Economic Inequality in the Netherlands

Creating a conceptual framework

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Thesis submitted on (month) the (day), 2022

Executive summary

In the last decades, we have seen an incredible rise in economic inequality. While this process already started in the 1980s, the increased attention towards inequality took flight after the Great Recession in 2007-2009. Gradually, there is a starting (scientific) consensus that inequality is damaging on several accounts. While in the past the accumulation of wealth could have been noted as success and a motivator for others to succeed, the perspective starts to change to accumulation being the occurrence of (unfair) advantages and a faulty economic system.

In this thesis, we are unravelling the various parameters which are connected to economic inequality. The importance of this work is that most often the parameters are connected 1-to-1, from one parameter to another, but frequently comes along with the disclaimer that it does not include all the related parameters. Often statements are made where the author claims to have researched the most important parameter but is not able to make definitive conclusion because other correlating parameters have not been included during the research. To avoid this limitation of various research, we reviewed a large set of parameters and unravelled how these parameters are connected in the larger system. We have done this by reviewing many various sources which includes scientific articles, grey literature, and various news articles to highlight the specific cases. In total, we were able to summarize the findings into four large branches: 1. The consequences of inequality, 2. The measurement of inequality, 3. The causes of inequality, and 4. Policies influencing inequality. These four large branches are the foundation to this thesis and the created conceptual framework.

In our first branch, we find that economic inequality has negative consequences on various (vital) parts of society, i.e., health, education, democracy, and the economy. In general, these consequences are caused by the rich being able to create favourable conditions for themselves or by unfavourable conditions which are primarily present among the poor. Moreover, the lack of mobility (social integration) causes that stratification occurs which embodies different behaviour and opportunities within these strata causing these differences to be persistent.

In the second branch, we attempt to grasp the size of inequality. We find that there are multiple databases which can be used, i.e., tax records, surveys, and rich lists. We find that they all have specific advantages and disadvantages, but when used coherently can lead to the most optimal representation of real life. However, quantifying inequality is another hurdle and is also met by various opportunities. One finds that there are Lorenz-curve based indices, general entropy-based indices, ratio-based indices, and poverty-based indices. Yet again, all of these indices have their characteristics and their flaws. To have an adequate representation of the inequality occurring within a society, one should not lean on one specific index value, but preferably one from every family type of index.

In the third branch we envoy into the causation of inequality. We have sub-divided economic inequality into three portions, i.e., income, wealth, and opportunity inequality. In the review of income inequality, one finds two distinct processes. The first process is the increase in the importance of income coming from capital caused by financialization, globalization, and technology. The second process is the diverging of incomes which is

mediated at one hand by spurring top incomes through reduced tax rates and demand for top talent. On the other hand, low incomes are lagging due to reduced bargaining power and a reduction in supportive state policy to increase low incomes. In the review of wealth inequality, we find that it is mainly a consequence of income inequality, wealth transfer, and life-cycle adjustments. In the review of opportunity inequality, we find it is mainly mediated by segregation and stratification within society between various socio-economic groups.

In the fourth branch, we analyse the opportunities for government to provide a direct impact on inequality. The most prominent policy tool in this regard is the tax & benefits system. We find that taxes are primarily to be used for tax revenue generation (which can be done progressively, especially for income tax). In turn, this tax revenue can be used for the benefits policy which is doing most of the leg work to reduce inequality (as compared to the tax policy). To improve the tax &benefits system it is required to make it simple, transparent, neutral, and, most importantly, efficient by operating coherently as a system integrating the potential of both taxes and benefits.

We integrated these four branches and created a conceptual model. We show a proof-of-principle of how this model can be used by analysing economic inequality within the Netherlands. We find that the general scientific outcomes found to create the conceptual model are largely coherent with the narrative of economic inequality occurring within the Netherlands. We do find that when applying the model new interactions are found which were not described within the model. We cannot be certain whether these interactions have been missed during the research or whether these interactions are specific to the country. It would call for "reverse engineering" the newly found interactions and reviewing their importance within the model.

Overall, we have been able to create a functional conceptual model[1] which shows the various interconnecting relations. The large network of interactions is exemplary of the complex nature of the issue economic inequality. An effect in one of the parameters will lead to changes in other portions of the network which will cause the perspective of reviewing a single domain as a tool to combat economic inequality to be of limited effect. It is advised to maintain an overview of secondary consequences when drafting policies an attempt to counteract unwanted consequence. As such, we state that to be able to create effective change to economic inequality, it will be necessary to review all policies as a coherent system. To do so, a separate (governmental) institute should monitor drafted policies for their (potential) effects within the network on economic inequality. Doing so, they can determine whether the envisioned purpose of the policy fits within the collective of policies to reach the ulterior goal, a fair society where economic inequality does not lead to unfair consequences.

[1] The conceptual model has also been published on the internet. The interactions can be viewed in a web tool that gives information about the nodes and edges. Moreover, one can switch between the generalized concept and the Netherlands. Link: Conceptual framework for economic inequality

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Introduction

In the past years, if not the last few decades, there has been an increasing interest in economic inequality. The moment when I became taken by the topic was when Rutger Bregman went viral because he held a speech at the Davos conference in 2019 stating that tax avoidance is a cornerstone issue in the topic of economic inequality (NOS, 2019). The simplicity of the statement, but also the call to attention for a problem that was not getting the attention it deserved, was a motivation to dive into the topic more thoroughly. When getting into the topic, it is almost impossible to not stumble upon the celebrated work of Piketty (2014), i.e., *Capital in the 21st century*. It has been a best-selling book over multiple accounts and gained several awards such as the Financial Times year award (De Slegte, sd). Overall, his book was monumental in attention to the field, to cite Timothy Shenk (2014):

> "*… stands a fair chance of becoming the most influential work of economics yet published in our young century. It is the most important study of inequality in over fifty years, …*" – T. Shenk (2014)

Within the book, Piketty brings to attention that inequality is on a rise with no end in near sight. He provides a sketch of (extreme) economic inequality returning to levels that were present in the late 19th century. At that time a small elite group were living as rentiers while a large portion of society was living in poverty (Piketty, 2014). This progression of the increasing wealth of the super-rich in the present time seems to be almost incomprehensible for normal people. For example, Oxfam (2018) wrote that the number of richest people needed to represent the total wealth of the poorest 3.7 billion decreased from 62 to a mere number of 41. Also, within the Netherlands the wealth of the elite society is spiralling upwards; in 2021 there was a record number of billionaires (45) and the amount of wealth required to enter the wealthiest 500 people was higher than ever before (110 million euros) (NOS, 2021).

On the far other side of the wealth spectrum, there is the issue of poverty, which is defined as having insufficient resources to function at a socially acceptable level (Sen, 1999), that is seemingly becoming a large problem among societies. While people mostly connect these problems to developing countries (or continents) such as Africa, poverty is also occurring much close to home. For example, in Great Britain, millions of people are faced with the issue to choose between 'eating or heating' (NRC, 2022). On the other side of the pond, California (the 5th largest economy in the world) is struggling with rising homelessness due to the inability to provide (affordable) housing. The issue has escalated thus far that it is being considered a humanitarian catastrophe with people dying on the on the street, students living in cars, and the rise in tent camps along the pavements and parks (The Guardian, 2022). While we could choose to turn a blind eye to these occurrences as they are not occurring in our backyard, the Netherlands is certainly trifled with his own problems. For example, the total number of (registered) homeless people in the Netherlands has almost doubled from 17.800 to 32.000 individuals between 2009-2021 (NOS, 2021). Moreover, a similar trend is found for the number of people who require support from food banks. Between 2010-2020 it also almost doubled from 50.000 to over 90.000 individuals (Voedselbanken Nederland, 2020) and in 2022 alone another 6.000

applied for the foodbanks (NOS, 2022). This process has been aggravated by the energy crisis and rising inflation and is causing fear and anxiety among the (low) middle-incomes. They are struggling to keep up with expenses and are reducing food consumption and avoiding to buy clothing. According to the NIBUD, this is a new phenomenon for this specific socio-economic group (NOS, 2022).

Overall, these trends in poverty and wealth seems to indicate that economic inequality is becoming more of a prominent problem. However, economic inequality is in no sense a new issue when reviewing history. Already in ancient Greek times, Plato identified the problematic nature of inequality as being potentially disastrous for society (Bury, 1968):

> *"It is, as we assert, necessary in a State which is to avoid that greatest of plagues, which is better termed disruption than dissension, that none of its citizens should be in a condition of either painful poverty or wealth, since both these conditions produce both these results; consequently, the lawgiver must now declare a limit for both these conditions."*
> – The Laws, 744d (Bury, 1968)

To make matters even worse, we can question if the assessment of Plato that the greatest plague of all, social disruption, caused by economic inequality is not already occurring right under our noses. On January the 6th 2021, the U.S. Capitol was besieged by a ravaging mob who were discontent with the democratic system. This was seen as a monumental event showing social and political disruption in a country (the U.S.) that is believed to be at the pinnacle of Western society. Parmigiani (2021) narrates that this monumental event is a (partial) consequence of growing economic inequality and the super-rich who dominate political power, being in line with Plato's assessment.

> "*To understand extreme political polarisation, and how a violent mob came to storm the US Capitol, we must consider the growing ability of the ultra-rich to transform their wealth into political power."* – A. Parmigiani (2021)

Parmigiani is not alone in his perspective. For example, also Bernie Sanders strengthens the view that the democracy in the U.S. is dwindling as the rich are grasping control creating an oligarchy (Sauer, 2022).

> *"Anyone who thinks we do not have an oligarchy right here* (i.e., U.S.) *is sorely mistaken."*
> – B. Sanders (Sauer, 2022)

Seemingly, large problems and consequences are revolving around economic inequality. However, 'solving' problems caused by economic inequality is difficult at best, and potentially even inherently impossible. This is caused by the fact that we can describe economic inequality as being a wicked problem. This has significant implications as the characteristics of a wicked problem, postulated by Rittel & Weber (1973), cause severe limitations. Keep & Mayhew (2014), for example, described that because of the various interacting parameters and numerous damaging consequences it is already difficult to even formulate a definitive problem statement for the topic.

However, while being a difficult problem, there are also great opportunities to add significant contributions to the field. We found during our research that articles that attempt to identify (the size of the effect of) a parameter on economic inequality. But while they did their research, they did not review it in an overarching conceptual framework. Seemingly, as noted by De Beer et al. (2018), a comprehensive framework which explains how the complex system works is missing. However, when reading the work of Yawson (2015), it is stated that a framework can aid in the analysis of a wicked problem. Moreover, Raadschelders & Stillman (2017) state that a conceptual framework also is one of the most effective analytic tools to aid in the interpretation of descriptive research. As such, there seems to be an untouched possibility to improve the research field which can attempt to analyse.

> *"These and other new perspectives deepen our comprehension of inequality but do not make an already complicated story any clearer. What is lacking the most at the moment is an overall picture in which all loose threads are brought and knotted together. … Whoever could construct such an overarching story and draw clear lines in it would deserve as much fame as Thomas Piketty!"* [2] – de Beer (2018)

[2] The citation is a translation from Dutch, the exact citation is as follows: *"Deze en andere nieuwe perspectieven verdiepen ons inzicht in de ongelijkheid, maar maken het toch al ingewikkelde plaatje er bepaald niet eenduidiger op. Waar het op dit moment vooral aan ontbreekt is een totaalbeeld waarin alle losse draadjes samen worden gebracht en aan elkaar worden geknoopt. … Wie een dergelijk overkoepelend verhaal zou kunnen construeren en daarin een heldere lijn zou weten aan te brengen, zou evenveel roem verdienen als Thomas Piketty!"* – de Beer (2018)

Thesis Objective

As read in the introduction, we assert that there are indications that inequality is increasing and there is potential for considerable problems for society, including social and political instability. However, to our knowledge economic inequality has not been analysed with the use of a conceptual framework although it possesses substantial advantages. For example, it could provide the potential to formulate policies in aid of each other and review their consequences in relation to other parameters. Moreover, it can create an overview of the field of economic inequality which has become tremendously large with difficult interactions. The absence of a (large) conceptual framework can therefore be hampering the evaluation of the topic. As such, we conclude that this is a knowledge gap worthwhile to be tackled.

Formulating the research question

Therefore, we will attempt in this thesis to create a conceptual framework that could aid in formulating potential policies and analysis of interacting parameters. To achieve our goal, we set out to formulate our main research question.

How do the different parameters which are involved in economic inequality interconnect with each other?

Thesis structure

To be able to answer the research question we need to answer the following sub-questions:

1. Is there a problem?

The most important aspect of the thesis is to explain why it is important to perform the research. While in the introduction some notions have been touched on, this is only the small tip of the iceberg. We will want to validate the problematic nature of economic inequality more tightly to review the necessity of the analysis and provide input to the framework.

2. How do we quantify the problem?

To be able to understand economic inequality it is required to know how economic inequality can be measured. Without an indicator to represent economic inequality, it will not be possible to correlate economic inequality to another parameter. However, if we want to measure a specific characteristic, we will also need data input for the calculations. Thus, we will need a chapter describing data acquirement and representation in relation to economic inequality.

3. What is the cause of the problem?

To be able to understand economic inequality and potentially influence, we will need to review the input parameters causing economic inequality. In essence, we cannot target economic inequality itself as it is an outcome variable. We will want to review two different kinds of input parameters: 1. The parameters that are causing economic inequality and, 2. Policies that can be implemented to potentially reduce economic inequality.

Having formulated a research question and provided the three sub-questions, we want to create an overarching structure for the thesis. In short, we will answer the sub-questions in four separate chapters and create the framework in the conclusion chapter. To create an overview for the conceptual framework, we will indicate in every chapter the (crucial) parameters involved in economic inequality, the "building blocks", which will be used for the conceptual framework. After the four chapters, we will combine the building blocks, i.e., the acquired knowledge, into a single conceptual framework. To understand whether this framework has applicational use, we will provide a proof of principle by investigating the Netherlands using this framework. To summarize the architecture of this thesis, we have created a graphical representation as shown in Figure 1.

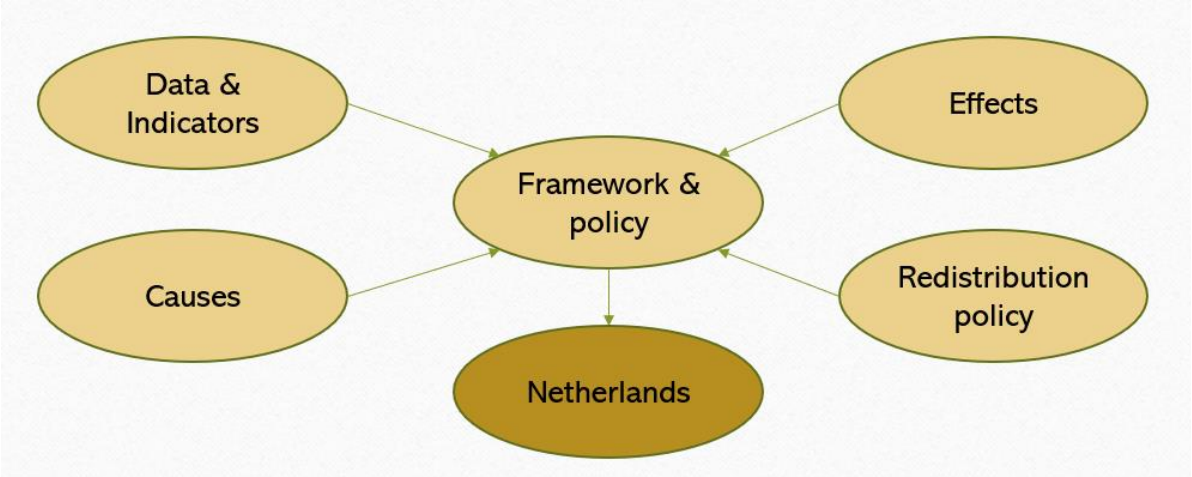

Figure 1 Method of approach for analysis of this thesis. *Note: The thesis consists of four pillars which are integrated into a framework and policy in the conclusion chapter After formulating the framework, we will provide a proof of principle by reviewing the Netherlands with the framework.*

Thesis limitations

We realize that economic inequality is a large topic, therefore we will have to put boundaries to the scope of analysis to enable us to have this thesis finished within the limited amount of time available. An intuitive form of analysis has been provided by Peterson (2017). He distinguished the problematic nature of economic inequality into two different aspects. These are *1. intrinsic aspect*, i.e., the justification of economic inequality, and *2. instrumental aspect*, i.e., the quantifiable effects of economic inequality.

In this thesis, we will (mainly) discuss the instrumental aspect. The reason for this limitation is that it is difficult to make the intrinsic aspect quantifiable. It largely revolves around the philosophical debate about what is "just". Exploring this aspect of economic inequality will therefore be rather different from the instrumental aspect and requires another type of literature review.

Moreover, we acknowledge that economic inequality complies with the characteristics of a wicked problem[3]. Due to these characteristics, there are several constraints to this thesis. The characteristic "*The perspective of the analyst determines the solution to the problem*" causes that there will always be a form of personal

[3] The full description of wicked problem and its characteristics can be found in Appendix .

perspective and, as such, a form of judgement that touches on the intrinsic aspect of economic inequality. While we cannot escape that the aspects sometimes are in close relation to each other, we will avoid evaluating the intrinsic aspect in depth. For the people who are interested in the intrinsic aspect of economic inequality, we would like to refer to the philosopher Rawls (1971). In his monumental work *A Theory of Justice,* he elaborates on the interaction between justice and economic inequality.

Other characteristics of the wicked problem cause important limitations to the potential solution which can be provided to the issue. These characteristics are: "*No stopping rule*", "*Solutions are not true/false, but better/worse*", "*Solution cannot be tested*", and "*Only a sub-set of all solutions can be identified*". The broad consequence of these characteristics is that our solution (but also every other solution formulated in regard to this topic) can only be formulated as a proposal without the possibility to test its quality nor it being free of judgement. In sum, the solutions posed by this thesis will most definitively not be the only solutions that can be formulated, it is a proposal that follows from our perspective.

We will attempt to provide a new angle on economic inequality, but we will certainly not be the last to write about the topic. The problem is highly complex and ever evolving and as such can metaphorically be compared to a hydra. Whenever we will tackle one of the many problems, other problems will sprout. However, we do notice that current tactics appear not to bring economic inequality to a halt, it is even spiralling faster out of control. We hope that this research can bring a stop to this process.

Research methodology

A key structure to creating the framework is a structured search strategy to acquire all the required information. However, as the nature of this thesis is explorative, i.e., we do not yet know what the framework will look like, we envision the strategy to be an iterative process. In short, after a paper has been reviewed by its content the lessons learned can create a "new" perspective on that (sub-)topic which causes an adaptation for the search strategy. As such, the search process is dynamic causing a continuous evolution of the set of analysed parameters into a more "appropriate" set of parameters.

Keywords

To maintain a structured form of analysis we attempt to use a "single" search strategy. We attempt to do this by breaking down our search descriptions into three different lemmas. The first lemma represents the overall theme of this thesis, i.e., inequality. The second lemma represents one of the four concepts which we are reviewing in our four chapters: 1. How to quantify economic inequality, 2. What is the cause of economic inequality, 3. What is the effect of economic inequality, and 4. How to influence economic inequality. The third lemma represents the analysed topic within one of the chapters. As such we define the search description as follows:

"(Economic OR Income OR Wealth) Inequality" AND "Key Concept" AND/OR "Topic"

These search input, represented in Table 4 in Appendix B, is to be used in the search engines Web of Knowledge and Google Scholar. Whenever a new topic is being addressed (and thus added to the table as a search term) we will also use a general Google search

inquiry regarding that topic to obtain a fast familiarization with the topic. We will also use cited literature from the articles we found during our search to aid in finding new key concepts and/or topics.

Inclusion and exclusion criteria

For this thesis, it is hard to define inclusion and exclusion criteria. In part, this is caused by the fact that we will be reviewing four different sections which all have a different scope of analysis. Thus, an exclusion criterium that is viable for one of the sections can be hampering analysis for one of the other sections. Also, because the search process is dynamic there is a large possibility that drafted exclusion criteria are viable during one part of the research but are hampering further analysis in another part of the research. Therefore, we will state general remarks for the inclusion criteria which are to be used as guidelines.

1. The articles are written in English or Dutch, the latter being of main interest when reviewing the Netherlands specifically.
2. Preference for published articles over grey literature, although the latter will frequently be reviewed because the topic is often discussed by (international) institutions such as the OECD, UNICEF, World Bank, governments, and others.
3. Preference for recently published articles. The topic concerning economic inequality has been rapidly developing in the past two decades, with an important landmark being the work of Piketty (2014). Moreover, the Great Recession between 2007-2009 brought a large shift within the world of economics (Turner, 2017). As such, we state that analyses after 2009 are to be preferred, in line with the statement of Peterson (2017) that after the Great Recession a surge of articles have been published regarding economic inequality.

The scope within the master

The position of this thesis within the curriculum of the TU Delft master Management of Technology (MoT), is in the integration of the tracks logistics and finance. It attempts to find the "supply chain" within the finance topic 'economic inequality'. When the interactions become known, how they "communicate" it becomes possible to optimize the chain itself. However, we can consider the topic to be a multi-actor system with conflicting interests. As such, optimization of one parameter will come at the cost of another. However, this thesis will attempt to draft the complete chain before it becomes able to bring in the scope the interests of the various actors within the system. We hope to give an important start to such a review, and may the next runner be able to assign the values and demands of the different actors.

1 Inequality influences – Are differences bad?

Economy and life are so intimately intertwined that it correlates to virtually every aspect one can think of. We can link economic inequality to topics such as (but not limited to) crime (Fajnzylber, Lederman, & Loayza, 2002), behaviour (Ku & Salmon, 2009), life satisfaction (OECD, 2017), and environment (Gunewald, Klasen, Martinez-Zarzoso, & Muris, 2017). However, due to time restraints will not be able to investigate all the various effects. After analysis of the works of the IMF (Dabla-Norris, Kochhar, Suphaphiphat, Ricka, & Tsounta, 2015) and Peterson (2017), we identified the four 'most important' domains to be analysed more thoroughly for the thesis, being:

1. *Health*

This key concept is chosen as health is a vital aspect, at the core it being a concept concerning life or death, but also simple life satisfaction is seemingly at stake (OECD, 2017). Also from the economic perspective, health is important as bad health relates to lost working hours. For example, sick leave mostly occurs significantly more often for people with lower socioeconomic status (Kristensen, Jensen, Kreiner, & Mikkelsen, 2010) but sick leave is predominantly compensated for high-wage employees (Gould, 2021) causing inequality among people who are hurt by bad health and who are compensated for it.

According to Pickett & Wilkinson (2015), economic inequality has large implications in relation to health. They show that a reduction of the economic inequality within the UK to get in line with the OECD average would cause a reduction of 39 billion pounds spent annually on mental health. Moreover, if all OECD countries would bring down their Gini coefficient below 30 then a 9.6% mortality reduction for the cohort 15-60 years old (equating to 1.5 million people annually) would be averted (Pickett & Wilkinson, 2015).

2. *Democracy*

This key concept is chosen as the governing entity implements redistributive policies such as taxes and benefits. If the governing entity, which mostly is a democratically elected entity in western society, is influenced by economic inequality then the opportunity to effectively alter economic inequality could be hampered. This would be a critical notion if the rich population is in control of the democratic system and would use their power to reinforce their position by implementing favourable policies.

This notion stands central in the Benabou model, which states that increasing inequality causes enhancement of the power of the rich which causes lower demand for distribution (Newman, Johnston, & Lown, 2015). This notion does not seem to be farfetched; Gilens & Page (2014) reviewed implemented policies in the US depending on the preference of the general population and the small elite. They found that it is not the general population that guides policies to be adopted, but an elitist group. Policies that were favoured by the elite, but disfavoured by the general population, were still being implemented as a policy.

3. *Education*

This key concept is chosen as education provides the potential to obtain jobs with high earnings. If economic inequality causes the rich to gain an advantage early in life by, for example, obtaining favourable educational positions leading to higher educational outcomes, then it could cause self-reinforcement of the economic inequality.

There are (indeed) various indications that there is a positive correlation between economic inequalities and differences in education (Killewald, Pfeffer, & Schachner, 2017). Abdullah et al. (2015) show that there is a general trend toward inequality reduction with an increase in education. This decrease is largely caused by the fact that education causes the poor population of society to earn higher wages by which the gap between poor and rich reduces.

4. *Economics*

This key concept is chosen due to its close interaction with economic inequality itself. Living standards and average/median income can improve when the economy grows. However, if economic inequality (negatively) influences economic growth or has the effect that economic growth is only benefitting a few, then we are unable to create systematic improvement for the whole population.

Currently, there are indications that countries are (indeed) experiencing stunted economic growth due to economic inequality (Cingano, 2014). However, the interaction between economic inequality and the economy is difficult to ascertain. For example. Stiglitz (2016) showed for Western countries, which have similar technology, GDP, and productivity, have large differences in their before-tax distribution. He states that there is no general theory that can explain why economic inequality is occurring.

We will discuss each of these domains and attempt to give an overview of what is occurring within that field in relation to economic inequality. We will close by providing the largest issue in the conclusion and providing concepts to be included in the conceptual framework.

1.1 Health

Health is an important factor in anyone's life. Sadly, not everyone is blessed with a healthy life and differences occur. While some seem to be rather obvious, such as the interaction between smoking and lung cancer (U.S. Department of Health and Human Services, 2010), others are more difficult to grasp. Such as the interaction between economic inequality and health. Dickman (2017) found that the wealthiest Americans live 10-15 years longer than the poorest Americans. This occurrence is not only present in America, but also in other developed countries, such as Germany, (Kroll, et al., 2017), Italy (Lallo & Raitano, 2018), and the UK (Iacobucci, 2019) encounter this phenomenon. It seems to be strange that in a high-quality health system the amount of wealth carried in someone's backpack makes a difference in life expectancy.

That differences occur between population groups has been acknowledged in the monumental work of Rose (1985). He created the vital concept that diseases, whatever their kind can have different health outcomes between population groups while the core cause, the disease, is exactly the same. Within the field of medicine, research has been performed to understand these differences caused by, for example, gender, race, and age.

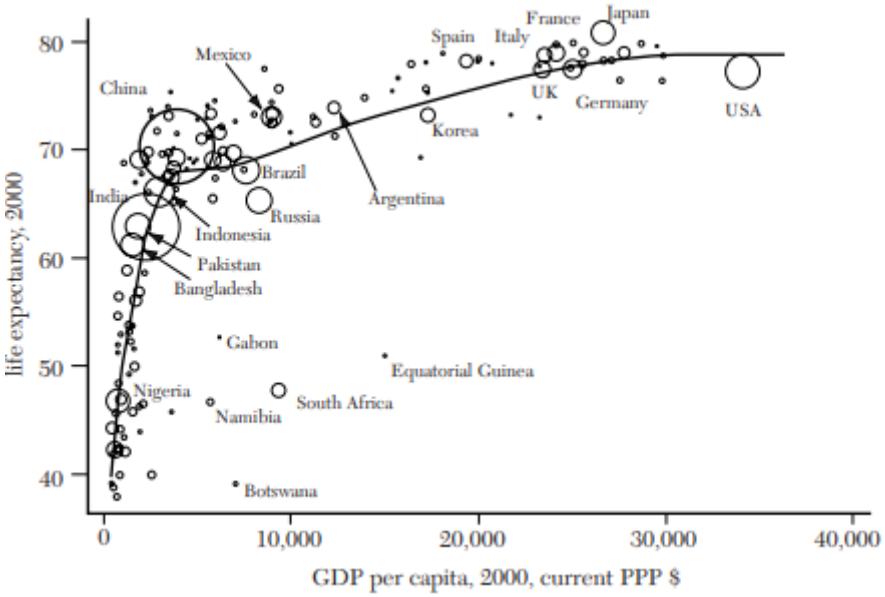

Figure 2 Preston Curve: Relation between GDP per capita (adjusted for PPP) and life expectancy. *Note: Data from the World Bank in 2002 has been used. The size of the circles indicated relative population sizes. A solid line is a population-weighed nonparametric regression. This figure has been obtained from* (Deaton, 2003).

In this thesis, however, we want to review how economic inequality relates to health. On this matter there are two perspectives (Deaton, 2003):

1) *Absolute income hypothesis*

The theory that health comes with certain costs and therefore a certain threshold of wealth/income must be surpassed to be able to gain all the health benefits

2) *Relative income hypothesis*

The theory is that the difference in health is caused by the distribution of wealth/income where being fixed in a certain class causes health differences between the classes.

We will discuss these hypotheses momentarily, however, it is important to mention that the main takeaway will be that the poor population are the ones who are receiving the grunt of damaging impacts. It has been acknowledged that health problems are more frequently occurring with decreasing socioeconomic status (Marmot, Ryff, Bumpass, Shipley, & Marks, 1997) (Gruenewald, et al., 2012). They have a higher prevalence of teenage pregnancy, lower expected life, lower expected life in good health, higher obesity, and higher smoking. This is only a shortlist in the long run of various negative effects occurring with the lower socio-economic classes. The conundrum is that diseases of affluence, i.e., rich people's disease, are experienced by the absence of wealth rather than the abundance of it. For this thesis, we will not discuss why specific health parameters are connected to economic inequality, but we will discuss the reasoning for the explanation for the two posed hypotheses.

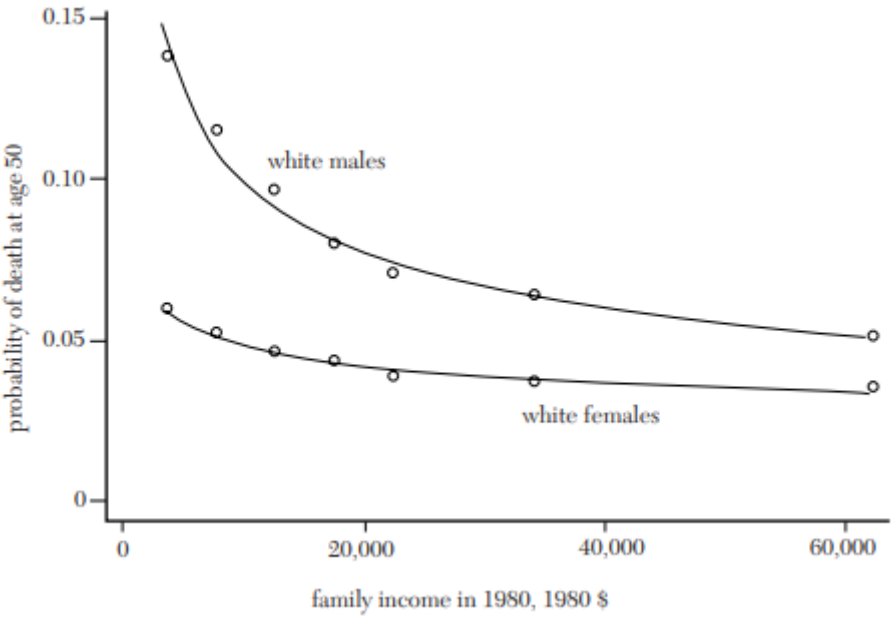

Figure 3 Relation between household income and probability of death at age of 50. *Note: Probability is based upon 3.288 days of follow-up time from interviews around 1980 using data from the National Longitudinal Mortality Study. This figure has been obtained from* (Deaton, 2003).

Absolute income hypothesis.

The absolute income hypothesis revolves around the notion that a shortage of wealth/income causes inaccessibility to health services. To gain access to health services a certain wealth/income threshold should be obtained. To illustrate, the shortage of wealth/income that large groups in Africa cannot buy enough food causes malnutrition and deteriorating health, in line with an example by Fogel (1994).

While this could be experienced as a problem far away from home, the same principle is also experienced in developed countries. For example, in 2014 23% of the working-age adults did not go to a doctor because of financial issues and 19% did not fill their prescribed medicine due to unaffordability (Collins, Rasmussen, Doty, & Beutel, 2014). Overall, these examples show the principle that a shortage of funds can cause inaccessibility to "good" health.

This hypothesis can graphically be summarized by the Preston curve. This curve plots the average income/wealth, e.g., GDP of a country, against life expectancy as shown in Figure 2. When reviewing the plot, there is a sharp gain in life expectancy until a certain GDP, i.e., roughly 5.000 euros per capita is obtained. After this threshold, the gain in life expectancy is only limited. This process can also be recognized when reviewing income differences within a country. In Figure 3 income of households within America is plotted against the risk of mortality at age 50, yet again we recognize a rather steep decrease with a plateau at higher income.

According to Lenhart, the minimum wage level correlates with population health. After analysing 24 OECD countries he found that an increase of 10% on the Kaitz index (minimum wage level/average wage level) caused an increase of 0.44 years in life expectancy (Lenhart & Otto, 2017). However, when discriminating between developed and developing countries the effect is not significant for the developed countries while it becomes more highly significant for the developing countries. This difference in impact

could find its basis that a minimum income is required to afford health expenses or be aware of health-related issues. If so, the effect would not per se be the difference between developed and developing countries, but the difference between minimum wage and required wage for basic needs.

According to Deaton (2003), it cannot be reasonable that there is a direct causal link between income inequality and health. In his reasoning there is universal access to health services, thus health should not correlate with the income distribution. An illustrative of his reasoning is that he cannot envision that increased wealth among the richest alters the health outcome of the poorest. He points out the fact that health issues are related to poverty and as such health can be improved by reducing poverty. The essential summary behind the absolute income hypothesis is, that the poor are unable to access health services due to a shortage in funds and are not adequately supported.

Relative income hypothesis

The second hypothesis is the relative income hypothesis which revolves around the notion that economic inequality causes stratification of society. The lower strata experience various health issues that are related to their (socio-economic) position. As there is an abundance of theories that attempt to explain why this is occurring, i.e., Mackenbach (2012) recognizes 9 different theories, it will be beyond the scope of this thesis to review them.

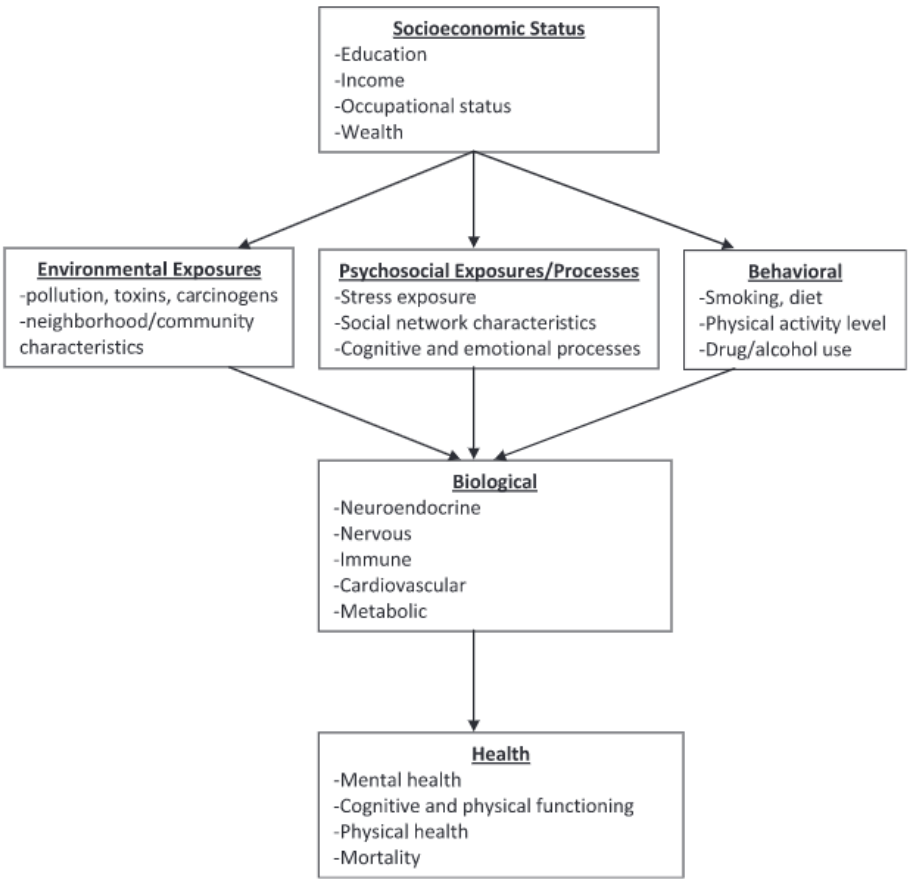

Figure 4 Conceptual model of interaction between socioeconomic status and health outcomes. *Note: This figure has been obtained from* (Gruenewald, et al., 2012).

The important takeaway from these theories is that almost all of them state that it occurs through the stratification of society. Problematic to this situation is that the health inequalities become worse with increasing economic inequality (Wilkinson & Pickett, 2006). As we already stated earlier that economic inequality is on the rise with no end in sight (Piketty, 2014), this gives a grave prospect for health inequalities in our society in the future.

The rationale behind the relative income hypothesis is that health interacts with social stratification through three mediators (Mackenbach, 2012): 1. Strata have common characteristics due to clustering by differences in social mobility, 2. Strata have different access to financial resources causing differences in access to services, and 3. Strata experience differences in benefits because of their characteristics. To make the interactions more conceptual, Gruenewald et al. (2012) created a conceptual model to show the interaction between socio-economic status and health outcomes, as shown in Figure 4.

Pickett & Wilkinson (2015) support their claim for a causal relation between income inequality and health by reviewing the interaction between income inequality and health inequality when plotted, as shown in Figure 5. In their research, they show that with increasing inequality, irrespective of average income, health deteriorates. Their theory is that with increasing income inequality more stringent class societies are being created. The mental and social distress of this 'class warfare' causes diminished health parameters, this being one of the 9 recognized theories by Mackenbach (2012) to explain the causation between economic and health inequalities.

Pickett & Wilkinson (2015) state that the effects as immensely impactful. They show that, if the UK would bring its inequality down to the OECD average, it would cause a reduction of 39 billion pounds annually. They also show that, if all OECD countries would be able to reduce their Gini coefficient (an indicator of inequality, this will be explained in Chapter 2: Quantifying Inequality) beneath 30 there would be a reduction of 9.6% in total adult mortality between 15-60, i.e., a reduction of 1.5 million deaths on annual basis (Pickett & Wilkinson, 2015).

Important for the relative income hypothesis is the effect of income artefact, i.e., increased inequality relates to an income/wealth transfer from the poor to the rich. As there are diminishing returns to health with increased income/wealth, as shown by the Preston curve, this would cause reduced health outcomes. However, Babones (2008) shows that it is specifically income inequality that is correlated ($p<0.001$) with lowered life expectancy and higher infant mortality. He specifically attempts to appreciate the income effect and finds that the interaction between health and economic inequality is not caused by this effect.

Concluding remarks

We showed the basic notion behind the two hypotheses in the previous two sections. However, we need to acknowledge that the interaction is immensely complicated. One of the most important complicating factors is that health and income/wealth are having a two-way interaction, i.e., income/wealth affects health, i.e., forward causality, but also vice versa, i.e., backward causality.

Figure 5 Relation between income inequality and health and social problems.
Note: This figure has been obtained from (Pickett & Wilkinson, 2015).

Fogel (1994) makes this illustrative by explaining the situation in the 17th and 18th centuries. At that time there was a large group of the population who were malnourished by not being able to afford to pay for food. Due to the malnourishment, they incurred health problems and were unable to provide labour and gain (enough) income to obtain food, causing a perpetual cycle (Fogel, 1994). It is difficult to state whether economic inequality is a representative or a consequence of the average health.

There are indications that income has a larger effect on health than vice versa (Muennig, 2008). Muennig does note that this effect differs throughout life, in early life and after the age of retirement this correlation is weaker because in those periods of life no/little work is performed and health cannot impact income. One should note that in his analysis children are not being accounted for, i.e., the early life starts from 25 years old. Because children are dependent on their parents, the forward causality would be their parents' income relating to the child's health. As for the backward causality, this could either be directly on their performance, while the amount of work performed by children will be limited (even more so in developed countries), or on their parents' work performance, e.g., due to sickness of the child the parent will possibly need to take sick leave to take care of the child. As for the late-life causality, Arber et al. (2014) made an extension and showed that it is rather subjective financial well-being rather than objective wealth which correlates with health.

Moreover, while we discussed the two hypotheses as separate entities, it is far too simple to state it is either one or the other. For example, Dorling et al. (2007) showed that teenage pregnancies are correlated with low income, i.e., being a facet of the absolute income hypothesis, this was being aggravated by increased income inequality within society, i.e., being a facet of the relative income hypothesis. It is rather reasonable that the two hypotheses are working in conjunction.

Deaton (2003) concludes that the absolute income hypothesis is important for poor economies whereas the relative income hypothesis is important for rich economies. In poor economies increasing inequality does not alter national health by large margins as only a

few will be pulled above the threshold. In rich economies, the average income lies above the threshold, so if all the wealth would be equally divided everyone would have the ability to pay for good health. However, because of economic inequality, some people are having an income beneath the threshold. As such, it is inequality that matters for rich countries. Overall, one could say that both hypotheses are valid, but their relative importance is dependent on the specific economy (Deaton, 2003).

While we reviewed the interaction between economic inequality with health, we can state that the medical research field is uncertain about how health inequalities are being produced and it is a complex interaction of various social parameters (Bergqvist, Yngwe, & Lundberg, 2013). For example, Dorling et al. (2007) show that educational debt delayed childbearing while mortgages and credit card debts accelerated childbearing. Thus, the type of debt, i.e., absence of wealth, causes differences in health outcomes.

Overall, economic inequality is only a small cog in the whole wheel of health inequality. While there is a certainty that aid is required for those who have fewer resources, the policy able to do so is less certain and should not be blind in stating that solving economic inequalities will solve all the issues.

1.2 Democracy

Economic inequality is viewed to be a consequence of implemented policies. Examples are the implemented tax schemes and benefit systems, the educational system, labour market regulation, and other types of policies (Fuentes-Nieva & Galasso, 2014). These policies are implemented by a governing entity, which in western society mostly is a democratically elected party. However, seemingly there have been ample efforts to curb economic inequality through enacting policies. Some of the policies made inequality even more severe while other policies which could have curbed inequality have not been enacted (Bonica, McCarthy, Poole, & Rosenthal, 2013).

