2008 financial crisis and 2020 pandemic had on the ratios. Whereas in other areas there was usually at least some reaction to these events, here it appears that the development simply continued in the previously acquired tendency, without being influenced by the crises.
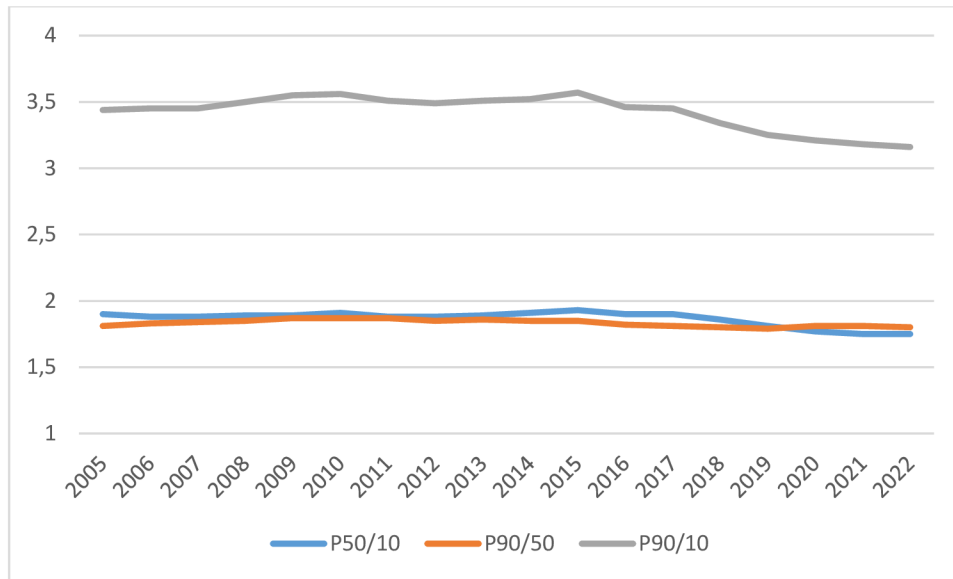
Figure 14: P50/10, P90/50, P90/10 ratios, own work based on MPSV (2023)

The only exception to this observation is the very slight change from in the P90/50 ratio, which had a small downward tendency until 2020, where there was a slight increase, as a result of rising income of the middle class.

The strength of institutions is evaluated in figures 15 and 16. Figure 15 shows a general downwards trend in Trade union density, which OECD (2023d) defines as number of trade union members as a percentage to the total number of employees. Collective bargaining coverage, defined as number of total employees minus the number of employees who are legally excluded from the right to bargain by the OECD (2023d) shows the same general trend, although with some periods of increased coverage, mostly around times of crisis – this could mean that employees tend to seek positions with stronger bargaining power during and after periods of uncertainty, but feel less inclined to do so after the crisis passes.
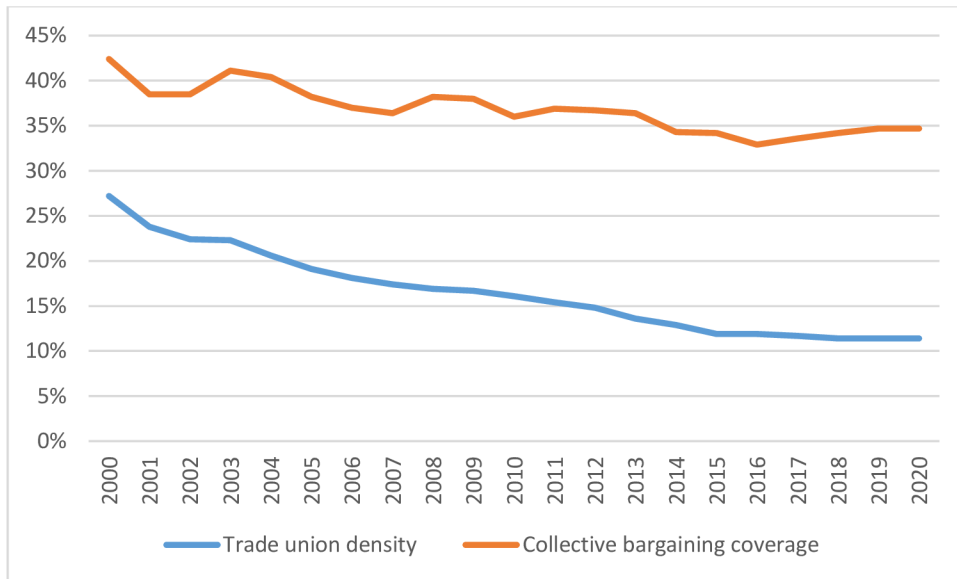
Figure 15: Development of union density and collective bargaining, own work based on OECD (2023d)

Figure 16 focuses primarily on labour market programs, such as public employment services, which help job seekers in locating work and income support for those without a job. Also displayed is training, which is tied to vocational rehabilitation mentioned in the theoretical part. However, the statistic displayed in figure 16 informs of all training provided by institutions, such as the dual system, which will be discussed in the case study of Germany.

Figure 16: Institutional expenditure as a percentage of GDP, own work based on OECD (2023d)

The expenditure on training remains consistently low at 0,01% with a peak of 0,04% in 20010, especially when compared to the German expenditure seen in its case study. Public employment services are also rather consistent, but income support interestingly responds to

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economic crises, showing state's increased support especially during the COVID-19 pandemic, where it increased from 0,15% to 1,03%. This increase also considered not only th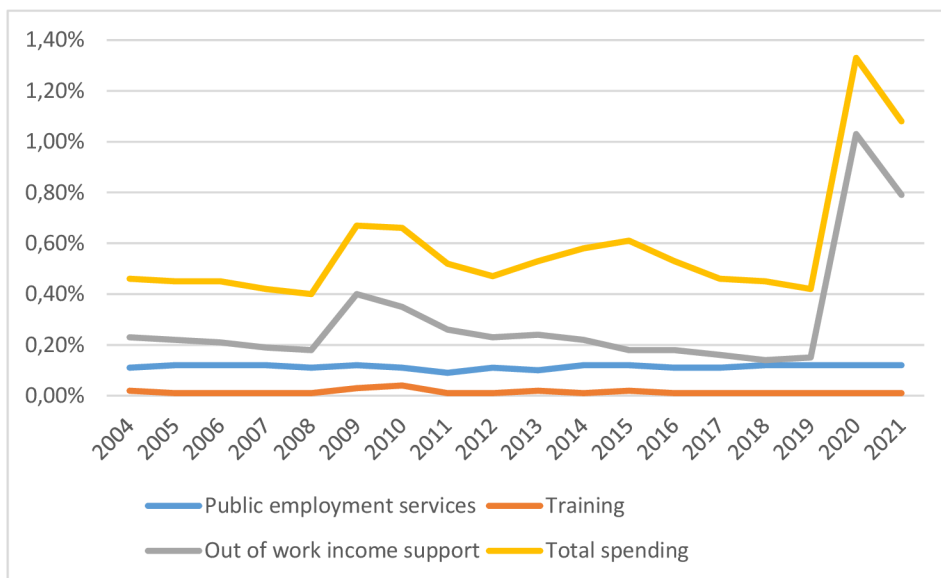e payments made to the unemployed, but also state support for entrepreneurs and firms that saw a decline in their operations during lockdown.