The current question which arises is 'how it could have been possible that economic inequality has been increasing over the past decades within a democratic system?'. While it can be that we are democratically choosing for this to occur, it is far more frightening if this occurs because the rich can steer policies in their favour. The fact that economic inequality has been increasing over the past decades can be a warning sign of the latter. The statement of Louis Brandeis, formerly seated in the Supreme Court of the United States, seems to be a warning for this problem (Irving, 1941):

> "*We may have democracy, or we may have wealth concentrated in the hands of the few, but we cannot have both.*"
> – L.D. Brandeis (Irving, 1941)

This quote signifies the essential notion behind politics, either we have a population that controls via democracy, or we have the few who are being in control. Overall, we can distinguish this statement into two perspectives that explain the relation between economic inequality and democracy (Newman, Johnston, & Lown, 2015):

Redistributive democracy perspective

The average voter will direct the political environment by democratic process toward more redistribution

Unequal democracy perspective

The rich can steer government policy into their interest which becomes easier with increasing inequality

For this thesis, we want to elaborate on the underlying perquisites for these perspectives. While we will not attempt to prove which one of the perspectives is true, we can state that the unequal democracy perspective seems to be dominant as inequality increases but limited efforts are attempted to reduce the inequality (Kelly & Enns, 2010). The concern for inequality being damaging to democracy is seemingly timeless as we can see from the statement of Daniel Webster, former secretary of state in the US in 1850-1852 (Webster & Whipple, 1879):

> *"The freest government, if it could exist, would not be long acceptable if the tendency of the laws were to create a rapid accumulation of property in few hands and to render the great mass of the population dependent and penniless"* – D. Webster (Webster & Whipple, 1879, p. 45)

Redistributive democracy perspective

We mentioned earlier that Plato already recognized that disruption of society can occur when inequality becomes too large (Bury, 1968). In more recent times, Cramer (2005) noted that inequality seems to have a pivotal role in numerous theories to cause revolt and rebellion. The central essence is that if politics does not control (perceived) inequality, the population itself will demand it.

The preference for redistribution often revolves around the median voter theorem which became famous by Meltzer & Richard (1981). The theorem states that with an increasing difference between the median and average income a greater demand for redistribution will occur as the number of people earning less than the average will increase. As such, with increasing differences, the demand will keep increasing causing a increasingly larger call to action.

While this theorem seems to be elegantly simple, the problematic notion is that the population needs to be aware of the income/wealth distribution and turn this awareness into a political vote. Several complexities cause that these notions are hampering the median voter theorem. We will review this by discussing: 1. Awareness of the distribution, and 2. Voter turnout.

Awareness of distribution

An important notion to the redistribution democracy is that the voters are aware of the distribution and (growing) economic inequality. If the voters are not aware of these facts, then they cannot demand action, i.e., one cannot ask for what one does not know.

Gimpelson & Treisman (2018) reviewed the prerequisite of whether the population was aware of the distribution by performing research in 40 different countries. They presented five different inequality distributions to respondents and only 24% of the people pointed at the correct inequality distribution, (which is only 4% better than the guess

rate). Consequentially, they reviewed the correlation between perceived inequality and demand for redistribution and found a high correlation. As such, Gimpelson & Treisman (2018) state that the absence of preference for redistribution occurs because the population is unaware of the economic inequality occurring. The unawareness of the distribution can be caused by several notions according to Hauser & Norton (2017): 1. The false belief of belonging to the middle, 2. Media coverage, and 3. Believes in merit.

As the absence of demand for redistribution is a consequence of unawareness, one could state that schooling is required concerning this topic. However, Kuziemko et al. (2015) show that educating the population about the misperception of inequality is a difficult task. They found that there were two different groups: 1 uninformed, i.e., had no prior knowledge about inequality distribution, and 2. misinformed, i.e., having prior knowledge about inequality distribution but not matching the actual distribution of that society. While informing uninformed people about the actual inequality caused an increased demand for redistribution, informing the misinformed did not cause a significant change in their redistribution preferences (Kuziemko, I, Saez, & Stefanie, 2015). Thus, while a portion of the population could switch their opinion about inequality, a sizeable group will retain their opinion even though it is based upon the wrong information.

In essence, the articles by Gimpelson et al. (2018) and Kuziemko et al. (2015) show that a large portion is inadequately informed about inequality but presenting them with the right information does not lead to a change in policy preferences when they already were misinformed. However, solving this hiatus in information has the potential to make the redistributive democracy more effective. According to Cruces et al. (2013) people who became aware of the actual distribution favoured political reforms for redistribution. In essence, this would mean that either schooling is required on the subject of inequality before people become misinformed or constant nudging is required to rewire misinformed beliefs.

However, not only unawareness and misinformation have an impact on the call for redistribution, but also the perspective of the society is having a large impact. Lupu & Pontusson (2015) postulating that "social affinity" is of large importance to the demand for redistribution. The theorem states that one will demand change if there is a social affinity between the group which is having negative impacts and the group which is having democratic power. It theorizes that economic inequality increases if the social groups at the bottom of the distribution are having lower social affinity to the middle group. As such, when social groups other than the dominant voting group, which will often involve ethnic minorities and immigrants, are residing in the lower part of the distribution it can cause less demand for redistribution as they experience less "social affinity".

Another important parameter which influences to demand for redistribution is whether inequality is an accepted feature within society. Starmans et al. (2017) describe that inequality is not deemed to be negative, but the question revolves more around fairness of the inequality. As long the people believe the inequality is caused by fair characteristics, mostly referring to meritocracy, and (high) income mobility is perceived then its existence can be accepted. These perceptions can large differ between nations and societies. For example, the redistribution differs largely between Western Europe and the USA, with the former having twice as much redistribution. According to Alesina &

Angeletos (2005), this is caused by the differences in perspective between the two regions. Western Europe considers wealth to be a consequence of luck whereas the USA considers it an effect of merit. Moreover, according from Western European perspective poverty is the cause of locked-in systems whereas the USA perspective considers it the cause of lack of effort and personal decision making.

The previously described difference is embedded in American society by its belief in the American Dream which causes acceptance of income differences. However, the ethos exaggerates the true economic mobility which is in practice lower than in European nations (Davidai & Gilovich, 2015). The underlying notion behind the American dream has famously been formalized in the promise of upward mobility (POUM) hypothesis. This hypothesis states that people do not favour more redistributive policies as they, or their children, could own large amounts of wealth and then would be hurt by a more redistributive system in the future (Benabou & Ok, 2001). Some of this reasoning is also a consequence of believing in the meritocratic system, i.e., everyone has acquired their wealth by a fair process and thus it is unfair to ask for redistribution. However, when reviewing the odds of being able to move up the ladder, it is a false belief that those opportunities are a regular occurrence. While the perspective of mobility and POUM is of interest for this thesis, we will discuss it further in Chapter 3: Economic Inequality as it deviates too much from the current topic of democracy. However, to be aware of the problem of the false promise of mobility (and thus faulty notion of POUM), we highlight a quote from Alan Krueger (2012) during his time as chairman of the Council of Economic Advisers of the White House in 2012.

> "*A reasonable summary is that the correlation between parents' and their children's income is around 0.50. This is remarkably similar to the correlation that Sir Francis Galton found between parents' height and their children's height over 100 years ago. This fact helps to put in context what a correlation of 0.50 implies. The chance of a person who was born to a family in the bottom 10 per cent of the income distribution rising to the top 10 per cent as an adult is about the same as the chance that a dad who is 5'6"* (1.68m) *tall having a son who grows up to be over 6'1"* (1.85m) *tall. It happens, but not often.*" – A.B. Krueger (2012)

Voter turnout

Another pivotal notion behind the redistributive democracy perspective is that the mass demands redistribution. However, it does require the mass to convert demand into voter turnout which seemingly is not a straightforward notion. Kasara & Suryanarayan (2014) found that there is a tendency for the rich to have a higher voter turnout than the poor. While differences do occur per nation, it is a common feature among many countries, as shown in Figure 6.

There is some uncertainty as to what the exact cause is of the relative voter turnout among the poor. There are various interactions, one of them being that income inequality causes distrust in political institutions and dissatisfaction with democracy (Schäfer, 2012). In Schäfer's view, the increasing social inequality, distrust, and dissatisfaction which is accumulating within the poor population of society, cause a risk for political detachment. Among the poor, it is felt that politics are after self-enrichment rather than preferring benefits to the poor. This has a by-effect that enrolment for social policies is reduced as it is provided by an institute they do not trust.

Newman et al. (2015) provide a similar discourse where the poor are experiencing that the meritocratic system is not functioning as it should. This cause that the poor are feeling that they are being left behind. Consequently, they are feeling less engaged in politics to demand change as they do not trust the governmental system to work properly. This view is also echoed by Solt (2008) who finds that rising inequality causes less political engagement of the poor. According to his narrative, this is caused by the effect that the poor are not experiencing any (positive) effects from their voting behaviour which causes that voting is being experienced as pointless.

The overall consequence of these feature is that the rich have increased political power. As such, they have increased opportunity to steer policies in their favour as their share of the votes becomes larger and can limit redistribution policy which strengthens their position (Solt, 2008).

However, there is a lively debate on whether income inequality suppresses voter turnout. Stockemer (2017) performed a meta-analysis using 135 articles, which include various countries for various periods of time, and found a significant negative effect for 54% of the regression models. However, it is difficult to state this to be conclusive as the other 46% showed either no or a positive correlation with inequality. So, while some evidence is apparent for voter suppression, it is far from overwhelmingly conclusive.

While the median voter theorem seems to be compelling, it has many perquisites, i.e., awareness of the inequality, political engagement, and awareness of social mobility, that need to be adhered to before it can function as proposed. For that to work, we would need more education on the topic of economic inequality, social mobility, and the higher effect of votes resulting in policies. The latter notion, the absence of effect of voting, can potentially be explained by the following section, i.e., the unequal power perspective.

Figure 6 Voter Turn Out Inequality. *Note: Voter turnout ratio between the top and bottom wealth quintile. This figure has been obtained from* **(Kasara & Suryanarayan, 2014)**.

Unequal power perspective

The unequal power perspective is concerned with the concept that the few can grasp power and use it to their advantage. In relation to economic inequality, this is called the Bénabou model, i.e., increasing inequality causes the enhancement of the power of the rich which causes lower demand for distribution (Newman, Johnston, & Lown, 2015). As an example,

Gilens et al. reviewed policy adoption in the USA depending on the preference of either the broad population or the small elite groups. They found that policies that were favoured by the elite but disfavoured by the greater mass were still being adopted as policy (Gilens & Page, 2014).

It is of interest to understand which entity has the actual policy creating power. One can make a distinction between *de jure*, i.e., by law political power, and *de facto*, i.e., in practice political power (Acemoglu & Robinson, 2008). The importance of the source of power comes when increasing economic inequality causes a higher incentive to gain de facto power. The rich have more to lose and therefore more to gain by attempting to grasp power. Interestingly, this causes that when an attempt is made to democratise politics, the rich will invest larger amounts to avoid this from occurring. This interaction stops when the investments required are outweighing the potential gains from having de facto power (Acemoglu & Robinson, 2008). This notion is important, as with increasing inequality the system is increasing the incentive to claim de facto power by the rich.

In this context, Krieger & Meierrieks (2016) reviewed the evidence for 100 countries and show that there is an increasing tendency over the period of 1971-2010 to favour political power in the hands of the rich and they can do so ever-increasingly. In their analysis, there were both democratic and non-democratic countries, but both have the same trend of increasing inequality causing increased power in the hands of the rich. However, democratic nations do experience less power from the rich as opposed to the non-democratic nation, i.e., working as a buffer against de facto power but negating the trend.

The process to put economic power into de facto political power seems to occur via five different processes. Using these processes, they can improve their economic power by adjusting policies regarding competition, market regulation, property rights protection and rule of law in their favour. These processes are (Krieger & Meierrieks, 2016):

Capturing legal and regulatory institutions

By buying/bribing officials they can gain advantages on the market inaccessible to the common people. (Tullock Paradox)

Media capture

By buying the media the rich can control the public narrative and steer opinions toward their favourable agenda.

Private property rights protection

After buying protection for their property, they steer lower protection for the greater mass which are not able to afford their protection, thus gaining an advantage in property protection.

Financing of extra-legal violence

By supporting (violent) demand, either via hired arms or incited protests and riots, they can steer politics into their desired agenda.

Shaping policies

By funding political entities, the rich can demand favourable policies protecting/enhancing their wealth.

It will be beyond this thesis to discuss all these processes in greater depth. Moreover, the processes are difficult to prove as they do not directly connect wealth to power but use intermediate steps to do so. For example, the U.S. Capital riots of January 2021 have famously been connected to Trump who potentially incited a mob to riot to maintain political power. However, how these events connect to economic inequalities is complex and has intermediary steps such as the use of his network with media outlets. Hacker & Pierson (2010) state that it is too simplistic to review the process of inequality one-on-one with political power. From their analysis, it is the system revolving around the winner-takes-it-all that in total steers the connection of wealth to political power in the United States.

While we want to avoid in-depth analysis, we do want to highlight the process of shaping policies, as it exemplifies the interaction between wealth and democratic power spot on. The last process revolves around the notion of political capitalism, neatly explained by Holcombe (2018):

> "*Political capitalism [means that] the economic and political elite cooperate for their mutual benefit. The economic elite influences the government's economic policies to use regulation, government spending, and the design of the tax system to maintain their elite status in the economy. The political elite are then supported by the economic elite which helps the political elite maintain their status; an exchange relationship that benefits both the political and economic elite.*" – R.G. Holcombe (2018)

This interaction of wealth supporting political parties has been rising. Former U.S. President Jimmy Carter mentioned that it has already come into effect after judicial ruling in the USA created the possibility to fund political parties without financial limitations (Weaver, 2016). After this judicial ruling, a record was broken for the financial support given by Wall Street businesses during presidential campaigning in 2016 to champion their favoured president nominee, i.e., 2 billion dollars (Bukhari, 2017). Four years later, during the presidential campaigns in 2020, this record got blasted and a record of 2.9 billion was spent by Wall Street businesses. Lisa Donner, the executive director of Americans for Financial Reform made the following statement after this occurrence (Schwartz, 2021):

> "*Year in and year out, this torrent of money gives Wall Street an outsized role in how we are governed while driving and protecting policies that help this industry's super wealthy amass even greater fortunes at the expense of the rest of us.*"
> – L. Donner (Schwartz, 2021)

Overall, we can state that there are risks of politics being captured by the rich. While there are systems that give power to the non-rich, they require an informed and politically engaged population that does not seem to be automatically present. While we cannot be certain how (and if) the rich gain power, the increasing inequality does increase the rich's ability and incentive to engage in gaining de facto political power.

These processes should raise doubt about whether democracy is functioning as it should. An elegant description of the issue is given by Schattschneider (1960):

> *"The struggle is no longer about the right to vote but about the organization of politics. … Nonvoting is related to the contradiction, embedded in the political system, between (1) the movement to universalize suffrage and (2) the attempt to make the vote meaningless. We get confused because we assume the fight for democracy was won a long time ago. We would find it easier to understand what is going on if we assumed that the battle for democracy is still going on but has now assumed a new form."* – E.E. Schattschneider (1960, p. 100)

1.3 Education

Education is often seen as the solution to economic inequality, it is "the great equalizer". Because of education, everybody has the potential to invest in their human capital and transform that into financial capital. However, the question arises if education gives equal opportunity to everyone to gain human capital? If the rich can gain advantages in educational attainment or if the poor are having systematic disadvantages, it will distort "the great equalizer". This process that wealth is causing advantages within education has, for example, been found by Killewald et al. (2017). However, education seems to be the easy answer, a deflection of the true problems (Wilby, 1977):

> "*No other induced social change has attracted quite the same degree of liberal enthusiasm and faith and vision … educational equality was an attempt to achieve social change by proxy. More and better education was more politically palatable and less socially disruptive than direct measures of tackling inequality. So was economic growth. Even the most complacently privileged could hardly object to children attending better schools and to the nation producing more wealth. Equality of educational opportunity had an altogether more agreeable ring to it than any other form of equality, such as equality of income or equality of property. With its overtones of self-improvement, it could even appeal to the more conservative elements in society. Its beauty was that, while many must gain, it did not imply that any must lose …. Education was a cornucopia, so prolific of good things that nobody would need any longer to ask awkward questions about who got what.*" – P. Wilby (1977, p. 358)

The fact that education is not "the great equalizer" seems to be exemplified by the fact that economic inequality has been increasing since the 1980s (Piketty, 2014) while there was a high increase in educational level obtainment as shown by Domina et al. (2017) in Figure 8. As such, it seems baffling that while we intensified our education the envisioned great equalizing effects are not coming into effect. This trend of increased education and increased inequality is not only occurring in the USA but worldwide, as shown in Figure 7. The number of tertiary students increased by a relative factor (accounting for the growth of the total population) of 3.17 between 1970 and 2013 (Piketty, 2014).

In this section, we will attempt to unravel how the hampering equalizing effects of education are related to economic inequality. We can synthesise two broad explanations for this occurrence. At first, there seems to be a system where the poor are unable to escape their positions while the rich are protecting their positions from entry, we will delve into this narrative in this particular section. Secondly, there seems to be a trend of diverging income between the different educational layers, as shown in Figure 9. While more people are obtaining tertiary education, it is only their income which has risen in

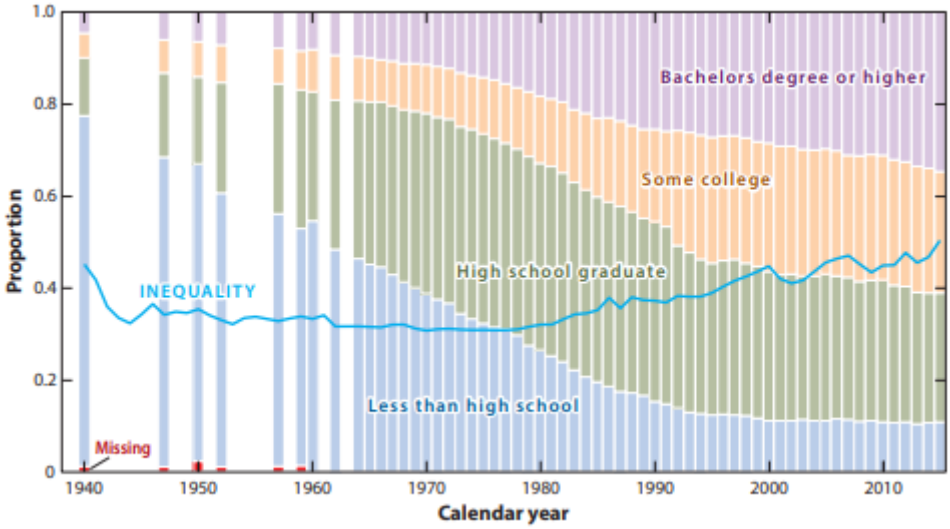

Figure 8 Progression of income inequality and educational attainment. *Note: Trend of income inequality and educational attainment within the US between 1940-2014. Data on educational attainment is obtained from people older than 25 via the Current Population Survey. Income inequality is visualized by the income share of the top 10% of earners. This figure has been obtained from* (Domina, Penner, & Penner, 2017).

the past decades whereas the lower educational layers have seen a deterioration in their income. We will explain this particular narrative in the section *Income Inequality* in chapter 3. However, the combination of the first notion, fixed socio-economic positions, and the second notion, increasing income difference between socio-economic positions, seem to be potent at aggravating income inequality across generations.

The central notion is the distinction between absolute mobility, i.e., the increase in income/wealth, and relative mobility, i.e., the increase in income/wealth compared to someone else, and the inability of education to effectively bring the latter into effect (Cole, 2014). According to Brown, this is caused by social stratification. The higher social strata can keep high socio-economic positions within their spheres (blocking relative mobility) and new entrants only occur during economic expansions, i.e., when new high socio-

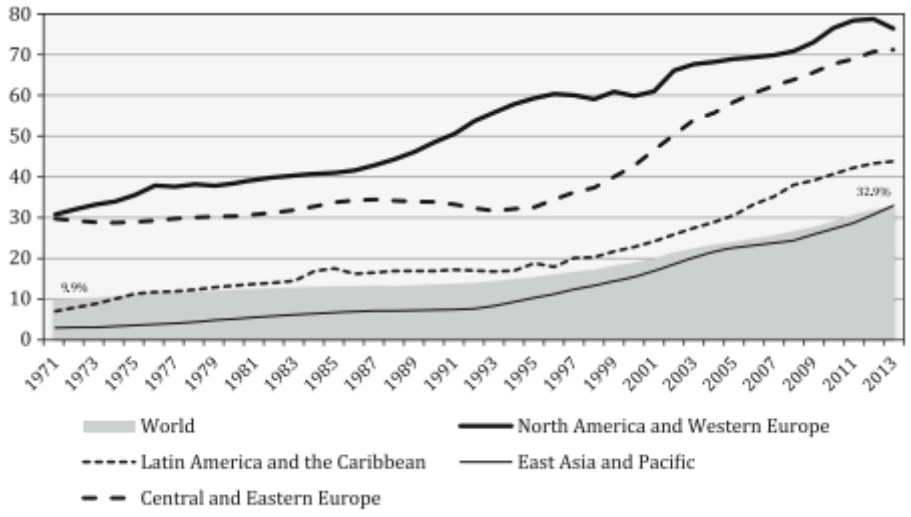

Figure 7 Growth in the number of students in tertiary schooling. *Note: Data has been acquired from UNESCO in 2015 and represent tertiary education enrolment between 1971-2013. This figure has been obtained from* (Marginson, 2016).

economic positions are created. As described by Willems (2010) these differentiations in opportunity can be described as horizontal inequality, i.e., the differences in acquiring the type of educational level in the same layer, and vertical inequality, i.e., the differences in educational level obtained causes differences in the type of job and socio-economic position obtained later in life. We will continue with discussing education onwards, but we will return to the topic of mobility in Chapter 3: Economic Inequality and give more insight into this parameter.

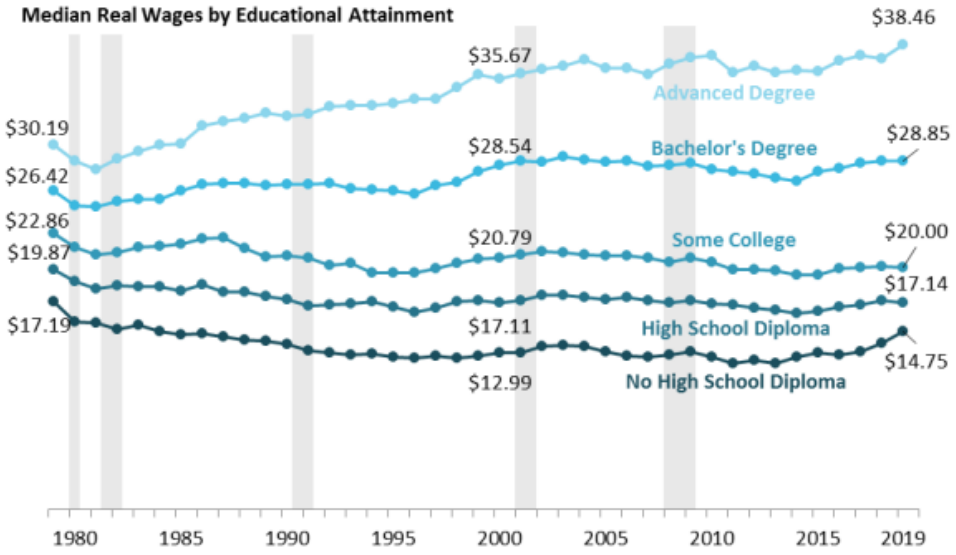

Figure 9 Median real wages by educational attainment within the US. *Note: The results are based upon data from the Current Population Survey Outgoing Rotation Group for the period 1979-2019. The results for the areas shaded in grey (recession periods) are based upon data from the National Bureau of Economic Research. Results are calculated using non-farm wage and salary workers between 25-64 years old (when hourly wage could be computed). The dollar values are adjusted for inflation using the CPI-U using 2019 as benchmark. This figure has been obtained from* **(Donovan & Bradley, 2020)**

Social congestion

The inability of education to create relative mobility is mediated through the process of social congestion, i.e., the accumulation of groups of people into a group that is saturated. Within education, this occurs through the inflation of education. However, when everybody gains higher educational diplomas no one gets ahead, it only increases the requirements one needs to obtain to gain a position.

In the process of social congestion, the higher social classes have advantages over the new entrants and retain their positions (Collins R. , 2019). This is caused by the fact that a tertiary diploma is no longer enough to obtain a high position, also soft skills are being used to differentiate between applicants. However, these are not unbiased as they correlate with the socio-economic background using networks to gain an advantage (Michaels, Handfield-Jones, & Axelrod, 2001).

Overall, we can state that the increased competition among the tertiary graduates within the labour market has two effects (Figueiredo, Biscaia, Rocha, & Teixeira, 2015): 1. Lower wages at the bottom of tertiary graduates, and 2. Increased wages at the top of the tertiary students. The latter effect occurs as companies are attempting to find top tier talent in the mass of graduates and bind them to their company. In this process, they give large pay-outs to these top talents to both stimulate applicants to perform, but also to

bind them to their company (Wooldridge, 2006). This steers the whole process into a superstar labour market where income and performance are not keeping track of each other, as described by Rosen (1981). In essence, the spur of higher education is reducing the income for the mass of the graduates but spurring the income of the few, economic inequality in the end.

The great sorting machine

While social congestion mainly occurs in tertiary education, which is being promoted globally, Domina et al. (2017) show that the educational system has a far wider implication. Their general notion is that education is performing as "the great sorting machine" causing (social) inequality by its categorizing structure. They explain that students are being filtered among grades, educational interests, regions, parents' preferences, and other elements. Education causes groups to be categorized into groups that hamper their development. As an example, the difference between a high school drop-out and a graduate has an immense impact on the ability to obtain a job because of being labelled as being one or the other.

The interaction between social class and outcome in education has been analysed by Manstead (2018). The basic notion is that the (perceived) social class causes a direct effect on the education obtained. The likelihood for the lower-class population to obtain higher education is decreased by traits associated with their class. Important for this is that the class structure is dependent on material conditions, in which economic inequality plays an important role. As such, social and economic mobility is hampered by economic inequality itself (Manstead, 2018). This is conceptualized in the model he proposed in his article, shown in Figure 10. Also, Stephens et al. (2014) describe that social class structures impact behaviour and thinking causing the perpetuation of inequality within societies. These effects do only occur within the education field, but also in homes and workplaces.

For this thesis, we are especially interested in sorting by the economic differences. Financial advantages can be translated into educational advantages through: 1. granting

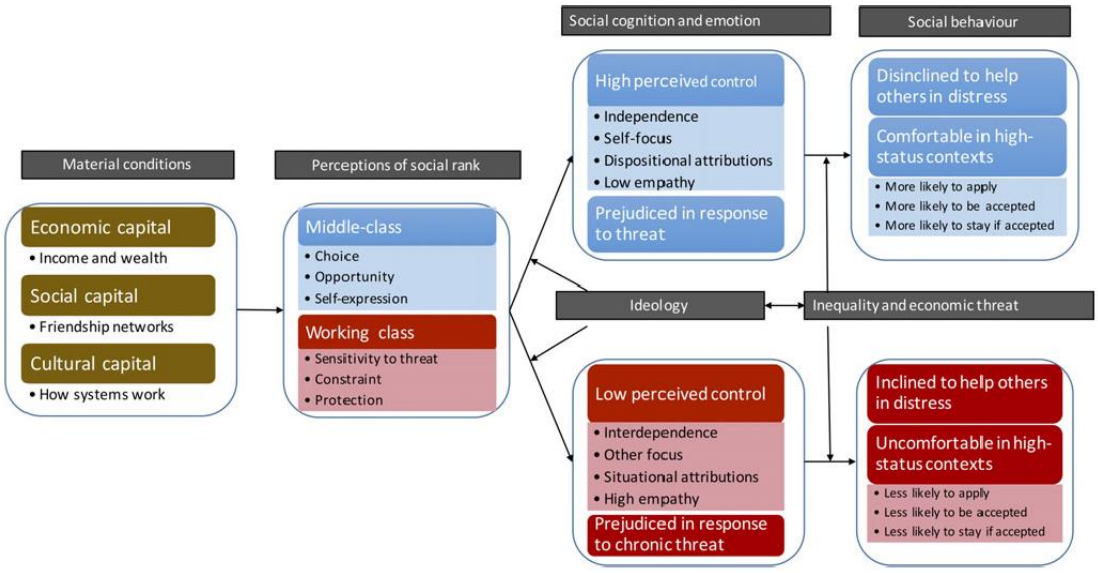

Figure 10 Model providing interaction between material conditions and social outcomes. *Note: This figure has been obtained from* (Manstead, 2018).

access to higher quality education, and 2. by being able to increase educational performance.

The first notion can be exemplified by the situation in the USA where elite Ivy League universities with high tuition fees, occupied by the elite of society (64% of students are coming from families in the highest income decile), which in turn offers elite positions at firms (Marginson, 2016). The relation between income and quality of education has also been analysed by Chetty et al. (2014), as is shown in Figure 11. This process seems to be persistent as it also has been reported 10 years earlier by Haveman (2006) but also various nations altogether (Jerrim, Chmielewski, & Parker, 2015; Neves, Ferraz, & Nata, 2017).

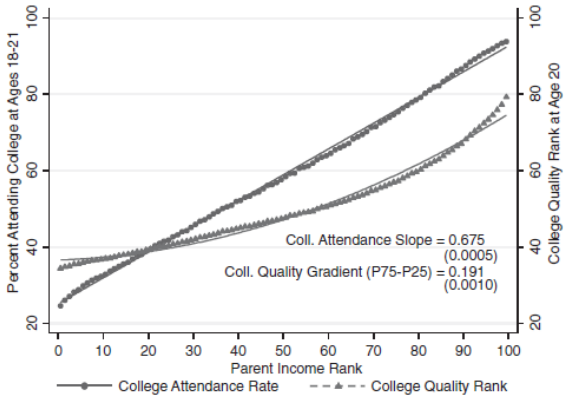

Figure 11 Interaction between college enrolment and parental income. *Note: Parent's income shows (almost) linear correlation with college enrolment, but non-linear with enrolment to (high) quality colleges. This figure has been obtained from* **(Chetty, Hendren, Kline, & Saez, 2014)**.

The second notion, increasing educational performance, occurs through "shadow education". In the non-public education sector aid is being provided to obtain higher test scores in return for a financial fee, i.e., making financial resorts a determinant in outcome (Buchmann, Condron, & Roscigno, 2010). Problematic to this process is that society is increasingly "obsessed" with using test scores to differentiate between individuals while high results can be bought. Au (2016) shows that these forms of testing are biased toward social constructs and instead of breaking inequalities are making them stronger.

While direct financial gains are effective in gaining a favourable position, it is also the socioeconomic position which is aiding in the process. When enrolling for an academic study, students who have parents who obtained an academic study have a knowledge advantage about specific parameters which improves their chances to be enrolled. But also, the notion of categorical differences creates an incentive to alter the valuation of students' work. The mere notion of a student with educated parents being categorized as gifted caused that the teacher evaluated their work more positively (Domina, Penner, & Penner, 2017).

The previous example is caused by the social network, but also geographical advantages are gained. Owens (2018) found that there is a significant discrepancy in educational attainment by geographical differences. Schools that were placed in rich zones were significantly outperforming schools in poor zones. The idea behind the relation was that schools in rich zones have more financial funding from their enrolled students by which they could provide higher quality schooling. As such, economic inequalities are transformed into geographical segregation causing advantages by location.

Being left behind

Rodríguez-Posez, (2018) analysed that lagging areas obtain a sense of being "places that don't matter" causing and encouraging them to think in territorial lines, i.e., the various regions will strive for their own best interest. In line with this process, Lamont (2018) shows that notions occur of "why try", i.e., reduced ambition in life goals as they feel locked

into their social strata. In her view, it is not so much the inequalities per se which need to be tackled but the stigmas that need to be abolished that can be achieved by reviewing how people reflect on their reality of living and breaking harmful constructs. Both Lamont and Rodríguez-Posez bring the notion that focus should be put on the less fortunate, respectively through reducing stigmatization and developing policies for the "places that don't matter".

Problematic to the current educational system, and more precisely in determining outcomes, is that the lower classes are becoming entrapped in their system (Lloyd & Mayhew, 2010; Roberts S. , 2012). There is a large volume of uneducated work which does not require any type of schooling, nor is schooling provided by these companies as there is a lack of necessity. Moreover, the investment costs for education are higher than simply hiring an employee with an adequate education level. From this, there are two lessons to be learned. The first one being that schooling should occur in the social sector as the benefits are incurred by society and not by private companies individually. The second is that low-skilled jobs are amply being trained by private companies, as such there is a governmental strategy required to avoid the entrapment of people working in the low-skilled sector (Lloyd & Mayhew, 2010; Roberts S. , 2012).

Overall, the story coincides with Torche (2011) who found a U-shaped pattern in the stratification in education. Both in the lower and upper echelons of education the enrolment and outcome were correlated with parental background whereas education in the middle had free mobility of moving up and downward. This fits the narrative where the low socio-economic background is being locked into their position and the high socio-economic positions can guard their position.

At the low end of socioeconomic, immobility seems to be in close relation to the fact that these socioeconomic positions seem to be bundled in the retail, catering, and care sector (Devins, Bickerstaffe, Mitchell, & Halliday, 2014). These industries have notably low educational requirements, high employee turnover, and give limited opportunities to gain educational progression. In a sense, they are jobs with the means to supply income but are not part of a progression in a career perspective. Also, from an employer's perspective the incentive to invest in the employees is low as the high turnover causes low odds of gaining a return on the investment. Moreover, the high turnover also causes high costs to employers. It is estimated by Devins et al. (2014) that the high turnover causes £4000,- per recruited employee. Problematic to these notions is that the number of jobs in the sectors is abundant, close to a quarter of the labour force in the UK are employed in these sectors, and their abundance is ever-growing. As such, there is large potency to create polarisation in the job market dividing low-income, low-skill jobs from high-income, high-skill jobs.

However, Chowdry et al. (2013) state that the guarding of high socioeconomic position towards the entry of high educational positions is only mildly occurring with the step going from high school towards university. The problem occurs at an earlier stage of the educational process as individuals in low socioeconomic positions are already not able to get into a position of being able to apply to universities. For example, they have significantly more issues with performing in secondary school. Thus, removing barriers between secondary and tertiary schools will not solve the bias toward high socio-economic positions, the stratification already occurs earlier in life.

A "new" perspective

The notion that education is important early in life corresponds with the research of Knudsen et al. (2006). They state that the return on investment of education is highest at a young age and decreases over time. Their general theorem is based on the belief that "skill begets skill" and an early start leads to a higher compounding effect of the obtainment of human capital, conceptually represented by Figure 12. It has been found that the program had 12,90 dollars return per dollar invested (Schweinhart, et al., 2011), or put differently the pre-school program has a rate of return of approximately 19%, outcompeting average stock market equity by a wide margin (Knudsen, Heckman, Cameron, & Shonkoff, 2006). However, it should be noted that 88% of these returns are connected to reduced crime rates, excluding these effects, the return rate would be 1,59 dollars return per dollar invested, a much small return rate. To test the compounding effect of the pre-school program, Knudsen et al. (2006) reviewed a study comparing children who received a pre-school program and those who did not. It was found that with a pre-school program educational and economic outcome was significantly improved as shown in Figure 13. The overall conclusion drawn by the work of Knudsen et al. (2006) is that from a social and economic perspective the investments done at an early stage of life are more cost-effective than when done later in life.

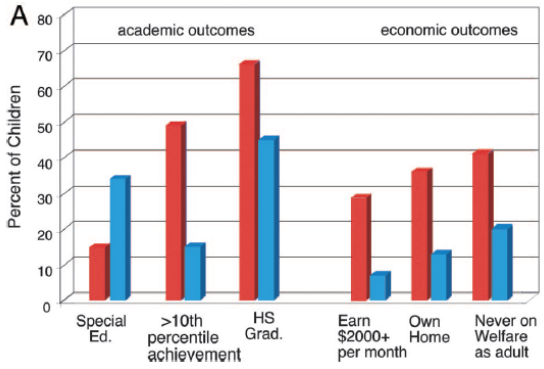

Figure 13 Effects of pre-schooling. *Note: Red bars indicate Perry Preschool intervention, blue bars control group. Data was obtained when individuals were 27 years old. >10th percentile achievement are students who tested above the lowest 10% on California Achievement Test. HS Grad are students who graduated from high school in nominal time. This figure has been obtained* (Knudsen, Heckman, Cameron, & Shonkoff, 2006).

Keep & Mayhew (2014) note that while improving the education of the poor is essential, education by itself will not be the ultimate solution to improved economic growth and social mobility. Currently, solutions should be found for the entrapment system of the low-wage population being unable to escape their position once entered. Providing them with more opportunities to climb the socio-economic ladder would prove to be more beneficial to socio-economic mobility and the economy as a whole (Keep & Mayhew, 2014). Overall, this has been conceptualized by Brown (2013) who shows the relation between social congestion and social stratification, with absolute and relative mobility, as shown in Figure 14. If it is desired to have more relative mobility we should avoid social stratification, which cannot

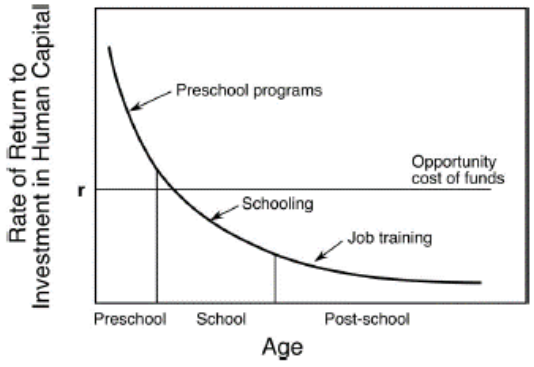

Figure 12 Rate of return on human investment as a function of age. *Note: Graph has been modelled using the life cycle model and dynamic human capital accumulation using various constraints. Investments were set equal across all ages. This figure has been obtained from* (Knudsen, Heckman, Cameron, & Shonkoff, 2006).

be obtained by simply focusing solely on education.

This is also voiced by Berliner (2013) who states the idea that educational reforms to improve quality can only be done in combination with economic and social reforms. In his rhetoric, the out-school parameters are causing three times more of an effect on school performance when compared to in-school parameters. He mostly points at poverty being a common denominator for unequal educational outcomes. This results in his following strong statement (Berliner, 2013):

> *"My point is that citizens calling for school reform without thinking about economic and `social reforms are probably being foolish. The likelihood of affecting school achievement positively is more likely to be found in economic and social reforms, … More than educational policies are needed to improve education."* – D.C. Berliner (Berliner, 2013)

1.4 Economy

Having reviewed the effects of economic inequality on health, democracy, and education, the question arises of how it affects the economy. Does economic inequality hamper economic growth? Went (2014) states it to be so, although the direct method of interaction is somewhat unclear. In their narrative, it could follow via four distinct interactions: 1. Lack of consumption due to insufficient income, 2. Increased burden of private debt causing reduced consumption, 3. The capture of politics by the rich favouring their position, and 4. Reduced investments into human capital reduce productivity. This inability to decipher the method of interaction is a caused by the complexity of economies. As Stiglitz (2016) mentions, when analysing Western countries which have similar technology, GDP, and productivity but still have large differences in their before-tax distribution, there is no general theory that can explain how economic inequality and economy interact.

The state of the economy is mostly signified by its GDP and the growth in the GDP. The growth in GDP can be distinguished into intensive and extensive growth, to scope

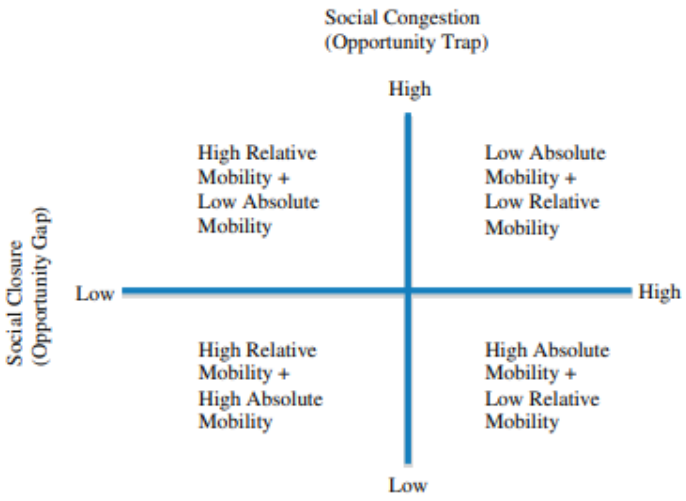

Figure 14 Potential for relative and absolute mobility. *Note: Social closure and congestion interact with the two different types of mobility. This results in various potentials of mobility depending on the societal system. This figure has been obtained from* (Brown P. , 2013).

this thesis we will only review the effect of inequality on intensive growth. An important model in this is the Galor-Zeira model (1993) which relates economic inequality to decreased human capital investment causing negative effects on economic growth. Another perspective is shown by Stiglitz (2016) stating that economic inequality is hurting economic growth through rent-seeking. This rent-seeking pulls wealth out of the economy affecting supply and demand in the economy. Using these two perspectives we distinguish two important parameters: 1. Productivity, and 2. Consumption. The notions coincide with the earlier vision of Went (2014), the impact of a captured democracy has already been discussed earlier.

> *"A more egalitarian income distribution is not luxury that can be dealt with once the economy has been stabilized; it is an integral part of a sound macroeconomic structure"*- Stockhammer (2012)

Productivity

As stated, the Galor-Zeira model states that increasing economic inequality causes a reduction in human capital. The general idea is that this decrease in human capital causes a reduction in productivity. This vision has been supported by Cingano (2014) when he reviewed the OECD countries, finding that economic inequality caused hampering economic growth, as shown in Figure 15. According to Cingano this mainly occurs through setbacks among the poor not gaining the ability to gain education and having fewer options in the labour market. This story resonates with the statements made in the section on education, there is stratification in the lower and higher classes, and apparently, the stratification causes inefficiencies in the market.