4.1.2 Econometric testing

In this chapter, variables that have been introduced will undergo testing to verify their impact on inequality. The dependent variables will be the Gini coefficient and the P90/P10 ratio. The independent variables will be the gender pay gap (%), number of companies listed on the stock exchange, youth unemployment (%), union density, LMP spending expressed as a percentage of GDP.

First, preliminary models from all available data (years when there is a complete dataset present for all the variables, namely 2007-2020) are developed to get a general understanding of the situation, displayed in figures 17 & 18.

```
Dependent variable: Gini

                      coefficient   std. error   t-ratio    p-value
          ----------------------------------------------------------
          const             22.5784      1.02755      21.97    1.94e-08  ***
          Gender            0.00384522   0.0488194    0.07876   0.9392
          Stocks            0.00661725   0.0104313    0.6344    0.5436
          Youthunemployment 0.0627922    0.0239132    2.626     0.0304    **
          Uniondensity      0.120074     0.0759996    1.580     0.1528
          Safetynets        0.943024     0.381825     2.470     0.0387    **
```

Figure 17: Results of preliminary Gini regression, own work

```
Dependent variable: P9010

                      coefficient   std. error   t-ratio    p-value
          ----------------------------------------------------------
          const             3.38363      0.138395     24.45    8.36e-09  ***
          Gender            0.0120849    0.00657520   1.838     0.1034
          Stocks            -0.00534448  0.00140493   -3.804    0.0052    ***
          Youthunemployment 0.00641548   0.00322073   1.992     0.0815    *
          Uniondensity      -0.0113292   0.0102360    -1.107    0.3005
          Safetynets        -0.0583719   0.0514259    -1.135    0.2892
```

Figure 18: Results of preliminary P90/10 regression, own work

The preliminary model for the Gini coefficient shows a high likelihood of youth unemployment and safety net spending impacting the Gini coefficient, while the model for P90/10 is more likely to be impacted by stocks listed on the stock exchange and possibly

youth unemployment. From these preliminary results, it is interesting to note that the coefficients are not entirely aligned with the expectations of the literature review. The number of stocks listed decreases the P90/10 ratio, resulting in lower income inequality between the ninetieth and tenth percentiles. LMP spending, like training and job seeking support display increasing influence on the Gini index.

The results of the examined period of 2011-2020 appear in figure 19.

```
Dependent variable: Gini

                       coefficient   std. error   t-ratio   p-value
           ---------------------------------------------------------------
  const                22.5393       1.32353       17.03     6.97e-05   ***
  Gender                0.0687885    0.0466427      1.475    0.2143
  Stocks                0.0180898    0.00930940     1.943    0.1239
  Youthunemployment     0.133702     0.0419835      3.185    0.0334     **
  Uniondensity         -0.119985     0.145512      -0.8246   0.4559
  Safetynets            1.01552      0.314192       3.232    0.0319     **


Dependent variable: P9010

                       coefficient   std. error   t-ratio   p-value
           ---------------------------------------------------------------
  const                 3.67637      0.256812      14.32     0.0001     ***
  Gender                0.0130070    0.00905033     1.437    0.2240
  Stocks               -0.00427454   0.00180635    -2.366    0.0771     *
  Youthunemployment     0.0167848    0.00814628     2.060    0.1084
  Uniondensity         -0.0483665    0.0282345     -1.713    0.1619
  Safetynets           -0.0873746    0.0609644     -1.433    0.2251
```

Figure 19: Econometric testing of the examined period, own work

While the Gini tests show similar results in the preliminary test, youth unemployment and LMP spending show significance. P90/10 however, performs worse, displaying only possible relationship with the number of listed stocks, but only at the alpha level of 0,1. However, if the focus is shifted towards the variables that showed promise in the preliminary test, the results (shown in figures 20 and 22) are very different.

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```
Model 3: OLS, using observations 2011-2020 (T = 10)
Dependent variable: Gini

                      coefficient   std. error   t-ratio    p-value
  ---------------------------------------------------------------------
  const                 23.9373      0.287615      83.23     9.52e-012  ***
  Youthunemployment      0.0929708   0.0149306      6.227    0.0004     ***
  Safetynets             1.14476     0.300022       3.816    0.0066     ***

Mean dependent var     25.76000    S.D. dependent var    0.573876
Sum squared resid       0.389896   S.E. of regression    0.236007
R-squared               0.868456   Adjusted R-squared    0.830872
F(2, 7)                23.10708    P-value(F)            0.000826
Log-likelihood          2.032914   Akaike criterion      1.934172
Schwarz criterion       2.841927   Hannan-Quinn          0.938367
rho                    -0.260584   Durbin-Watson         2.424596
```

Figure 20: Results of Gini refined test, own work

These results are much more informative, though they keep the surprising coefficients of stock numbers and social safety nets. Considering the coefficient of Safety nets, in the theoretical part of this work, there was a phenomenon called the "poverty trap" where state support disincentivizes job-seeking. In the case of the Czech Republic, most of the social safety net spending was not used for active social policies like training or job-seeking services (which could also be part of the unemployment trap), but for unemployment support, a passive tool of social policies. Therefore, the more the state spends on income-supporting programs, the more individuals participate in the easier, but less lucrative option, as opposed to regular work. This in turn results in more people shifting towards lower income, increasing the Gini index and income inequality. Specifically, every 1 percent of GDP increased in social safety net spending results in the Gini coefficient increasing by 1,14476, *ceteris paribus*.

The youth unemployment factor presents much more expected results, with every 1 percent unemployed increase resulting in a corresponding 0,0929708 increase in the Gini coefficient. Though the impact of this factor appears to be smaller when compared to Safety nets, the variable is much more specific – targeting only 15–24-year-olds who are unemployed and looking for work.

R^2 is rather high, at 0,868456, meaning that the independent variables explain about 86,8% of the variation seen in the Gini coefficient over the observed period.

The Durbin-Watson test shows no signs of either positive or negative autocorrelation, as 2,424 > 1,333 and (4-2,424) > 1, 333. Breusch-Pagan test rejected the null hypothesis of

heteroscedasticity for all but the constant, but further examination using the White's test disproved heteroskedasticity for all variables. The model showed no signs of multicollinearity. All test results are shown in figure 21.