However, it has been shown by Cohn et al. (2015) that economic inequality also causes direct inefficiency in productivity. They show that this is mediated by the underperformance of labourers who find their salary to be underpaid. A wage increase would only increase productivity when they felt that they were being underpaid, those who felt being paid adequately or even being overpaid had no benefits of increased payment. Moreover, if an employee receives a wage cut of 25% his working performance drops by 38% while if they both receive a wage cut their performance reduces by 15%. Moreover, they show that the employee with a single wage cut performed more employee

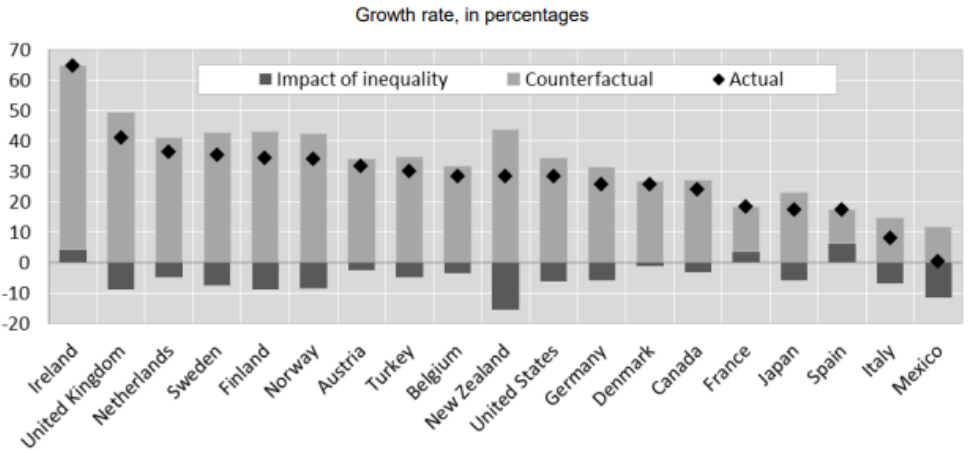

Figure 15 Effect of inequality on economic growth for OECD countries between 1990-2010. *Note: Chart shows the estimated effect of changes in inequality observed between 1985-2005 on the cumulative GDP per capita growth rate over the period of 1990-2010. Counterfactual is the difference between actual and the effects of inequality. This figure has been obtained from* (Cingano, 2014).

	Income		Wealth	
	1999	2013	1999	2013
Q1	0.976	0.974	0.654	0.744
Q2	0.680	0.741	0.583	0.658
Q3	0.561	0.629	0.564	0.590
Q4	0.518	0.542	0.555	0.607
Q5	0.435	0.475	0.582	0.607

Figure 16 Average propensity to consume according to income and wealth. *Note: Figure represents propensity to consume per income and wealth quintile in the years 1999 and 2013 according to calculations performed by the article's authors using data from the Panel Study of Income Dynamics. This figure has been obtained from* **(Fisher, Johnson, Smeeding, & Thompson, 2020).**

theft and was more dissatisfied with his work compared to the group of employees who received the same wage cut (Cohn, Fehr, Herrmann, & Schneider, 2014). As such, we conclude that rising inequality potentially is causing employees to experience unfairness in pay-out and reducing productivity.

Consumption

Besides having issues regarding productivity, we also state, as mentioned by Stiglitz (2016), that economic inefficiencies caused by economic inequality are hampering economic growth. In the research by Stiglitz (2016), he states that economic inequality has a negative correlation with economic growth due to rent-seeking behaviour. The top of the economic pyramid attempt to increase funds without causing gain for the GDP. This is not only limited to the very wealthy but also the common civilian is diverting funds towards housing, which is not creating added value and thus no increase in GDP. According to Stiglitz (2016), it is also problematic that, while neoclassical theories predict diminishing returns, this is not occurring for finance and housing. It is a broken link with potential large damage to the economy.

The explanation why economic inequality is damaging to the economy can be explained by consumption habits. The differences in consumption by economic inequalities have been shown by Fisher et al. (2020). As shown in Figure 16, the highest quintile consumes less than half of their income while in the lowest quintile more than 95% of the income is being consumed. As such, the highest quintile will largely save their income and have limited input into the economy. As such, an increase in inequality would cause that every dollar pulled out from the lowest quintile would cause a decrease of 0.976 dollars per dollar, while it would only increase by 0.435 dollars per dollar when given to the highest quintile.

We can explain that consumption is more directly related to income as opposed to wealth because wealth is not always accessible. Kaplan et al. (2014) showed the concept of the Hand-to-Mouth (HtM) population. This is a population that has a high propensity to consume, i.e., they consume almost every dollar they have gained in wealth. They find that there are people who have considerable amounts of wealth but still have high consumption rates from their income. This high wealth is invested in illiquid funds causing inaccessibility for consumption when needed. When reviewing the population who are living HtM, they find that more than half are wealthy, as shown in Figure 17.

As such, Cingano (2014) claims that redistribution would cause more equality in disposable income without hampering economic growth. He states that the trickling down economy should be viewed as a wrong model and that improved wealth can be obtained

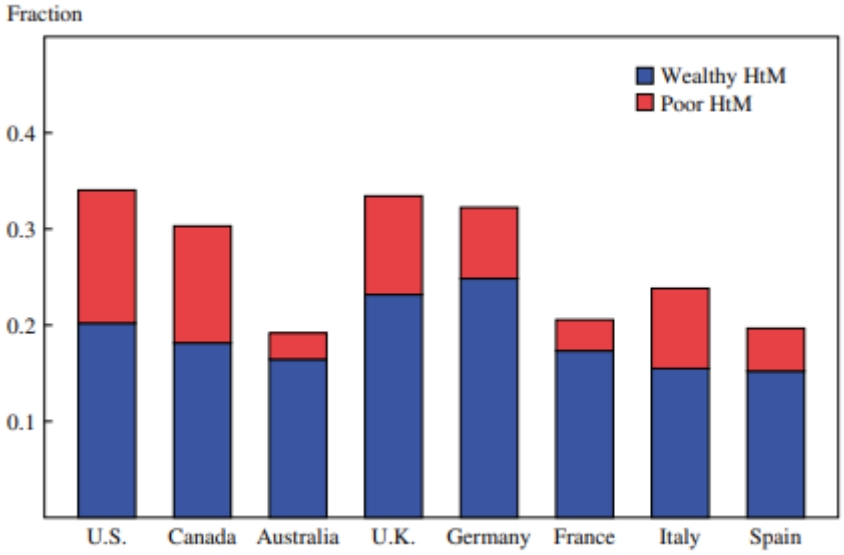

Figure 17 The relative presence of (wealthy/poor) Hand-to-Mouth population compared to the total. *Note: Results come from calculations of the article's authors using (various) national and euro area survey series. This figure has been obtained from* **(Kaplan, Violante, & Weidner, 2014)**.

by creating more equal societies. His analysis concludes that the largest benefits can be made by improving the economic possibilities of the low income, i.e., the lowest 40%, and not solely focusing on the poorest 10%. This can be concluded as well by the research of Fisher et al. (2020) that found that a transfer of wealth from the top 20% to the bottom 80% would increase aggregate consumption. They calculate that a transfer of 1 billion dollars from top to bottom would increase aggregate consumption by 1.232 billion dollars. As such, reducing inequality, i.e., focussing upon the poor, can increase aggregate demand and would improve the economy.

While the main narrative is that economic inequality has a negative impact on economic growth, various other theories are stating otherwise. For example, Bruckner & Lederman (2015) find that economic inequality has a positive effect on growth for developing countries while it has a negative effect on developed countries The whole premise of inequality affecting economic growth is further doubted by Breunig & Majeed (2020) who state that inequality and economic growth primarily interact in countries that experience high rates of poverty. Therefore, the reason that one should set policies against poverty instead of inequality. This is in contrast with Madsen et al. (2018) claiming that inequality is the primary cause of stunted economic growth in developing countries but has little effect in developed countries. As such, while we opt for the mainstream narrative, it does not necessarily have to be the right narrative.

Moreover, when following that economic inequality causes stunted economic growth, redistribution does not automatically cause improvements. Berg et al. (2018) show that redistribution only works up to a limited size of redistribution, i.e., it fails to have a positive impact on growth when more than 13 Gini points reduction from market income to disposable income is being achieved. This view that redistribution should not be too large gives reason to believe that pre-tax inequality cannot indefinitely be redistributed to adhere to 'fair' distribution post-tax. The pre-tax distributions should already have a form of equality. The Netherlands, for example, is outside the boundary of

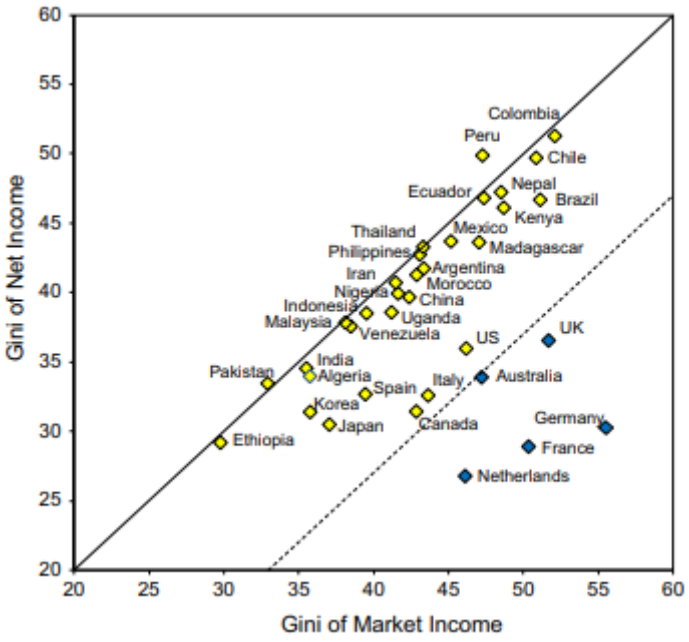

Figure 18 Redistribution of income for various countries. *Note: Size of redistribution according to the change in Gini coefficient from market income (pre-tax) to net income (post-tax) where the botted line represents a shift by redistribution of 13 Gini points. Results have been obtained by the article's authors' calculations. This figure has been obtained from* **(Berg, Ostry, Tsangarides, & Yakhshilikov, 2018)**.

gaining a positive effect from further redistribution as its pre-tax inequality is already of considerable size, as shown in Figure 18.

Type of Economy

The effects of redistribution do not only affect the distribution, but it also affects the economic functioning. In this regard, one finds that one can distinguish countries between being wage-led or profit-led economies. A wage-led economy focuses on the perspective that increases in overall wages cause larger consumption/demand and, as such, are beneficial to the economy. A profit-led economy focuses on improving profits to motivate entities to improve productivity to gain more profits. As such, redistribution policy would direct society toward a wage-led economy while less redistribution would direct toward a profit-led economy (Palley, 2017).

These effects are also found by Onaran & Galanis (2012) showing that the reduced wage shares after the 1980s caused inhibited economic growth in wage-led economies as it was counter-effective to those types of economies. In a general sense, they advocate that to enforce economic growth it would be favourable to focus on wages as the global economy proves to be wage-led. Moreover, it has been stated that a profit-led economy is more fragile to economic shocks as profits gained and investments done are sensitive to economic status. In a down turning economy, risks of investments are often avoided causing hampering of the economy which contrasts with wage-led economies which prove to be more stable.

In the works of Storm & Naastepad (2013), they review the topic of being wage-led or profit-led economy. Their view is that for both types of economies a wage-reduction is

a counter-productive policy to obtain economic growth. As such, de-unionization and deregulation of the labour market are ill-advised. However, they do note that simply increasing wages as a single policy is also not the way forward. They advise combining these steps with three other notions:

1. a fair sharing of the gains of labour productivity growth between business and labour
2. an allowance for high enough profits to stimulate investment
3. a commitment to providing employment security both at the level of the firm and as a (full employment) macroeconomic strategy

As a (last) example to show how the type of economy affects inequality, Carvalho & Rezai (2016) found that being either wage-led or profit-led interacts with the tendency to create savings. In a profit-led economy, there is a higher tendency to save as it creates an opportunity to perform investments. This is a consequence of the Kalencki-Steindl model. This interaction causes that higher redistribution causes a tendency to become a more wage-led economy and in turn creates higher consumption but a lower propensity to invest. As such, one could theorize that higher inequality diverts economies from being wage-led toward profit-led economies. This has also been shown by Oyvat et al. (2020).

We will stop the analysis of the types of economies at this point as it is at the edge of this thesis. However, it is important to note that redistribution will not only affect economic inequality, it can potentially also affect the economic functioning entirely. As such, it should not be underestimated how the effects of redistribution can have far more drastic consequences. How such a change will affect economic inequality is (for us) yet to be unknown.

1.5 Chapter conclusion

Problematic to these advantages is that they are often self-reinforcing in the sense that parents heave their advantages over to their children. As such, segregation is occurring within a society where there are groups that are better off than other groups. As (dis-)advantages are being transferred between generations, the mobility to adjust between segregated groups is limited and potential is being formed to acquire dynasties of wealth groups.

As already mentioned, when reviewing wicked problems, there is no hierarchical structure to causation in relation to the problem. Moreover, economic inequality studies are empirical, and their conclusion are using inductive reasoning, which cannot lead to definitive results. According to David Hume, inductive reasoning is a demonstration of something being true for the empirical observations, but it cannot be extrapolated to other situations. He has famously put this into the philosophical discussion of “the problem of induction” (Henderson, 2020). A famous example of this problem is: having only observed white swans, one cannot conclude that all swans are white for one has not observed all swans, either alive, dead, or yet to come. As such, all observations we have mentioned are mere demonstrations of how things are, we cannot be certain they will persist being so. However, from what we have analysed, we state that the current arena of problems in economic inequality lies with:

Poverty

The absence of financial funds causes the inability to access services creating inequalities.

Social Immobility

Stratification causes unwanted socioeconomic effects, these problems lie mostly at the ends of the spectrum, i.e., the poor and the rich.

Great wealth

The abundance of financial funds causes the ability to leverage that into self-reinforcing advantages in other domains.

It is difficult to pose a starting point for what should be 'tackled' first, as all parameters seem to be intertwined. As such, we state that this is proof that a conceptual model of interacting parameters is required. An overview is needed to envision potential policies and how they could promote each other effect. We should avoid looking for one magical silver bullet to solving inequality, we require a strategy, for as economic inequality is not a single fight, it's an everlasting struggle.

Conceptual model's building blocks

We have reviewed four different domains. To complete the analysis for this chapter, we retrieved the following "building blocks" for our conceptual model.

Health

a. *Health – Financial Resources*

Because of economic inequality health is being affected (predominantly for the bottom of the socio-economic ladder)

b. *Health – Stratification*

Because of economic immobility stratification occurs which causes a negative impact on health

c. *Health – Opportunity Inequality*

Because of negative health, the possibilities in the job market are unequal

Democracy

a. *Democratic power – Stratification*

Because of economic immobility stratification occurs causing the possibility for the richest to ascertain their political dominance

b. *Democratic power – Financial Resources*

Because of economic inequality, the rich can turn economic power into democratic power

c. *Democratic power – Policy Approval*

Because of democratic power, the rich can favour policy adoption which is in their interest

d. *Democratic power – Unawareness*

Because of unawareness of the inequality occurring in society voting is not occurring which favours redistribution

e. Democratic power – Disconnection

Because of mistrust and disinterest in the political arena, the poor are voting less causing lower democratic power

Education

a) Education – Stratification

Because of stratification, the potential to gain certain educational outcomes is being prespecified.

b) Education – Income Inequality

Because of education, the opportunities to gain certain positions in the job markets are prespecified.

c) Education – Opportunity Inequality

Because of economic inequality, people (rich) can gain advantages in educational outcome.

d) Education – Mobility

Education increases mobility and can lift people out of their parents' class.

Economy

d. Financial Resources – Economic Growth

Because the lower portion of the distribution is lacking financial resource to buy goods and services, the economic growth gets hindered due to a loss in demand.

2 Quantifying inequality – How to define inequality?

Frequently outcries are made within the media about worsening wealth and income inequality. For example, almost daily there is an article published on the topic of Income Inequality in the New York Times (The New York Times, sd). The small portion of wealthy people is called the super-rich (Jones O. , 2022) or the top 0.01% (Gold, 2017), which is contrasted with reports on severe poverty. In a recent news article, it has been described that 100 million fell into poverty in 2021 while the top 0.01% gained 10% in wealth (Reuters, 2021). However, while these claims are made, how do we know that inequality is growing? How do we measure inequality and poverty? And how can we compare inequality, in both temporal and geographical notions?

In this chapter, we will attempt to answer such questions in two separate sections. The first section will discuss how data concerning economic inequality can be collected in general. The second section will discuss how economic inequality can be quantified to be used for analysis. After these two sections, we will conclude which notions are important for our framework and policy specifically.

2.1 Data collection

To review economic inequality data are required for analysis. However, datasets often have limitations in their manner of data collection. To be able to create a policy it is vital to know which data source is being used and what the limitations of the data source are. With regard to economic inequality, we can recognize three types of datasets that are commonly used (Alvaredo, Atkinson, & Morelli, 2016): .1 *Tax data*, 2. *Household surveys*, and 3. *List of large wealth owners*.

While we will discuss the data collection methods in each section, we should note that there are some general aspects which can complicate analysis regarding economic inequality. We will discuss the following set of remarks, but these are potentially non-exhaustive as we have not found an article which provided a complete overview of issues: 1. *purchasing power parity* and, 2. *undocumented wealth and income*

Purchasing power parity

The monetary value of a single dollar is not the same in each country. While one can use the official exchange rates to convert between different currencies, the official exchange rates do not represent the differences in the "purchasing power" of these currencies. A strong example is shown by Cole (2014). In Oakland, the median household income is 51.683 dollars, which is relatively close to the national average of 53.046 dollars in the U.S. in 2014 (2.6% lower). However, the regional purchasing power parity is 123.5, i.e., the region is 23.5% more expensive than the national average, which implies that the purchasing power represented by the 51.683 dollar income is only 41.849 dollars in comparative values (being 21.1% lower). This is important to realize as variance in income will be measured, but without adjusting for purchasing power between those regions it can lead to false conclusions. In this thesis, we attempt to review inequality within the Netherlands, which will limit the effect of purchasing power parity, but when reviewing international differences, it is essential to adjust for this parameter.

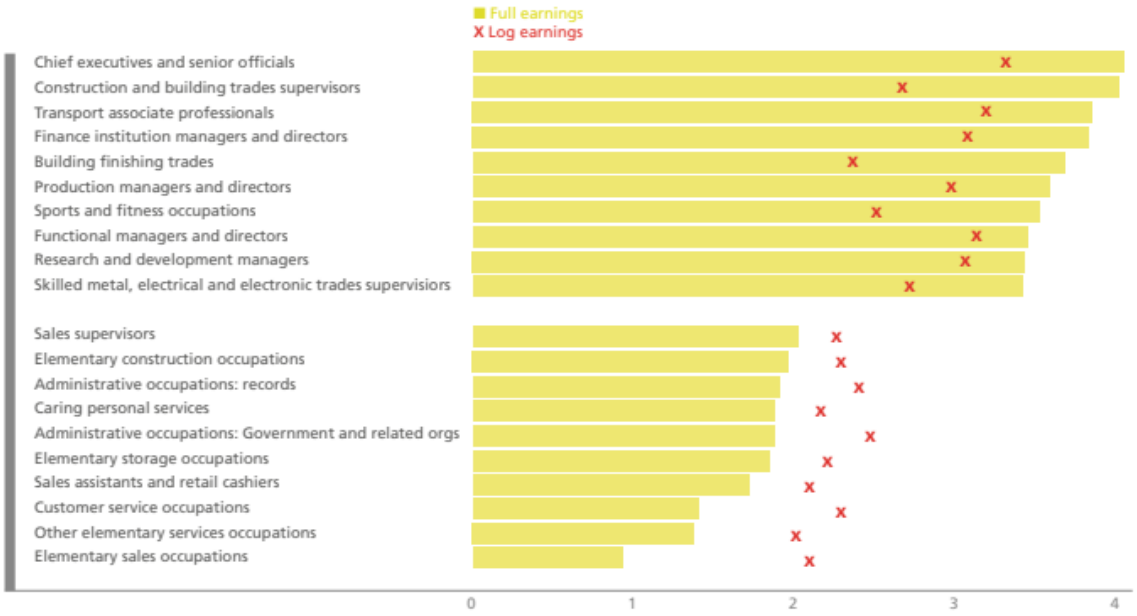

Figure 19 Difference in monetary and non-monetary earnings for various jobs. *Note: Cross indicates monetary earnings and the bars indicate total earnings when adding non-monetary earnings. The upper group indicate jobs that have higher returns due to positive non-monetary earnings, bottom group indicate jobs that have lower returns due to negative non-monetary earnings. Data has been obtained from the Annual Population Survey. This figure has been obtained from* **(Clark, Cotofan, & Layard, 2021)**.

Undocumented wealth and income

We can only measure income and wealth if the value of the income or wealth can be translated into a monetary value. Often income and wealth are present in a monetised form, but this is not always the case. For example, bartering is being used by companies to hide price discrimination between transactions (Magenheim & Murrell, 1988). However, the barter and trade industry seems to be relatively small with a trading volume of 12-14 billion dollars over 2022 (The International Reciprocal Trade Association, sd), which is not even getting close to being 1% of the GDP, i.e., U.S. GDP was 20.95 trillion in 2020 (The World Bank, sd). Another issue regards the valuation of (illiquid) assets, which are infrequently traded, have larger bid-ask differences, and greater price volatility. Examples of these types of assets are real estate, cars, antiques, and arts (Majaski & Potters, 2021). As the actual value of illiquid is difficult and costly to assess in value, they also become more easily to be used for tax evasion (Joint Research Centre, 2019).

The previously mentioned issues concern assets, however, documentation can also become an issue for income. This can take shape in the form of undeclared work, i.e., lawful paid activities which are no declared with official authorities (European Commission), or non-monetary compensation (amenities) for labour. For example, labour can be (partly) paid in the form of housing which is common practice for au pairs. However, non-monetary compensation also occurs with high-income jobs in various forms. There are indications that there are positive correlations between monetary and non-monetary compensation (Clark, Cotofan, & Layard, 2021), as shown in Figure 19. As such, Clark et al. state that for both the US and the UK the labour market is more unequal than monetary earnings would indicate. It would be unwise to underestimate the size of undocumented income. For example, the IMF estimated that the OECD countries had 14-

16% of their GDP between 1988-2000 to be performed as the shadow economy, also called parallel economy, and is undocumented (Schneider & Enste, 2002). The absence of documentation causes problems for crafting adequate policies as jeopardizes informed decision making.

Tax data

Taxation is the oldest form of creating financial data in history. It dates back as far back as the start of historic times when pharaohs imposed taxation upon farmers in 3000 B.C. (White, 2002). Throughout history, it has been a financial resource to obtain revenue for the government but since the industrial revolution, it is also used to estimate the wealth and income of the people. Until the 1960's taxation data was the primary data input to estimate economic inequality in the United Kingdom (Davies & Shorrocks, 1999).

For example, pension funds are often exempted from taxation (Cole, 2014). This has been 'justified' as pensions represent social security, but also pension funds cannot be controlled by the entity, i.e., it is not possible to extract wealth out of pension fund and as such to react upon taxation. The missing data are not only limited to missing assets and income sources but also complete entries of taxation data for a person can be missing. In India only slightly over 6% of the population pays taxes which means that via tax collection data the other 94% of the population remains unmeasured (Alvaredo, Chancel, Piketty, Saez, & Zucman, 2018). Having an incomplete dataset can cause misinterpretation of economic inequality within that society.

The income and wealth which is not being taxed, i.e., the missing data, are not uniformly distributed amongst the whole population. The wealthy population has the highest incentive to avoid taxation as they are impacted the most severe. This effect is highlighted by Zucman (2014) estimating that about 8% of the global wealth is within tax havens and 6% of the global wealth is hidden. It is estimated that 3% of the tax income within Europe is missed due to tax evasion, as seen in Figure 20. Moreover, the number of people using offshore accounting is dwindling but their wealth is increasing creating a skewed advantage of offshore accounting for the super-rich – for example, within Switzerland offshore accounting is available for agents with more than 50 million euros

	Offshore wealth ($ billions)	*Share of financial wealth held offshore*	*Tax revenue loss ($ billions)*
Europe	2,600	10%	75
United States	1,200	4%	36
Asia	1,300	4%	35
Latin America	700	22%	21
Africa	500	30%	15
Canada	300	9%	6
Russia	200	50%	1
Gulf countries	800	57%	0
Total	**7,600**	**8.0%**	**190**

Figure 20 Offshore financial wealth. *Note: Wealth includes only financial assets (equity, bonds, mutual fund share, and bank deposits). Lost tax revenue is based upon the evasion of personal income and wealth taxes. Results are obtained by the article's author's calculations. This figure has been obtained from Zucman* (Zucman, 2014).

of wealth (Saez & Zucman, Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data, 2016).

In essence, the notion of escaping taxation is mainly a practice performed by the rich (Alstadsaeter, Johannesen, & Zucman, 2018). While there is the certainty that data are missing, we are unaware of the size of the missing data. However, up to 32 trillion dollars of offshore wealth is potentially being missed from calculations (Shaxson, Christensen, & Mathiason, 2012). Not only do tax evasion and avoidance deprive tax revenue, but it is also described as violating human rights and causing extreme poverty (International Bar Association's Human Rights Institute, 2013). While these damaging effects are occurring, the authorities are vigilant to attempt to avoid tax evasion. One important implementation has been the Automatic Exchange of Information (AEOI) on taxation. In 2018 approximately 4.9 trillion-euro worth of financial accounts were being tracked by this system, hampering tax evasion possibilities of these accounts (OECD, 2019). As such, these attempts have contributed to "finding" 1/7th of the missing wealth.

For income tax data it is important to realize that income can be measured during several stages of the taxation process. As such, there are at least three important types of income that can be reviewed (Stone, Trisi, Sherman, & Beltran, 2020):

Market Income: all income accrued by labour and capital
Total income: market income + social benefits
Disposable income: total income - taxation

The various forms of income are important as government intervention often has a redistributive nature by which inequality of (market) income gets reduced. For example, the analysis performed by Piketty was based upon market income which omits any of the redistributive policies at hand (Piketty & Saez, 2003). While in contrast, the claim that the Netherlands is one of the most equal states worldwide is based upon income after taxation. When reviewing the market income, the Netherlands is much more unequal and is certainly not at the frontier of equality (Berg, Ostry, Tsangarides, & Yakhshilikov, 2018), as shown in Figure 18.

Moreover, taxation data are acquired once a year and provide a snapshot of income and wealth for that specific year for the whole total population. As such it provides a vertical comparison of the whole population, i.e., within the dataset both a young student and an older experienced worker are included. Therefore, the inequalities measured are partially also "fair" in nature as it resembles a difference in age/experience (Cole, 2014). As an example, a medical student has zero income, while his future expected income will be much higher than the national average income. This effect is mentioned in the "Life-cycle theory" which was developed by Modigliani (Modigliani, 1966); this theory will further be explained in section Chapter 3.

While taxation covers (almost) the whole population and creates large amounts of detailed data, its primary goal is to obtain income for the government. The collected data are a side effect of taxation, which was never intended to create a database to estimate income and wealth distributions (Cole, 2014).

Household surveys

Whereas tax data generates income and wealth distributions through sampling large portions of the population, household surveys attempt to generate income and wealth distribution via sampling. The general idea is that household surveys can generate more complete data sets as t can also include undocumented (untaxed) assets and income, but also give more data concerning household size, job occupancy, and other secondary parameters (United Nations Statistics Division, 2005). However, collecting survey data is time demanding and is, therefore, an expensive form of data collection. Therefore, only small subsamples of the population are used to decrease the costs of data sampling (OECD, 2013). Moreover, household surveys have their own issue, i.e., the following two types of errors complicate the generated data (Banda, 2005):

1. Sampling errors

A sampling error is a mistake of viewing the result of the questions asked in the sample to be equal to the results which would have been obtained when sampling the whole population. This type of error is influenced by the size of the population sampled and the effect of random sampling.

2. Non-sampling errors

The other type of error, non-sampling, is the combination of all kinds of errors which leads to the fact that the result obtained does not equal the result for the whole population investigated. For the field of household surveys, the following five are the most important (Biemer & Lyberg, 2003):

I. Specification error

This error is caused by an ambiguous line of questioning. A question such as "Did you complete school?" is open for interpretation as it could mean middle school, high school, college, or university. Depending on one's interpretation of what is meant the question will be answered differently and no accurate data is obtained from the question.

II. Frame error

When creating a survey, the targeted population can differ from the population which needs to be sampled, which can be both too large or too small – with the latter being a non-coverage error.

III. Non-response error

The surveys within the targeted population can either be partially or completely non-answered. The combination of non-response and a frame error, i.e., non-coverage error, is called a non-observation error.

IV. Measurement error

This type of error can be subdivided into four aspects:

a. Questionnaire: This is the overarching visual aspect of the survey and the choice of words that can affect answering.
b. Data-collection method: How the survey is being taken, it can be done via paper, electronically, in person, or own diary

c. Interviewer: The interviewer can create biases in answering questions by the manner of questioning and his presence while answering private questions
d. Respondent: Answers are dependent on social background and educational differences

V. Processing error

The acquired data needs to be processed to obtain a result that can be interpreted. Errors can for example occur with faulty data handling, computational errors, and data editing.

A limitation of the surveys is the inability to capture the extreme ends of the wealth and income spectrum. As explained by the OECD (2013) the very poor have no interest in answering wealth surveys as they have next to nothing to declare. On the other side of the spectrum, the very wealthy avoid giving details about their financial status, or give inaccurate information, as it could be counter beneficial to evade taxation and/or gain unwelcome attention. It has been shown by Vermeulen (2014) that non-response error is positively correlated with wealth, and this causes a downward effect on the wealth distribution. Another example is that a high percentage of those who said they held business assets failed to provide an estimate of the value of such assets (Daffin, 2009). Essentially, the core weakness of surveys is that there is no legal obligation to answer the questionnaire (correctly) mainly affecting the end of the distribution.

Besides the issue of inaccurate answers, the very wealthy are a small niche of people who have small odds of being sampled when using random sampling. This, in combination with the non-response error, can create an underrepresentation of this group. To counter underrepresentation, it is possible to use oversampling. To do this correctly a second database can be used to estimate the size of the oversampling required (Kennickell, 2008), for the super-rich this his can be done by using taxation data (Eckerstorfer, et al., 2015). However, the European Central Bank (ECB) and Household Finance and Consumption Survey (HFCS) have attempted to use such an oversampling strategy for household surveys across various EU nations but seemed to be ineffective to compensate for the non-responder error (Vermeulen, 2014). It was noted by a member of the Federal Reserve that the Survey of Consumer Finances (SCF) was not designed to capture the top 0.5% of the wealth distribution and purposely excludes members of the Forbes 400 list (Wolff E. W., 2017). Overall, the design of the surveys causes the inability to capture the wealthiest amongst the population. According to the recent research of Yonzan et al. (2021), this inability only holds for the top 1%, the remaining 99% can adequately be captured by household surveys.

List of large wealth owners

The “super-rich” is a specific and important niche when evaluating wealth and income inequality. This is caused by the fact that this small group of people own large amounts of wealth. For example, it is estimated that the richest 1% of the US population owns 1/3rd of the total wealth (Kennickell, 2008). In previous paragraphs concerning taxation data and surveys, data problems were highlighted concerning the hiatus in data of the super-rich. The super-rich tends to avoid supplying information concerning their wealth either due to financial and fiscal reasons or because they attempt to avoid attention to their persona. However, for analysis of wealth distributions, the omission of the super-rich and their large wealth would hamper proper analysis. It is therefore of interest to

gain more detailed knowledge about their financial status to be able to effectively create policies that affect them.

Luckily there are a few organisations, such as Forbes and Quote, which analyse the "super-rich" intensively. While these lists originally were created for entertainment reasons, their existence gives vital information for current wealth and income distribution analyses. The list (partially) fills up the data gap which is retrieved from surveys. Vermeulen (Vermeulen, 2014) shows the largest wealth owner included in a survey and the poorest large wealth owner investigated in a list of large wealth owners, this is visualized in Figure 21. Mostly, a large gap in wealth remains when combining these two data sets, where Belgium has the largest gap with wealth owners between 8 and 1920 million not being documented (Vermeulen, 2014).

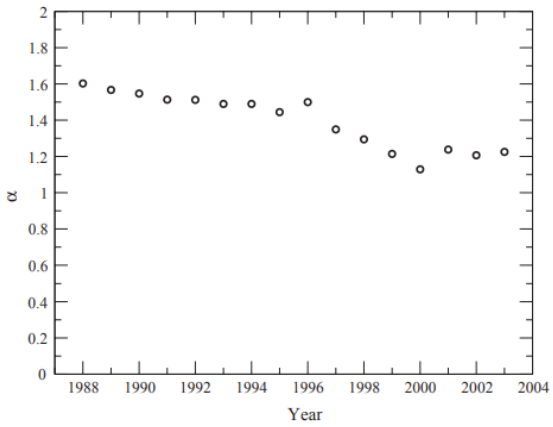

Figure 22 Pareto value across time. *Note: Pareto values (y-axis) are obtained by applying a Zipf analysis on data from the Forbes 400 list between 1988-2003 (x-axis). This figure has been obtained from* **(Klass, Biham, Levy, Malcai, & Solomon, 2006)**.

However, even with this gap in data estimations can be made due to an interesting phenomenon discovered by Pareto in 1897. He showed that the richest wealth owners seem to follow a mathematical distribution which later has been called the Pareto distribution (Pareto, 1897). He found that the wealth of a specific member can be expressed by the following function of the wealth of the richest person (A), the rank number (r), and the Pareto variable (α)

$$w_r = A * r^{-\frac{1}{\alpha}}$$

The usefulness lies in the extrapolation, for example, in the recent work of Blanchet et al. (2021)they state that they can estimate the wealth of the top 5% with 3% accuracy using (only) 100.000 data entry points. Interestingly, the Pareto variable does not seem

	Maximum wealth SCF/HFCS	Minimum wealth Forbes
US	806	737
Germany	76	818
France	153	810
Italy	26	893
Spain	409	780
Netherlands	5	958
Belgium	8	1920
Portugal	27	1110
Austria	22	1560
Finland	15	958

Figure 21 The gap between SCF/HFCS's maximum and Forbes' minimum recorded wealth. *Note: The results are based upon the article's author's calculations. This figure has been obtained from* **(Vermeulen, 2014)**.

to be constant in time. Klass et al. (2006) analysed the data from the Forbes list 400 between 1988 and 2003 and found that the Pareto variable decreased over time which indicates an increasing inequality, as shown in Figure 22. The specific distribution of 2003 is shown in Figure 23 using a Zipf's plot (log-log plot) from which a Pareto variable of 1.22 can be found. What is puzzling about this distribution is that skill and ability mostly follow a Gaussian distribution, such as IQ with the norm at 100.

Therefore, if skill and ability would directly correlate with wealth it could not follow a Pareto distribution. Various research has been performed to explain this phenomenon with the primary outcome that wealth for the richest persons is based upon chance instead of skill (Levy, 2003).

However, the outcomes of the analyses of Forbes are seeming not 100% accurate and mistakes are made when estimating wealth. For example, in research comparing tax data to the Forbes list, it was found that there were 26 individuals who upon death appeared to have enough wealth to enter the Forbes 400 list but had no entries (Raub, Johnson, & Newcomb, 2010). Upon analysing the data, it appeared that approximation mistakes were made when estimating the dispersion of wealth amongst the family. Another mistake more frequently made was estimating the wealth coming from creative endeavours. It can particularly be difficult to estimate the value of a creative asset, such as a painting, and price discovery only occurs when the commodity is traded. Thus, estimating the Pareto variables based on the Forbes list will most presumably underestimate the wealth owned by the wealthy and the extrapolation will be an estimation but not a perfect fit. The Pareto model has been adopted and adjusted by various authors, more recently an improved version has been described by Blanchet et al. (2021). However, for this thesis further evaluation of this specific alteration is regarded to be beyond the scope of analysis.

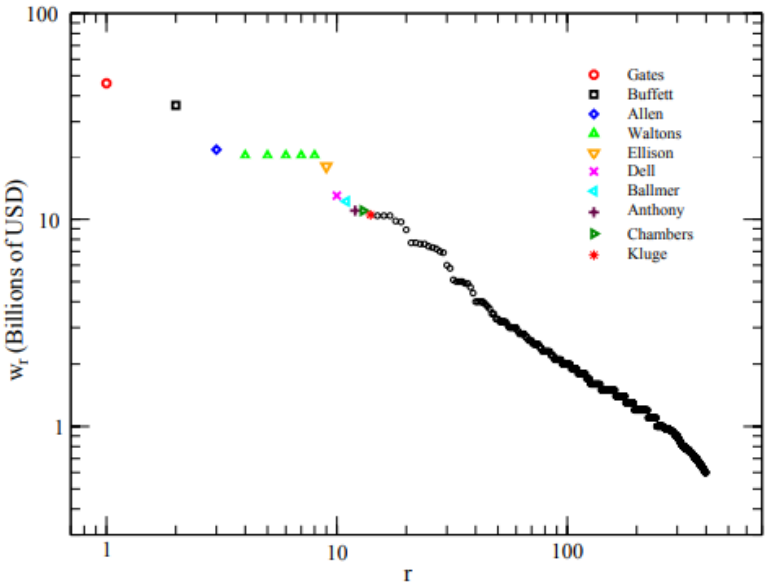

Figure 23 Zipf plot. *Note: Data has been obtained from Forbes 400 in 2003. Wealth and rank are plotted on a log-log scale. A Pareto exponent of 1.22 has been found for ranks between 10 and 400. This figure has been obtained from* **(Klass, Biham, Levy, Malcai, & Solomon, 2006)**.

2.2 Quantification

This section will discuss how data can be translated into the quantification of economic inequality. A common method is translating measurements and graphs into a single distribution value, i.e., a numerical figure which represents the measure of inequality for the reviewed system. The elegance behind these indices is that a complex system becomes summarized into a single comprehendible value which enables cross-country comparison and measures the impact of policies (Department of Economic and Social Affairs, 2015). However, the large drawback to these indicators is that they are precisely just that, they are a single value. Trying to capture a whole economy and the inequalities present within that country drastically simplifies the dynamics of that country and possible does injustice to the whole complexity (McGregor, Smith, & Wills, 2019). Nonetheless, inequality parameters are widely used and therefore require our attention as they will pass by more frequently than not in inequality analyses.

While there is a wide variety of indices, there are four main conditions to which all indices must comply (Costa & Perez-Duarte, 2019):

1. *Anonymity*

The owner of the measurement should not have an impact on the outcome of the metric.

2. *Scale independency*

The inequality should not be affected by the magnitude of income or wealth; for example, if an economy has twice the income (on average per person), or uses a different currency, the metric itself should not be influenced.

3. *Population independence*

The inequality should not be dependent on the size of the population measured.

4. *Pigou-Dalton transfer principle*

The transfer of measurement from a rich person to a poor person should at least not increase the metric, but preferably decrease the metric.

Beyond these four main principles, Costa & Perez-Duarte (2019) state that it is beneficial for an indicator to be decomposable. This means that a population can be decomposed into various sub-groups, but the addition of all these sub-groups leads to the same value as when the whole group is analysed as one group.

To set boundaries to the scope of analysis, as Coulter could find over 50 indices that measure inequality (Coulter, 1989), we will limit ourselves to indices that evaluate monetary differences in economic inequality. In this category we recognize four different families of indices that require our attention:

1. Family of Lorenz indices
2. Family of generalized entropy indices
3. Family of ratio indices
4. Family of poverty indices.

While we will discuss the various families in each section, we should note that there are some general aspects one should be aware of. These general remarks relate to the following aspects: 1. relative and absolute differences, and 2. database inconsistencies.

Relative and absolute differences

An important distinction to be made is the difference between relative and absolute differences. This is most clearly explained by providing an example: person A owns 10.000 euros and person B owns 20.000 euros, in this scenario person B owns 2 times as much as person A. When person A gains 10.000 euros (total of 20.000 euros) and person B gains 15.000 euros (total of 35.000 euros) then person B owns 1.75 times as much as person A. In this scenario, we have a decrease in relative inequality (person B owns a factor of 1.75 more instead of 2) but have an increase in absolute difference (person B has gained 5.000 euros more than person A).

Atkinson et al. (Atkinson & Brandolini, On Analyzing the World Distribution of Income, 2010) demonstrate that relative inequality seems stable in the last 50 years, but absolute difference increased dramatically, as shown in Figure 24. This becomes even more complex when taking note of the fact that the poverty headcount decreased in the same period. The important lesson to be learned is that various indices measure different aspects. An index cannot measure these aspects within a single value. Therefore, when reviewing a certain index, we must be aware of what it represents and preferably use various indices simultaneously.

Database inconsistencies

We have already mentioned that there are various forms of obtaining data, but we did not discuss the already present abundance of institutions that attempted to create large databases of information regarding economic inequality. This is important because there is a large debate and uncertainty about which database is superior to the other. As neatly described by Galbraith, it is not easy to investigate the various databases. The widely supported Luxembourg Income Study Database (LIS) is regarded as one of the top tier databases due to its thorough investigation of data. However, due to their thorough investigation, the database is mostly limited to developed countries as developing

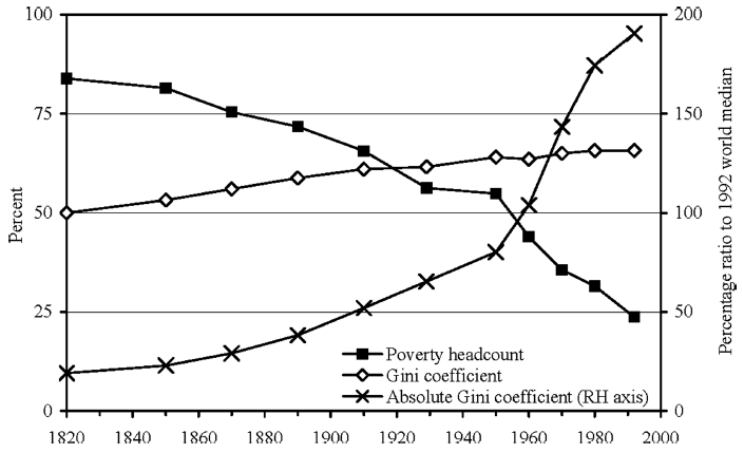

Figure 24 Different perspectives for different indices. *Note: Progression of poverty headcount, Gini index, and absolute Gini index between 1820-1992. This figure has been obtained from* **(Atkinson & Brandolini, On Analyzing the World Distribution of Income, 2010)**.

countries cannot provide detailed economic information (Galbraith, 2019). In essence, when reviewing a large database, one needs to be aware of which kind of data they use and how they process that data. Inequality statistics should not be regarded as "holy grails" of information without any bias.