```
Breusch-Pagan test for heteroskedasticity
OLS, using observations 2011-2020 (T = 10)
Dependent variable: scaled uhat^2

                      coefficient   std. error   t-ratio   p-value
         ---------------------------------------------------------------
         const              3.05408       1.19424       2.557    0.0377   **
         Youthunemployment  -0.0686621    0.0619948    -1.108    0.3047
         Safetynets         -2.04540      1.24575      -1.642    0.1446


White's test for heteroskedasticity
OLS, using observations 2011-2020 (T = 10)
Dependent variable: uhat^2

                      coefficient   std. error   t-ratio   p-value
         ---------------------------------------------------------------
         const              1.50325       0.958995      1.568    0.1921
         Youthunemployment  -0.0144170    0.0539116    -0.2674   0.8024
         Safetynets         -4.56739      3.60229      -1.268    0.2736
         sq_Youthunemploy~  -0.00185669   0.00282255   -0.6578   0.5466
         X2_X3              0.134932      0.0996142     1.355    0.2470
         sq_Safetynets      1.91293       1.61571       1.184    0.3020


Covariance matrix of regression coefficients:

            const Youthunemploym~      Safetynets
      0.0827223      -0.00323194      -0.0631698  const
                      2.22922e-04      8.15406e-04  Youthunemploym~
                                       0.090013  Safetynets
```

Figure 21: Results of model testing, own work

Moving on to the dependent variable of P90/10 ratio, results, using the variables that have shown promise in the preliminary testing are displayed in figure 22.

```
Dependent variable: P9010

                      coefficient   std. error   t-ratio   p-value
         ---------------------------------------------------------------
         const              3.60754       0.0919117     39.25    1.81e-09 ***
         Stocks             -0.00690885   0.00150312    -4.596   0.0025   ***
         Youthunemployment  0.00461746    0.00393336     1.174   0.2788
```

Figure 22: Further testing of P90/10 ratio, own work

Though the variable of youth unemployment showed promise in the preliminary test, it did not hold up in further testing and will be eliminated going forward. The variable of stocks listed, however, continues to be promising. When fully isolated, the results are shown in figure 23.

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```
Model 6: OLS, using observations 2011-2020 (T = 10)
Dependent variable: P9010

                 coefficient   std. error   t-ratio    p-value
    ---------------------------------------------------------------
    const          3.70429      0.0416392     88.96     2.84e-013 ***
    Stocks        -0.00808544   0.00114634    -7.053    0.0001    ***

Mean dependent var    3.431000    S.D. dependent var    0.122152
Sum squared resid     0.018603    S.E. of regression    0.048223
R-squared             0.861468    Adjusted R-squared    0.844151
F(1, 8)              49.74833     P-value(F)             0.000107
Log-likelihood       17.24557     Akaike criterion    -30.49115
Schwarz criterion   -29.88598     Hannan-Quinn        -31.15502
rho                  -0.254068    Durbin-Watson         2.295142
```

Figure 23: Final P90/10 model, own work

This, more narrow observation of the causes of inequality in the P90/10 ratio yields much more promising results than in figure 19. The number of stocks listed on the Prague stock exchange are significant at an alpha level of 0,05, which satisfies the criteria set out by this work. However, the number of stocks still behaves contrary to what was set up by the theoretical part. By this model's estimation, each additional stock listed on the stock exchanges decreases the P90/10 ratio by 0,00808544. This would mean that further financialization lowers income inequality, however, the effect is rather small. As the Prague stock exchange has had at most 60-70 stocks listed on it, this is much smaller than the number of companies listed on more renowned stock exchanges, for example the Frankfurt stock exchange ranged in 800-1200 listed stocks over the observed period. This explains the limited impact listing on the Prague exchanges would have, and also suggests that there may be some critical mass of financialization that has to occur before it becomes a problem, as previous research indicated that there was a positive relationship between number of companies listed on the stock exchange and income inequality Movahed (2023)

The Durbin-Watson test shows no signs of autocorrelation, and Breusch-Pagan test shown in figure 24 rejects null hypothesis of heteroskedasticity.

```
Breusch-Pagan test for heteroskedasticity
OLS, using observations 2011-2020 (T = 10)
Dependent variable: scaled uhat^2

                 coefficient   std. error   t-ratio    p-value
    ---------------------------------------------------------------
    const          0.730219     0.963382      0.7580    0.4702
    Stocks         0.00798170   0.0265222     0.3009    0.7711
```

Figure 24: Testing for heteroskedasticity, own work

4.2 Case study of Germany

Germany has the highest GDP of all European countries and is a well-known for the quality of its industrial products and skilled labour force. Its products are exported to both its neighbours within the European single market and across the world.

4.2.1 Econometric variables

In this chapter, the econometric variables which will be tested to see their impact on income inequality are examined and displayed in graphs. Some other economic indicators are also shown to inform of the general state of German economy.
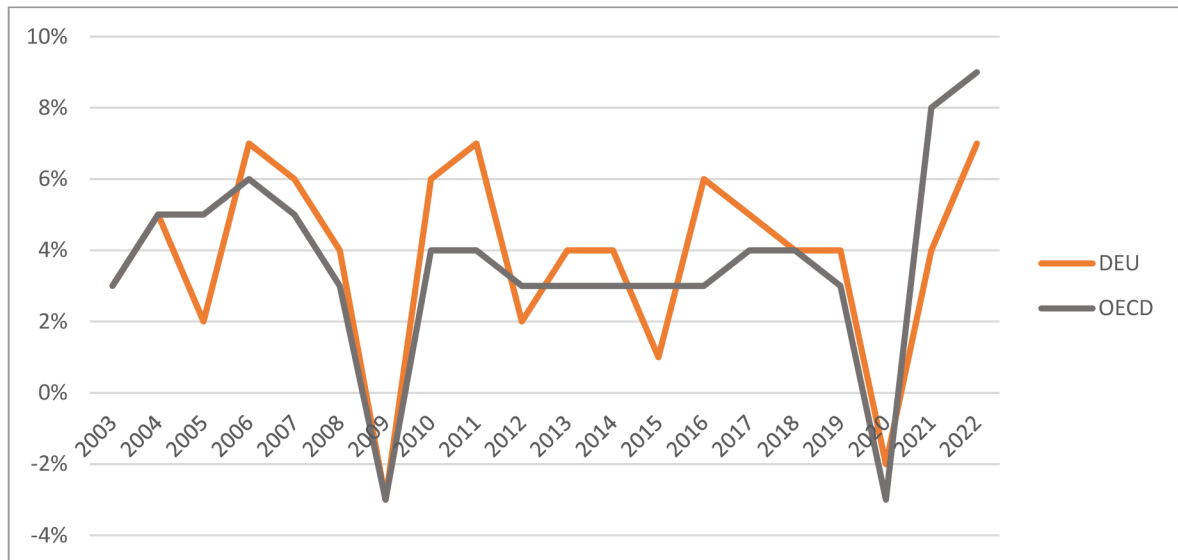
Figure 25: GDP per capita growth percentage, own work based on OECD (2023a)

Figure 25 displays the development of GDP growth in Germany, showing that it experiences larger swings than other OECD states. According to the OECD (2023a), Germany still retains higher growth on average over the observed period at 3,8%, however it is still behind the Czech Republic which has an average growth of 4,8%.
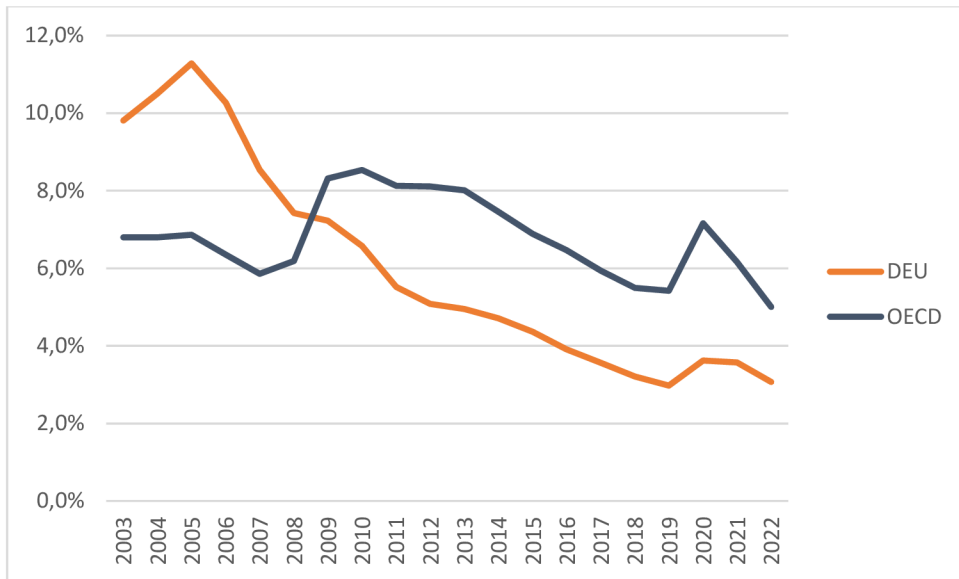
Figure 26: Unemployment in Germany, own work based on OECD (2023b)

Figure 26 shows a development in unemployment that was not seen in any other graph presented in this work. Worldwide crises leave little impact on German unemployment and its continuous downwards trend, leaving Germany with a more than 6% reduction in unemployment over the observed period.
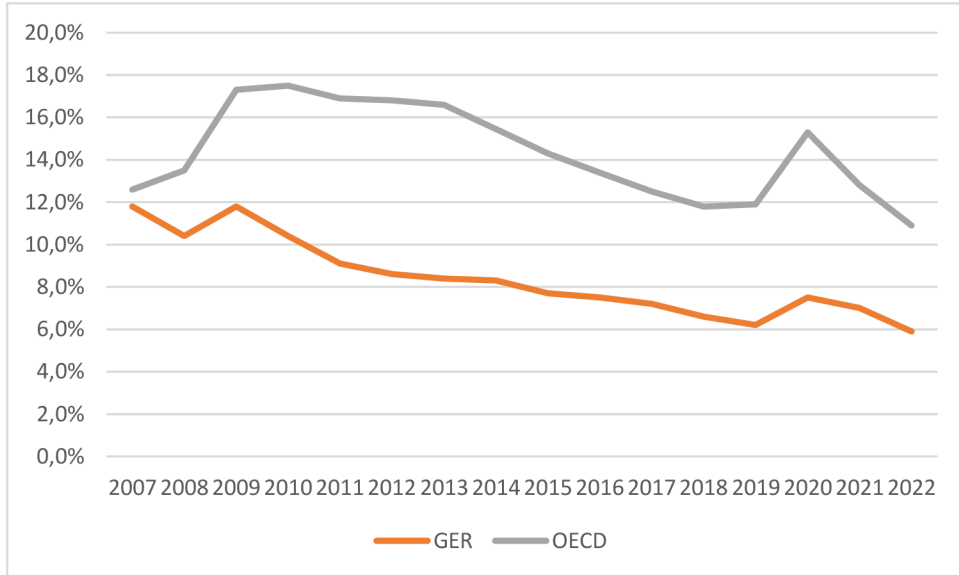

Figure 27: Youth unemployment in Germany, own work based on OECD (2024b)

Figure 27 displays the development of youth unemployment in Germany. Continuing the phenomenon seen in figure 26, the trend and the overall level of unemployment is vastly different when compared to OECD or the Czech Republic. Even though some crises did cause an increase in unemployment, it quickly recovered and continued in a clearly visible downwards trend. Not only that, but its long-term average youth unemployment is 6,9

percent and 3,7 percent lower than OECD and the Czech Republic respectively, even though the starting points do not differ greatly (both are within 1 percent of Germany).

For the calculation of number of listed companies, the CDAX index will be used, its development is displayed in figure 28. The Frankfurt stock exchange (2024a) defines the CDAX index as comprising stocks of all German corporations, representing the entirety of its stock market.
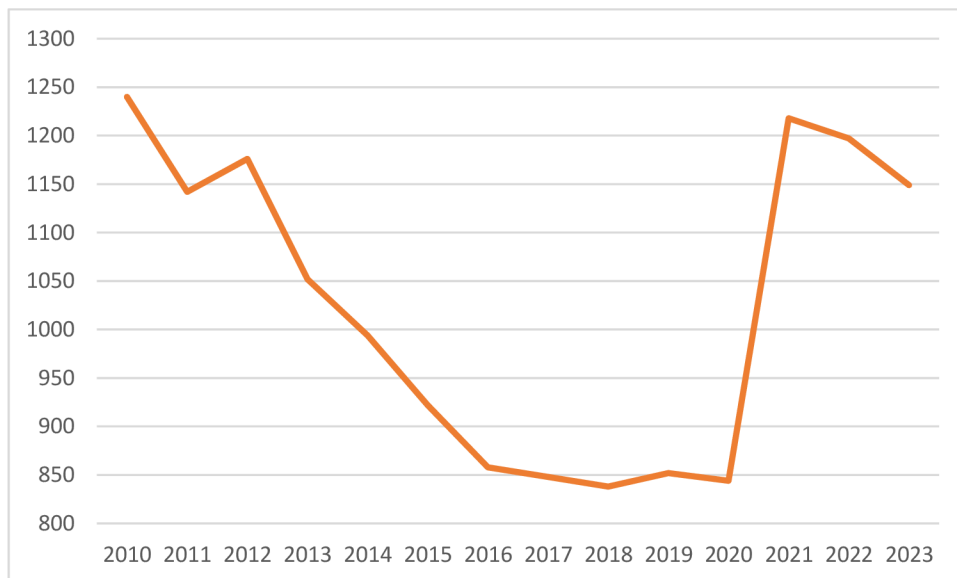

Figure 28: Number of companies listed on the Frankfurt stock exchange, own work based on the Frankfurt stock exchange (2024b)