Moreover, Roantree & Shaw (2018) found that the Gini coefficient for inequality was reduced by a fifth if one would analyse household survey data over a span of 18 years instead of an annual analysis.

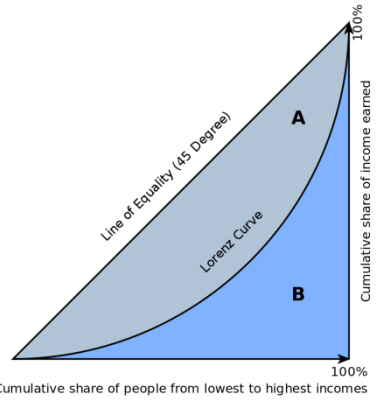

Figure 25 – Example of a Lorenz Curve *Note: This figure has been obtained from* (Wikipedia, sd).

Family of Lorenz indices

The family of Lorenz indices use the Lorenz Curve as the basis for their calculations. This curve was formulated in 1905 by M.O. Lorenz (1905). In basic principle the Lorenz curve is a per cent-per cent (P-P) plot that evaluates two cumulative distribution functions, a theoretical plot is shown in Figure 25. Having perfect equality would mean that for every additional person the same share in the total is added, which results in the "line of equality". In the scenario of perfect inequality, everything is owned by just one (super-rich) individual; this would be depicted as a straight horizontal line at the far right end of the curve with one entry who owns everything.

While in essence there are no restrictions to what is being plotted, the functions are normally income or wealth on the y-axis and individuals on the x-axis. Problematic to the Lorenz curve is illustrative for the distribution of a certain quantity, it is not easily comparable with other Lorenz curves. Various indices tried to solve this issue and translated the Lorenz curve into an index but to attempt to keep this thesis compact we will only discuss the most famous one, i.e., the Gini index (Eliazar & Sokolov, 2012).

Gini index

A widely used inequality measure is the Gini index, named after the economist Corrado Gini, who formulated the coefficient in his book "Variabilità e Mutuabilità" in 1912

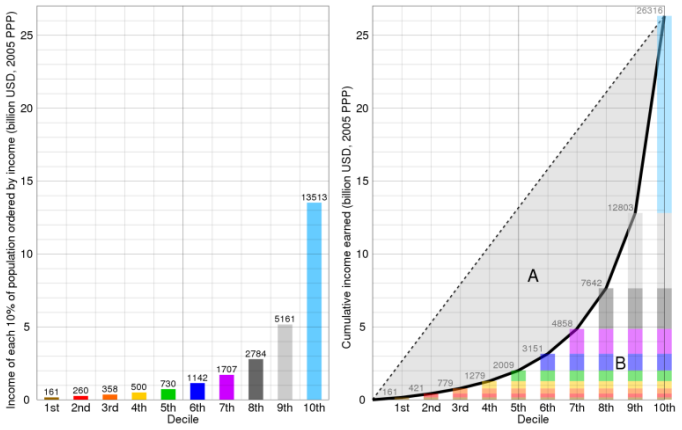

Figure 26 – Practical example of the Lorenz curve and Gini calculation. *Note: This figure has been obtained from* (Wikipedia, sd).

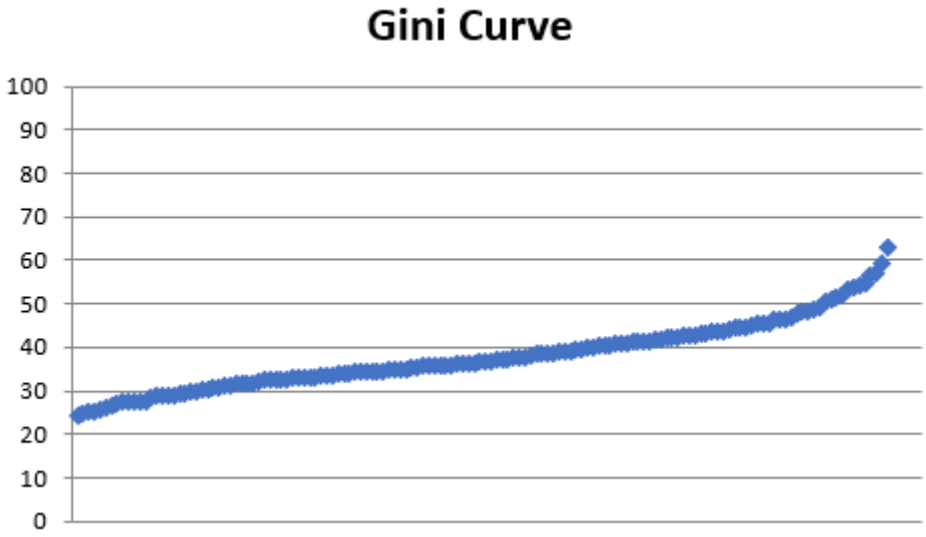

Figure 27 Gini Index value from all countries *Note: The results are obtained using data acquired from the World Bank database in 2022* **(World Bank, sd)**. *Gini Index is ordered ascendingly along the x-axis. rank from low to high along the x-axis.*

(Ceriani & Verme, 2011). He developed a 'translation' of the Lorenz curve by dividing the surface size beneath the Lorenz curve by the surface beneath the perfect equality line – i.e. A/(A+B) which equals A/0.5 or 2*A, shown in Figure 26. The index has a value between 0 – perfect equality – and 1 – perfect inequality. Perfect equality is
acquired when everyone has exactly the same value while perfect inequality is acquired when everything is owned by 1 person. The Gini index conforms to all four main principles but does fail to comply with decomposability. Thus, when a group is divided into two groups, the average Gini index of those two groups will not be the same as the Gini index of the group as a whole.

A drawback to the Gini Curve is that it is more sensitive to transfers to the middle than compared to the tails. This has the consequence that policies aimed at the Gini Curve will have more benefit from helping the middle class than the lower class. (Atkinson A. B., 1970). Upon viewing different portions of the population across the globe one finds that the middle class has a stable portion of the economy, which is visualized in Figure 27. The stability of the portion of income for the middle class has the important consequence that the Gini Curve value is limited to roughly a maximum of 0.6 (Palma, 2011). The combination of the statements of Atkinson, sensitivity to the middle portion, and Palma, stability of income of the middle class, means that differences in the Gini curve tend to be somewhat limited. This can be seen in Figure 27, in which the Gini index of all nations collected in the World Development Indicators of the World Bank (WDI) has been plotted.

To obtain a grasp of the range of the Gini index we calculated the global characteristic and found that the average is 0.377 (+/- SD: 0.079)[4], with the lowest value being 0.242 (Slovenia) and the highest value being 0.630 (South Africa).

While these figures create a distinct difference between different countries when plotted these differences can be difficult to be evaluated. In Figure 28 the Lorenz Curves of various countries have been plotted and differences are apparent, but the immediate interpretation could be difficult. This especially occurs when various curves are crossing,

[4] This has been calculated by the authors using data from the World Bank (World Bank, sd)

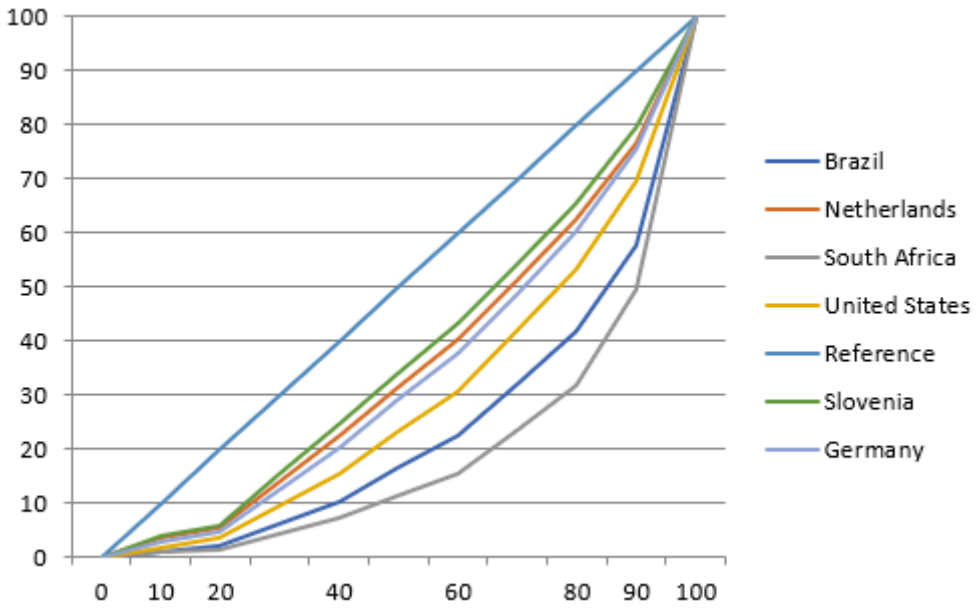

Figure 28 Example of Gini curves for selected countries. *Note: The results are obtained using data acquired from the World Bank database in 2022* (World Bank, sd).

it is possible to have the exact same Gini Value while the distributions are differing by crossing Lorenz Curves. Moreover, interpreting Gini indices is difficult when knowing that the bandwidth of the values is rather limited when reviewing all countries in the world, as shown previously in Figure 27.

Family of generalized entropy indices

Generalized entropy (GE) indices are a special family of inequality indices that analyses the 'randomness' of a distribution (Eliazar & Sokolov, 2012). The power of GE indices is that they both conform to the four main principles of the inequality indices and the decomposability principle (Costa & Perez-Duarte, 2019). Thus, the value obtained from a GE index can be decomposed into smaller groups from which the various GE indices will combine into an overarching GE index for the whole group. These specific attributes are unique for the generalized entropy indices, as such, they are the

only family of inequality indicators that comply with all principles (Cowell, 2011). The mathematical principle of the GE indices is based on the principles of Shannon's information entropy. The general mathematical formula for the GE indices is as follows

$$GE(\alpha) = \begin{cases} \frac{1}{N\alpha(\alpha-1)}\sum_{i=1}^{N}\left[\left(\frac{y_i}{y}\right)^{\alpha}-1\right] & \alpha \neq 0,1 \\ \frac{1}{N}\sum_{i=1}^{N}\frac{y_i}{y}\ln\left(\frac{y_i}{y}\right) & \alpha = 1 \\ -\frac{1}{N}\sum_{i=1}^{N}\ln\left(\frac{y_i}{y}\right) & \alpha = 0 \end{cases}$$

N is the number of identities, y_i is the income for identity *i*, y is the mean income of all *i*'s, and α attributes as a weight factor to indicate the importance of large incomes. When α is high one puts a large weight on high income whereas a low α puts a large weight on low incomes. There are two specific cases for the GE index:

- α = 0: This specific case is called the mean log deviation measure, sometimes also referred to as Theil's L index
- α = 1: This specific case is called the Theil's T index
- α = 2: This specific case is called the squared coefficient of variation

In general, the GE index adheres to the following properties:

1. The minimum value equals 0, this shows perfect equality
2. The maximum value equals ln(N), thus being open bounded
3. The sum of values is always positive
4. Decomposition of an analysed system can cause that separate sub-systems have a negative value, however, the sum of all sub-systems is always positive
5. Moving towards 0 always goes slower than moving from it.

The unique capability of decomposition means that inequality can be measured between and within sub-systems (Cowell, 2011). This creates a larger array of opportunities when attempting to determine the source of inequality in a system. An example of geographical and, between and within the analysis of inequality will be given in the following section on the Theil index.

Theil index

The Theil index has been formulated by Henri Theil (1967). As mentioned, the Theil index is a specific case of generalized entropy index with α being 1, giving:

$$GE(1) = \frac{1}{N}\sum_{i=1}^{N} \frac{y_i}{y} \ln\left(\frac{y_i}{y}\right)$$

The power of Theil indices is its decomposability and analysing sub-systems. An example of such an analysis based upon geography is shown in Figure 29. In this analysis geographical dispersion of contribution to the inequality within the USA is visualized. It becomes apparent that the highest contributions derive from the coastal areas of the USA and some other urbanized areas. Knowing where the deviations are occurring, one can perform a more in-depth analysis that could form the basis for formulating potential

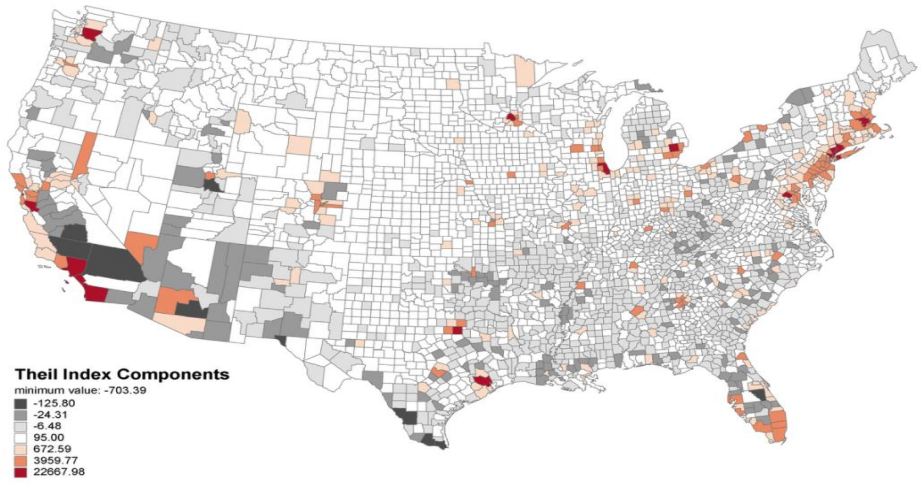

Figure 29 Decomposition of Theil's T for the US in 2004. *Note: This figure has been obtained from* **(Wikipedia, sd)**.

policies which are focused on those specific sub-populations. However, the decomposition analysis shows the relative contribution to the overall inequality. While the relative contribution to inequality may be limited, it does not exclude the possibility of the occurrence of inequality within the specific sub-system. It requires between and within-group analysis to be aware of this potential interference. The analysed areas should be comparable in size to create unbiased results (Novotný, 2007).

On the matter of between and within-group analysis, we would like to show the analysis performed by Novotny (Novotný, 2007). To be able to perform a between and within-group analysis of a system the generalized entropy formula (keeping α=1) needs to be expanded:

$$T = B + W = \left(\sum_{j=1}^{k} \frac{n_j}{n}\frac{y_j}{y}\ln\left(\frac{y_j}{y}\right)\right) + \left(\sum_{j=1}^{k} \frac{1}{n}\frac{y_j}{y}\sum_{i=1}^{n_j} \frac{y_{ij}}{y_j}\ln\left(\frac{y_{ij}}{y_j}\right)\right)$$

In this formula, the unit of analysis is composed of k regions, where n_j corresponds to the population size of the jth region, y_j the mean income of the jth region, and y_{ij} to the income of an individual in the jth region. In such a formulation B corresponds to the inequality attributed between the regions and W corresponds to the inequality within the region. Novotný (2007). calculated the Theil index for the group of several nations (using decile data from the World Bank). The results are shown in Figure 30; note that one can differentiate between the contributing factors to global inequality. The exact value is of less importance, the main interest is in the fact that one can distinguish where inequality is occurring, within or between systems. As Novotny mentions, on a global scale "inequality-between subsystems" has a larger contribution to global inequality, while on a national level the inequalities are more frequently within subsystems (Novotný, 2007).

Atkinson's Index

Atkinson's index is developed by Anthony Atkinson in 1970 as an answer to fallacies he found in other inequality measures (Atkinson A. B., 1970). While the Atkinson index is not directly related to the family of the GE indices, it can be proven that its transformation is directly related to the family of GE indices. As such, it is discussed as a branch of the family of GE indices and also has the same advantages, i.e., adhering to all principles, as the other GE indices. The (none-transformed) Atkinson index is calculated using:

$$A = \begin{cases} 1 - \frac{1}{y}\left(\frac{1}{N}\sum_{i=1}^{n} y_i^{1-\varepsilon}\right)^{\frac{1}{1-\varepsilon}} & 0 \leq \varepsilon \neq 1 \\ 1 - \frac{1}{y}\left(\prod_{i=1}^{N} y_i\right)^{\frac{1}{N}} & \varepsilon = 1 \end{cases}$$

The core aspect of the Atkinson index is that it measures the difference between the income of the low earning population to the mean of the population, for which it is normalized to run from 0 to 1. The fallacy he wanted to solve is the input of aversion to inequality, he did this by adding ε which can run from zero to infinity. At ε = 0, there is no aversion to inequality and the Atkinson index will always be 0. At ε = ∞, there is an absolute aversion to inequality by which the lowest income, i.e., closest value to 0, will dominate and thereby the Atkinson index will limit to 1. An important feature of the

	Estimates of within-region inequality ($W' = T' - B$)		
	Low $W' < 0.150$	Medium W' (0.150, 0.300)	High $W' > 0.300$
Low regional inequality $B < 0.015$	*Sweden, Netherlands, Norway, Austria, Denmark*	USA, Australia, Japan, Canada, UK, Switzerland, France	**Senegal**
Medium regional inequality B (0.015, 0.059)	*Finland, Germany,* Spain, Poland, Czech Republic, *Belgium*	Ireland, Italy, China	**Paraguay, Madagascar, Bolivia,** Uzbekistan, Russia, **Nepal, Egypt, Mexico,** Argentina
High regional inequality $B > 0.060$	*Hungary,* India, Estonia, Kyrgyzstan	Vietnam, Indonesia, **Thailand, South Africa**	Peru, **Chile,** Niger, **Sri Lanka,** Philippines, **Brazil,** Kazakhstan

Figure 30 Analysis of intra- and interregional inequality for various countries. *Note: The grouped countries within a specific structure of inequality are sorted ascendingly according to their B value. Countries in bold have T' > 0.500 (high inequality) and countries in italics have a T' < 0.150 (low inequality). This figure has been obtained from* (Novotný, 2007).

Atkinson index is that it can adjust the weight of importance to the difference between low income to the mean income, but it is not capable of evaluating the mean to the highest incomes.

Another interpretation of the aversion to inequality parameter is that it resembles the price one is willing to pay to achieve equality. This aspect can be explained using Figure 31 where the y- and x-axis represent the income of two individuals. The dotted line represents equal income between the two. We start at A, a situation where y_2 has more income than y_1, and we want to achieve equality between y_1 and y_2. In the case where we have no aversion to inequality, i.e., ε=o, we can achieve equality by drawing a line perpendicular from A to the line of equality. We will hit point B and have achieved equality by a simple transfer of income without causing change to the total income, i.e., the sum of y_1 and y_2 is the same at point A as at point B. If we have a form of inequality aversion, i.e., $\varepsilon > 0$, the perpendicular line will transform into a concave line and equality will be at point C. However, at point C the sum of y_1 and y_2 is lower than at point A thereby obtaining a lower total income within the system. Thus, we were willing to sacrifice a certain amount of total income to obtain equality. This sacrifice becomes the largest when ε limits to infinity. In that case, the 'redistribution' of income is achieved by subtracting income from y_2 such that it becomes equal to y_1, i.e., equality is obtained by removing all surplus income that is higher than the lowest income in the system without redistributing it (Bellu & Liberati, 2006).

Viewed from the willingness to pay to obtain equality it becomes clear that the limiting cases, i.e., zero and infinity, will never be socially applicable. Zero will not be possible because there are costs linked to redistribution, thus equality without costs is not possible. Infinity is also undesired as this would mean the removal of income without any benefits to other entities in the system, only having 'losers' in a system will never obtain political traction. This leaves an arbitrary judgement as to which value of ε is preferred, i.e., what are we willing to pay for equality? In the article of Atkinson et al., there are various values used, but the values range from 0.125-2, thus staying far from 'infinity' (Atkinson & Brandolini, On Analyzing the World Distribution of Income, 2010). It is not possible to mention that there is one 'good' value for the parameter. It is highly dependent on various factors which differ per country. Lambert et al. show that the aversion to inequality parameter for society is dependent on politico-socioeconomic factors

Table 1 Characteristics of the 10:10 ratio and the 20:20 ratio. *Note: The results are obtained using data from the World Bank only including data points after 2010* (The World Bank, sd).

	20:20	10:10
Mean	7.8 (+/- 4.1)	14.0 (+/- 9.3)
Median	6.6 (IQR: 5.2-8.7)	10.9 (IQR: 8.2-15.7)

Table 2 Characteristics of quintile and decile ratios for a subset of countries. *Note: The results are obtained using data from the World Bank only including data points after 2010* (The World Bank, sd).

Country	20:20	10:10
Lowest score	*3.4 (Slovenia)*	*5.0 (Slovenia)*
Netherlands	4.3	6.7
Germany	5.2	8.5
United States of America	9.2	17.9
Brazil	18.8	42.5
Highest score	*28.4 (South-Africa)*	*56.1 (South-Africa)*

such as economic inequality, female equal rights, capita growth, and GDP per capita (Lambert, Millimet, & Slottje, 2003).

Family of ratio indices

A different family of indices is that of the ratio indices. They are largely common due to their intuitive nature. When stating that the top 10% earn 10 times as much as the bottom 10% then it becomes better to grasp its meaning when compared to a Gini Index value of 36 or an Atkinson Index value of .60. In essence, their strength lies in the fact that it is an interpretable value by itself, while other indices mostly acquire meaning only when compared to another entity. There are various ratios which can be used, but the most used are the top-bottom ratios and the Palma ratio, which we will discuss in the following sections.

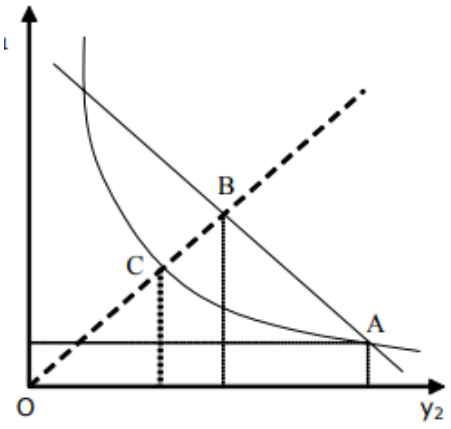

Figure 31 Figurative illustration of the Atkinson index. *Note: An income partitioning of A can be equalized by moving to a point on the dashed line. Depending on the aversion to inequality this can be somewhere between B and the intercept of the dashed line and the horizontal line of A. This figure is an adaptation of the figure obtained from* (Bellu & Liberati, 2006).

Top-bottom ratio's

Commonly used ratios are equipartition ratios between the top decile over the bottom decile and the top quintile over the bottom quintile. These ratios neglect the middle portion of the income distribution and put their aim at the tail ends, the portion with the highest variance. What we can see is that on average the top quintile and decile earn respectively about 8 and 14 times as much as the bottom quintile and decile. Moreover, the variance of the decile ratio is higher than the quintile ratio, which is to be expected as moving further to the tail sides one finds larger extremes.

To put the ratios in a global perspective all different ratios have been plotted ascendingly in Figure 32 with some general characteristics provided in Table 1 and specific examples shown in Table 2. From a global perspective, advanced economies have the lowest ratio values, with the USA having the highest value amongst that group, and third world countries having higher values, especially in Africa – 7 of the 10 highest values are African countries.

One could mention that it is more essential to use the top 10% instead of the top 20% as the variance in the top 10% is larger when compared to the top 20% per country (Palma, 2011), as shown in Figure 33. While the difference shown by Palma is geographical, there are indications that growth in wealth and income is also in a temporal sense mainly happening in the upper percentiles of society (Oxfam international, 2018). While it is possible to compare the top 1% to the bottom 1%, there are limitations to decreasing the comparative portions. First, the bottom portions of the income distribution have negative income. The ratio can only work when incomes are positive (else a negative ratio will be obtained with raises difficulties for the interpretation of the value. Moreover, with decreasing portion, one would obtain even more volatile values but the gained value becomes debatable. With the smaller size of the unit of analysis, the less suitable it is to use it as value for the population as a whole. For example, comparing the richest person in a country with the poorest person in a country will give a drastic ratio, but one can hardly say that inequality within the country can be based upon that value. We do not know what the most relevant frame of reference is, but this evaluation lies beyond the scope of this thesis. But one must be aware that reducing the size of the frame of reference comes at the cost of generalisability.

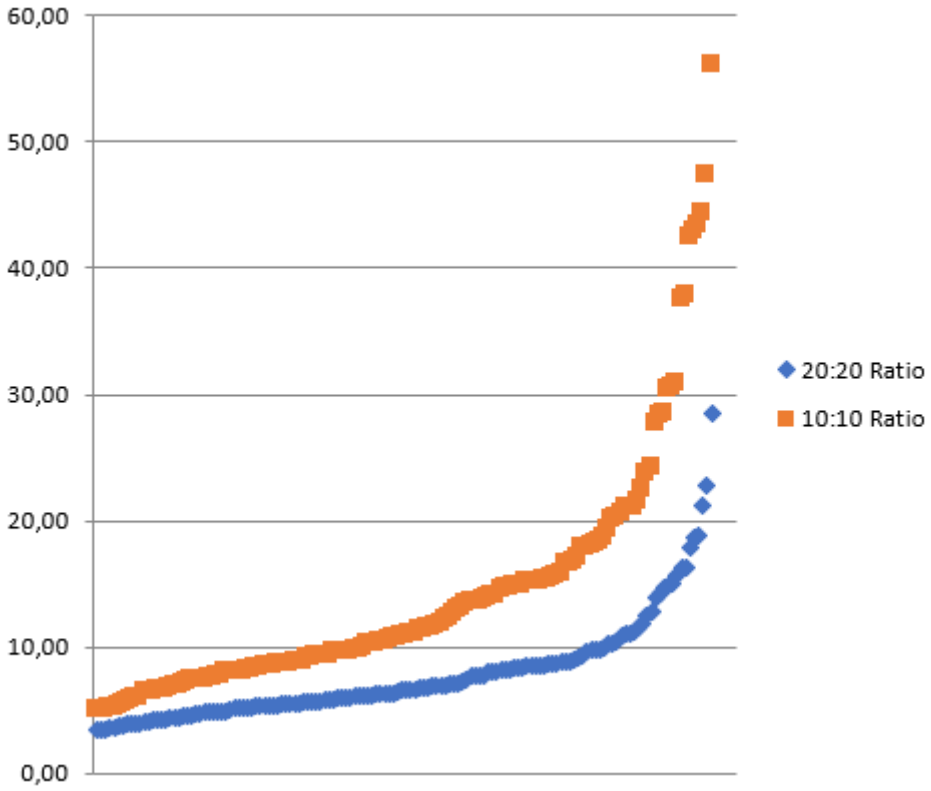

Figure 32 The 10:10 and 20:20 ratios aligned ascendingly. *Note: The results are obtained using data from the World Bank only including data points after 2010* (The World Bank, sd).

Palma ratio

A different type of ratio-based indices is the Palma ratio, this term was coined in 2013 by Alex Cobham and Andy Sumner in their work when referring to Palma's work (Cobham & Sumner, 2013). The unique feature of the Palma ratio is that it is not equipartitioned but uses the top 10% in comparison to the bottom 40%. Palma did so because he noticed that the 5th to 9th decile for most countries has a stable portion of income share – roughly 50% -, and as such the largest variance occurs in the lowest 40% and highest 10% of the income distribution, as can be seen in Figure 35. Therefore, he reasoned that using the ratio of the 10th decile compared to the 1st to 4th decile gives all 'necessary' information about the income distribution of the country (Palma, 2011). The importance of the 10th decile is accentuated by various studies which find that accumulation of wealth occurs mostly within the highest income/wealth
deciles of the economy (Atkinson A. B., 2005; Piketty & Saez, Income Inequality in the United States, 1913-1998, 2003). The usage of only the 10th decile can be supported by the fact that the variance of income for the 9th decile is far more stable compared to national income as compared to the income of the 10th decile across the globe (Palma, 2011), as shown previously in Figure 33. Thus, the overall conclusion is that the income inequalities are mostly a matter of the top 10% accruing larger shares of national income at the cost of the bottom 40%, hence the Palma ratio.

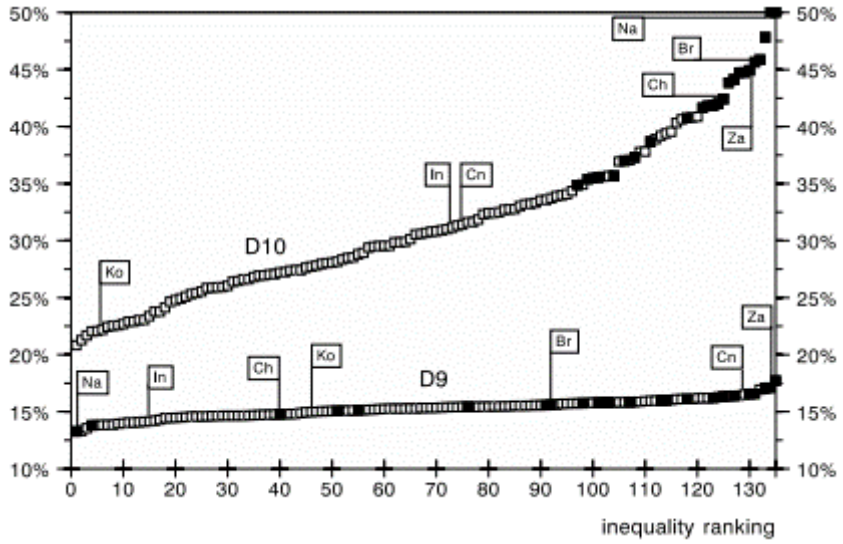

Figure 33 Relative income share of the 9th and 10th decile for various countries. *Note: Ranking from the 9th and 10th decile are independent of each other. Botswana's and Namibia's 10th decile data points are beyond the graph's borders, values are 51% and 65% respectively. Data has been obtained from the World Bank in 2010. This figure has been obtained from* **(Palma, 2011)**.

While the Palma ratio only uses 50% of the income distribution mathematically, it has been shown by Tridico (2018) that it is almost linearly correlated to the Gini index, as shown in Figure 34. This has also been noted by Cobham & Sumner (2013), they also found that the Palma ratio is strongly related to the Gini index. In their analysis they show that the Gini Index can be predicted with 99% accuracy when using the following formula:

Gini index = 0.581(income share of top 10%) – 1.195*(income share of the bottom 40%) + 0.419*

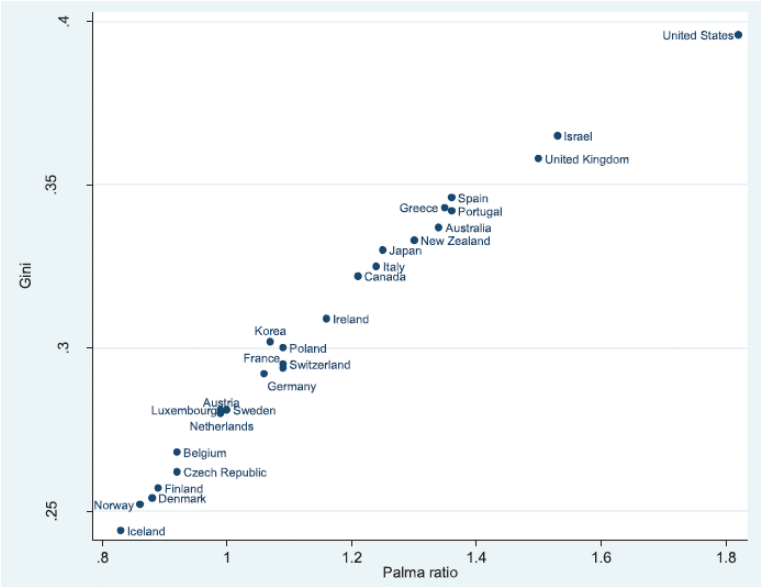

Figure 34 Correlation between the Gini index and the Palma ratio in 2013. *Note: The data is based on disposable income. The results are calculated by the article's author using data from the OECD. This figure has been obtained from* **(Tridico, 2018)**.

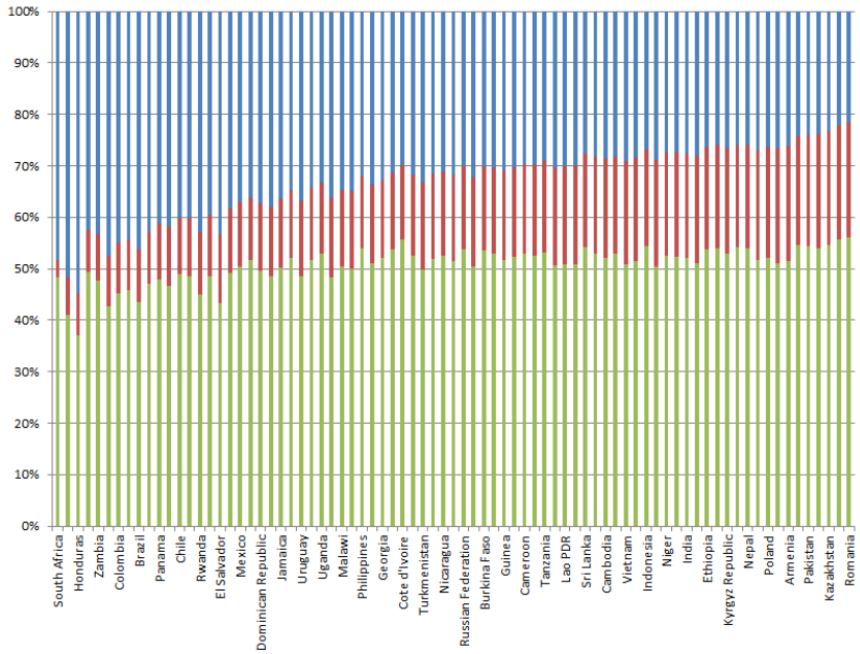

Figure 35 Income share for the lowest 40%, middle 50%, and highest 10% of the income distribution for various countries. *Note: Blue indicates the top 10%, Red indicates the lowest 40%, and Green indicates the middle 50% of the income distribution. Data has been acquired from the World Bank database in 2013. This figure has been obtained from* **(Cobham & Sumner, 2013)**.

Thus, while the Palma ratio only evaluates 50% of the population's income, it can obtain the same information as the Gini index which evaluates 100% of the population's income. One can see this as a confirmation that the middle incomes are relatively stable throughout the various economies causing that the Gini index variations are explained by the variation in the extremes of the distribution. However, as stated by Palma (2011), the middle-income is not necessarily safe from the growth of the top 10%:

> *"… once the bottom 40 per cent has been squeezed almost out of existence, the only way that the seemingly unstoppable 'centrifugal forces' at the top can continue to operate is by squeezing the middle."* – J.G. Palma (2011)

This statement of Palma seems to hold according to the research of Cobaham et al. (2016) finding that the middle income responds to a change in the top income, as shown in Figure 36. However, the analysis did not state a certain transition point after which the middle starts to experience squeezing. The figure predominantly indicates the negative correlation between top and bottom income.

Family of poverty indices

One special kind of indices concerning wealth and income is the indices revolving around poverty. These indices are used to investigate the portion of the population which is living beneath certain agreed-upon living standards. The main interest for this index is that it puts the debate of inequality into the perspective of obtaining a liveable society for everyone without setting moral problems for the rich. The issue concerning poverty indices is that they are not a well-defined measurement. The poverty indices are based upon consumption (Roser & Ortiz-Ospina, 2013). This is caused by the fact that people in poverty rarely have any wealth which is considerable in size. This is caused by the fact that their income is directly used for consumption. In more theoretical formulation, their propensity to consume is close to 1, and therefore are also considered to be hand-to-mouth consumers (every dollar entering the hand is used to feed the mouth). We will discuss this property in more depth in a later chapter.

It is important for poverty indices to acknowledge different types of poverty and thresholds used to indicate poverty. As for the type, Rowntree (1901) made a distinction between primary and secondary poverty. Primary poverty is poverty caused by insufficient income to pay for (all) essential expenditures. Secondary poverty is poverty which is caused by spending too much income on luxury goods by which insufficient funds are left for essential expenditures. As for the threshold, there are two different manners to create a threshold (University of Oxford, 2019), i.e., an absolute and a relative threshold. Absolute poverty means that there are inadequate financial funds to pay for essential items, such as food, water, and housing. One of the most famous international absolute poverty thresholds is set by the World Bank at $1,90/day. Relative poverty means that an individual is considered to be poor relative to the financial capabilities in society. For example, the OECD considers a person being in poverty when the disposable income is below 50% of the total disposable income of the population (OECD, sd). When comparing thresholds between countries, we find that they can differ considerably between countries and relate to the GDP of that country, as shown in Figure 37.

While there is a wide variety of poverty indices, we want to limit the analysis to those that are of greater importance. For this, we follow the Handbook on Poverty and Inequality published by The World Bank which states that there are four main poverty indices (Haughton & Khandker, 2009), i.e., three which follow from the Foster-

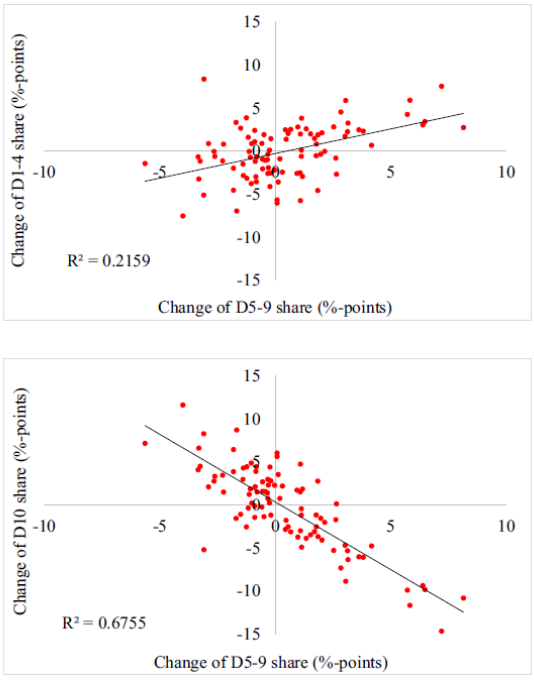

Figure 36 Correlation between middle income or consumption between 1990-2012. *Note: Top window shows the correlation for consumption with the bottom 40% and the bottom window shows the correlation with the top 10%. Results are the author's calculations using data from World Bank in 20015. This figure has been obtained from* **(Cobham, Schlögl, & Sumner, 2016)**.

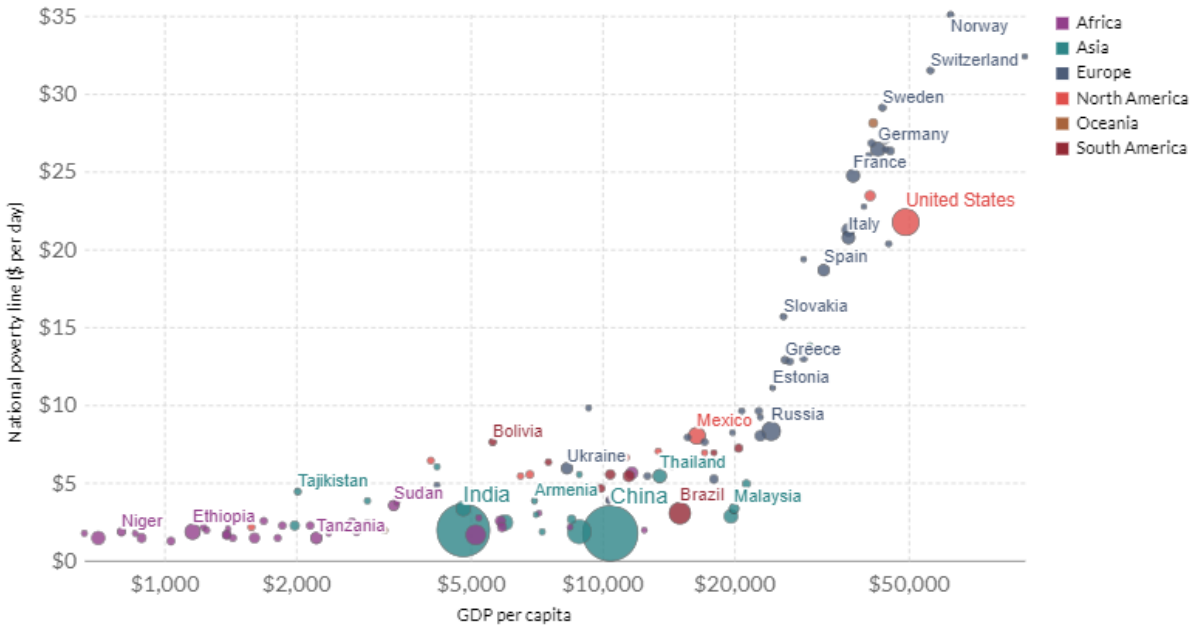

Figure 37 National poverty thresholds for various countries aligned by GDP per capita. *Note: Data has been obtained from the World Bank. This figure has been obtained from* (Roser & Ortiz-Ospina, 2013)

Geer-Thorbecke index family and the Sen-Shorrocks-Thon index.

The FGT index family relate to the following general equation (Foster, Greer, & Thorbecke, 2010)

$$FGT_\alpha = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z - y_i}{z}\right)^\alpha$$

The FGT index is a normalized index, N is the total population size, H is the population size beneath the poverty threshold, z is the poverty threshold, y_i is the i^{th} income, and α is the poverty aversion parameter. Being normalized, FGT_α runs from 0, i.e., having no poverty, to 1, i.e., the max poverty. The input the research needs to give is the poverty aversion, which runs from 0, i.e., maximum aversion to poverty, to infinity, i.e., only the poorest person of society is of importance. Depending on the value of the poverty aversion the FGT index resolves into the 'common' poverty indices. As to note, poverty aversion parameters α>2 is seemingly rarely used, the reason being that it is less intuitive compared to lower poverty aversion parameters (Foster, Greer, & Thorbecke, 2010):

α=0, poverty headcount ratio

The formula reduces to FGT_0=H/N. This index represents the relative size of the number of people beneath the poverty threshold,

α=1, poverty gap index

The formula reduces to $FTG_1 = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z-y_i}{z}\right)$. This index represents the relative size of the gap between the poverty threshold and the average income (or consumption). In essence,

using this formula one can calculate the size of financial resources required to pull everyone out of poverty.

α=2, poverty severity index

The formula reduces to $FTG_2 = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z-y_i}{z}\right)^2$ This index represents the relative squared size of the gap between the poverty threshold and the average income (or consumption). As such, it puts a higher weight on the people being more impoverished.

Besides the FGT family, we also want to discuss the Sen-Shorrocks-Thon index, which combines the headcount ratio index (FTG_0), the poverty gap index (FTG_1), and the Gini index of the poverty gaps (G_p) as follows

$$P_{SST} = FTG_0 FTG_1 (1 + G_p)$$

The relevance of this formula is, that it can answer three relevant questions (Haughton & Khandker, 2009): 1. Are there more poor people?, 2. Are the poor poorer? and, 3. Is there higher inequality among the poor?. One can obtain this by analysing the following equation

$$\Delta \ln(P_{SST}) = \Delta \ln(FTG_0) + \Delta \ln(FTG_1) + \Delta \ln(1 + G_p)$$

An important remark is to question whether poverty should (merely) be measured by financial resources. While poverty is defined as the absence of resources, these resources can also be education, health, and labour opportunities. Brady shows that poverty can be reviewed from various angles. In his analysis he recognizes three distinct theorems on the existence of poverty (Brady, 2019):

1. Behavioural theory:
causation by incentives and culture

2. Structural theory:
causation by demographic and labour market

3. Political theory:
causation by power and institutions hampering policy

An appealing reason to not only review poverty measured by financial resources has been explained by Foster et al. (2010). They explain that the HIV/AIDS pandemic in sub-Saharan Africa predominantly affected the poorer population which caused their life expectancy to be dramatically lower and their relative presence to be diminished. As in result, the financial poverty index measurements decreased, e.g., the poverty headcount ratio decreased as the poor were smaller in size. However, to state that poverty became less important would be the wrong conclusion as it was exactly that, poverty, which

caused them to be at higher risk to die because of HIV/AIDS. Moreover, the late 20th century saw a decrease in relative poverty headcount ratio decreased but the absolute number of people in poverty almost doubled, i.e., from 212 million in 1985 (53,4% of the population) to 388 million in 2005 (50,9% of the population) (Foster, Greer, & Thorbecke, 2010). It is questionable what is of greater importance, but one should not lose sight that an indicator only forms a representation of its inputs. Moreover, changes in the index value are also not inherently good or bad, one should review the cause of the change to reach those conclusions.

While we are reviewing income and wealth inequalities, Falkingham & Namazie (2002) state that it is not a 'closed case' whether these parameters are the most important ones when considering poverty, it is regarded as a multidimensional problem in which financial is just one of the many parameters. However, the convenience of financial parameters is that they are measured more easily than other parameters which give sway to their usage as a representant of socioeconomic position (Howe, Hargreaves, & Huttly, 2008). Even more broadly speaking, McGregor et al. (2019) state that when reviewing inequality, we are ultimately considerate about the welfare of the people which tracks more adequately with measures such as happiness and utility than income and wealth. However, a theorem is that humans are logical beings who attempt to maximize their happiness, as such it suffices to measure the financial capabilities which enable people to perform this maximization process on their own accord (McGregor, Smith, & Wills, 2019).

2.3 Chapter conclusion

In this chapter, we have reviewed how we can quantify economic inequality. When answering the question "How to measure economic inequality", we find that we must distinguish between measuring the underlying data and quantifying the outcome. In the arena of measuring data, we have found that three techniques can be used to retrieve income and wealth data, i.e., tax data, household surveys, and rich lists. We state that due to their specific (dis)-advantages it would be optimal to use the three techniques conjointly.

However, the general returning issue is that the top of the income and wealth distribution are more intensively (and successfully) attempting to avoid and evade supplying their complete income and wealth data. This leads to problems of governments having misperceptions about the size of the economic inequality within their nation. Moreover, we find that in the interpretation of data that there are difficulties because of using different types for the frame of analysis for income & wealth, i.e., which definition is being used for income & wealth, and of the unit of analysis, i.e., the individual or the household. It requires rigour and vigilance to obtain data sets that use the same type of data to be able to perform meaningful comparisons between those data sets.

As for the quantification of inequality, we have found that there are various options to 'measure' inequality within a society. Every type of quantification has its specifications and, therefore, should be used depending on the purpose of the analysis. We cannot formulate an a priori hierarchical ranking for the best and worst methods of representation of inequality. The general statement would be it seems ill-advised to use one single quantification method, as it will be biased in some manner. We would conclude that inequality indices should be used conjointly to obtain a more comprehensive view of

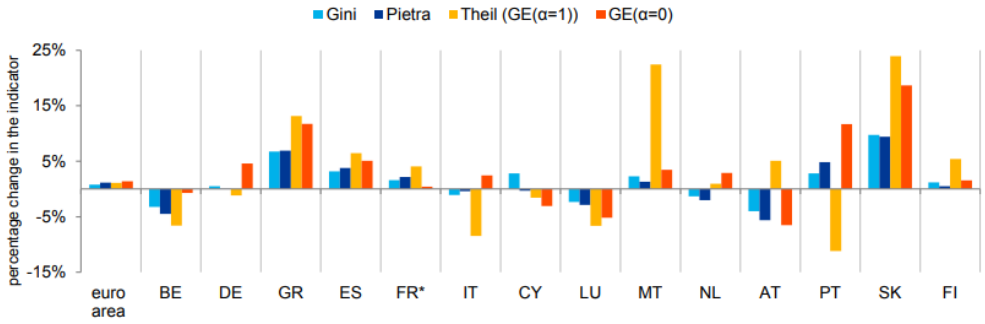

Figure 38 Change in inequality according to various inequality parameters for various countries. *Note: Results are based upon authors' calculations using data from the HFCS using (mostly) data between 2010-2014. This figure has been obtained from* (Costa & Perez-Duarte, 2019).

the inequality within a society. This is also advised as the indications can different interpretations of the economic inequality, as shown in Figure 38.

As a last remark, we would like to warn against using inequality indicators as a method to measure the effects of specific events, e.g., newly introduced policies, economic events, and natural disasters. The economy is a tremendously complex system with various portions of society being interconnected and, as such, stating that a specific event is the specific cause for a change in an inequality parameter would be oversimplifying the system. Moreover, one can debate if a change in a specific inequality indicator should be the goal of a policy or that would like to change other (connected) parameters, e.g., health, education, democracy, and economic growth.

Conceptual model's building blocks

We have reviewed how income and wealth are being measured and how wealth and income inequality is being quantified. To complete the analysis for this chapter, we retrieved the following "building blocks" for our conceptual model.

Data collection

a. Undocumented inequality – Taxes & Benefits

Taxation leads to avoidance of that tax, this can be done through hiding taxed assets or income which leads to undocumented inequality. People with greater wealth or income have improved capabilities to withhold information concerning taxed assets or income.

b. Undocumented inequality – Data collection

Every type of information source on economic inequality has its limitations in assessing economic inequality. It would be advised to bundle different information sources to limit the amount of undocumented inequality.

c. Undocumented inequality – Measurements

Due to undocumented inequality, there is missing data which leads to incomplete measurements.

Quantifying inequality

a. Measurements – Policy Approval

It is of core essence to realize that the measurements (and sequential indices) have their specific limitations. It would be ill-advised to devise policies based upon a single index; they should be used coherently.

3 Economic inequality – How does money flow?

Having reviewed the harmful impacts of economic inequality and how it can be measured, we will start reviewing 'how does it occur?'. For this, it is of importance to understand that economic inequality is the overarching term combining income and wealth inequality. These two types of inequality have their specific characteristics, as shown in Figure 39, but have an interconnecting correlation.

The interconnecting factor is that wealth can generate income which aids income inequality. This can be conceptualized by creating a distinction between income from labour and capital (wealth) per person/household. Piketty (2014) has shown that the share of income from capital (wealth) increases with increasing income, as shown in Figure 40. These kinds of differences have important implications for the potential policies which can be drafted to alleviate income inequalities. For example, if 100% taxation would be applied to income from capital, then the top 0.01% would have a reduction in income of almost 60% while the 90-95th percentile would only have a loss of approximately 5%. This would be a simple theoretical policy to equalize income using the difference in the source of income.

In this chapter, we will attempt to untwine the two concepts and review the basic principles causing them. This can potentially aid in understanding why these two types of inequality are occurring and, more importantly, can give indications to which policies can be drafted to influence these inequalities. Beyond income and wealth inequality, we will also discuss the properties called economic mobility and opportunity, i.e., the ability to change one's income and wealth. This is of importance as it describes the ability of a person to move up or down the (socio-)economic ladder and causing alter in economic inequality. As we will argue during this chapter, high mobility can potentially be more important than an equal society. We will conclude this chapter with some overarching statements and provide the contributions made to the conceptual model.

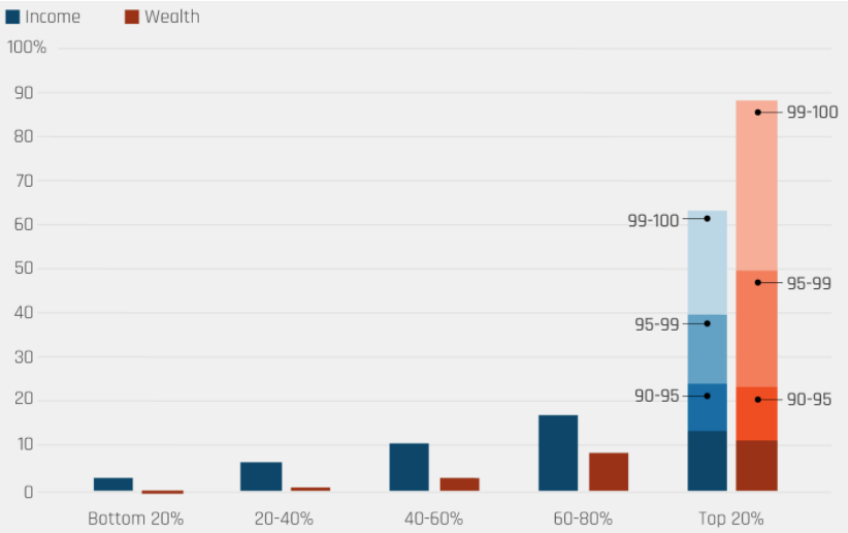

Figure 39 Income and wealth distribution quintiles in the United States in 2016. *Note: The results are based upon the article's author's calculations using data from the Federal Reserve Board (Survey of Consumer Finances) in 2017. This figure has been obtained from* **(Leiserson, McGrew, & Kopparam, 2019)**.

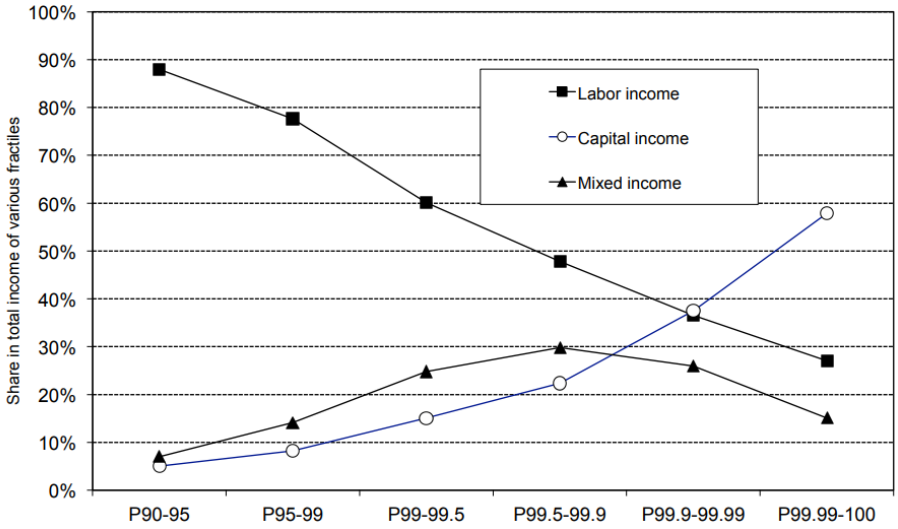

Figure 40 Composition of top income in France in 2005. *Note: This figure has been obtained from* **(Piketty, 2014)**.

3.1 Income Inequality

While income inequality is not a new phenomenon, it is becoming of increasing concern as income inequality has been increasing since the 1980s (Alvaredo, Chancel, Piketty, Saez, & Zucman, 2018). An example of this trend is shown in Figure 41, representing a progression of highest incomes while median and low incomes were falling behind. Also "new" to the growth of income inequality is the fact that since the 1980s the net increase in global income inequality, i.e., the relative inequality of incomes among all peoples of the world ignoring where they live, is caused by inequalities within nations and is dampened by between-country inequalities. This is a complete overhaul as compared to before the 1980s when global income inequality grew due to divergence between countries and was dampened by reduced income inequalities within countries (Ravallion, 2018). Garcia-Penalosa & Orgiazzi (2013) are hinting that this with-in country rise in inequality is (partly) caused by an increase in income inequality within age groups. This is an important notion as it could indicate that a portion of the population is reaping the

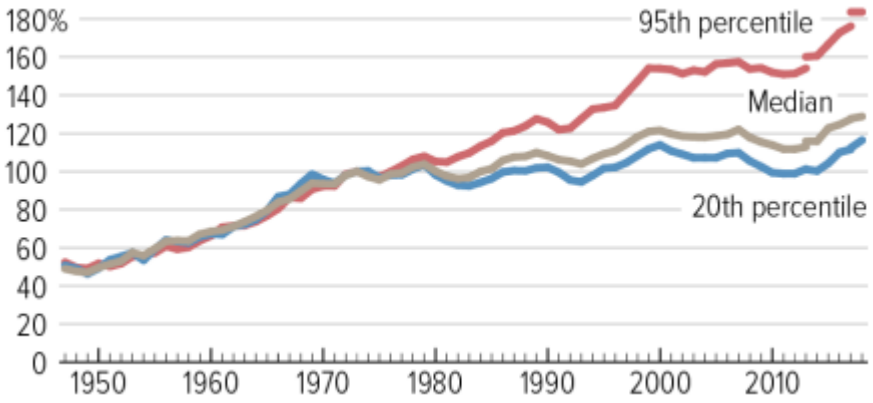

Figure 41 The discrepancy in the growth of income between high, median, and low income, in the United States. *Note: The graph shows data from 1947-2018 and is normalized based on income in 1973. Results are based on the Center on Budget and Policy Priorities (CBPP) using data from the U.S. Census Bureau Data. Small anomalies around 2013 and 2017 are consequences of a redesigned questionnaire and updated data processing respectively. This figure has been obtained from* **(Stone, Trisi, Sherman, & Beltran, 2020)**.

benefits while the others are not. This would be in contrast if the differences would be between age groups, which could indicate that the 'future selves' of a young age group could also reach that higher income in the future, indicating a life-cycle consequence for inequality (we will explain this notion later on in this chapter).

The importance of the finding of Ravallion (2018) is that, if inequality currently is on the rise within a nation, the potential solutions, i.e., national policies, could also be residing within those nations. We envision, maybe falsely, that attempting to change the inequality within a nation will be easier than resolving inequalities between nations as that would require negotiating bilateral treaties. However, before we become too optimistic about a possible change, we will first need to understand the current causes of income inequality before we can devise policies opposing it.

For this thesis, we will review the topic of income inequality following the distinction in causes of income inequality made by Stansbury & Summers (2017), i.e., 1. a decreasing labour share of income, and 2. diverging income between high and low wages. They reach this conclusion by analysing the progression of income and labour productivity, shown in Figure 42. Their narrative is that the difference in income growth between production/non-supervisory jobs (representing 80% of the workforce) and the average income after the 1970s is occurring due to differences in high and low wages. But the difference between labour productivity and average income, diverging from each other after the 2000s, is caused by a reduction in the labour share of income (or put differently, an increase of the capital share of income).

However, we do acknowledge that various other perspectives can be chosen for the analysis of income inequality. For example, Kaasa (2005) used five different parameters: 1. Economic development, 2. Demographic factors, 3. Political Factors, 4. Cultural and environmental, and 5. Macroeconomic. Whereas Sharpe et al. (2008) attempted to clarify income inequality using four different parameters: 1. increase in non-wage income, 2. rise

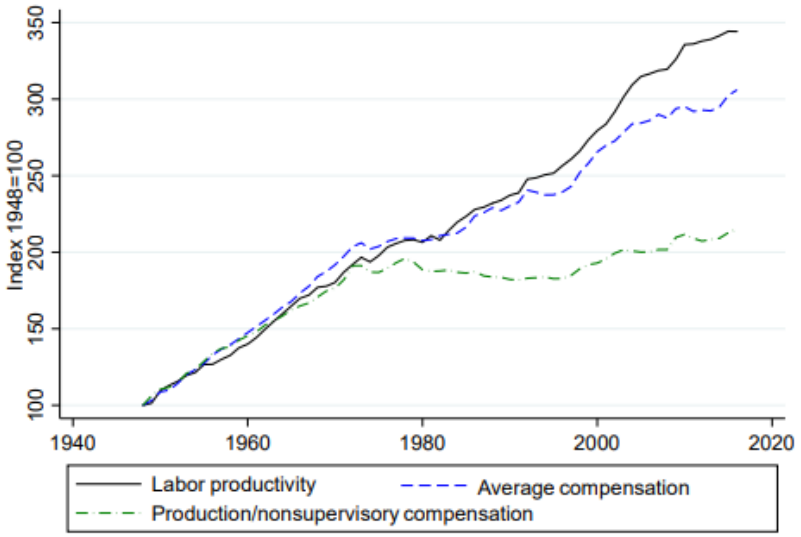

Figure 42 Labour productivity compared to average labour compensation and production/non-supervisory compensation. *Note: The results are shown for the USA between 1948-2016 with data retrieved from BLS, BEA, and Economic Policy Institute. This figure has been obtained from* **(Stansbury & Summers, 2017)**.

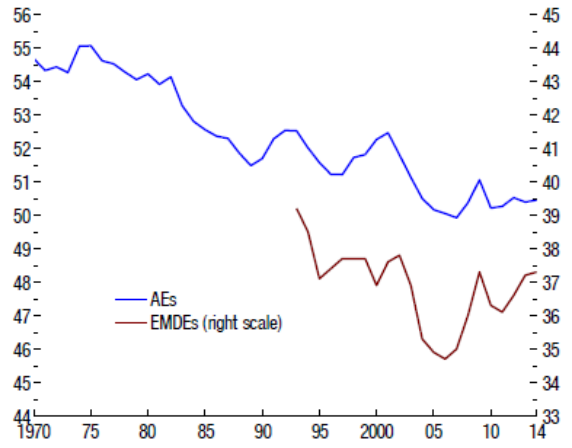

Figure 44 Share of labour income over the past decades for both advanced and developing countries. *Note: AEs represents advanced economies and indicates the average weighted by nominal GDP. EMDEs represents the emerging market and developing economies and indicates normalized year fixed effects weighted least squares regressions using nominal GDP. The results are based upon data from the CEIC database,* **(Karabarbounis & Neiman, 2014)**, *national authorities, OECD database, and IMF calculations. This figure has been obtained from* **(Dao, Das, Koczan, & Lian, 2017)**.

in income inequality, 3. decrease in labour's term of trade, and 4. fall in the share of labour income. While Kaasa (2005) and Sharpe et al. (2008) use different classifications, their separate arguments will largely return when applying the parameters used by Stansbury & Summers (2017). As such, we were tempted by Occam's razor and chose the simplest version, but depending on the researcher's perspective, another classification can certainly be justified.

Decreasing labour share of income

Market income can be divided in a labour share of income and a capital share of income. In a recent article of the IMF (Dao, Das, Koczan, & Lian, 2017) it has been stated that the relative importance of the labour share of income has decreased, as shown in Figure 44, when compared to the capital share of income. However, such an analysis neglects that income is gains a third income source, i.e., the benefit share of income, when reviewing the total income. This source of income has steadily been becoming more important after the Second World War, increasing to 15-20% of total income (Piketty, Saez, & Zucman, 2018), as shown in Figure 43. Problematic to the analysis of benefits is that it represents a state/institutional supplied income which attempts to correct for inequalities. As such one can question whether benefits are a cause of the decrease in the labour share of income or attempts to fix the decrease in the labour share of income. Moreover, benefits are a cornerstone piece in the direct redistribution policy next to the taxation policies. As such,

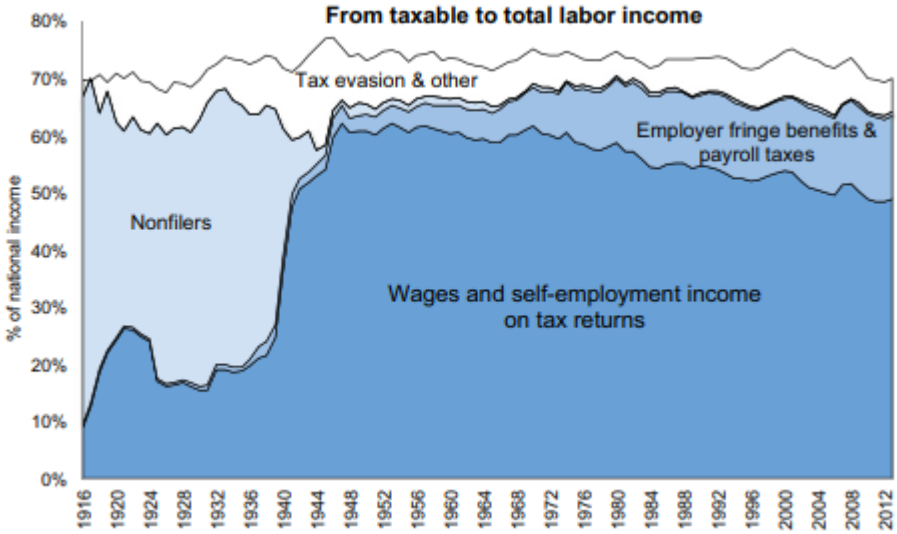

Figure 43 Origin of taxable income for the United States from 1916-2012. *Note: This figure has been obtained from* **(Piketty, Saez, & Zucman, 2018)**.

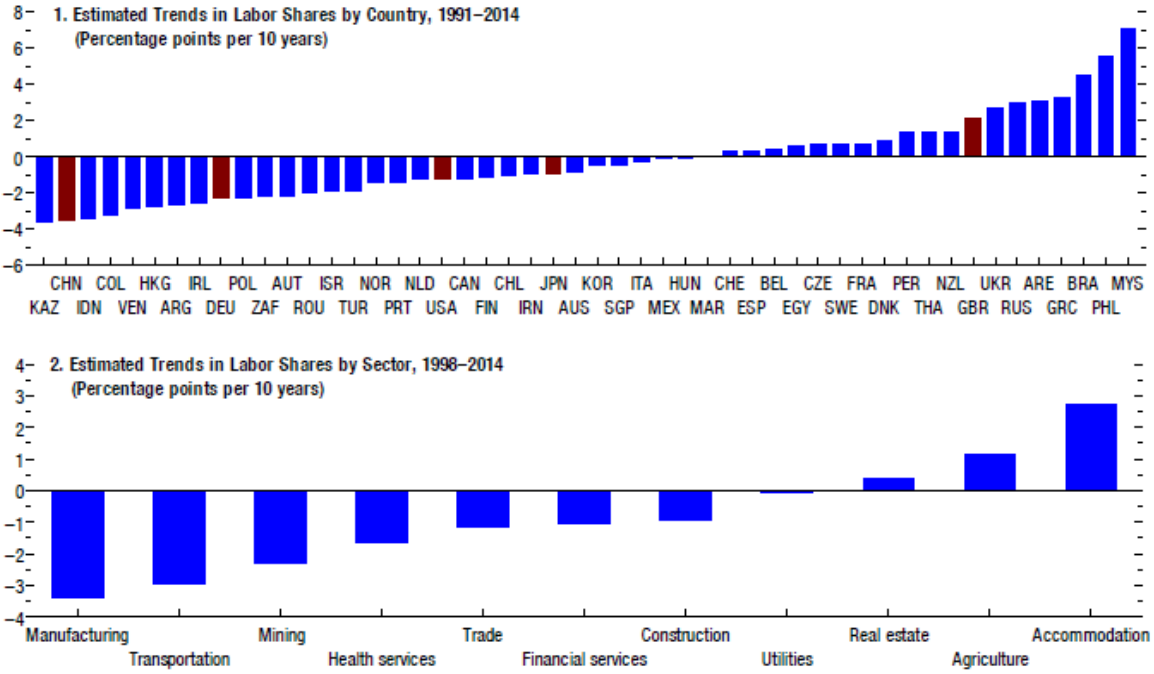

Figure 45 Changes in labour share income for various nations and industries. *Note: The top panel shows trends per country with the five largest economies highlighted in red. The bottom panel shows trends per industry sector. The results are based upon data from the CEIC database,* **(Karabarbounis & Neiman, 2014)**, *national authorities, OECD database, and IMF calculations. This figure has been obtained from* **(Dao, Das, Koczan, & Lian, 2017)**.

we will opt to discuss labour and capital income in this chapter and will return on benefits in Chapter 4: *Redistribution policy – One for all, and all for* one?.

When reviewing the labour share of income, we find that changes have been occurring due to developments in the global economy (Stockhammer, 2017). This can largely be summarized by three causes: 1. Technological changes, 2. Globalization, and 3. Capital accumulation[5]. These aspects have potentially caused that the current economy is less labour intensive as compared to the past. Besides giving these three parameters a more in-depth analysis, we will also review the concept of elasticity of substitution as it connects labour and capital income by the substitution of the one into the other.

Before going into depth into the three causes, it should be remarked that the decline in labour share income is a stylized effect of averages across industries and nations (Dao, Das, Koczan, & Lian, 2017). Some nations and industries even saw an increase in labour share income, as shown in Figure 45. However, the estimates are yet again an average for the developments within the particular industry. For example, the average labour share for agriculture is positive but for developing countries, this was negative while it was more strongly positive in developed countries.

Elasticity of substitution

Income from labour and capital are interconnected by the elasticity of substitution. The elasticity of capital-labour substitutions indicates the percentage change in the ratio

[5] Stockhammer (2017) also refers to welfare state entrenchment, we will discuss it in the subsection Diverging Income as, following another perspective, it is more aptly discussed in that section. Moreover, Stockhammer (2017) refers to financialization which we will discuss as capital accumulation, it being the contributor to investment of financialization.

of capital to labour (K/L or capital intensity) in response to a change in the ratio of the wage rate (W) to the price of capital (Pk) by 1 percentage point and is described as follows:

$$s = \frac{\Delta(\frac{K}{L})/(\frac{K}{L})}{\Delta(\frac{W}{Pk})/(\frac{W}{Pk})}$$

The value of the elasticity ranges from 0 to infinity with an important pivot point at 1. When the elasticity of substitution is >1 then labour and capital are gross substitutes and when the elasticity of labour is <1 then they are gross complements. Gross substitutes (complements) means that the ratio of capital to labour (K/L) will increase by more than 1% if the relative price of labour (W) to the price of capital (Pk) increases by 1%. As such, this would indicate that capital causes positive returns and thus the accumulation of capital (Piketty, 2014).

There have been various attempts to calculate the average elasticity of substitution for a whole economy with varying outcomes. For example, Knoblach & Stöckl (2020) and Muck (2017) showed that the elasticity of substitution is <1, with the latter showing an average of 0.7 for 12 advanced economies. This would mean that capital is a gross complement and capital investments should be labour augmenting. However, Piketty (2014) and Karabarbounis & Neiman (2014) showed that the elasticity of substation is >1, with results finding that the elasticity of substitution would be 1.3-1.6 and 1.25 respectively. According to them, capital would be capital augmenting and, as such, would be self-expanding.

Overall, the values for the elasticity of substitution are being debated. When reviewing the previously mentioned articles they all give their scientific reasons as to why their elasticity value should be the true one. Mostly these differences are caused by a different perspective of analysis and the assumptions made. For example, the International Labour Office (ILO) (2019) shows that the elasticity of substitution for the whole distribution is differently impacted upon a 1% increase in wage for the top 5%, as shown in Figure 46. In a broader perspective, Knoblach & Stöckl (2020) have shown that the elasticity of substitution varies as a function of: 1) industry, e.g., <0.8 for manufacturing and service industry while for the agricultural industry it is >1.5, 2) time-dependent, e.g., over the past decades the elasticity of substitution became larger, and 3) country-country specific, e.g., the value being 0.03 for Burundi and 2.18 for Hong Kong. However, for the overall trend, The International Labour Office (2019) states that the

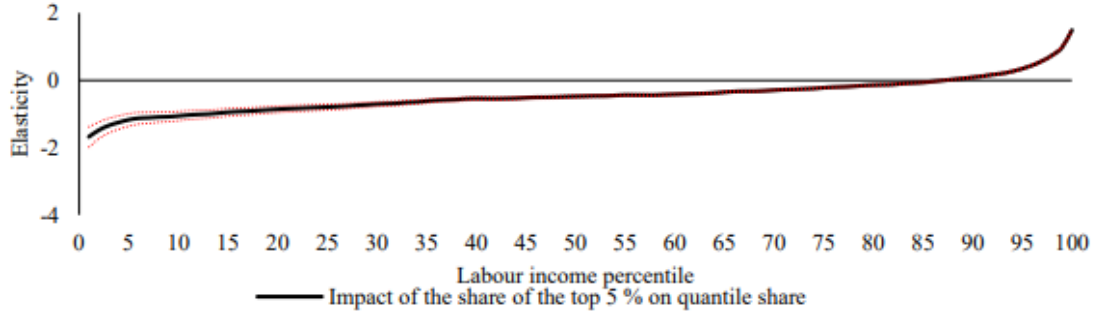

Figure 46 Elasticity of substitution varying according to income percentile upon a 1% labour share income increase for the top 5%. *Note: This figure has been obtained from* **(ILO Department of Statistics, 2019).**

share of labour income is decreasing. It will be a matter of perspective of which value elasticity is connected to this value. However, from the perspective of this thesis, the results of the ILO (2019) indicate that labour is becoming of lesser importance to total income which impacts the lower income percentiles more harshly than the higher income percentiles.

Technology

An intermediary between labour and capital is technology. Through technological developments new (capital) investment opportunities are created which can increase labour productivity. While in the past technological development was (mostly) concerned with the creation of physical capital goods (such as machines), since the occurrence of ICT technological development also has large branches into the digital realm. This has vastly changed the return on capital as it creates the opportunity to create additional content with a marginal increase in labour input. This is caused by the fact that digital content can be duplicated without additional investment costs. As such, a single investment can create an unlimited amount of output. According to Karabarbounis & Neiman (2014), the ICT developments caused that capital investment costs have been reduced by 25% which explains up to 50% of the decline of the labour share as the return on capital investment increased. They see their reasoning solidified as the decrease in labour share has been occurring for 90% within the industries and not by changes between industries.

However, the consequence of technology cannot be stated by only reviewing ICT development. For example, Guerriero & Sen (2012) performed a cross-country analysis of 89 countries for the effects of technology and found differentiation between technological innovation, giving an increase in labour income, and technological mechanisation, giving a decrease in labour income. Reasons for this can be that technological innovation requires large human capital for research which promotes highly educated labourers with high incomes. This is in contrast to technological mechanisation which causes a decrease in labour share. For this, the reasoning is that machinery substitutes labour intensive (low wage) jobs and increases the return on capital. According to Guerriero & Sen (2012), this could also explain differences between developed and developing countries, as the former mainly experience technological innovation while the developing countries are experiencing technological mechanisation.

Globalization

Another "recent" large occurrence in the world economy is the process of globalization. This is an overarching term for deepening/intensification of various aspects, e.g., trade, capital mobility, finance mobility, and labour mobility (Tridico, 2018). The interaction between globalization, and more specifically capital and labour mobility, and income is explained by the Stolper–Samuelson theorem which states that countries will specialize in being either labour- or capital-intensive economies. Capital intensive nations will specialize in such a type of economy (developed countries) and vice versa for labour-intensive countries (non-developed countries) (Hogrefe & Kappler, 2013). The theoretical explanation of these effects goes as follows. Companies in capital intensive (developed) countries can create a threat to out-source labour intensive jobs to labour intensive (developing) countries. This causes workers in labour-intensive jobs within developed countries to experience lower bargaining power and as a result, they must accept lower

wages. This is in contrast to workers in capital-intensive jobs which (taken together) causes a discrepancy between the incomes of these two groups of workers and depresses labour income in capital intensive countries.

The narrative is confirmed by Guerriero & Sen (2012), who show that the effect of globalization on the share of labour income is dependent on the state of the economy. As such, OECD countries, i.e., developed countries, experience a reduced share of labour income with increasing globalization as it transfers labour-intensive work towards cheaper labour force countries, mostly developing countries. As the labour-intensive jobs are being transferred, the remaining jobs will on average be more capital-intensive and thereby the labour share decreases. This contrasts with developing countries which experience an influx of labour-intensive jobs which increases the share of labour income (Guerriero & Sen, 2012).

Another consequence of globalisation, i.e., capital and labour mobility, is that it represses the welfare state according to the 'efficiency thesis' (Tridico, 2018). This thesis revolves around the notion that a welfare state requires large public revenues to support social support which in turn requires increased taxes. The increased taxes create larger costs to corporations which makes a welfare state more expensive to operate than a non-welfare state. As such, due to increased competition between countries caused by globalisation, countries justify decreased expenses to the welfare state, i.e., the retrenchment of the welfare states as shown in Figure 47, to attract labour and capital from companies. However, Tridico (2018) explains that globalisation can also cause an opposing effect coined as the 'compensation thesis'. This thesis states that welfare state will increase expenses as a response to rising inequality caused by globalisation. It is uncertain which thesis dominates. For example, in Scandinavian and Continental countries the 'compensation thesis' seems to fit while in Anglo-Saxon and Mediterranean countries the 'efficiency thesis' seems to be a better fit (Tridico, 2018). As such, we cannot speak of a single effect caused by globalisation and the effects differ per country.

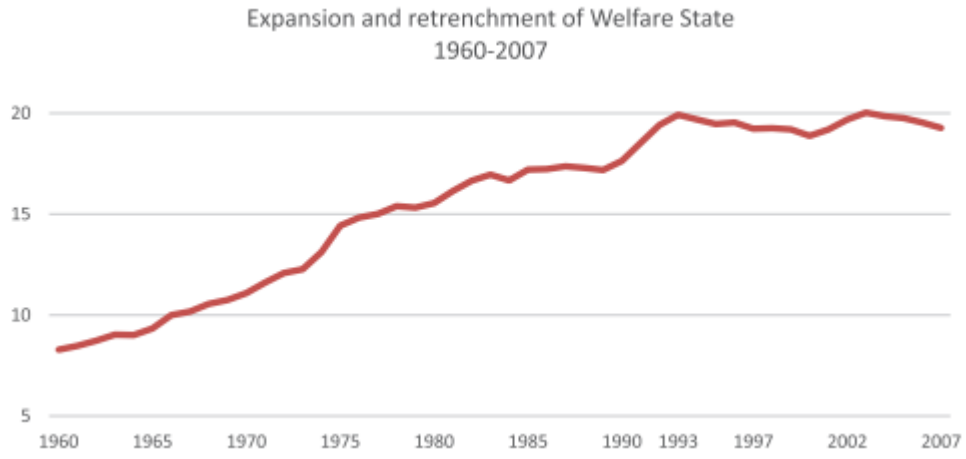

Figure 47 Retrenchment of the welfare state. *Note: The results are shown as an aggregate of 23 OECD countries between 1960-2007 based on data from the OECD. The results are based upon the article's author's calculations using the OECD database. This figure has been obtained from* **(Tridico, The determinants of income inequality in OECD countries, 2018)**.

Moreover, the interaction between globalisation and financialization, i.e., financial mobility, has been causing damaging effects on inequality. As narrated by Baud & Durand (2012), they find after reviewing the annual accounts of large corporations that there has been an increase in the return on equity for these corporations. However, these higher rates of return were achieved by asset financialization (rather than production) and this has weakened the position of low wage workers. Moreover, the interaction between globalisation and financialization has caused an increase in the opportunity to invest capital in foreign countries which has aided corporations in the process of tax avoidance (Evertsson, 2016). Overall, it has been stated by Van der Zwan (2014) that financialization has been hurting equality and has suppressed low wage workers while high wage workers have seen the advantages.

Wealth accumulation

Income from capital/wealth is an interesting source of income. The idea is that the existence of wealth can create more wealth when invested. Piketty (2014) reviewed this process on a national level by describing income from capital (α) as the multiplication of the return on capital *(r)* by the amount of national capital owned per amount of national income (*β*)

$$\alpha = r * \beta$$

As such, the income from capital is dependent on the two parameters, i.e., r and ß, and the interaction between the two parameters, which is described by the (aforementioned) elasticity of substitution (Piketty, 2014). This simple formula shows that income from capital can increase when either the rate of return increases or a larger amount of wealth (per unit of national income) is owned. However, this only occurs with the prerequisite that growth in one parameter is not offset by a larger decrease in the other parameter, which will always be true if the elasticity of substitution is 1 or larger.

While Piketty (2014) performed his review on the national level, the story behind economic inequality and wealth accumulation becomes clearer by reviewing what occurs with income and wealth on a percentile level. Earlier, we already showed that the amount of wealth owned has a large unequal distribution, as shown in Figure 39. However, the returns on capital were not yet investigated. In the analysis of Advani et al. (2021), they reviewed the type of assets according to the wealth distribution. They found that the number of assets with zero return progressively diminishes along with the wealth distribution, as is shown in Figure 48. As such, one finds that with increasing wealth, increasing returns can be obtained, which in the least will not reduce economic inequality.

The size of return on capital and size of wealth becomes easier to interpret when reviewing the wealth composition. Azpitarte (2010) performed an in-depth analysis and showed that stock ownership is a common item in the top 10% (44,1% have stocks) while it is an anomaly for the poorest 10% (0,4% have stocks), as shown in Figure 49. The financialization of assets becomes even starker realizing that the poorest 10% have almost 90% of their financial assets in bank accounts while for the top 10% this is just smaller than 25%. When reviewing the current returns, a bank account gets up to a maximum of 0,3% of interest (Actuelerentestanden.nl, 2022) while on average the yield on stocks is 7%

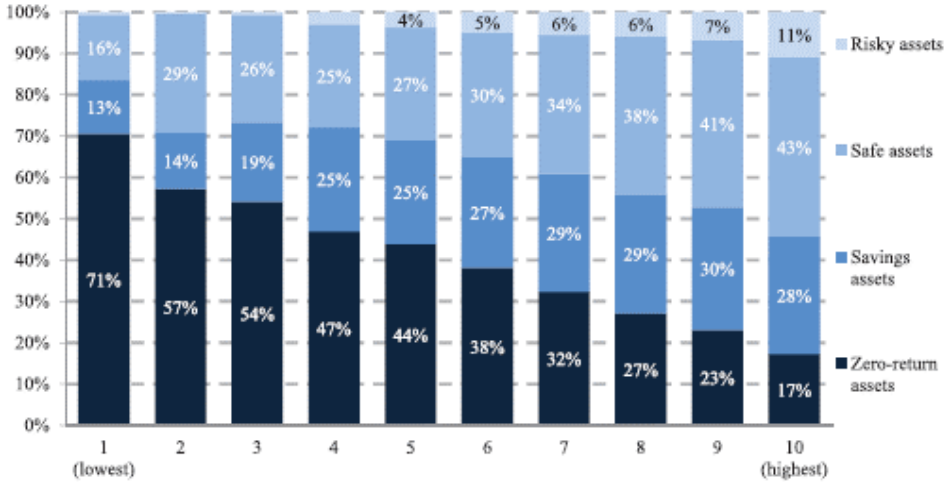

Figure 48 Composition of family assets in Great Britain between 2016-2018. *Note: Zero-return assets include cash, current bank accounts, and other informal financial assets. Saving assets include interest-bearing sight deposit accounts and national savings products. Safe assets include tax-free interest savings accounts (ISA accounts) and formal financial assets. Risky assets include shares and bonds. Data has been obtained from the WAS in 2020. This figure has been obtained from* **(Advani, Bangham, & Leslie, 2021)**.

(LangzaamRijker.nl, sd). This contrast in asset composition and asset size indicates that it will increase economic inequalities by its mere nature.