The data displays a sharp increase from 2020 to 2021. As the data was collected every year at the beginning of February, before the pandemic began, it is difficult to pinpoint what caused such a steep increase in firms listed on the stock market. Most sources claim that the pandemic caused volatility and uncertainty in the stock market (Athari, Kirikkaleli, and Adebayo 2023; Jabeen et al. 2022), which should point to company owners to be hesitant to enter the stock market. However, it could also mean that some hoped to benefit from this volatility, or they had no other way to raise finances than through equity.
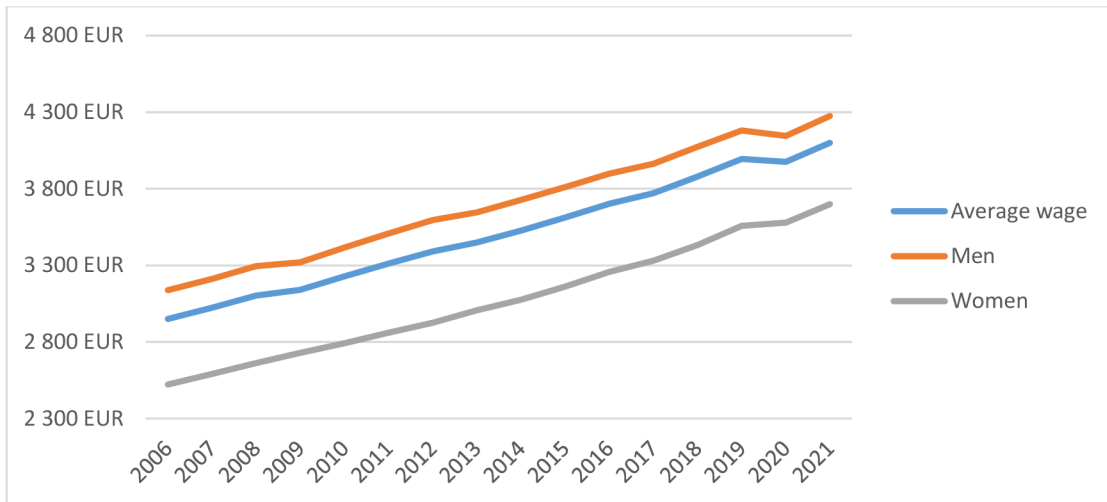
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Figure 29: Gender pay gap, own work based on German Statistical Office (2022)

According to the data provided by the German Federal Statistical Office (2022), salary in Germany retained relatively stable growth over the observed period, showing only small deviations as a response to the largest crises, as can be seen in figure 29. The growth of average women's wage closely mimics that of men's, however the difference in pay was reduced from its starting value of 24,33% to 15,57%, showing a very clear trend in the reduction in inequality. The average pay difference over the observed period was 20,693%.
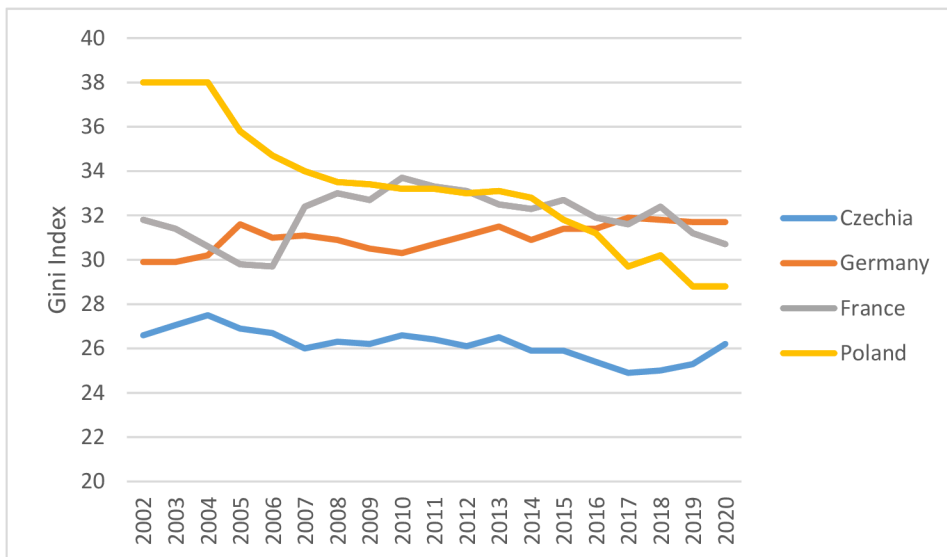

Figure 30: Gini index of selected countries, own work based on the World Bank (2023b)

Figure 30 shows that Germany overall experienced growth of inequality measured by the Gini index. At the start of the observed period Gini index measured 29,9, while at the end of the period, it measured 31,7, showing an upwards trend, and overall higher amount of inequality than seen in the Czech Republic.
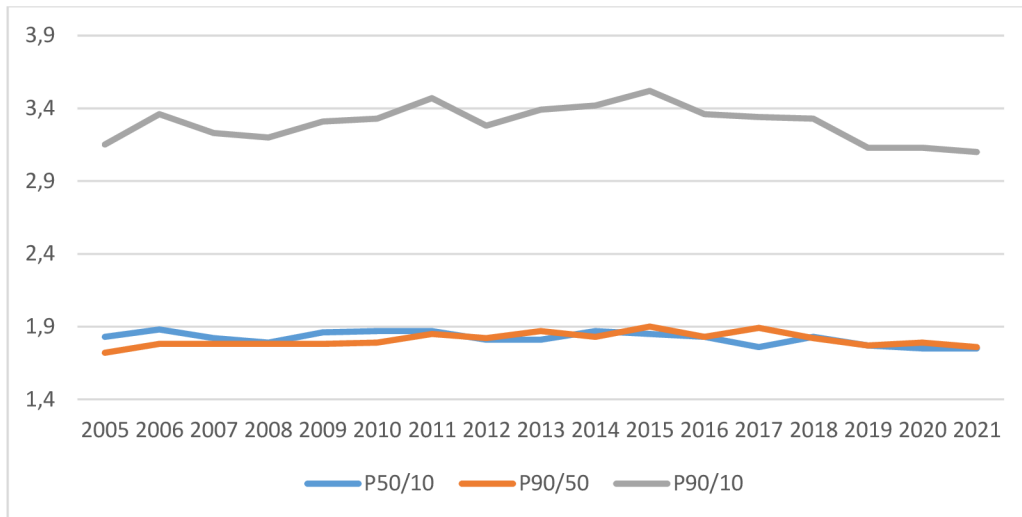
Figure 31: P90/10 and other ratios, own work based on OECD(2024a)

Figure 31 displays the same trends that were seen in the case of the Czech Republic – a general downwards trend since 2015, little disparity between P90/50 and P50/10 and little reaction to crises. Although in the case of Germany it is interesting to note that the year 2008 is marked one of the lowest in terms of the P90/10 ratio, with only 4 other years in this record having a lower ratio than that of 3,2. The start and end value in the P90/10 ratio show a reduction of only 0,05, indicating low overall change in income inequality.
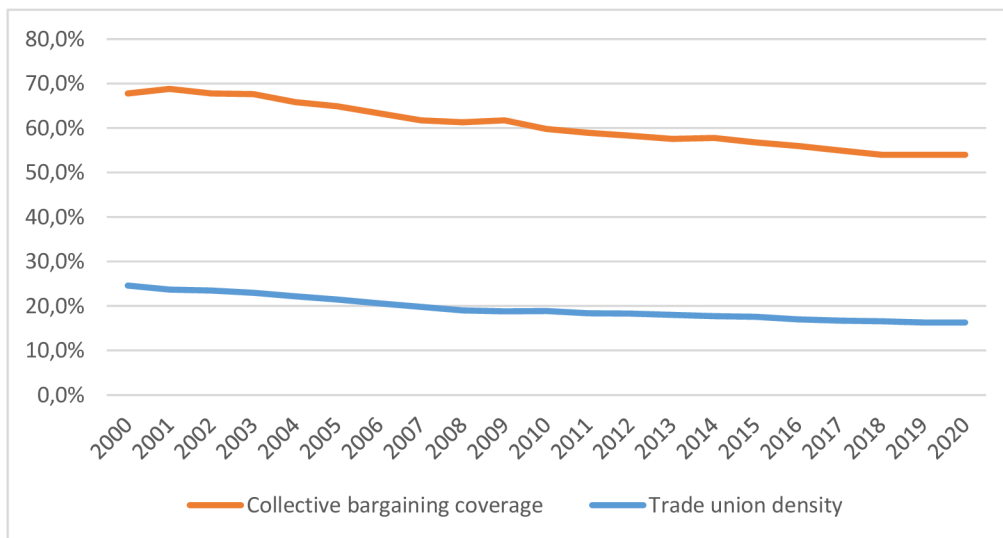

Figure 32: Development of union density and collective bargaining, own work based on OECD (2023d)

Examining the strength of institutions, figure 32 shows much higher collective bargaining coverage then in the Czech Republic, which, if the assumptions from theoretical part prove true, would have reducing impact on income inequality. Trade union density has also lessened over the period, but a much smaller degree, experiencing a fall of only 8% over

20 years, whereas the Czech Republic decreased by twice as much. While there are small increases in membership and coverage during times of crisis, they are much less pronounced. This could mean that the positions that could provide these benefits are already saturated.

Furthermore, in figure 33 the data shows much higher spending on training programmes, with an average 0, 25% of GDP spending, as compared to the Czech Republic's 0,01-0,02. As was noted above, the increased spending on training also includes the German dual system, which is often attributed to the low youth unemployment seen in figure 27. Additionally, there is a steep decline in 2004-2008 which was not seen in the case of the Czech Republic. This could be attributed to the fact, that Germany's GDP saw a period of rapid growth in years 2004-2008, resulting in both less necessity for LMP expenditure and less resources needed to maintain the current level of LMP, proportionate to the increased level of GDP.
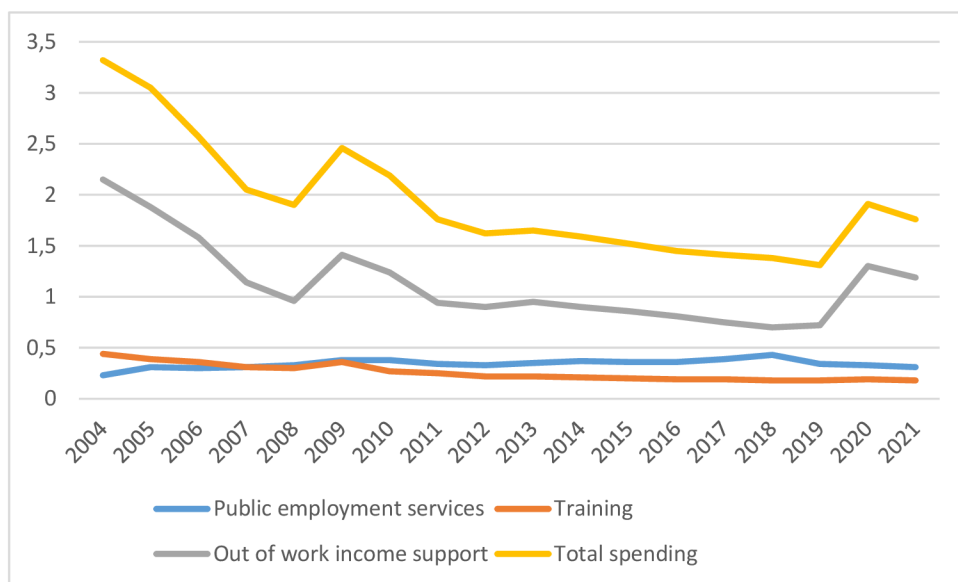

Figure 33:Institutional expenditure as a percentage of GDP, own work based on OECD (2023d)

4.2.2   Econometric testing

First, the preliminary test is deployed. Unfortunately, a lot of data for Germany in the years outside the examined period were missing, so the test will consist only of one additional year – 2010.

```
Dependent variable: Gini

                      coefficient   std. error   t-ratio   p-value
         ------------------------------------------------------------
         const            33.1499      8.77950      3.776    0.0129   **
         Gender          -0.0471445    0.429278    -0.1098   0.9168
         Stocks          -0.349344     0.759788    -0.4598   0.6650
         Youthunemployment 0.140266    0.937334     0.1496   0.8869
         Uniondensity     0.0549225    2.87520      0.01910  0.9855
         Safetynets      -0.000660533  0.00250383  -0.2638   0.8025


Dependent variable: P9010

                      coefficient   std. error   t-ratio   p-value
         ------------------------------------------------------------
         const           -0.814390     1.34860     -0.6039   0.5723
         Gender           0.0839708     0.0659402    1.273    0.2589
         Stocks          -0.103330      0.116709    -0.8854   0.4165
         Youthunemployment 0.267700     0.143981     1.859    0.1221
         Uniondensity     0.418137      0.441653     0.9468   0.3872
         Safetynets      -0.00210825    0.000384608 -5.482    0.0028   ***
```

Figure 34: Preliminary model, own work

The data from the preliminary tests shown in figure 34 are not very promising, only showing significance for the constant in the case of Gini and in Safety nets in P90/10 test. The P90/10 test has other variables that could show statistical significance if the conditions were altered, like Youth unemployment, which is very close to significant at alpha level 0,1. Gini's most likely to be significant variable other than the constant is Stocks at 0,66, which is not very promising. As Safety nets has a negative coefficient, it means that with more investment into social policies comes a reduction in inequality.

```
Dependent variable: P9010

                      coefficient   std. error   t-ratio   p-value
         ------------------------------------------------------------
         const           -0.942220     1.41589     -0.6655   0.5422
         Gender           0.0711009     0.0707409    1.005    0.3717
         Stocks          -0.00206809    0.000404385 -5.114    0.0069   ***
         Youthunemployment -0.0798623   0.125418    -0.6368   0.5589
         Uniondensity     0.281840      0.151241     1.864    0.1358
         Safetynets       0.368684      0.464937     0.7930   0.4722

Dependent variable: Gini

                      coefficient   std. error   t-ratio   p-value
         ------------------------------------------------------------
         const            32.5030      9.48651      3.426    0.0266   **
         Gender          -0.112282     0.473967    -0.2369   0.8244
         Stocks          -0.000457282  0.00270940  -0.1688   0.8742
         Youthunemployment -0.230570    0.840308    -0.2744   0.7974
         Uniondensity     0.211834      1.01332      0.2090   0.8446
         Safetynets      -0.195371      3.11510     -0.06272  0.9530
```