The increase in income inequality because of wealth accumulation has been connected to the rise in financialization which has soared in the second half of the 20th century (Davis & Kim, 2015). In the USA the size of finance went from 15% of GDP in the

	Portfolio composition (percent of total assets)							Percent of owners						
	All	Bottom 10 %	Next 20 %	Next 20 %	Next 20 %	Next 20 %	Top 10 %	All	Bottom 10 %	Next 20 %	Next 20 %	Next 20 %	Next 20 %	Top 10 %
Real Assets	88.3	89.2	89.6	93.7	92.8	90.8	82.9	100	100	100	100	100	100	100
Principal residence	52.2	21.8	59.6	71.1	69.2	58.7	34.2	81.9	6.4	68.9	95.3	96.7	97.7	95.8
Other state properties	18.6	7.6	6.0	5.6	9.2	17.5	29.2	30.1	2.7	12.1	18.5	29.4	50.4	77.8
Durables and collectibles	7.6	42.8	16.2	11.2	8.9	6.9	4.7	100	100	100	100	100	100	100
Business equity	6.6	1.3	0.5	1.2	1.5	4.3	12.9	11.5	2.1	2.7	6.7	9.0	20.0	35.5
Vehicles	3.3	15.7	7.3	4.6	4.1	3.3	1.9	73.7	46.8	60.6	71.5	80.1	86.9	92.6
Financial Assets	11.7	10.8	10.4	6.3	7.2	9.2	17.1	98,5	92.7	98.8	98.6	99.1	99.6	99.9
Bank accounts	4.6	8.8	8.4	4.3	4.3	4.6	4.1	98.2	91.6	98.7	98.3	99.0	99.4	99.6
Stocks	3.2	0.0	0.5	0.3	0.6	0.8	7.3	12.5	0.4	3.1	5.7	10.9	20.6	44.1
Private pension assets	1.7	1.5	0.7	0.9	1.1	1.9	2.3	23.1	5.1	8.0	18.5	24.7	36.1	51.0
Investment funds	1.1	0.0	0.4	0.2	0.5	1.0	1.9	7.2	0.0	2.3	2.9	6.4	12.5	24.2
Bonds	0.2	0.0	0.1	0.1	0.2	0.4	0.2	1.9	0.0	0.4	1.0	1.6	4.6	3.7
Other financial assets	0.8	0.5	0.3	0.5	0.4	0.4	1.4	5.4	4.0	3.4	4.4	3.8	5.4	16.1
Total	100	100	100	100	100	100	100							
Debts	7.7	48.8	22.2	15.1	8.7	5.4	4.0	43.6	25.1	40.0	51.6	45.3	45.7	45.6
Principal residence	4.3	14.2	16.6	10.8	5.9	2.6	1.2	21.6	3.0	21.9	29.2	26.4	20.3	17.1
Other state properties	1.8	9.4	2.0	1.4	1.3	1.5	2.2	6.5	1.0	2.2	3.3	5.3	10.7	20.9
Vehicle loans	0.4	3.9	1.5	1.0	0.5	0.3	0.1	11.6	7.7	11.8	16.0	10.0	12.4	7.4
Installment debt	0.4	8.6	0.2	0.2	0.3	0.4	0.3	1.9	0.7	0.6	1.1	1.8	3.4	4.6
Other debts	0.7	12.8	1.8	1.6	0.6	0.5	0.3	13.6	15.9	11.3	12.3	9.7	8.3	6.5
Net equity principal residence	47.8	7.7	43.0	60.3	63.2	56.2	33.0	81.9	6.4	68.9	95.3	96.7	97.7	95.8
Net equity other state properties	16.8	-1.8	4.0	4.2	7.9	16.0	27.0	30.1	2.7	12.1	18.5	29.4	50.4	77.8

Figure 49 Composition of household wealth. *Note: Results are based upon article's author's calculations using the EFF database in 2002. This figure has been obtained from* **(Azpitarte, 2010)**.

1960s to 23% of GDP in 2001. To put it in starker terms, the size of finance (in GDP) surpassed the size of the industry by the 1990s (Davis & Kim, 2015). Van der Zwan (2014) states that financialization caused an increased focus on profits for the investors and stagnated wages for wage-earners and increased indebtedness among households. This effect is not only present in the finance sector. Lin & Tomaskovic-Devey (2013) state that financialization also had a profound effect on the non-financial sector influencing income inequality. From their analysis, they find that financialization incentives caused up to half of the decrease in the labour share of income, about a tenth of the increase in managerial wages, and increased income inequality in the non-finance sector.

In essence, it has been shown that increased financialization is correlated with increasing income inequality (Roberts & Kwon, 2017) and this correlation has been increasing over time (Zalewski & Whalen, 2010). According to Stockhammer (2017), financialization has been the greatest contributor to the decline in the labour share of income between 1970-2007 in 71 countries overall when compared to globalization, technological change, and welfare state entrenchment. According to Roberts & Kwon (2017), the effects of financialization on inequality become worse in countries with weak social (labour) security. This is caused by the fact that bargaining power is decreased, and the wealthy can turn the disorganised low wage class in favour of their income. These advantages are, in turn, mostly accrued by the top 1% of income of the nation. Overall, Tridico (2012) concludes that financialization has caused soaring corporate profits and high rates of return on financial assets at the cost of job insecurity and income inequality.

Diverging income

Income inequality does not only occur because the labour share of income has been decreasing, being advantageous for capital owners. There is also a stable increase in a stretching income distribution, i.e., higher incomes are earning more and low incomes are lagging. The problem of this occurrence is that there seemingly is a self-reinforcing trend which is aptly captured by Malloy (2020) in the following quote:

> *"However, as the relative economic power of labour declined and that of the top 1% increased, so too did the political power shift. This becomes a vicious cycle in which economic resources are translated into political power and policies are put in place that favor the top 1%. This can lead to policies that further erode labor's bargaining power, keeping top marginal tax rates low, eroding the value of the real minimum wage, and making it difficult for workers to organize."*

When reviewing the divergence of incomes in general terms, one can state that divergence can occur by either the running away of the top income, the lagging behind of the bottom incomes, or a combination of both. Most probably this latter perspective, being a combination of various factors, is the most likely when reviewing the results of Jones (2015). He showed that the top incomes have obtained a spur in income growth rate after the 1980s while the others saw a reduction in income from that period, as shown in Figure 50. This is an important notion, as reducing income inequality will involve altering the conditions at both ends of the spectrum and not only reviewing the rich or the poor.

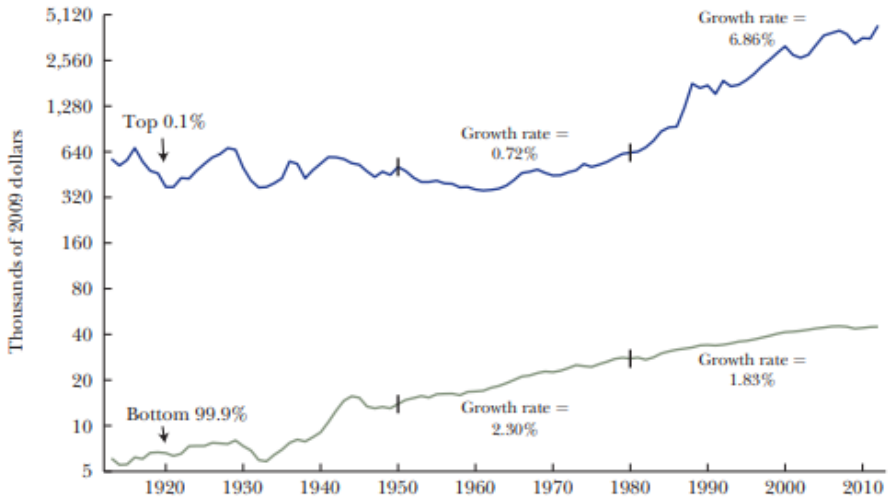

Figure 50 Income growth rates for the top 0,1% and the bottom 99,9%. *Note: The data represents growth rates for the top 0,1% (blue line) and bottom 99,9% (green line) in the period from the early 20th century up to the early 21st century. The growth rates are reported for the period 1950-1980 and 1980-2007, The results are based upon article's author's calculations using data from (Angus) Maddison Historical Statistics (pre-1929 period) and Bureau of Economic Analysis (post-1929 period) for the 99,9% income population and the top 0,1% using the World Top Incomes Data Base. This figure has been obtained from* **(Jones C. I., 2015)**.

There are various perspectives as to why income divergence is occurring. For example, Malloy (2020) states that the increasing income inequality is caused by a reduction in bargaining power, i.e., employees have more difficulties demanding higher wages. This process is a difficult interplay of various parameters of which several are shown in Figure 51. This is in contrast to Bakija et al. (2012), which explained increasing income inequality as a consequence of seven different parameters: 1. the Stolper-Samuelson theorem, 2. Technology-enhanced effects for top income, 3. Superstar theorem, 4. Financialization of pay-out in executive wage, 5. Technology enhancing out-put of the finance sector, 6. Change in cultural norms of high wage pay-out, and 7. Changes in taxation scheme. Reviewing these perspectives, we find that there are several aspects

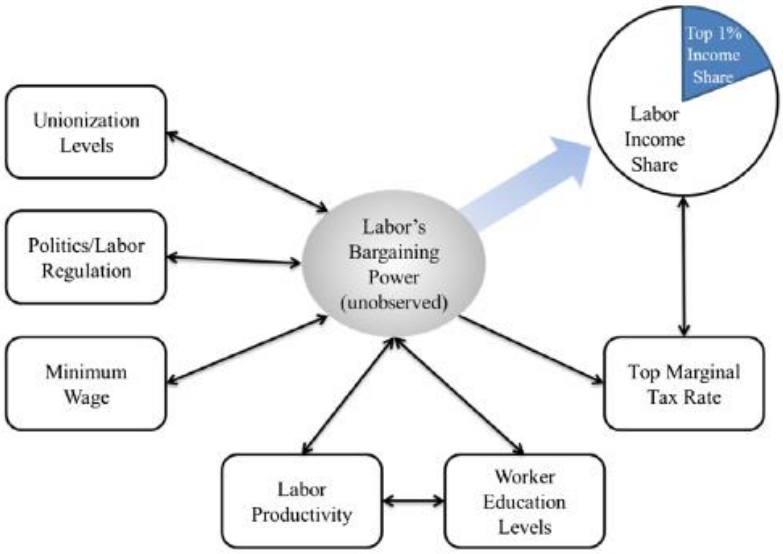

Figure 51 The interplay of various parameters in relation to labour's bargaining power. *Note: This figure has been obtained from* **(Malloy, 2020)**.

which have already been discussed earlier, such as education and labour productivity in chapter 1 Inequality influences – Are differences bad?. We will attempt to differentiate these aspects over the two sections being: 1. The spurring top income and 2. The lagging bottom income.

The spurring top income

Top incomes have risen considerably in the past decades and this has certainly aided in the increase in income inequality (Atkinson, Piketty, & Saez, 2011). According to Bivens & Mishel (2013), about 60% of the cumulative growth gap between the middle quintile and the average income growth rate between 1979-2007 can be solely contributed to the top 1%. This difference in growth rate has caused, for example, that the top 1% of the income distribution increased from a 9% share of the total income in 1976 to 20% in 2011, an 11-percentage point increase. This is almost four times as large as an increase compared to the growth of the 95th to 99th percentiles in the same period, i.e., an increase of 3% in total share of the income (Alvaredo, Atkinson, Piketty, & Saez, 2013). As explained by Alvaredo et al. (2013), there have been various effects that caused an increase in top income, i.e., tax policy, labour market changes, capital income, and correlation between labour income and capital income. In this, the growth seemingly is equally distributed over an increase in income from capital and labour, as can be seen in Figure 52.

In the previous parts of this thesis, we have already discussed capital income and provided the correlation between capital and income. What is yet to be discussed are the changes that benefitted the incomes, i.e., Superstar theorem and Tax changes. We will

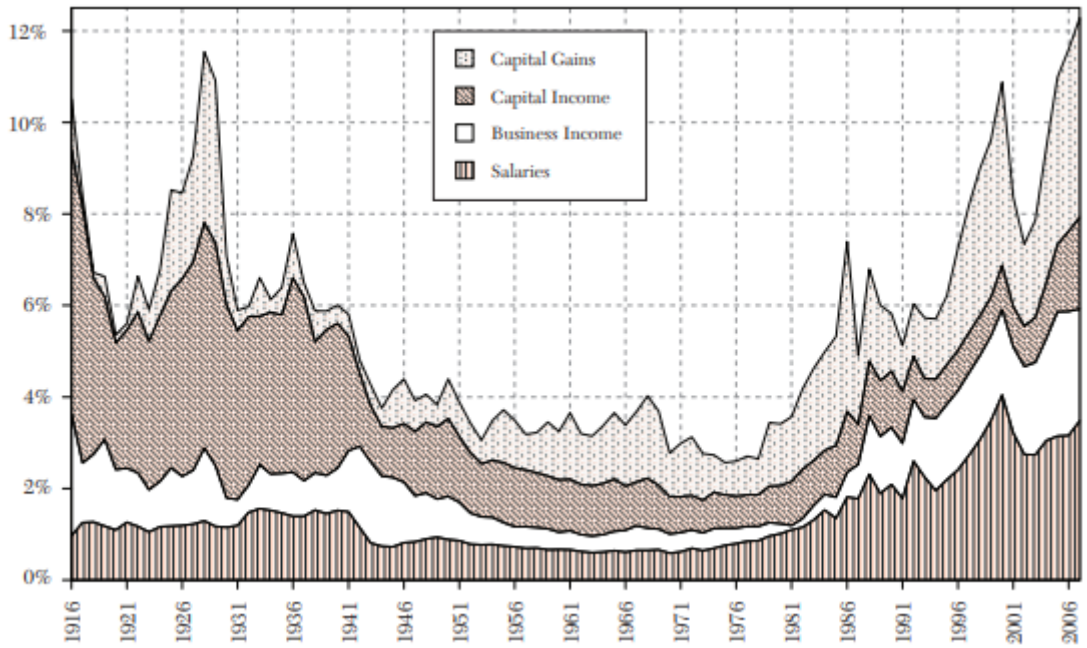

Figure 52: Composition of income and income share of the top 0,1%. *Note: Income is defined as market income, i.e., before tax and benefit transfers. Salaries indicate wages, salaries, bonuses, exercised stock options, and pensions. Business income indicates profits from sole proprietorships, partnerships, and S-corporations. Capital income indicates interest, dividends, rents, royalties, and fiduciary income. Capital gains indicates realized capital gains net of losses. Results are based upon article's author's calculation using a database of Piketty and Saez* **(2003)** *which has been updated to 2007. This figure has been obtained from* **(Atkinson, Piketty, & Saez, 2011)**.

also review labour market changes in the following sub-section. We will show in that part that the spurring top income and lagging bottom income are interacting with each other. Therefore, we want to highlight that while the top and bottom incomes changes are being discussed separately, they should be viewed as two faces of the same coin. However, as we are unable to look at the front and back of a coin at the same time, we will discuss them separately for convenience's sake.

Superstar theorem

An important part of the escalating top incomes has been contributed to the superstar theorem which has been theorized by Rosen (1981). He explained that at the far extremes of talent a small increment in talent causes a more extreme difference in wage. For example, the best surgeon in the world will only have a small increase in the success rate of operation but will have a much larger increase in wage because of being the very best by which he attracts a much larger demand. In essence, the demand for top-quality causes that at the far ends of various fields the increase in incomes extends above the increment of talent.

This notion has also been found by Gabaix & Landier (2008). They found that the marginal increase in the talent of the managers caused a dramatic wage increase. For example, the CEO of the number one company could increase market capitalization by 0.016% compared to the CEO of the company at the 250th position but had a 530% higher wage. According to Bakija et al. (2012), the effect of the superstar theorem is enhanced by globalization and technology, i.e., there are larger opportunities to sell one's product over a large consumer base. As such, the national superstars can now compete internationally causing an increase in demand for the top talents which further increases their income.

The increase in CEO income becomes even more stark when reviewing it compared to the average income of the company. In the early 1960s the ratio of CEO-to-worker payments were 21.1. However, after 1990s a large increase in the ratio occurred and rose to 351.1 (Mishel & Kanda, 2021), as shown in Figure 53. Mishel & Kanda (2021) state that the exorbitant pay-out to CEOs is a major contributor to the inequality. Partly, this has been enabled due to their high bargaining power by which they can set their own pay-outs. According to their report the economy would incur no consequences when their pay-out would be reduced when policies limiting pay-oout would be drafted. These would include shareholders influence of CEO pay-out, legislative limitations for companies, and increasing top marginal tax.

In a more thorough analysis of why executive pay grew, Bebchuk & Grinstein (2005) explain that in the grand scheme enhanced bargaining power caused them to obtain favourable incomes. However, the form of income is largely contributed to financing which gave new opportunities to realize these increased incomes. The idea is that industries had changed the wage structure, using bonuses and stock options which inflated the wages for top incomes but also changed the attention of the sectors. Tomaskovic-Devey & Lin (2011) state that wages increased to be 60% higher than other industries' income and coincide with an income transfer of 5.8-6.6 trillion dollars. There is a trend of industries diverting investments from production towards the finance sector to increase their short-run profits, in part, due to correlations with favourable managerial pay-outs (Turner, 2017).

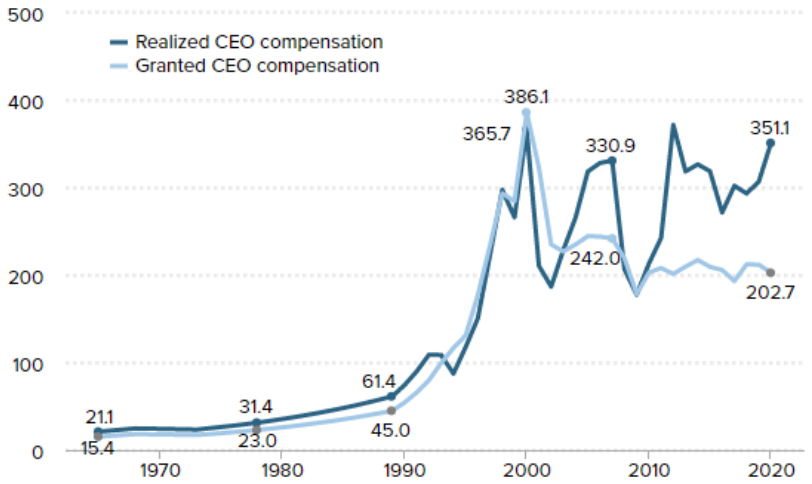

Figure 53 CEO-to-worker compensation ratio between 1965-2020. *Note: The compensation of the CEO's has been calculated by averaging the top 350 U.S. firms (ranked by sales). The granted compensation is composed out of salary, nous, and incentive pay-outs and the value of the stock options and awards when granted. This opposed to realized, which projects the value by including stock options exercised and vested stock awards. Typical work compensation is composed out of annual salary plus benefits for a full-time worker in production/nonsupervisory position. Data has been obtained from the Compustat's ExecuComp database from the Bureau of Labor Statistics' Current Employment Statistics data series combined with the Bureau of Economic Analysis NIPA tables. This figure has been obtained from* **(Mishel & Kanda, 2021)**

Tax changes

Another important change has been the changing tax policies that enable higher (real) top incomes. In his influential work, Piketty (2014) showed that marginal taxes for the highest tier have been decreasing in the second period of the 20th century, exemplified by Figure 54. In response to this decrease in top marginal income, the income share of the top has doubled (Alvaredo, Atkinson, Piketty, & Saez, 2013). Piketty et al. (2014) state that reduced taxation enabled this increase due to having higher efficiency for

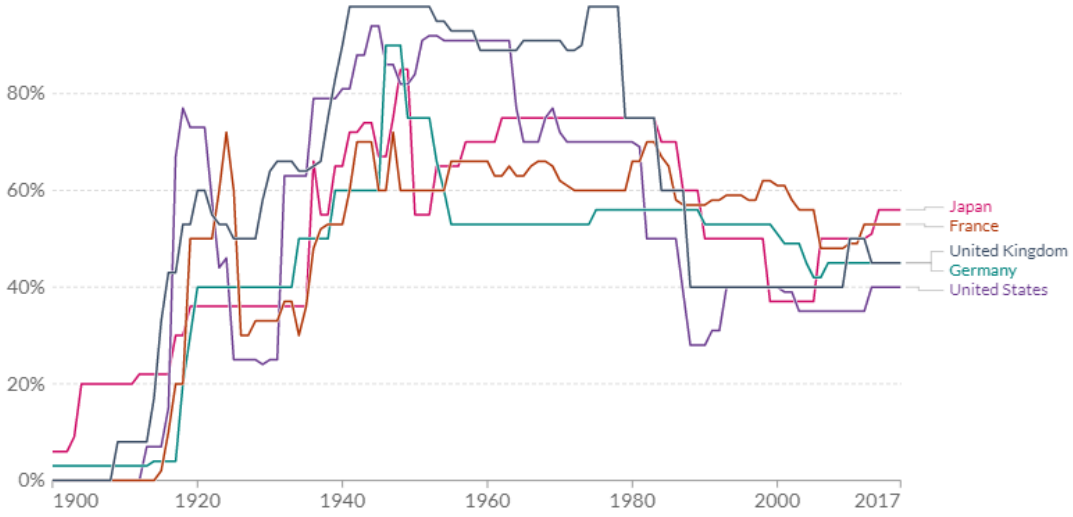

Figure 54 The progression of top marginal income *Note: This data has been retrieved from the World Inequality Report in 2018 and represents the period 1900-2017. This figure has been obtained from* **(Ortiz-Ospina & Roser, 2016)**.

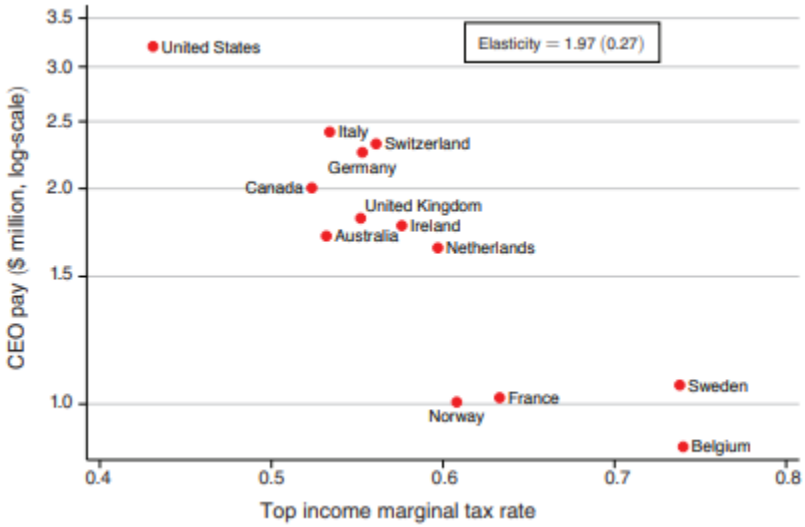

Figure 55 Correlation between CEO pay-out top marginal income tax rate. *Note: This figure has been obtained from* **(Piketty, Saez, & Stantcheva, 2014)**.

CEO's/managers to bargain for higher wages as its effective result on wage increase was much higher. This seems to be further exemplified by the negative correlation between CEO pay-out and the top marginal tax rate (Piketty, Saez, & Stantcheva, 2014), as shown in Figure 55.

Of importance is that a change (increase) in top marginal tax impacts top income leaves (almost) only influences the very top income. For example, Saez et al. (2012) state that it is the top 1% that is sensitive to changes in top marginal tax while the next 9% is insensitive to changes in top marginal tax. However, as Saez et al. (2012) mention, the higher sensitivity of top income possibly is not caused by an effect on total income, but mainly affects taxable income and an increase in tax causes avoidance by the top 1% diverting taxable income to other channels. Thus it can be questionable whether taxes change registered or true income. Nonetheless, Bivens & Mishel (2013) state that an increase in top marginal income can be effective to curb income inequality and does not damage overall economic growth. This would an important notion as it would give potential to attempt to decrease top income with taxes without any side effects on economic growth.

It is interesting to realize that tax changes the outcome of earned income by reducing the amount of income earned. Bivens & Mishel (2013) reason that there are numerous avenues by which increased top income is possible, e.g., inflated income due to top-income decisions by wage holders instead of stakeholders, exploitation of information asymmetries, reduced bargaining power of other employees, non-cash payment favourability, and performance-based pay-outs (Bivens & Mishel, 2013), and these examples will only be a subset of the potential avenues through which top incomes can increase. As such, they reason that attempting to tackle the source of the income will require a larger number of policies while changes to tax policy would be a far more simple policy to curb the outcomes.

The lagging bottom income

While the previous notions explained why the top earners have seen their income growing considerable, we are yet to become aware of why the bottom incomes are lagging. When reviewing the literature, we find that this has been connected to the retrenchment of the welfare state, as mentioned earlier. As a key notion to the cause of the retrenchment, the 'efficiency thesis' is that the labour market has been made more flexible and support for the average labourer has been decreasing. For this, we will discuss the following two notions: 1. Faltering trade unions and 2. Falling minimum wages.

Faltering trade unions

An important parameter for diverging incomes is the presence of trade unions. They perform wage bargaining between employers and a collective of employees to gain bargaining power. The idea is that trade unions can claim higher wages as their bargaining power is increased by the support of a large employee force, in contrast to employees who bargain on their own. This seems to be an effective tool as there are clear negative correlations between the number of low wage earners and high collective bargaining coverage and high trade union density (Keune, 2021), as shown in Figure 57. According to Kristal & Cohen (2017), de-unionization could potentially explain up to 50% of the growing inequality, as shown in Figure 56. They state that this impact is (partly) caused by the fact that trade unions are also impacting the wage of non-members within that industry. Their theory is that markets with trade union presence cannot (heavily) underpay non-members as it can incentivize them to unify with the existing trade unions. Moreover, they find that trade unions also limit top income by causing lower CEO wages, as shown in Figure 58, and create fewer managerial positions. Overall, the consequences of trade unions do not only impact low income but also top income, by which they are seemingly effective in reducing income inequality.

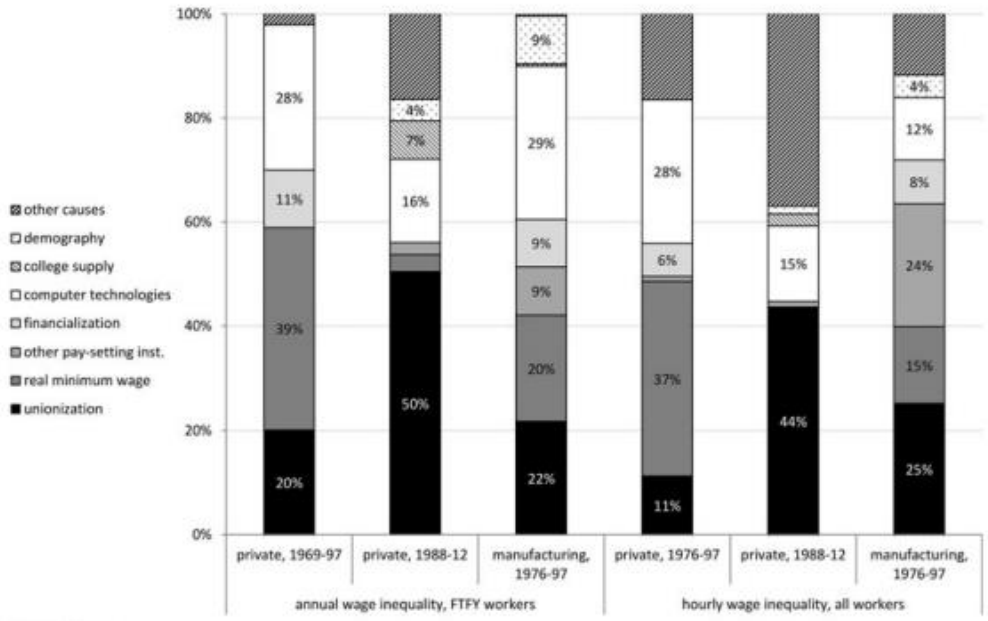

Figure 56 Decomposition of variables impacting income inequality in the United States. *Note: Results are based upon the article's author's calculation using data from Standard Industrial Classification and North American Industry Classification System for the period between 1969-2012. This figure has been obtained from* **(Kristal & Cohen, The causes of rising wage inequality: the race between institutions and technology, 2017)**.

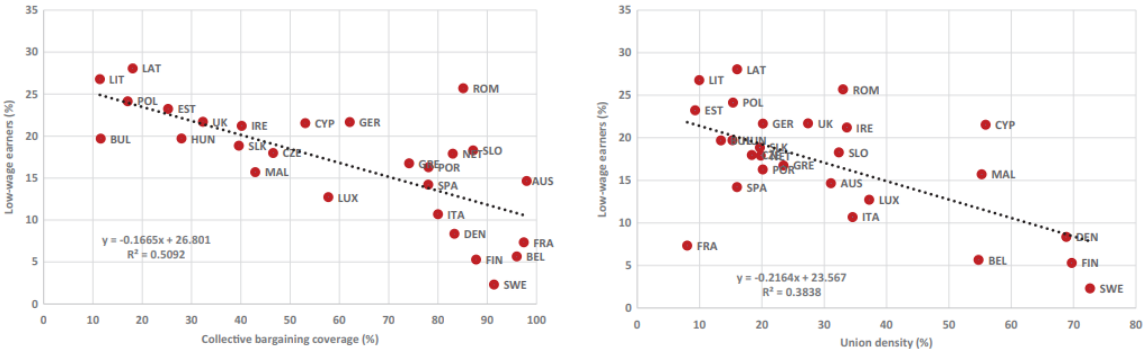

Figure 57 Effects of, left) collective bargaining coverage and, right) trade union density, on low-wage earners. *Note: Both panels represent average results for the EU-27 for the period between 2000-2016. Low-wage workers have been formulated as having income below 2/3rd of the mean income in the period 2006-2014. Calculations are based upon data from Eurostat and OECD. This figure has been obtained from* **(Keune, 2021)**.

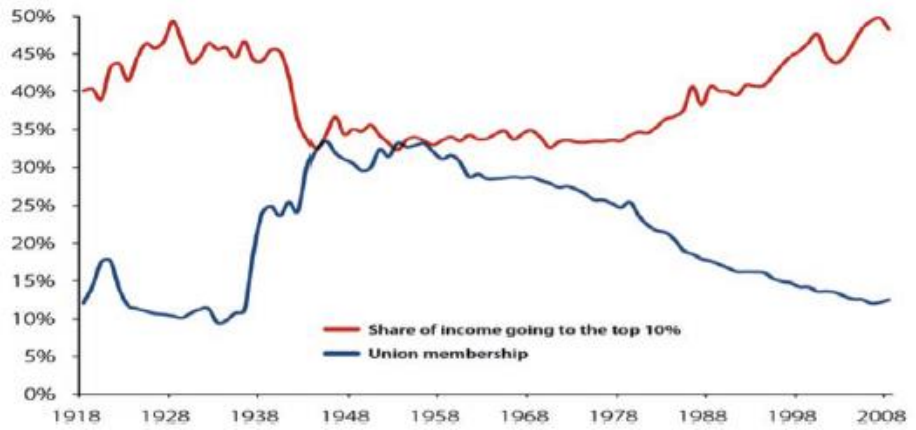

Figure 58 Correlation between income share of the top 10% and union membership. *Note: Results based upon the author's analysis reflect data concerning the U.S. from 1918 to 2009. Data from the Historical Statistic of the United States, The World Top Income Database, and Piketty and Saez* **(2003)**. *This figure has been obtained from* **(Gordon, 2012)**.

Problematic to the effectiveness of trade unions is their dependence on governmental policies. For example, governments can implement the extension of collective agreements by which non-unionized labourers are also benefitting from the agreements made (Keune, 2021). However, governments and institutes have been undermining rather than promoting these features (Van Gyes & Schulten, 2015). As an example, to gain financial support after the crisis, Portugal, Ireland, Spain, and Greece had to put through extensive reforms which included lowering of minimum wage, decentralization of collective bargaining, and reductions in coverage of collective bargaining which have been directly hindering the reduction of income inequality. It would be beyond this thesis to summarize the whole research performed by the European Trade Union Institute regarding wage bargaining, as such we would like to refer to their report (Van Gyes & Schulten, 2015). However, there is a noticeable difference between nations and income inequality which can be related to the strength/protectiveness of the labour market, with stronger labour markets showing lower inequalities (Tridico, 2018), shown in Figure 59. The increase in inequality, therefore, does not seem too surprising as Tridico (2018) notes that the labour market protection has been decreasing ever steadily since the 1990.

Falling minimum wage

An important institutional policy is the minimum wage setting as it creates a (financial) statement in regard to the minimum amount of income required to support basic living conditions. As such, companies are obliged to at least provide this minimum wage which creates a lower boundary to income and should prevent workers from falling into poverty. However, minimum wages are not necessarily automatically adjusted to changing economic conditions. For example, according to Autor et al. (2016), there has only been a limited increase in real minimum wage between 1979-2012 which has been contributing to the income inequality within the USA.

While at first inspection, the minimum wage affects only the lowest wages, its influence is far greater than that. It has been shown by Malloy (2020) that an increase in the minimum wage has a significant effect on top managerial income. The reasoning behind this effect is that to retain the profitability of a company an increase in lower wages needs to coincide with a decrease in top income wages. Moreover, Cengiz (2019) found that the minimum wage affected wages up to $3 above the threshold. When increasing the minimum wage several effects are occurring, as summarized in Figure 60. These exist out of 1. Missing jobs, some jobs will be removed due to excessive costs for the company, 2. Bunching, the jobs that had wages in the region between the new and old minimum income will pay the new minimum wage causing an increase in the number of jobs to pay minimum income 3. Non-compliance, there will be jobs paying wages beneath the minimum wage not complying with the new wage setting, 4. Spill-over, jobs which formerly paid just above minimum wage want to keep paying above minimum wage income and thus increasing the wage to avoid minimum wage payment.

Figure 59 Correlation between income inequality and liberal labour markets. *Note: The x-axis represents an indicator value of 10 different labour market institutions, with higher values being less liberal. The results are based upon article's author's calculations using data from the OECD. This figure has been obtained from* **(Tridico, 2018)**.

An important side effect of minimum wage increases is the effect on the labour market. Frequently it is hypothesized that an increase would cause a decrease in labour demand as it would not be cost-effective. This interaction between increasing wages and the lay-off of employees is captured by the parameter elasticity of substitution. This elasticity of substitution differs per industry as it is not as easy for different types of industries to remove human labour in favour of capital intensified methods. For example, Cengiz et al. (2019) show that in the manufacturing industry the elasticity of substitution is 1.4. Thus, an increase in wages will cause a shift from human labour to capital having a negative influence on income inequality. This is in stark contrast to the service industry, such as waiters, which experienced an elasticity of substitution close to 0 (Cengiz, Dube, Lindner, & Zipperer, 2019). As such, the service industry responds barely to wage increases as an input to transforming human labour into capital. Therefore, in the service industry there seem to be significant opportunities to decrease wage inequality by raising minimum wages. When reviewing the statistics of the Bureau of Labour Statistics from the US (Statista, 2022) we find that Leisure and hospitality industry, i.e., the service industry, constitutes almost 60% of all employees being paid the minimum wage, as shown in Figure 61. Thus, while an increase in wages could cause job loss, the largest industry which is being affected has a close to zero elasticity of substitution. Seemingly, there could be gains achieved in increasing the minimum wage to combat income inequality.

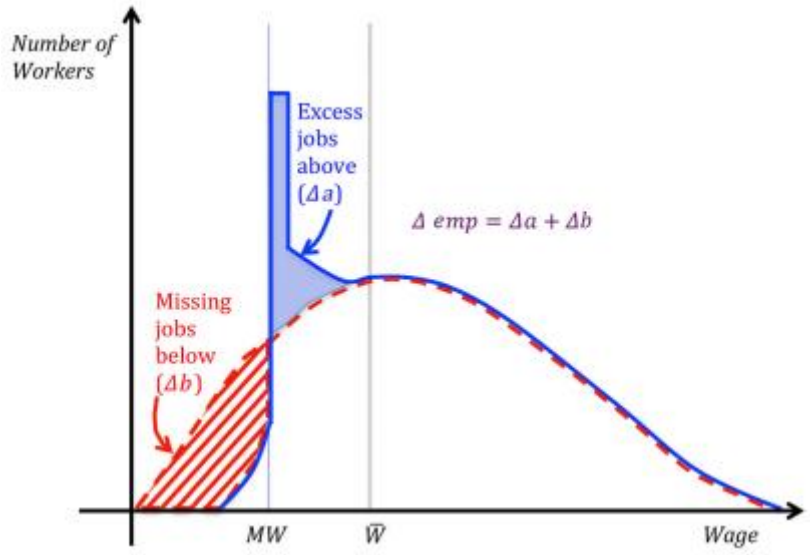

Figure 60 Effect of increasing minimum wage showing bunching, spill-over, and job loss effect. *Note: Red line indicates wage distribution before the minimum wage increase. The blue line indicates wage distribution after the minimum wage increase. The change in employment (Δ emp) equals the number of excess jobs (Δ a) minus the number of missing jobs (Δ b). MW indicates the minimum wage. W indicates the wage cut-off until which the employment is altered due to the minimum wage increase. This figure has been obtained from* **(Cengiz, Dube, Lindner, & Zipperer, 2019)**.

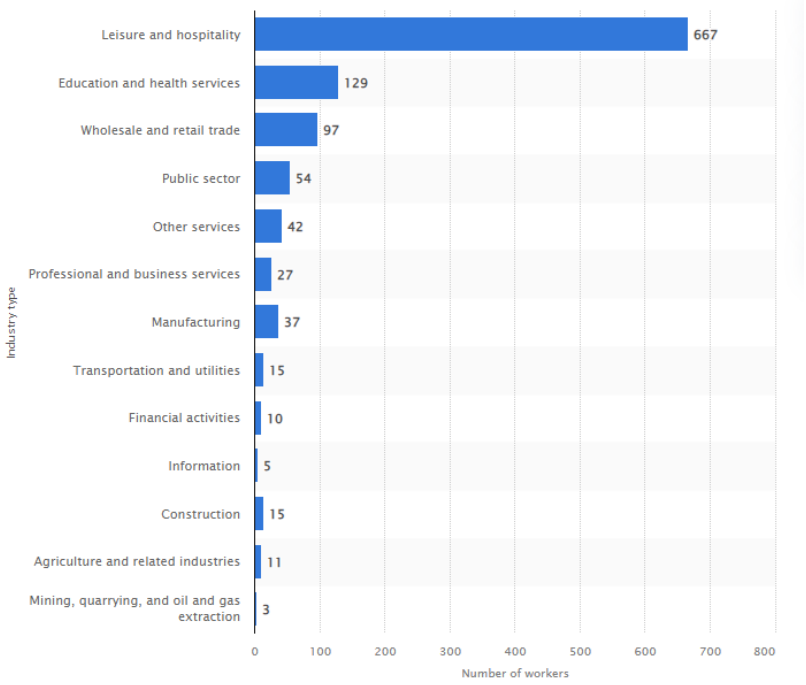

Figure 61 Number of employees paid minimum wage differentiated per industry. *Note: Results reflect workers who are 16 years or older within the US in 2020. Data is retrieved from the Bureau of Labor Statistics. The figure has been obtained from* **(Statista, 2022)**.

3.2 Wealth Inequality

Wealth inequality is higher within societies than income inequality. For example, the Gini index for income inequality for developed countries ranges from 0.3 to 0.4 while wealth inequality for developed countries ranges from 0.5 to 0.9. This gets put into perspective when the size of wealth owned is set against the population size shown in Figure 62. Wealth inequality is seemingly becoming more problematic due to its overwhelming size and its tremendous growth which is exemplified by the following notes of the Oxfam report in 2018 (Oxfam international, 2018):

- In 2017 82% of the growth in wealth went to 1% of the world population and about half of the population had no change in wealth at all.

Figure 62 Distribution of wealth owned by wealth brackets and its share of the total wealth. *Note: Data has been obtained from Credit Suisse Global Wealth Databook in 2020. This figure has been obtained from* **(Inequality.org, sd)**.

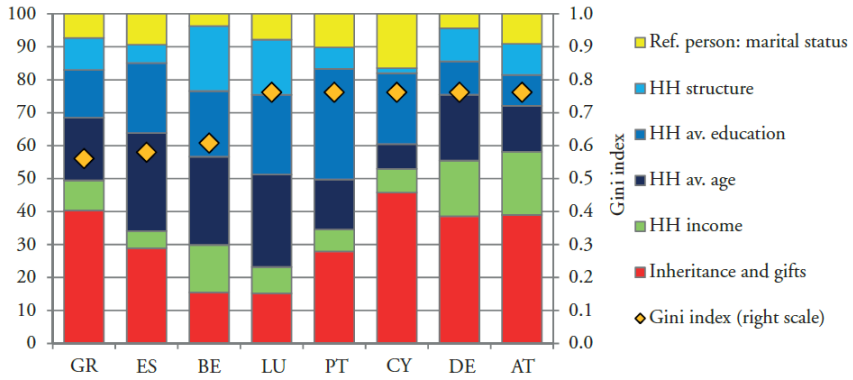

Figure 63 Decomposition of the origins of net wealth for 8 different EU countries. *Note: The results are based on the article's author's calculations, using the database of the HFCS in 2010. The author made use of Shapley value decomposition for net wealth. HH=household, GR=Greece, ES=Spain, BE=Belgium, LU=Luxembourg, PT=Portugal, CY=Cyprus, DE=Germany, AT=Austria. This figure has been obtained from* **(Leitner, 2016)**.

- The richest 1% of the globe owns more than the following 99%
- In the period from 2006 to 2015 the common worker saw an increase of 2% per year in income while billionaires saw an increase of 13% a year
- The number of people who own as much as the bottom 3.7 billion decreased from 62 to 41
- Keeping income distribution constant, the global economy needs to increase by a factor of 175 to push everyone above a 5-dollar income (an ecological impossibility).

According to Davies & Shorrocks (1999), the accumulation of wealth can only occur via two processes, i.e., through income saving or inheritance. Leitner (2016) had a similar perspective on wealth accumulation but makes a distinction between income from labour and capital, and rephrases inheritance as wealth transfer. The importance of wealth transfers and income is supported by Semyonov & Lewin-Epstein (2013). Their analysis shows that wealth accumulation occurs through income from labour and wealth transfers, statistically unaffected by differences prevailing in economy, taxation, and benefit programs between the different countries.

One can attempt to further distinguish between contributing factors. For example, Leitner (2016) assessed five different parameters, as shown in Figure 63: 1) Age 2) Education 3) Inheritance 4) Household composition 5) Income. However, he finds that inheritance, i.e., wealth transfers, explains about 40% of the inequality for half of the analysed countries. As such, also having discussed income inequality, education, and stating that age and household are more demographic factors that are outside the scope of this thesis, we will only review wealth transfers.

However, it is important to stress that wealth accumulation has its particular use in society. Modigliani & Brumberg (1954) described this use by the Life-Cycle theory. This theory states that wealth smoothens expenditure in various stages of life when income is not supporting expenditure sufficiently, as shown in Figure 64. A natural consequence of the theory would be that wealth is unevenly distributed because people are in different stages of life of the life cycle. Moreover, as the life cycle is dependent on income and consumption, the size will differ between people even if they are at the same stage in the

life cycle. However, the life cycle theory assumes careful planning of finance and views the life cycle of a specific person (thus negating potential wealth transfers). While these issues are to be considered, the general concept of the life cycle remains to be largely true for most people (Deaton, 2005).

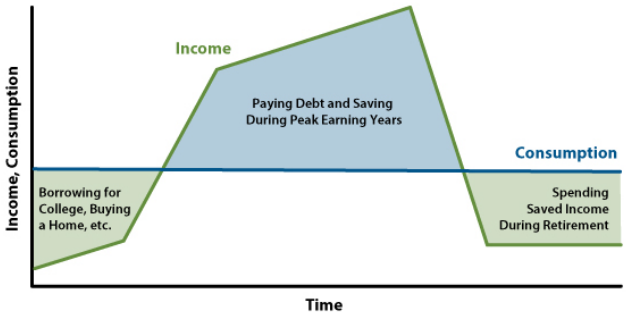

Figure 64 General theory behind the life cycle theorem. *Note: The blue line indicates an average consumption whereas the green line indicates income. In the green areas, wealth is being invested while in the blue area wealth is being accumulated. This figure has been obtained* **(Wolla & Sullivan, 2017)**.

Wealth transfer

Wealth transfer is the process of transferring wealth from one entity to another. Up till now, we have mentioned inheritance, but wealth transfers can occur via two routes, i.e., in vivo transfers and inheritances transfers (Piketty, 2014). The distinction between the two is of importance as in vivo transfers are performed before death and require an active procedure, having a pre-emptive plan, while inheritance transfers are performed after death and occur automatically without the necessity of a pre-emptive plan.

This distinction is highlighted by Wolff & Gittleman (2014), showing that wealth transfers through inheritance occur unplanned for most people. The inheritance had been accumulated from a life-cycle perspective to adjust for potential expenses occurring, e.g., health shocks and emergencies expenditure, and only secondary, if not consumed, is valued as an investment to be transferred to offspring. Only the very top of the wealth distribution accumulates wealth with the main purpose for it to be transferred to offspring (Wolff & Gittleman, 2014). This is in clear contrast to in vivo gifts, i.e., gifts given during life, as reviewed by Albertini & Radl (2012). They show that in vivo gifts are designed to pass on their socio-economic status to their offspring. However, the size of the required vivo gifts differs as the costs of transferring socio-economic status to the offspring differ for the working class as compared to the service class. This, for example, is caused by differences in required investments into human capital, i.e., requiring tertiary education by the service class in contrast to limited education requirements by the working class. However, Albertini & Radl (2012) do acknowledge the existence of altruism and reciprocity for in vivo gifts, but state that the perspective of socio-economic reproduction is more befitting according to their research. This has been aptly narrated by Semyonov & Lewin-Epstein (2013):

> "These findings shed light on social and economic inequality as a temporal process whereby inequality develops within one's lifetime but is transmitted across generations."
> - Semyonov & Lewin-Epstein (2013)

In the past decades, there seems to be a shift from inheritance transfers toward in vivo wealth transfers (Piketty, 2014), as shown in Figure 65. As Piketty (2014) shows, a century ago in vivo transfers contributed around 15% of the wealth obtained while in present times it rose to almost 50% of the wealth. He reasons that this is caused by the increasing life expectancy of the population. The parents attempt to transfer wealth to the offspring at a time of need. While a century ago the inheritance would be obtained around the 30th life year, in recent times this would be around the 50th life year, as shown in Figure 66. As such, inheritance is now received "too late" to bring aid to the offspring in times of need, echoing the transfer of the socio-economic position of Albertini & Radl (2012). To compensate for this, parents are transferring wealth in vivo. When reviewing at which age wealth is being transferred to the children in present times, this is close roughly around 10-15 years before the time of death, as such the children (still) receive their wealth during the (late) thirties (Piketty, 2014).

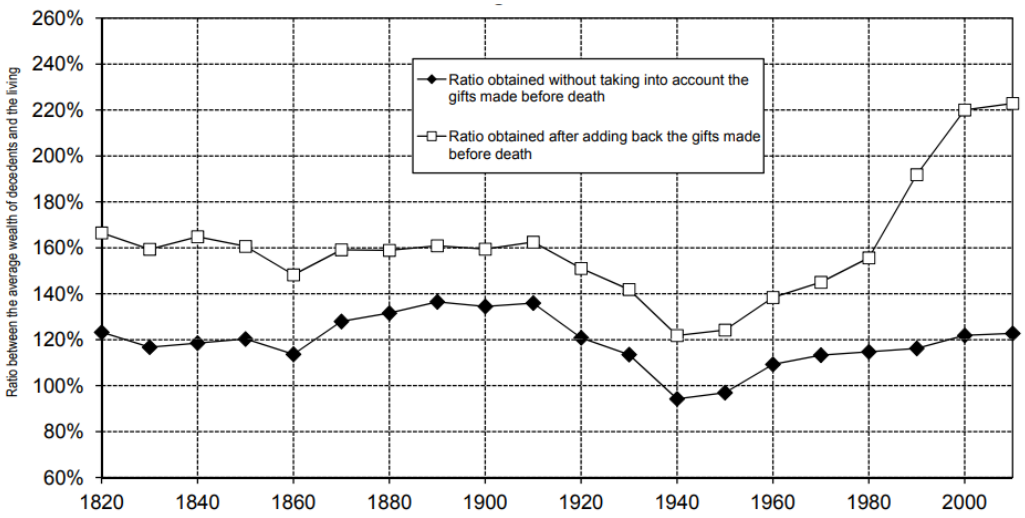

Figure 65 Amount of wealth transferred with and without in vivo transfer. *Note: Y-axis indicates the wealth ratio between the average wealth of the decedents and the living. The triangle line indicates wealth transfers via inheritance. The squared line indicates wealth transfers via inheritance + in vivo. Data is shown for France in the period 1820-2010. This figure has been obtained from* (Piketty, 2014).

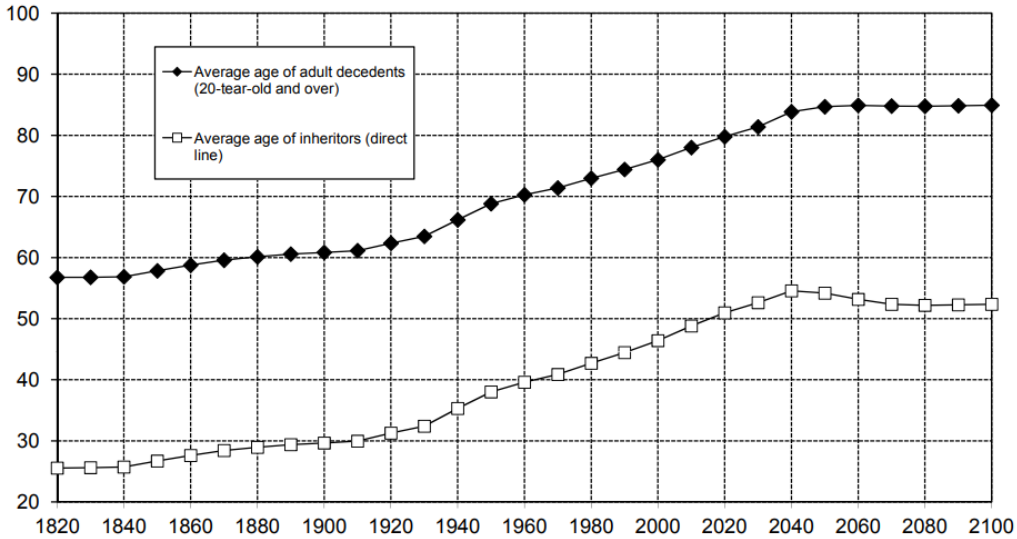

Figure 66 Age of death of descendent and inheritance receiver. *Note: Rectangle line indicates average life expectancy for people >20 years old. The squared line indicates the age of receiving an inheritance from the decedent. Data is shown for France in the period 1820-2010. This figure has been obtained from* **(Piketty, 2014)**.

While Piketty (2014) has made important remarks concerning wealth and its effects on inequality, he certainly does not stand alone in this assessment. For example, Adermon et al. (2018) reviewed the occurrence of wealth in Sweden and found that the impact of inheritance on owned wealth is reaching 50% correlation and effects for wealth are even apparent between grandparents-grandchildren. The effects have also been noted by the OECD (2021) which finds that the high impact of inheritance had been dwindling between 1900-1975, but it has been rising again after 1975 where Sweden was the country with the lowest inheritance effect (45%) and the USA had the highest impact (60%), as shown in Figure 67.

The problematic issue revolving around inheritance is that its effect is non-linear across the wealth distribution with the highest quintile having the largest benefit of inheritance, as shown in Figure 68. As stated by Piketty (2014), the OECD (2021) concludes that with the current development of wealth, the inheritance will play a pivotal role in wealth accumulation from which primarily the wealthy will benefit and gain advantages in the economic market. Boserup with his team performed research in Denmark regarding wealth transfer reviewing both inheritances (Boserup, Kopczuk, & Kreiner, 2016) and in vivo transfers (Boserup, Kopczuk, & Kreiner, 2018).

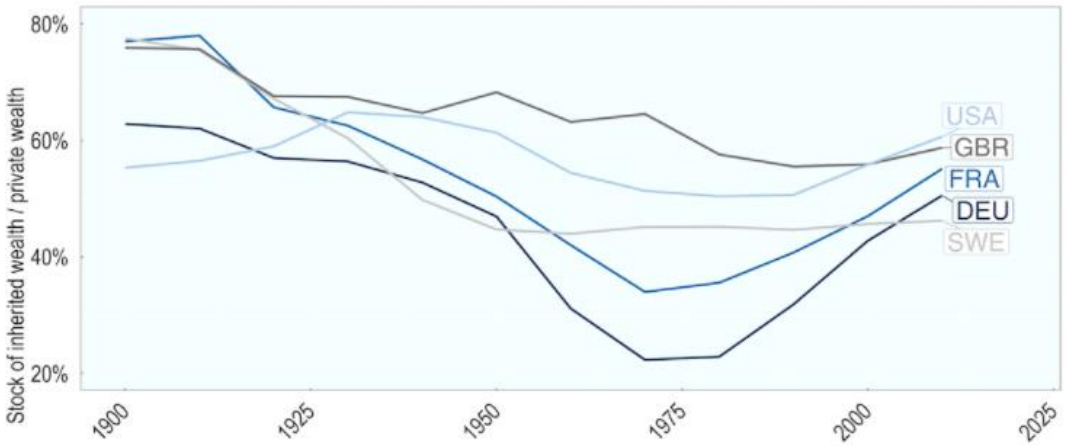

Figure 67 Contribution of inheritance to wealth. *Note: Data has been obtained from Alvaredo et al.* **(2017)** *and Ohlsson et al.* **(2020)** *for Sweden specifically. Data representing the United States are unweighted averages of benchmark and high-gift estimates. Data runs from 1900-to 2010. This figure has been obtained from* **(OECD, 2021)**.

They found that inheritance causes an increase in absolute inequality but a decrease in relative inequality (Boserup, Kopczuk, & Kreiner, 2016), which is similar to the findings of Elinder et al. (2018). According to the latter research, this equalizing effect is primarily the consequence of the fact that debts cannot be inherited. As such, not receiving wealth by the lower deciles is still having an equalizing effect because their parents own negative amounts of wealth. Moreover, because the lower decile groups own only small amounts of wealth, even a small inheritance is of considerable size to them (Elinder, Erixson, & Waldenstörm, 2018), as shown in Figure 69. However, the decrease in relative wealth inequality is stated by its short-term effect, i.e., affects up to 3 years after the transfer (Elinder, Erixson, & Waldenstörm, 2018). The short-term reviews neglect potential revenue obtained from future investment. This becomes more important due to decreasing propensity to consume wealth along increasing wealth/income deciles, as discussed earlier in the section 1.4 Economy under Consumption. According to their research, it is likely that the relative reduction of relative inequality is a short-lived effect after inheritance. We have not encountered research showing the long-term effect of

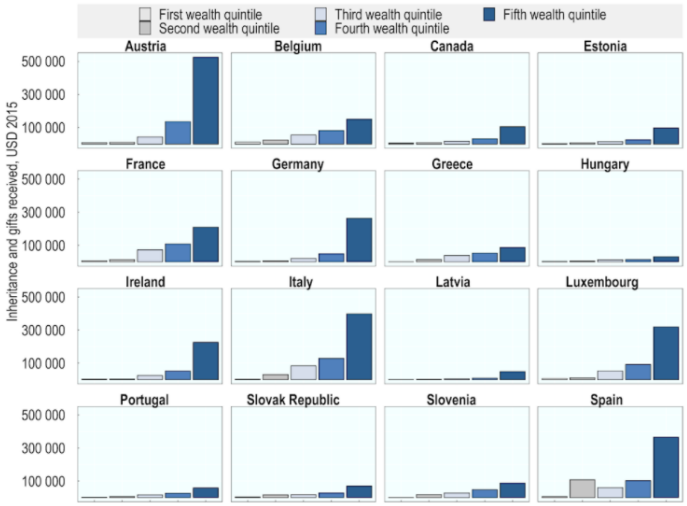

Figure 68 Amount of inheritance gained by quintile group. *Note: Data represents values of 2015 or the latest data available for that specific country. This figure has been obtained from* **(OECD, 2021)**.

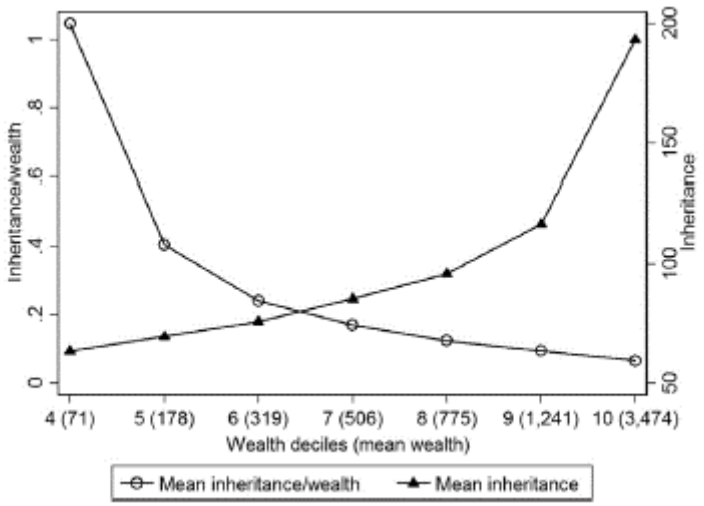

Figure 69 Relative and absolute amount of wealth earned per decile. *Note: The triangle line represents the average absolute inheritance received (in Swedish Krones), with a scale bar on the right. The circle line represents the average relative inheritance received, with a scale bar on the left. The three lowest deciles are excluded from graphical representation as they own a negative amount of wealth making the relative amount of wealth received insensible. The data represents the population of Sweden in 2003 based upon a survey from the cohort 2002-2004. This figure has been obtained from* (Elinder, Erixson, & Waldenström, 2018).

inheritance, but our hypothesis would also state that the effects are only short-lived due to consumption differences and investment opportunities.

While wealth transfers are having a significant impact, Boserup et al. (2018) show indications that in-vivo transfers are potentially of larger importance. They reviewed in vivo transfers occurring at a young age, i.e., before the age of 18, and found that they had a significant impact on wealth later in life. These transfers at a young age were a stronger predictor of future wealth than wealth owned by parents. They show that this relation is not explained by education or capital accumulation, i.e., the wealth owned by an 18-year-old is too small to accrue such rent, but it is possibly explained by differences in financial behaviour, e.g., differentiation in the habit to save and invest (Boserup, Kopczuk, & Kreiner, 2018). If so, this would be an interesting thought as it could indicate a learned habit, which potentially can be educated.

In the narrative of wealth transfers, we do want to highlight that real estate holds a pivotal role in wealth inequality and wealth transfers (Semyonon & Lewin-Epstein, 2013; Christophers, 2018; Pfeffer & Waitkus, 2021). This seems to be a logical statement reviewing the data from Aziparte (Azpitarte, 2010) which shows that 80% of the population has >50% of its wealth entrenched in real estate. Christophers (2018) explains that the housing market is entrenched in youngsters not being able to afford new housing and the elderly who are owning real estate. Fuller et al. (2020) show that the number of house owners in the category 24-35 years has steadily been decreasing over the past decades. Young people seem to be locked out from the housing market and need to rent real estate causing an inverse transfer of wealth from young to old (Christophers, 2018), which increases with increasing real estate values (Fuller, Johston, & Regan, 2020).

According to both Fuller et al. (2020) and Christophers (2018), the gap between house owners and non-house owners is being aggravated through wealth transfers. The coming decades will be pivotal as the baby boomer generation will start to transfer large volumes of (real estate) wealth to their offspring (Christophers, 2018). This could potentially lead to political conflicts between young-old and non-housing/housing owners (Fuller, Johston, & Regan, 2020). We will avoid performing an in-depth analysis of the real estate market, but we like to end with the statement that real estate is an important mediator in wealth inequality and requires attention.

3.3 Economic ladder

In the previous sections, we described the occurrence of income and wealth inequality. In this section, we want to describe how changes can occur along the (socio-)economic ladder. The large importance of this occurrence is mentioned by Alan Krueger (2012) in the following statement while being the Chief Economist of the US Department of Treasury:

> "*Higher income inequality would be less of a concern if low-income earners became high-income earners at some point in their career, or if children of low-income parents had a good chance of climbing up the income scales when they grow up. In other words, if we had a high degree of income mobility we would be less concerned about the degree of inequality in any given year*" – A.B. Krueger (2012)

In essence, Krueger states that forms of inequality can be accepted if the opportunity exists that more advantageous positions can be obtained by all. This is in line with the research performed by Starmans et al. (2017), showing that inequality is not necessarily an unwanted feature, it is the unfairness that is being condemned. They state that policies should focus on creating equal opportunities instead of (more) equal outcomes.

At the pinnacle of equality of opportunity stands the concept of origin independence, i.e., the income of the parents does not correlate to the income of the child. This concept revolves around the idea that the child obtains his income based upon his own merits and everyone has the "same playing field" in regard to opportunity. However, Roemer et al. (2004) describe that it will never be possible to create independence of origins because the family influences: 1. The aspiration and goals of the offspring, 2. Genetic transmission of abilities, 3. Social connections of the family, and 4. Family culture and investment. As Arneson (2015) states, equalizing social background will be impossible as the government is deemed to not interfere with the private space of social structures of families. Moreover, disconnecting outcome and opportunity is close to an impossibility. For example, Corak (2016) described that inequality of outcomes can influence political power and educational opportunities which further strengthens the inequality of outcomes. The IMF supports these types of findings, stating that unequal access to education, labour markets, and finance influence income inequalities (Aiyar & Ebeke, 2019).

However, equality of opportunity does not necessarily have to lead to economic mobility. For example, Arneson (2015) described that societies can have complete equality of opportunity but still have limited mobility. An example of a limiting process is assortative mating, i.e., people with similar backgrounds creating new families, which can transfer genetic advantages of families to the offspring. These advantages could cause

that highly educated parents receive offspring able to attain higher education while low educated parents receive offspring with limited educational prospects. The former hypothetical sketch shows that traits that cannot be equalized can still cause low mobility. Overall, while mobility and opportunity are closely related concepts, they both have inherently different meanings, and we will discuss both topics in a separate subsection.

Economic mobility

Economic mobility is an umbrella term for quantifying the ability to alter income or wealth relative to a certain perspective. Broadly, we can distinguish four of these perspectives (Sawhill & Morton, 2007):

1. Inter-generational mobility: The change of income compared to another generation, mostly viewed from a father-son perspective.
2. Intra-generational mobility: The change of income compared to peers within the generation, often a career perspective is taken.
3. Absolute mobility: The change of income in absolute figures compared to another point in time. This can also be called structural mobility, it does not per se alter the ranking of the distribution, but it can change the shape of the distribution of income.
4. Relative mobility: The change of income in respective to another, thus the change upon the economic ladder. This can also be termed exchange mobility, the relative rise of one person causes the relative decrease of another person.

The first two types of mobility describe the mobility compared to a specific group, while the latter two perspectives describe mobility compared to the shape of the distribution. As our interest resides with (re)shaping the distribution, we will zoom in on the last two perspectives, i.e., relative and absolute mobility. They both have their unique position in the field of inequality which we will explain in the following two scenarios.

In the first scenario we assume that only absolute (income) mobility is present, thus an absence of relative (income) mobility. In such a case it would only be possible to change income, i.e., having a higher or lower income than before, but it would not be possible to earn more (less) than the person above (below) you within the distribution of income, as relative (income) mobility is not present. In this world, one can change one's income, e.g., lift oneself out of poverty, but one's position in the distribution is fixed in perpetuity. As such, the poorest people would continue to be the poorest people indefinitely. Such a system would be at risk of creating social classes as an initial economic position could lead to a fixed socio-economic position.

In the second scenario we assume that only relative (income) mobility is present, thus an absence of absolute (income) mobility. In such a system there is no change in income for anyone, i.e., the shape of the distribution is fixed, but everyone would be able to swap positions with someone else in the distribution. Thus, the poorest person could become the richest person, but another person would need to take his place as the poorest person. In this world, there is fluidity in economic position and the ability to form socio-economic classes is lowered. However, the number of people living in poverty is not altered, only the people affected by it would alter with the passing of generations.

The general takeaway from these scenarios is that absolute mobility is required to improve the living condition by pulling people out of poverty, i.e., changing the shape of the distribution, while relative mobility is required to obtain social fairness, i.e., avoiding fixation of (socioeconomic) position within in the distribution.

While we will be describing mobility as a separate entity within the field, it most certainly is interconnected to economic inequality. This is shown by "The Great Gatsby Curve", introduced by Alan Krueger (2012). This curve indicates that there is a positive correlation between income inequality and income mobility, as shown in Figure 70. It is difficult to give a (direct) causal explanation to this interaction, but Durlauf & Seshadri (2018) hypothesize that it can be explained by reduced mobility due to increased segregation among classes. Class segregation in turn occurs through spatial segregation where the rich are spatially clustering (Reardon & Bischoff, 2011). This clustering is enhanced by increased income inequalities which gives high incomes access to (exclusive) expensive living locations. These locations are experiencing improved conditions, e.g., improved education as mentioned in section 1.3 Education, and cause detachment of the rich from the other groups due to lowered interaction between classes. This in turn leads to a reduced incentive to support favourable policies for the other classes as unawareness and detachment dictate (Reardon & Bischoff, 2011).

The previous narrative revolving around the Great Gatsby curve shows the complexity of the numerous cogwheels which are interacting in the system of economic inequality. While it seemingly is interesting to investigate, it is difficult at best to prove such a theorem and requires many assumptions. To avoid getting off track from the scope of this thesis, we will leave it at this and go further by explaining the basic concepts of absolute and relative mobility.

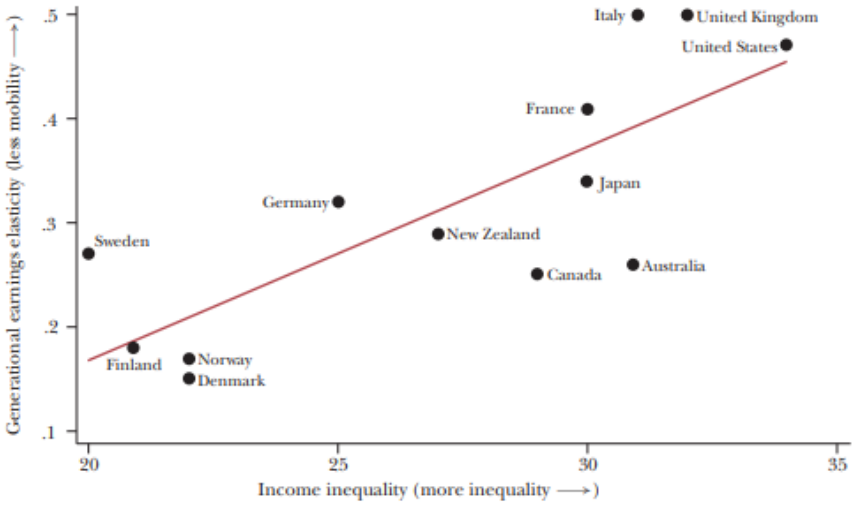

Figure 70 The Great Gatsby Curve, the correlation between income inequality and income mobility. *Note: Income inequality is measured by the Gini index using disposable household income. Intergenerational economic mobility is measured as the elasticity of average long-term income around the age of 30 between father and son. Data has been derived from the article's author's calculations and the OECD database. This figure has been obtained from* **(Corak, 2013)**.

Absolute mobility

As mentioned earlier, absolute mobility represents the change in income that alters the shape of the distribution curve. One can have negative (downward) and positive (upward) absolute mobility, with the former representing a decline in income while the latter representing growth (Berman, 2022). In general, one can relate absolute mobility with the state of the economy, i.e., a growing economy will cause positive absolute mobility when the growth is distributed equally along with the distribution (Manduca, et al., 2020; Kennedy & Siminski, 2021).

In this topic, Chetty et al. (2017) published important research reviewing absolute mobility in the United States. They found that absolute mobility declined in the United States in the 2nd part of the 20th century. While 90% of the children earned more than their parents in the 1940s, this decreased to 50% of the children in the cohort 1980s, as seen in Figure 71. They found that this decrease can be explained by the fact that the growth in GDP is concentrated among a smaller portion of the population when compared to the past. If the growth would be distributed among the population as it was in the 1940s, the absolute mobility would have been 80% instead of the measured 50% (Chetty, et al., 2017).

This decrease in absolute mobility can also be interpreted using the parent-children income curve for the cohorts of the 1940s and 1980s, shown in Figure 72. However, these curves also signify two other interesting notions. The first notion is that not only does the absolute mobility odds decrease, but also the relative increase vastly differs. In the cohort of 1940s, the 80th percentile of the parent's distribution corresponds with the 14th percentile of the children's curve while in the 1980s cohort this intersects with the 74th percentile. So those who have absolute mobility have so in smaller sizes. The second notion is that the peak of the income curve of the children (compared to the parents) is to the right in the 1940s cohort while it is on left in the 1980s cohort. Overall, the bunching

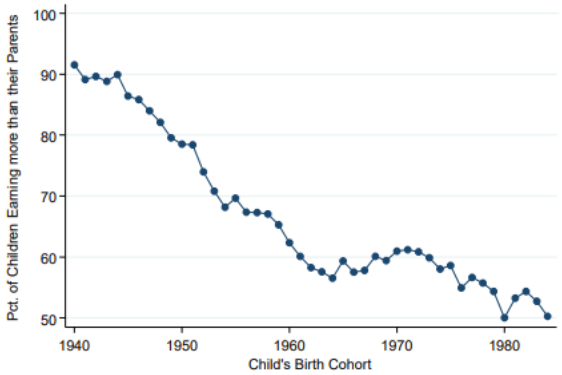

Figure 71 Absolute mobility decreased from the 1940s up to the 1980s. *Note: Percentage of children who were in a higher income percentile compared to their parent's income percentile. Parents' income is calculated as combined income with the highest income earner between the age of 25-35 using tax data between 1980-1982. The child's income is calculated using combined income from child and spouse income, at age of 30 from the CPS March supplement. Income is measured as real dollars in 2014 using CPI-U-RS. Parents with zero income were excluded. This figure has been obtained from* **(Chetty, et al., 2017)**.

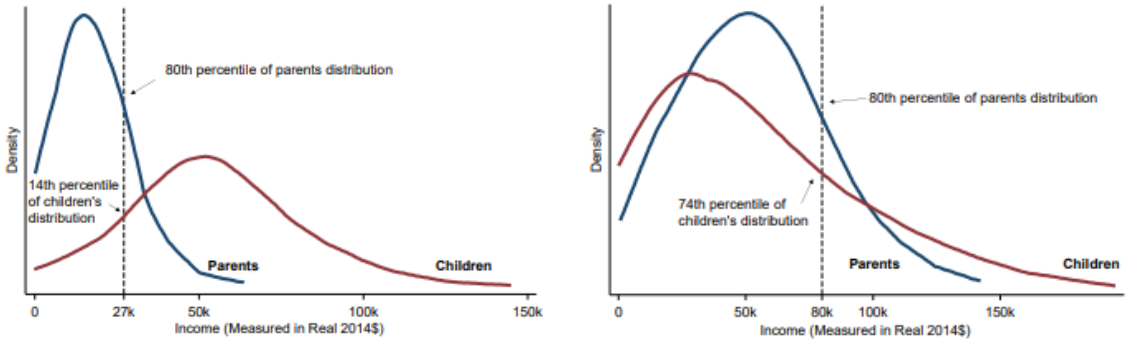

Figure 72 Left panel) Family income distribution for birth cohort 1940, Right panel) Family income distribution for birth cohort 1980. *Note: Blue line indicates parents' income, and the red line indicates children's income. Incomes have been scaled as real dollars in 2014. Incomes are measured around the age of 30. Parents with zero incomes have been excluded as well as incomes above 200.000 dollars in general. This figure has been obtained from* **(Chetty, et al., 2017)**.

of income thus occurs at a lower level with a longer tail to higher incomes. Chetty et al. (2017) also find that the middle-class has the lowest absolute mobility compared to all other classes. Although not concluded, overall, this could be an implication of the squeezing of the middle income, i.e., the income in the middle income is pushed towards low and high income with the brunt ending in the lower-income portions.

Manduca et al. (2020) extended the research of absolute mobility reviewing not only the United States but also including seven other Western countries, as shown in Figure 73. They found that the decrease in absolute mobility is not a global phenomenon. For example, Sweden, Finland, Norway, and Canada are having essentially stable mobility since the 1970s. However, a decrease is certainly not unique only for the U.S., also Netherlands, Demark, and the UK experienced a decrease in mobility.

Figuur 5.4 Sociale mobiliteit en inkomensongelijkheid in rijke landen

Bron: Wilkinson (2013).

Relative mobility

Relative mobility reviews the relative change of a parameter of one person to another, an example of this process is shown in Figure 75. This can be done in various

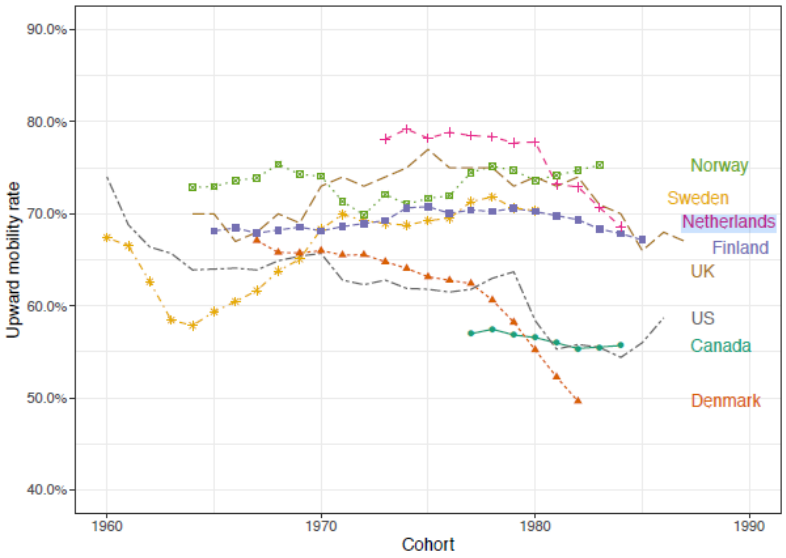

Figure 73 Relative portion of the population experiencing absolute upward income mobility for various countries. *Note: Upward mobility rate has been calculated as the total income of the family at the age of 30. Results are based upon the article's author's calculations using register and survey data from the specific countries. This figure has been obtained from* **(Manduca, et al., 2020)**.

forms with the most common being status mobility, class mobility, individual earnings, and family income (Torche, 2015). These parameters are (mostly) measured by intergenerational differences between parents and children. For example, economic mobility can be measured by the elasticity of the parent's earnings to the child's earnings or the earnings rank of the parent compared to the child's rank. This is in contrast to sociological parameters which use an integration of various parameters such as education, employment, earnings, wealth, and health. Interestingly, the sociological parameters and the economic parameters are not per se correlated in having the same outcome. While economic mobility is closely related to economic inequality, sociological mobility is only weakly, or even uncorrelated, to economic inequality (Torche, 2015). Noting that this thesis concerns economic inequality, we will focus on economic mobility due to its importance to the field.

As mentioned, relative mobility is concerned about the fluidity of the economic distribution and correlates and is negatively correlated with economic inequality. We find that there is a large variance in economic mobility across various nations. For example, Corak (2016) shows that on an international level, differences can be seen between developed and developing countries, i.e., the former has higher mobility than the latter, but also that countries with higher inequality (compared to countries with low inequality) also experience less mobility. The implications of these differences can be vast, as will be shown in the following example.

Corak (2016) found that the intergenerational income elasticity for Denmark was 0.15 while for Peru this was 0.67, as shown in Figure 74. Now, let's assume that Peruvian person A earns 100% more than another Peruvian person B, then the son of A will earn 67% more than the son of B. In the next generation, their sons will have a difference in income of 45%, and so on. To close the gap of income <5% between these two bloodlines, it will take 8 generations, i.e., 240 years. When comparing the same scenario to Denmark,

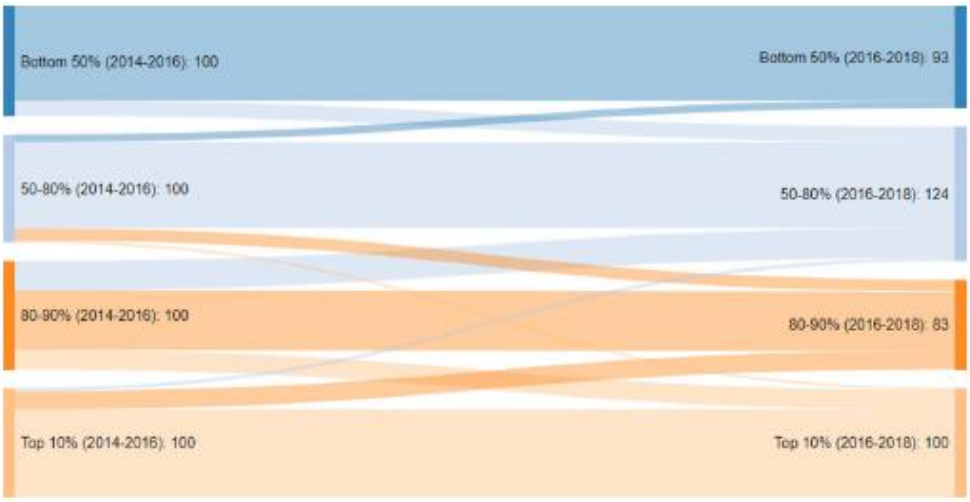

Figure 75 Relative wealth mobility within the UK. *Note: Relative mobility measured as change in value between 2014-2016 and 2016-2018 WAS measurements. Wealth is measured according to the household. This figure has been obtained* (Advani, Bangham, & Leslie, 2021).

having an elasticity of 0.15, this will take two generations, i.e., 60 years. Thus, the difference between an elasticity of 0.15 and 0.67 causes that it will take 180 years more to close income differences. As such, differences that occurred right after the Second World War have been resolved in Denmark while Peru is still being impacted by income differences which were present when Napoleon was ruling France as an emperor. As such, the differences can have large implications for the future.

It is important to realize that economic mobility is, once again, an aggregate of various sub-units. For example, differences can be seen between income groups with the middle-income group having high mobility in contrast to high- and low-income groups which are having limited mobility (Corak, 2016). Or reviewed from an ethnic level, the immobility within low-income is more pronounced for the black community within the US or single parents compared to other groups. Moreover, Hansen (2014) found that wealth mobility is limited due to the transmission of wealth causing potentially being more

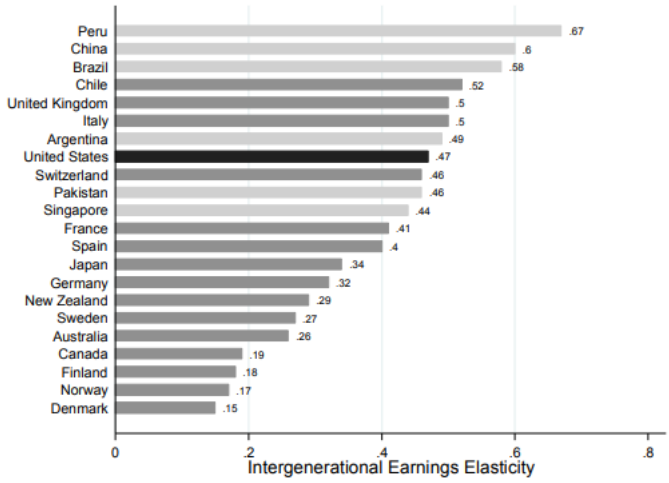

Figure 74 Intergenerational income elasticity between father-son earnings over twenty-one countries. *Note: Lightly shaded countries indicate non-OECD countries which have (in general) a lower mean income. This figure has been obtained from* **(Corak, 2016)**.

limited than income mobility. She reviewed the transmission of wealth within families in Norway and its importance in retaining wealth. She concluded that over time the wealth background became of higher importance, and it implies the closure of wealth exists at the top of the wealth distribution.

Moreover, we did not investigate individualistic incomes and family incomes. However, their differences are of importance with Torche (2015) stating that the latter should be the preferred parameter. She explains as such because family income is more capable of including assortative mating and adjusting for income decisions, e.g.., one of the parents sacrificing income in favour of parenting. However, we will refrain from investigating mobility in-depth for different sub-units of the perspective as it would divert from the overall thesis. We do want to state that from a policy perspective these differences can be important for a targeted approach.

Related aspects

This importance of economic mobility is captured by the fact that it is, e.g., incorporated into the national ethos of the United States, i.e., *the American Dream*. The idea revolves around the possibility for every person, regardless of socioeconomic background, to become rich and famous (Adams, 1931). As such, the American Dream glorifies the possibility of relative mobility, everyone can settle among the richest persons if one studies and works hard.

This focus on the winner mentality, i.e., the ability to improve income, has resulted in an interesting by-effect which is formulated in the "*prospect of upward mobility*" (POUM) hypothesis. The essence behind the POUM hypothesis is that people earning less than the average population oppose redistribution of income and wealth as they expect themselves to be able to obtain higher income in the future. The idea that their future selves, or their children, will be residing in the upper deciles of income and wealth and redistributive policies will affect their future high income/wealth. As such, the redistributive policies would be damaging to their potential future income/wealth (Benabou & Ok, 2001). Cojocaru (2014) showed that the POUM hypothesis is not only relevant for the United States but also for EU countries. There are three conditions which need to be met before POUM will be valid (Benabou & Ok, 2001):

1. There is the belief that the current policies will persist into future times
2. There needs to be low-risk aversion, as redistribution would bring more certainty of increased income and wealth than economic mobility as downward mobility is also an option.
3. The people need to have a belief that an increase in income and wealth is a possibility

It is not clear whether relative and absolute mobility are interacting. Manduca et al. (2020) state that there is no interaction while Chetty et al. (2014) claim the opposite. Chetty et al. (2014) show this interaction by showing the overlap in absolute and relative mobility in different regions, as shown in Figure 76. They connect these regional effects to the variance in income mobility to five different factors: 1) segregation 2) inequality 3) school quality 4) social capital and 5) family structure. Potentially these differences in

correlation can be explained due to differences between countries. As noted by Deutcher & Mazumder (2021), there is a (high) correlation between different types of mobility, but these correlations differ per country and, as such, are difficult to be generalized for all countries.

As to what it means that absolute and relative mobility are correlated, Chetty et al. (2014) calculated the effect of a 1 unit increase in relative mobility on the absolute mobility for the various percentiles. Their research shows that absolute income increases with increasing relative mobility for parents below the 85,1 income rank (with rank 1 being the lowest income and rank 100 the highest) and decreases for parents' income rank above 85.1. However, for lower-income individuals, the positive effect is almost 4 times as large as the negative effect for the high-income. As such, policies which attempt to improve relative mobility for poorer families can improve their absolute outcomes significantly while only 'hurting' a relatively small portion of the population with smaller effects (Chetty, Hendren, Kline, & Saez, 2014).

In a poetic form, wealth inequality seems to be ruled by the Matthew effect:

> *"For whoever has will be given more, and they will have an abundance. Whoever does not have, even what they have will be taken from them."* – The Matthew effect (Merton, 1968).

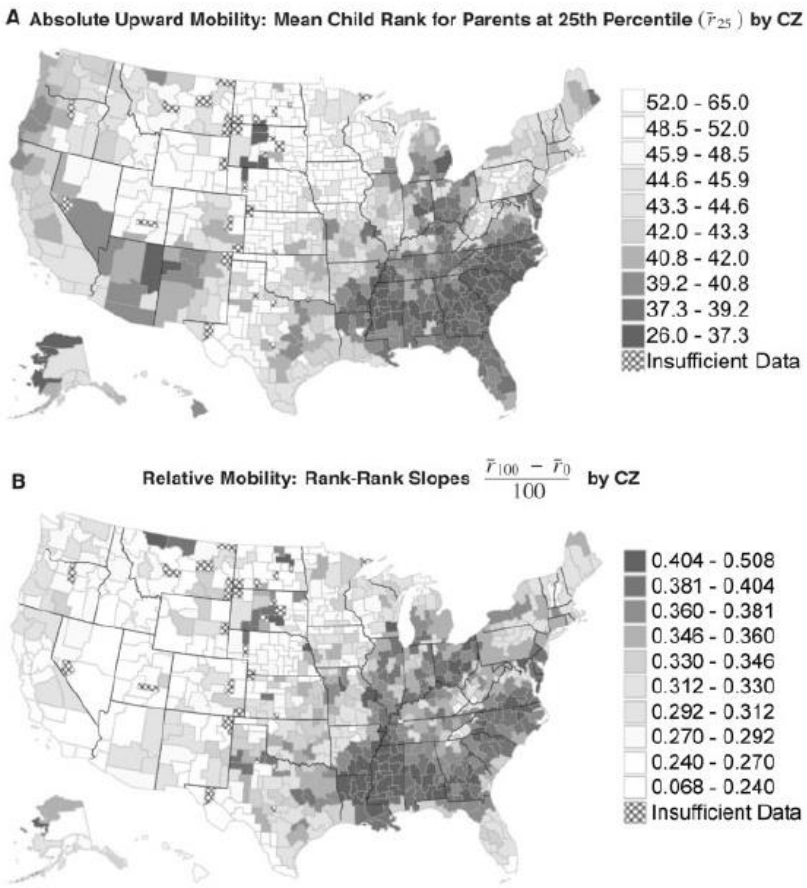

Figure 76. Correlation between absolute (top panel) and relative (bottom panel) mobility with the US. *Note: The data represents outcomes for birth cohort 1980-1982 per zone. The lighter areas represent the portion of children experiencing absolute mobility (top panel) and the correlation between parent's and child's income rank (bottom panel) (low values indicate low correlation and vice versa). Checkerboard areas have less than 250 parent-children coupled data and are regarded as having insufficient data. This figure has been obtained from* **(Chetty, Hendren, Kline, & Saez, 2014)**

Equality of Opportunity

Research revolving around equality of opportunity is interested in giving everyone a fair chance to develop their merits. In this section, we will discuss some key notions revolving around equality of opportunity. However, we will keep it brief as this topic slides towards the intrinsic aspects of inequality, i.e., the justification of economic inequality (Peterson, 2017), which, as mentioned in the objectives, will not be discussed.