Figure 35: Model of the examined period, own work

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The results, shown in figure 35, have improved for P90/10 – Stocks has gained significance at alpha level of 0,1 and other variables remain relatively close to the desired level of significance. However, results for Gini are worse than in the preliminary test, with p-values increasing in all variables. Again, Stocks variable has a negative coefficient, meaning that increasing the number of companies listed on the stock exchange reduces inequality, which goes against the findings of Movahed (2023). The values are further eliminated to reach statistical significance of the model:

```
Model 9: OLS, using observations 2011-2020 (T = 10)
Dependent variable: Gini

                  coefficient   std. error    t-ratio     p-value
       ----------------------------------------------------------
       const       33.7178       0.631352       53.41     1.68e-011 ***
       Stocks     -0.00242260    0.000657241    -3.686    0.0062    ***

Mean dependent var    31.41000    S.D. dependent var     0.398469
Sum squared resid     0.529584    S.E. of regression     0.257290
R-squared             0.629402    Adjusted R-squared     0.583077
F(1, 8)              13.58673     P-value(F)             0.006165
Log-likelihood        0.501853    Akaike criterion       2.996294
Schwarz criterion     3.601464    Hannan-Quinn           2.332424
rho                  -0.162769    Durbin-Watson          2.204611
```

Figure 36: Refined Gini model, own work

When the variable Stocks is isolated in figure 36, the result provide much more information. Both the constant and Stocks are statistically significant at alpha 0,1 and Stocks again show a negative coefficient. The model shows that the Gini index has a baseline value of 33.7178 and for every additional company that would be listed on the Frankfurt stock exchange, Gini index would decrease by 0,0024226 points, reducing income inequality.

R^2 is somewhat low, at 0,629402, meaning that the independent variables explain about 62,9% of the variation seen in the Gini coefficient over the observed period. However, as the model contains only one variable, it can be expected that much of the variation is explained by the error term.

The Durbin-Watson test shows no signs of either positive or negative autocorrelation, as 2,204 > 1,001 and (4-2,204) > 1,001. Breusch-Pagan test rejected the null hypothesis of heteroscedasticity, and the model showed no signs of multicollinearity, as shown by results in figure 37.

```
Breusch-Pagan test for heteroskedasticity
OLS, using observations 2011-2020 (T = 10)
Dependent variable: scaled uhat^2

              coefficient   std. error   t-ratio   p-value
    ----------------------------------------------------------
    const       -2.34430      2.33214      -1.005    0.3442
    Stocks       0.00351071   0.00242777    1.446    0.1862


Covariance matrix of regression coefficients:

          const         Stocks
       0.398606   -4.11491e-04   const
                   4.31966e-07   Stocks
```

Figure 37: Gini model testing, own work

Considering the P90/10 dependent variable, two tests, displayed in figure 38, showed promising results:

```
Model 10: OLS, using observations 2011-2020 (T = 10)
Dependent variable: P9010

                  coefficient   std. error   t-ratio   p-value
    -------------------------------------------------------------------
    const          -1.74542      0.563819     -3.096    0.0174   **
    Stocks         -0.00195888   0.000292542  -6.696    0.0003   ***
    Uniondensity    0.401876     0.0471917     8.516    6.10e-05 ***

Mean dependent var    3.337000    S.D. dependent var    0.129276
Sum squared resid     0.011362    S.E. of regression    0.040289
R-squared             0.924457    Adjusted R-squared    0.902873
F(2, 7)              42.83110     P-value(F)             0.000118
Log-likelihood       19.71074     Akaike criterion     -33.42149
Schwarz criterion   -32.51373     Hannan-Quinn         -34.41729
rho                  -0.051861    Durbin-Watson          1.761904


Model 15: OLS, using observations 2011-2020 (T = 10)
Dependent variable: P9010

                  coefficient   std. error   t-ratio   p-value
    -------------------------------------------------------------------
    const           2.45575      0.229658     10.69     1.37e-05 ***
    Stocks         -0.000988781  0.000397942  -2.485    0.0419   **
    Gender          0.0914897    0.0233392     3.920    0.0057   ***

Mean dependent var    3.337000    S.D. dependent var    0.129276
Sum squared resid     0.040397    S.E. of regression    0.075967
R-squared             0.731422    Adjusted R-squared    0.654685
F(2, 7)               9.531582    P-value(F)             0.010040
Log-likelihood       13.36856     Akaike criterion     -20.73711
Schwarz criterion   -19.82936     Hannan-Quinn         -21.73292
rho                  -0.487388    Durbin-Watson          2.682096
```

Figure 38: Two models for P90/10 variable, own work

First test has all variables significant at alpha level 0,05 and has a high R^2 at 0,924457, with the independent variables explaining about 92,4% of the variation seen in the dependent variable, which is the highest value seen in all of the tests in this work. Once again it maintains the negative coefficient in Stocks, indicating that each additional company listed results in 0,00195888 reduction in the P90/10 ratio, but also has a surprising coefficient in Union density – each additional percentage of workers in a trade union results in a 0,401876 increase in the P90/10 Ratio, resulting in higher inequality.

The second test shows the same significance levels, but a slightly lower R^2 at 0,731422. The largest impact on this model has the variable Gender, as each percentage increase in gender pay disparity increases the P90/10 ratio by 0,0914897. This indicates that men are more represented in the ninetieth percentile, while women are more represented in the tenth percentile. The impact of Stocks variable is lesser than seen in any of the other model, with each additional company listed resulting in 0,000988781 reduction of the ratio. This amount has an order of magnitude and more in line with the expectations – the Frankfurt stock exchange has 20-30 times more companies listed than the Prague stock exchange, but so far, the models have shown that the impact in Germany is about 30% of what was seen in the Czech Republic, whereas the expected impact would be approaching 5%.

In both tests, the Durbin-Watson test shows no signs of autocorrelation, and the Breusch-Pagan test showed no signs of heteroskedasticity. There were also no signs of multicollinearity (results shown in figures X).

```
Durbin-Watson statistic = 2.6821

H1: positive autocorrelation
   p-value = 0.641544
H1: negative autocorrelation
   p-value = 0.358456


Breusch-Pagan test for heteroskedasticity
OLS, using observations 2011-2020 (T = 10)
Dependent variable: scaled uhat^2

                  coefficient    std. error    t-ratio    p-value
    -------------------------------------------------------------
    const         -5.81924       15.1324       -0.3846    0.7120
    Stocks        -0.000874947    0.00785156   -0.1114    0.9144
    Uniondensity   0.442609       1.26658       0.3495    0.7370
```

Figure 39: Testing of the models, part 1, own work

```
Breusch-Pagan test for heteroskedasticity
OLS, using observations 2011-2020 (T = 10)
Dependent variable: scaled uhat^2

              coefficient   std. error    t-ratio    p-value
   -------------------------------------------------------------
   const      -1.55599       3.11673       -0.4992    0.6329
   Stocks      0.00591282    0.00540054     1.095     0.3098
   Gender     -0.154388      0.316740      -0.4874    0.6408


Covariance matrix of regression coefficients:

             const          Stocks        Uniondensity
     0.317891       1.41914e-04      -0.0261953 const
                    8.55808e-08     -1.29230e-05 Stocks
                                     0.00222705 Uniondensity


Covariance matrix of regression coefficients:

             const          Stocks          Gender
     0.0527427      1.07298e-05     -0.00313069  const
                    1.58358e-07     -8.10848e-06 Stocks
                                     5.44716e-04  Gender
```

Figure 40: Testing of the models, part 2, own work

5 Results and Discussion

5.1 Comparison of the Czech Republic and Germany

Of the examined variables, only a few showed statistical significance, with the variable Stocks being most often statistically significant in total. Despite the two orders of magnitude that make up the difference between the number of stocks listed on the Prague (average 38,85) and the Frankfurt (average 1023,57) stock exchange, the impact on the dependent variables is rather similar. In the case of the Czech Republic, each additional company listed on the stock exchange lowered the P90/10 ratio by 0,00808544, meaning that either the poorest decile takes advantage of the stock market, raising money from stock investors, or that the newly listed companies somehow lower the income of the top decile. The results in Germany indicate, that, each additional company results in a 0,0024226 reduction in the Gini index and a 0,00195888 and 0,000988781 reduction in the P90/10 in the first and second model respectively.

Comparing these results, the large difference in stocks listed not only was the direction of the impact unchanged, as was theorized in the case of the Czech Republic, but the influence on inequality is very comparable. The two orders of magnitude that make up the difference between the Prague and Frankfurt stock exchange result in about 75% reduction of impact on the P90/10 ratio in the first model and 90% in the second model, whereas the more expected reduction would be around 95%.

The Stocks variable was the only one which appeared in the models of both case studies, but there are some parallels that can be observed.

In the theoretical part of this work, there were strong arguments made for the importance of institutions in the reduction of inequality. In the practical part, the first model for P90/10 ratio in the case study of Germany and the Gini index model in the case study of the Czech Republic have shown the opposite effect. In the case of Germany, additional percentages of workers registered in a union are shown to increase the P90/10 ratio by 0,401876, resulting in higher disparity between the highest and lowest income deciles. In the case of the Czech Republic, each percentage of GDP spent on social safety nets resulted in a 1,14476 increase in the Gini index. Though the P90/10 ratio and the Gini index are not

directly comparable, it is apparent that the impact of these variables was higher than the other variables that appeared in their respective models.

Considering the variable of youth unemployment, it showed statistically significant impact on the inequality in the Czech Republic, but not for Germany. An argument explaining this that is presented in this thesis is that Germany has much higher spending on after school training that allows for easier integration of absolvents into the workforce. However, the data shown by the models of the Czech Republic has shown that spending on safety nets increases income inequality, meaning that if the Czech Republic wished to increase spending on their graduate programmes to mimic the success of Germany, it could result in the increased inequality. Though another factor to consider is the fact that most of safety net spending within the Czech Republic is spent on income support, not training, so the variable could change if the budget distribution shifts.

5.2 Discussion

One of the foremost findings of this work was that the variable Stocks, representing the number of companies listed on the countries' respective stock markets had a negative relationship with inequality. This variable was examined based on the findings of Movahed (2023). In his results, Movahed mentions that the more companies are listed on the stock exchange the more income inequality increases. He links the number of companies listed on the stock exchange as well as the market capitalization, as indicators of tools that companies use to raise money. The more they use these tools of equity, rather than liabilities such as loans or bonds, the more income inequality increases. Movahed's findings were significant across the world, but the impact was most prominent in liberal market economies.

Germany is a good example of coordinated market economy, however, the Czech Republic does not clearly fit within these definitions, though it has a slight tendency to lean towards liberal market (Klimplová 2007). As it stands, neither of the examined countries appeared to confirm Movahed's findings, instead indicating that raising funds through equity helps decrease income inequality.

Another interesting finding was the impact of strength of institutions, here displayed in variables Union density and Safety net spending. In works of Chong and Gradstein, the OECD and Bohn and Danielson (2007; 2016; 2017) the findings suggested that the union strength and institutional support are beneficial in reduction of inequality, providing better

bargaining positions and certainty of income. However, the results of this work have shown the opposite effect – increased spending on safety net programs and union presence have shown to increase income inequality. The issue of safety net spending could be explained through the phenomenon of poverty trap and inefficient support programmes that focus on labour market participation over effective employment of citizens (Azariadis and Stachurski 2005; Hillel, et al. 2020).

Finally, the last two independent variables that have shown impact on inequality were Youth unemployment and Gender pay gap. While Youth unemployment showed significance in the model for the Gini index, Gender pay gap did so in the P90/10 model. This indicates that women are more represented in the lowest decile, meaning as the Gender pay gap decreases, the disparity between the first and last deciles of income decreases, which aligns with findings of others (Webb 1993). However, unemployed youths did not show the same effects, as they influenced the Gini index, not P90/10 ratio. This could be caused by the fact that young people are often supported by their families, so they avoid falling into the last decile or are not counted in the data altogether. These are also the only two independent variables that have the expected impact on inequality, as all the others have shown the opposite relationship to which was laid out in methodology.

6 Conclusion

The main research question of this thesis asks if the income inequality in the Czech Republic and Germany increased over the observed period. Even at the very start of this thesis, it became clear that the answer is unlikely to be unambiguous. In the case of the Czech Republic, there was seen a large reduction between the highest and lowest income decile, but overall stagnation in the development of the Gini index. In the case of Germany, Gini index showed an increase, while the first and last income deciles remained largely unchanged. Both countries showed little development in the income of the middle decile, in relationship with the other deciles. This leads into the question of how can one indicator remain largely unchanged overall, while the other shows a reduction or increase in inequality? Other objectives of the thesis are present to attempt to answer it.

In the first half of this thesis, a literature review was conducted to estimate which factors would be likely to have an impact on income inequality. During this research, the expected impact of variables was formed. Sources indicated that strength of institutions would play a key role in reduction of inequality and that financialization, measured through firm's use of equity, would also be important. However, in the second half of this thesis, models and tests indicated that, even though the estimated variables do have an impact, it is often in the opposite direction to what was expected.

Explanations for this, however, also arose from the literature review – spending on passive tools of social policies create a poverty trap, leading to income inequality and while liberal market economies can suffer from extensive use of equity, coordinated or mixed markets benefit from the additional funds leading to reduced income inequality.

To conclude, income inequality is a topic that is subject to much debate and research in the western world, but much of this research focuses on countries that are more of an economic outlier, rather than a sound indicator. By extending research to other countries, results can subvert expectations and increase understanding of complex topics.

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8 List of pictures, tables, graphs and abbreviations

8.1 List of pictures

8.2 List of tables