In short, equality of opportunity envisions inequality as an honest outcome if the underlying principles of equality of opportunity have been met (Marrero & Rodriguez, 2012). The principles can be distinguished into two different elements (Hufe, Kanbur, & Peichl, 2018):

1. Effort: the various parameters which can be influenced by the person itself. For example, the amount of time and training invested to acquire a certain skill
2. Circumstance: the various parameters which cannot be influenced by the person itself. For example, gender, race, and a person's physical dimensions.

The importance of these two principles is that effort is valued as an individual task while circumstance is valued as outside of the influence zone of the individual. Because of this, 'effort' is deemed to be an acceptable source of inequality whereas 'circumstance' is deemed to be an unacceptable source of inequality. Therefore, policies ought to be targeting parameters involving circumstances (Hufe, Kanbur, & Peichl, 2018). In other terms, the goal is creating complete equality of opportunity such that economic hierarchy is the result of differences completely based upon 'effort' (Arneson, 2015).

Moreover, one should not underestimate what equality of opportunity, i.e., to remove inequalities in circumstance, entails. It requires that everyone gets the same opportunity to obtain an education, equal nutrition, equal access to the internet, equal access to cultural events, and so on. To obtain complete equality in every field will be a large financial burden and is (inherently) impossible to obtain (Arneson, 2015). Therefore, some form of analysis is needed to indicate which parameters can be 'equalized', this quickly becomes a political opinion as to what we need to invest in and whatnot.

However, as Hufe et al. (2018) note, while economic inequality based upon effort may sound fair, it does not automatically lead to inequality which can be deemed ethical. The main issue is that equality of opportunity does not set any boundaries to the economic ladder, i.e., there is no upper and lower limit to income earned. The main problem occurs with the absence of a lower limit, as people have a set of minimal needs which needs to be paid for. They state that people have a right to have "Freedom from Poverty" because of being ethically obliged to supply at least minimum living standards. As such, fully relying on equality of opportunity to create fairness is too much to hope for. Hufe et al. (2018) attempted to measure fair and unfair inequality with the latter conflicting with equality of opportunity and inequality causing poverty to be unfair. They found that not only fair inequality has grown, but also unfair inequality has become of larger importance relative to fair inequality. To be specific, from 1995 to 2012 52% of the increase in inequality could be contributed to an increase in unfair inequality, as seen in Figure 77.

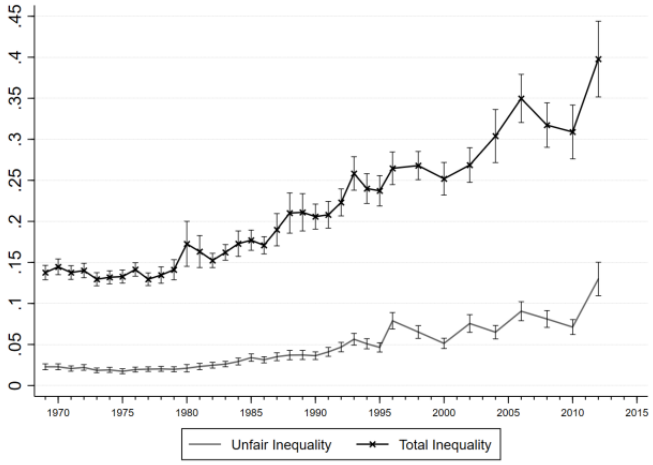

Figure 77 (Unfair) Inequality through the years. *Note: Data represents inequality (black line) and unfair inequality (grey line) in the US between 1969-2013. Black crosses indicate calculated total inequality using mean log deviation with 95% confidence intervals based upon the bootstrap procedure. The article's authors used PSID public dataset and PSID-CNEF. This figure has been obtained from* **(Hufe, Kanbur, & Peichl, 2018)**

While at the one hand we can attempt to define what is fair and unfair inequality, not even considering which parameters are to be equalized and which are of personal concern. There are also two fundamentally different procedures concerning how equalization can occur (Fleurbaey & Peragine, 2013):

1. Ex-ante procedure: everyone has the same set of possibilities regardless of their circumstance
2. Ex-post procedure: everyone who puts the same amount of effort into a venture obtains the same outcome

Fleurbaey & Peragine (2013) explain that these procedures are conflictive in nature, one can either perform one or the other, but cannot apply both. In essence, the ex-ante procedure evaluates the difference in circumstances, not yet including the performed effort by the entities. This procedure emphasizes equalizing circumstances between entities and assumes that the occurring differences will be the consequences of effort. In the ex-post procedure, both the circumstances and the effort are being measured. As such, it attempts to measure if an equal effort has been exerted and, if so, attempts to equalize the outcome. From their analysis, they conclude that the ex-post procedure should be preferred as the ex-ante procedure can create the false belief that circumstances have effectively been equalized and the remaining consequences are the result of differences in effort. Moreover, Fleurbaey et al. (2017) state that the ex-ante approach also neglects the interaction between effort and circumstance. We will refrain from explaining how to implement these methods but highlight that 'how to equalize opportunity' has a field of analysis on its own which needs to be considered.

3.4 Chapter Conclusion

In this chapter, we have discussed the parameters which are resulting in economic inequality. In broad terms, we find that numerous parameters affect income and wealth inequality, and they are frequently interconnected, but mostly the top income and wealth have seen an incredible increase when compared to other portions of the distribution. However, it is difficult to distinguish cause and effect, as the effect is also affecting the cause. Moreover, while various parameters can be recognized, it is seemingly impossible to recognize the most pivotal parameter. Almost every research report various "ifs and maybes" and states that their researched parameter is part of a large system.

Even if parameters are known and are susceptible to governmental policy, it is tremendously difficult to effectively intervene in unwanted processes. A prime example of such a problem is the Child Poverty Act 2010 in the UK. The British government attempted to abolish child poverty and improve mobility through the Child Poverty Act 2010. At the launch, it proposed various interventions such as combatting the entrapment of the low socio-economic positions, mostly through poor education prospects, and advised improving lower education (Social Mobility and Child Poverty Commission, 2013). However, it has been a large failure, in 2013 it already became clear that the goals set for 2020 were "almost totally out of reach". The relative poverty would be twice as high as the set goal and the absolute poverty a stunning five times the set goal (UK Parliament, sd). It was in 2015 when the Child Poverty Act 2010 was replaced with new legislation (Department for Work and Pension, 2015).

While serious attempts have been taken to tackle child poverty and mobility, they failed to do so as economic downturns hampered intervention (UK Parliament, sd), but also doubt was created about the analysed parameters stating that new multidimensional parameters would be more effective (Secretary of State for Work and Pensions , 2012). Sadly, not everything is not in our control, even knowing which parameters are of influence, and which parameter to tackle, the complexity will continue to form a struggle when attempting to address inequalities.

Conceptual model's building blocks

To complete the analysis for this chapter, we have retrieved the following "building blocks" for our conceptual model:

1. Income inequality

a. Income Inequality – Taxes & Benefits

Because of (increased) top marginal tax, top incomes have reduced incentives to bargain for higher incomes and total incomes are made more equal.

b. Income Inequality – Labour Bargaining

Because of (increased) labour bargaining, low incomes can obtain higher wages and top income positions are reduced and receive lower wages.

c. Income Inequality – Welfare State

Because of the welfare state, institutional designs are possible such as minimum wage which helps in reducing income inequality by aiding low incomes.

d. Income Inequality – Technology

Technology increases the capital share from income when mechanisation occurs, but can also decrease the capital share of income when innovation occurs.

e. Income Inequality – Globalization

Because of globalization, larger opportunities exist for capital to "find" higher returns and labour positions have less bargaining power due to larger competition.

f. Income Inequality – Financialization

Because of financialization, top incomes have various methods to increase their wages using financial assets which are not available to low-wage jobs.

g. Income Inequality – Wealth inequality

As wealth and income distributions are correlated, the returns from capital are primarily concentrated in the higher income portion of the distribution.

2. Wealth inequality

a. Wealth Inequality – Taxes & Benefits

Wealth inequality can be sustained at large due to favourable tax policies on wealth (transfers).

b. Wealth Inequality – Real Estate

Wealth inequality runs along with real estate ownership where real estate owners have favourable returns on capital whereas non-real estate owners need to pay (via rent) for living accommodations.

c. Wealth Inequality – Financialization

The accumulated wealth can be invested into financial assets which have larger returns on investment than saving rents among low wealth owners causing an increase in inequality.

d. Wealth Inequality – Wealth Transfers

Families with wealth are enabled to transfer wealth along sanguine lines which positively correlates with wealth accumulation among recipients.

3. Economic ladder

a. Mobility – Income Inequality

Inequality and mobility are negatively correlated with each other. Moreover, if there is the fluidity of poor people also being able to become rich at one point in their lives, then inequality would be less of an issue.

b. Mobility – Education

Mobility is largely enhanced by increased education which enables obtaining a high wage position and flexibility in the number of job positions available.

c. Mobility – Real Estate

Mobility is largely stratified according to the lines of real estate ownership having segregation in the household with and without real estate.

d. Mobility – Wealth Transfers

Mobility is stratified according to wealth transfers, those who receive (in vivo) wealth transfers enable gaining favourable (socio-)economic positions.

e. Mobility – Stratification

Segregation of society potentially aids in creating positive/negative effects for social clusters which (negatively) impacts mobility.

4 Redistribution policy – One for all, and all for one?

So far, we have discussed how economic parameters can be quantified, and the cause & effect of economic inequality. In this last describing chapter, we want to discuss the tax & benefit policies which is one of the most influential policies a government can draft (Bourquin & Waters, 2019). In short, this is done by the ability of taxation to subtract income or wealth from people while benefit policies can give (monetary) support to its people.

When considering taxes & benefits for their potential to cause redistribution, it is important to realize that they have essential differences. For example, taxes are primarily based upon individual earnings while benefits are frequently based upon household income. Moreover, taxes are often incurred for a fixed period of one year while benefits can be distributed in times of need for varying periods and, not being uncommon, can be for a period of only a few months (Mirrlees, et al., 2011). These differences cause that an individual could be paying both taxes and receiving benefits at the same time. The importance of this duality is that it can affect tax payments and benefits received when they are not reviewed properly, as is shown in Figure 78. As such, it is ill-advised to review the two items too much as separate entities and one should approach the tax & benefit system as one coherent system (Mirrlees, et al., 2011), this being one of the reasons why we discuss it in this chapter conjointly.

The importance of taxes and benefits differs according to the desired target of the policies, i.e., reducing poverty, improving low-income, or enhancing redistribution (Brady & Bostic, 2015). However, having one goal in mind does not immediately cause that another goal is also achieved. For example, a policy designed to cause redistribution does not immediately cause an improvement of low income. This is explained by the example that levying higher taxes on high income would reduce inequality but does not improve the wages of the poor. Another example being that a tax reduction for low-income wages does not automatically reduce poverty as the impoverished can have no income and thereby have no positive effect from this policy. In general, it is erroneous mindset to automatically assume that a policy affecting one aspect will transcend its effect to another aspect.

When reviewing tax and benefits by their effect on inequality we find that countries rely more heavily on their benefits program to affect inequality as compared to their tax program (Joumard, Pisu, & Bloch, 2013). On average, the impact of the benefit programs is about 2 to 4 times as large when compared to taxation, as shown in Figure 79. In the

	Simultaneous assessment	Tax assessed first (means test on after-tax income)	Benefit assessed first (benefit taxable)
Extra earnings	**£100**	**£100**	**£100**
Extra tax due	31% of 100 = **£31**	31% of 100 = **£31**	31% of (100–39) = **£19**
Benefit withdrawn	39% of 100 = **£39**	39% of (100–31) = **£27**	39% of 100 = **£39**
Extra net income	100 – 31 – 39 = **£30**	100 – 31 – 27 = **£42**	100 – 19 – 39 = **£42**

Figure 78 Interaction between taxes and benefits. *Note: This figure has been obtained from (Mirrlees, et al., 2011)*

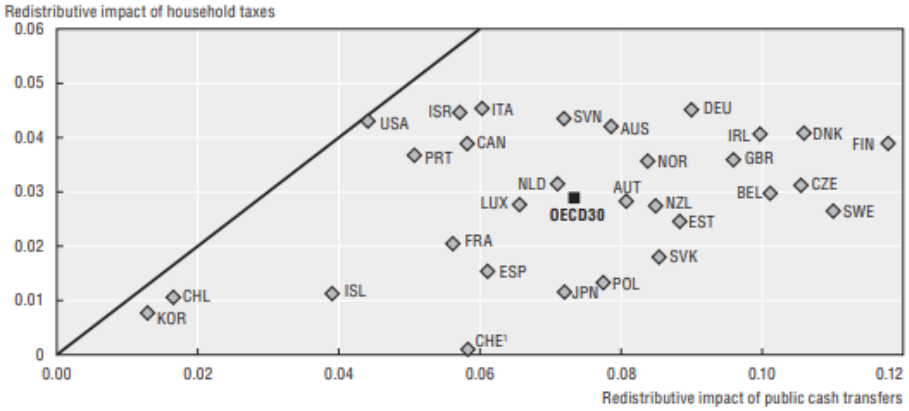

Figure 79 Redistributive impact of taxes and benefits on household income. *Note: The redistributive impact of taxes is measured as the difference in the concentration coefficient of market income and total income. The redistributive impact of benefits is measured as the difference in the concentration coefficient of total income and disposable income. The results are based on the author's calculations using the OECD Income Distribution and Poverty Database for the late 2000s. This figure has been obtained from* **(Joumard, Pisu, & Bloch, 2013)**.

more recent evaluation of the UK tax and benefit system by Bourquin & Waters (2019), they found similar values with benefits having four times as large an effect on reducing inequality as compared to direct taxes. They also made an added finding that indirect taxes even have a negative impact on inequality.

However, we would like to remind you that these previous values are aggregates and stark differences certainly occur. In a broad scope analysis of Luebker (2011), he found that there are distinctive different systems, as shown in Figure 80. For example, he showed that both Latin America and East Asia offer only limited redistribution even though they experience stark differences in inequality, i.e., 20 points on the Gini index. This is in contrast to Europe and another group of countries which attempt to cause redistribution but differ remarkedly in their attempt of doing so. Moreover, they use their tax and benefit system in different intensities, i.e., 1/3rd of the redistribution occurs through taxes for the group of countries as compared to 1/5th in Europe.

Before venturing into the topic of taxes and benefits, it is important to stay vigilant about the goal of redistribution. For this Oishi et al. (2012) states that the general task of a government is to address the subjective well-being of its population. Interestingly, they found that subjective well-being correlates with progressive taxation and other parameters. Moreover, Oishi et al. (2018) found that progressive taxing increased happiness among the poor due to improvements in equality but did not cause reduced happiness among the rich. However, the mediating factor was the quality of public and common goods (Oishi, Schimmack, & Diener, 2012). As such, it is not only the redistribution which is of importance, but also how it is spent which (in part) relates to the benefit system. In general, it is important to realize that equality is not a goal in itself, it is a means to an end. As exemplified by a quote from Hufe et al. (2018), the end itself can give direction to where to target redistribution:

> "*This suggests to re-shift the recent focus of attention from the upmost parts of the income distribution to the lower percentiles if the issue at stake is unfairness instead of a mere description of aggregate inequality*"

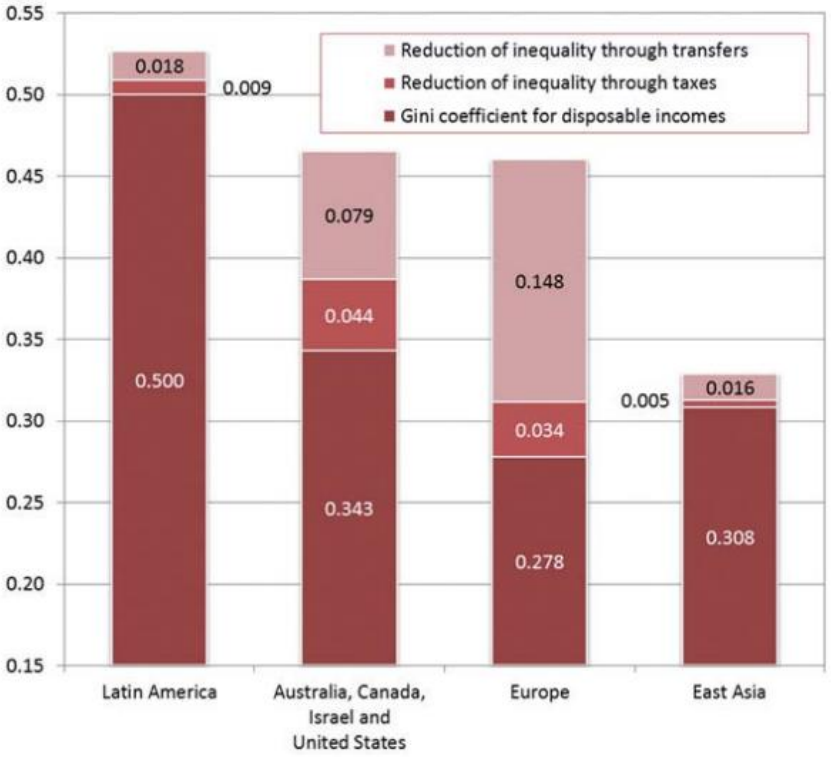

Figure 80 The impact of benefits and taxes on the Gini coefficient. *Note: The columns represent market income, i.e., before taxes and transfers. The results are based upon the Luxembourg Income Study database with data retrieved around 2000. This figure has been obtained from* **(Luebker, 2011)**.

4.1 Taxation

Taxation is a very old concept that traces back to ancient times and various large theories concerning taxation already started to be developed in the 18th century. (Trotman-Dickenson, 1996). However, taxation has not been standing still over the course of time. The size of taxation has changed and has become of much larger importance within the economy (Piketty, 2014), as shown Figure 81, which correlates with the change in purpose of taxation. Until several decades into the 20th century, the main purpose of taxation was to create revenue to support government expenses. Only from the late 20th

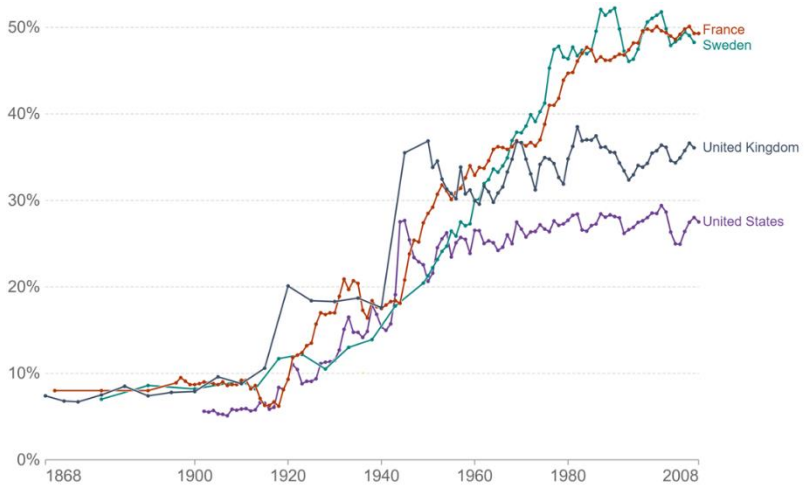

Figure 81 Revenue generated from taxation as a share of national income. *Note: Results are based upon data from Piketty* **(Piketty, 2014)**. *This figure has been obtained from* **(Ortiz-Ospina & Roser, 2016)**

century it has also been reviewed as a tool to shape the economic distribution (Trotman-Dickenson, 1996). While such a change occurred, taxation as a system is still a developing field and attempting to optimise its workings both in theory and in practice (Mirrlees, et al., 2011).

There are various taxes available for a government to generate revenue, as shown in Figure 82. However, to limit the scope of this thesis we will be reviewing only a subset of taxes which are incurred by citizens individually. These are direct (income) taxes on individuals, wealth (property) taxes, consumption taxes (VAT/sales taxes), and social contribution taxes (Trotman-Dickenson, 1996). While it could be that the other types of government revenue generators can influence economic inequality, their limited presence in the tax revenue generation, as shown in Figure 83, makes us believe that their impact will most likely be limited (and less worthwhile to be analysed).

However, it is worthy to note that not only the relative importance of the different taxes differs but also the size of taxation starkly differs between nations, as shown in Figure 84. In broad lines, the developed countries excise larger income taxes compared to developing countries. This in part has to do with the administrative abilities to administer taxes. To circumvent the administrative inabilities, developing countries resort more often to consumption taxes which are easier to administer and collect as opposed to income and wealth taxes (Ortiz-Ospina & Roser, 2016). As such, it is important to realize that every nation has its own tax system and has its specific relative importance for every type of tax. Therefore, generalizations are to be warned off as every nation will have its own unique features.

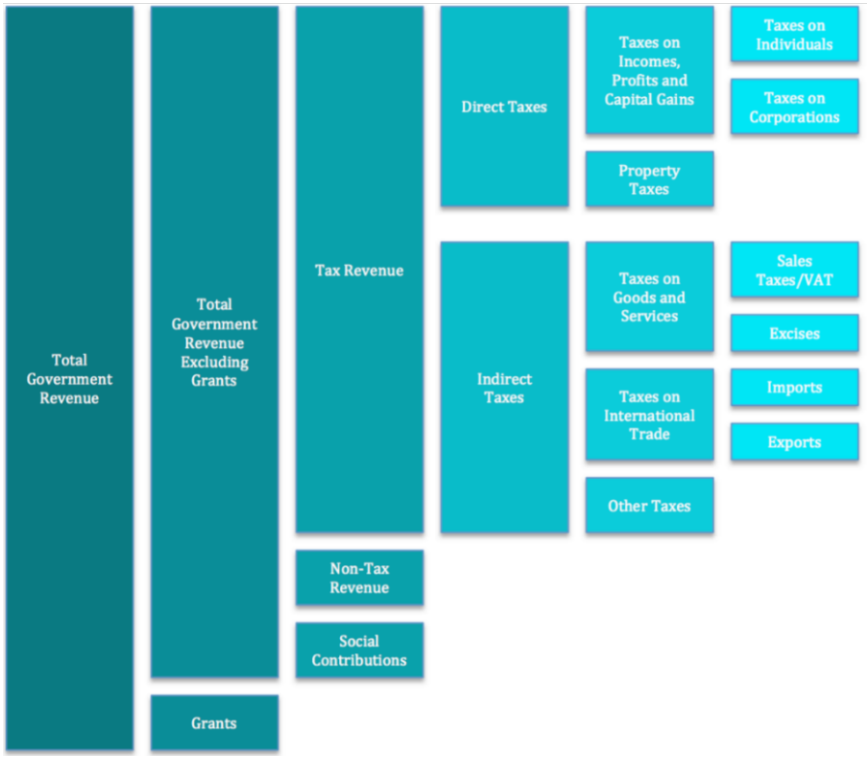

Figure 82 Model of government revenue generation. *Note: This figure has been obtained from* **(Prichard, Cobham, & Goodall, 2014)**.

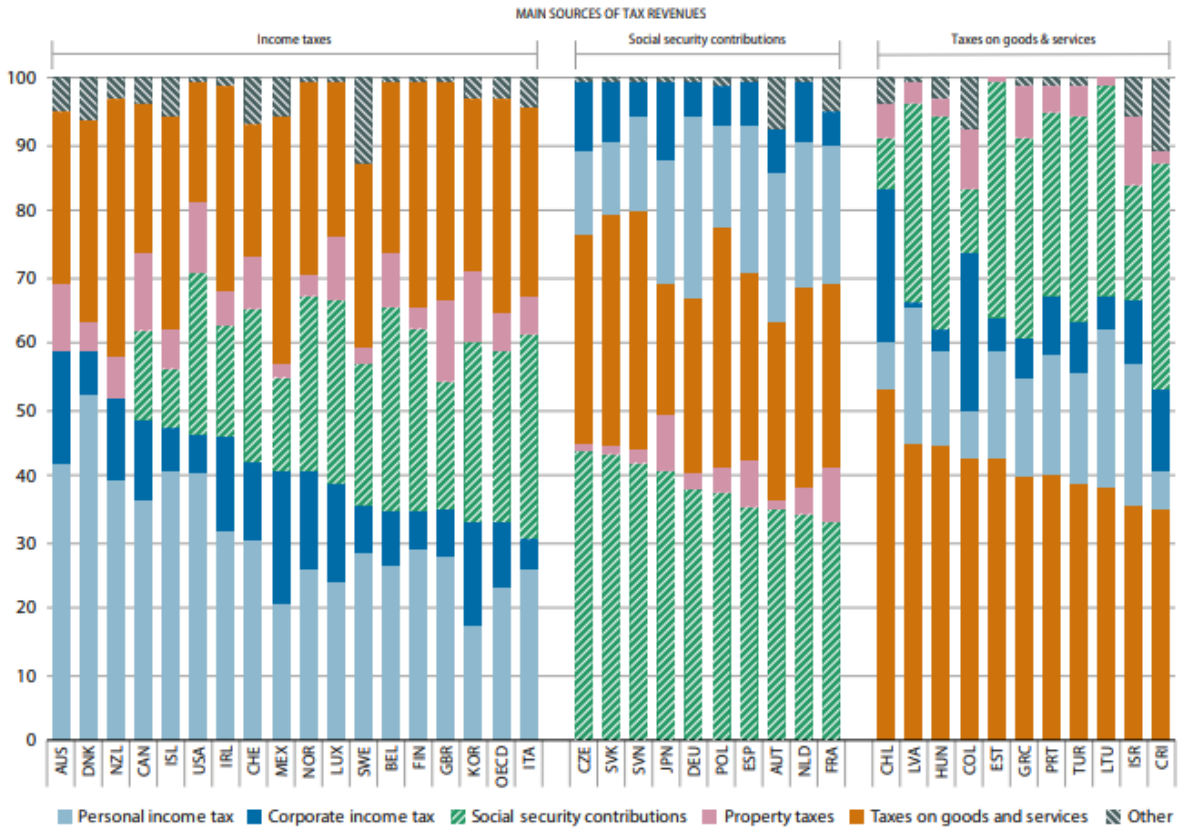

Figure 83 The relative importance of various taxes as a share of the total tax. *Note: Nations are grouped per dominant tax revenue source, i.e., Income taxes, social security contributions, or tax on goods & services. Results are based upon the author's calculations using the data of the OECD from the Revenue Statistics database in 2021 This figure has been obtained from* **(OECD, 2021)**

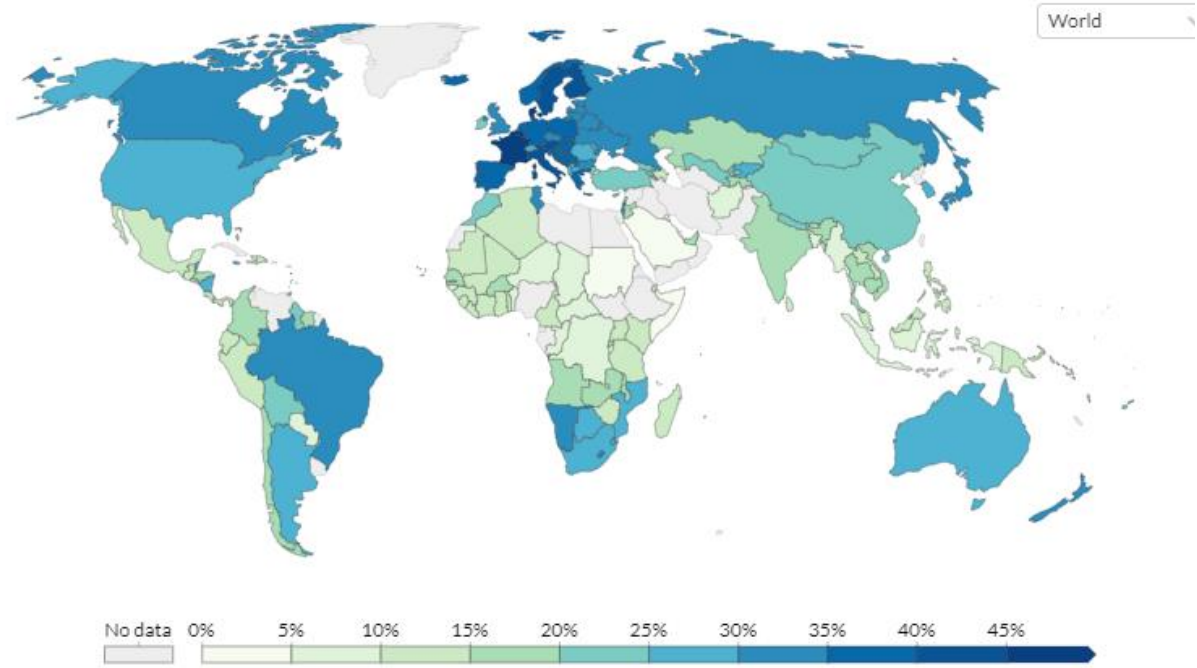

Figure 84 The total tax revenue as a relative share of the GDP per country in 2020. *Note: This figure has been obtained from* **(Ortiz-Ospina & Roser, 2016)**.

General construct

Before we start discussing the individual taxes, we first want to explain some critical basic concepts which are required to be known to improve the understanding of the upcoming sections. For the sake of clarity, we will review these concepts along the following six items: 1. Requirements individual taxes, 2. Tax formats, 3. Differentiating between entities, 4. Distinction between direct & indirect taxes, 5. Burden of taxes, and 6. Requirements tax system. However, we do realize that this list (potentially) is incomplete as it is a compilation of our own making. Nonetheless, we do feel that this list of items gives the proper background knowledge to understand our narrative in the other sections and, as such, suffices for what is needed for this thesis.

1. Essential requirements for individual taxes

It has already been recognized by Adam Smith in the 18th century (and famously formalized in The Wealth of Nations (1776)) that individual taxes should comply with the following four requirements: 1. Taxes should be proportionate to income or abilities to pay, 2. Taxes should be incurred with certainty rather than arbitrary, 3. Taxes should be paid at times and in ways convenient to the taxpayer, and 4. Taxes should be cheap to administer and collect.

However, since the date of writing those principles and the present time, various economic changes have occurred. As such, Trotman-Dickenson (1996) describes four more principles that should be adhered to: 1. Flexibility to adjust for a change of (economic) conditions, 2. Minimalization of economic disruption, 3. Avoidance of double taxation (potentially occurring through international economic activities), and 4. Adaptability to adjust for (changing) redistribution preferences. Similar extensions (with some subtle differences) have been drafted in the Mirrlees Review[6] (Mirrlees, et al., 2011): 1. Minimization of negative effects (on welfare and economy), 2. Reduced administration and compliance costs, 3. Fairness in treatment, and 4. Transparency (one should be able to understand the taxing logic).

2. Tax formats

One of the most fundamental aspects of taxes is their format. The format decides which impact the tax is designed to have on the distribution. As such, the format holds for every type of taxation, being direct or indirect. There are four fundamental formats from which other type formats can be seen as combinations or alterations of these specific designs (Trotman-Dickenson, 1996):

a) *Flat* – Everyone pays the same lump sum as tax, e.g., every citizen pays 100 euros.
b) *Proportional* – Everyone pays relatively the same relative amount of tax, e.g., 10% on income.

[6] The Mirrlees Review is an extensive review of the UK tax system under the chair of Nobel laureate Sir James Mirrlees. We will use The Mirrlees Review frequently as a point of departure to review specifics taxes and general concepts. Reason for doing so is the fact that it is recognized as being a canonical work, as exemplified by Auerbach (2012), i.e., *"… it (The Mirrlees Review) clearly must be considered a major compilation and synthesis of current thinking on what constitutes good tax policy.", and Feldstein* (2012)*, i.e., "Any student of tax policy would benefit by reading it carefully and critically"*.

c) *Regressive* – The average tax rate decreases with increasing income/wealth, e.g., the first income bracket pays 20% tax, the second bracket 10%, the third bracket 5%, etc.
d) *Progressive* – The average tax rate increases with increasing income/wealth, e.g., the first income bracket pays 5% tax, the second bracket 10%, the third bracket 20%, etc.

3. Differentiating between entities

In a tax system, it is often required to gain information to be able to differentiate the amount of tax to be paid by the taxpayer. Even for the most simplistic format, i.e., flat tax, it will be required to be aware of the taxable population. As such, questions need to be answered such as who are alive (one cannot tax dead people with the exception of the inheritance tax), what are the ages (often children are exempted or taxes are transferred to their parents), and what is their residency (various taxes are only paid when living inside the country). If a tax format is chosen which is dependent on income and/or wealth, the information becomes increasingly more complex as the type of income needs to become known (tax rates differ per type of income) and need to be registered for multiple years (recalls and exemption can be based upon previously paid taxes).

The method used to differentiate the size of taxation between citizens is called "tagging", as coined by Akerlof (1978). The general idea behind tagging is that it creates the ability to adjust the size of taxes by the specified tags, for example, marital status, parenthood, household composition size, and age. In general, tags are applied to distinguish citizens according to their ability to pay taxes (as imposed earlier by Adam Smith (1776)), but various other reasons can exist. However, tags are not always socially desired to be used as a differentiating parameter for taxes. For example, the tags gender, race, and educational level of the parents are not used as they are viewed as unethical. Mostly, the differentiation of whether a tag is considered ethical or unethical is based upon the ability of a person to influence that specific parameter where the fixed specifications are deemed unethical (1978). Moreover, it is also desired that the tag complies with the horizontal equity principle, i.e., treating similar people similarly, and efficiently contributes to vertical equity, i.e., the attempt to redistribute from the haves to have nots (Mankiw, Weinzierl, & Yagan, 2009; Trotman-Dickenson, 1996).

4. Distinction between direct & indirect taxes

An important difference between various taxes is that they can either be specified to a specific person, i.e., a direct tax, or can be levied on a transaction/consumption of a commodity, i.e., indirect tax. Following the narrative of Trotman-Dickenson (1996), we have summarized the differences between these two types of taxes in Table 3. These aspects of direct and indirect taxes can give direction to what is possible and what is not. The general notion important to this thesis would be that direct taxes are able to cause redistribution whereas indirect taxes are (mostly) incapable of doing so.

Table 3 Merit and demerits for direct and indirect taxation. *Note: The characteristics are based upon the results of Trotman-Dickenson* (1996).

Direct		**Indirect**	
Merits	*Demerits*	*Merits*	*Demerits*
Equity	Complexity	Universality	Regressive nature
Certainty	Increasing costs of compliance	Limited scope of evasion	Distortion of consumer preference
Convenience	Tax evasion	Psychological palliative	Distortion of pattern of production
Known incidence	Disincentive effects	Optional nature	Inflationary effect
Avoidance of distortion in allocation of income	Taxpayer resistance	Flexibility	
Flexibility		Simplicity	
Built-in stabiliser		Low cost of compliance	
		No disincentive to work	
		Political appeal	

5. Burden of taxes

Taxes will always cause a penalty on a transaction or commodity and will disincentivize this specific action (Mirrlees, et al., 2011). A tax is always clearly described and is called the legal incidence of the tax or differently mentioned, the entity who incurs the statutory burden of the tax. However, the officially taxed entity does not have to coincide with the entity who will pay the tax in practice. For example, excise taxes on tobacco are levied on the producer of the tobacco but can be valuated into the price and, as such, be paid by the consumer of the tax. This process of 'who pays the final bill' is called the economic incidence or differently mentioned, the economic burden of the tax. The major importance of the burden of the tax is that it will always cause a loss of welfare, but it should be known who will bear the economic burden. This notion is important as the envisioned plan of a tax can differ from the practical consequences which can hamper the outcome of a policy.

6. Essential requirements of tax systems

While the individual taxes should comply with individual prerequisites, they should also complement each other to properly function as a system. For this, pivotal work has been performed in the Mirrlees review (Mirrlees, et al., 2011) and stated that a tax system has three key principles:

I.Review the format as a system

While individual taxes can be favouring or disfavouring inequality or, for example, have damaging consequences to the environment, they should be judged by the effect of the whole tax system. In essence, if the devised goals for a policy are obtained through the workings of the whole tax system, then the nature of individual taxes should be considered of lesser importance. The same holds for the devised benefits, they should efficiently cooperate within the benefit system but also in adherence to the complete tax system.

II.Neutrality

It is required that the tax system values similar activities similarly. The reason to favour neutrality in activities is that it is economically undesired to distort the system by giving (arbitrary) favourability to a certain activity over another. The

economic system (demand & supply) should guide pricing instead of artificial intervention. The added benefit of reviewing activities similarly is that the tax administration is not required to collect information to differentiate between activities. This makes the system less complex and requires less administration to keep track of differences. Moreover, differentiation causes an incentive for entities to reshape their activities to other activities which have favourable taxation rates. This requires control and legislation to avoid this from occurring. In general, neutrality is desired and strong arguments are needed to justify deviating from this practice. However, differentiation can be beneficial in some cases, for example: 1. Environmental harmful activities, 2. 'sin taxes', 3. pensions, 4. research & development, 5. education, and 6. childcare.

III. Progressivity while retaining efficiency

Taxation will always impose a burden on activities and distortion potentially causing changes in behaviour. It is therefore of importance to be aware of which response will occur upon implementation of a policy. For example, (young) parents (especially mothers) and close to retirees have a higher response rate to stop working upon increasing taxation rates. One should attempt to implement policies which cause the least amount of distortion to the system, acknowledging that the distortion can differ between population groups. However, one should be warned about confusing cause & effect as a change in policy can also promote perceived characteristics. For example, implementing a wealth tax to compensate for tax evasion & avoidance on (capital) income can cause increased evasion & avoidance in an attempt of the taxpayer to retain their former interest rates. As such, a policy can initiate activities that it was designed to combat.

Income & social contribution tax

The first taxes to be discussed is income & social contribution tax. The combined impact on tax revenue generation of these two types of taxes is by far the largest in developed countries. In the report of the OECD (2021), it has been stated that they contributed somewhere in the range of 60-70% of all tax revenue for developed countries, as shown previously in Figure 83. We have opted to discuss these two types of taxes combined as they are both incurred over income. As such, they have similarities in their effect on labour which would make a separate discussion of these taxes a bit superfluous. We will first briefly consider the differences between these two types of taxes, after which we will discuss two important issues regarding these taxes, i.e., underreporting and labour disincentives.

However, there are a few important differences between the two. At first, income tax has its main goal aimed at redistribution (and gaining revenue) while social security contributions are an earmarked tax with the purpose of social security, e.g., unemployment insurance, sick & injury insurance, and retirement (OECD, sd). Secondly, income tax has its statutory burden solely on the employee while the social contribution tax has its statutory burden spread over both the employee and employer with varying ratios of tax dependence differing between countries (Torres, 2021). This split burden has the important consequence that social contribution interacts with both labour wages and corporate revenues and the tax should be reviewed in combination with corporate and

income tax simultaneously (Torres, 2021). However, as mentioned earlier, the statutory burden of the social security contribution lies is not automatically the same as the economic burden. As shown by Melguizo & González-Páramo (2013), the economic burden of social contributions predominantly lies with the employee in the long run making it rather similar to the income tax. Thirdly, the design of income tax is often progressive (Joumard, Pisu, & Bloch, 2013) while social security contributions (with split statutory burden) are often regressive in design due to an upper contribution limit (OECD Tax Database, 2021). For example, within the US the social security contribution is 6.2% of the salary which is matched by the employer, i.e., 50% for employer and 50% for the employee, with a contribution limit set to $9.114,-. This would equate to (with a 6.2% tax rate) an upper annual income tax limit of $147.000,- (U.S. Social Security Administration, sd). Fourthly, Goudswaard & Caminada (2015) explain that the perception differs between income tax and social security contribution as the latter is being socially accepted and therefore there are fewer negative consequences of social security contributions. This is in contrast to income tax for which the purpose is much more vague creating a sense of illegitimacy because it is being perceived as stealing money from well-earned income. Scheve & Stasavage (2012) highlighted this notion in the following quote regarding the fairness in treatment in the perspective of redistribution:

> *"A main lesson of our work is that support for progressive taxation is greatest when its advocates can make a convincing case that it is necessary to tax some individuals more heavily to compensate for some prior source of unfairness. In the absence of such an appeal, arguments that the rich should pay more simply because they have a greater ability to pay may fall on deaf ears."*

Underreporting

While we can attempt to cause redistribution via income taxation, the ability to do so can be hampered by underreporting. Mirrlees (1971) describes this problem as the revelation principle, i.e., the issue of information asymmetry between the principal and the agent. The principal, i.e., the tax collector, wants to implement a certain policy that can be obtained by enforcing taxes. However, the agent, i.e., the taxpayer, needs to be motivated to reveal his information, i.e., income, and be willing to have a tax imposed on him. If the agent is not incentivized to reveal his information, it will attempt to hide it. Duncan & Peter (2016) show an example of this issue where progressive income taxation causes an incentive to hide income to avoid taxation. In their research, they showed that progressive income taxation causes a decrease in observed/reported income, but it has a significantly smaller effect on true income.

A method to prevent under-reporting, i.e., causing the taxpayer to be willing to share income data, is by creating a tax system which provides the right incentive to show income and wealth to the principal. The Optimal Taxation theory states this can be done at best by implementing a lump-sum tax (Mankiw, Weinzierl, & Yagan, 2009). The idea is that the size of tax is uncorrelated to the size of income and as such, there is no reason to hide income data. Moreover, as everyone would pay the same value the bureaucratic costs are minimized as it is not required to measure tags and adjust payment accordingly. However, a lump-sum is mentioned as undesired as it would impact the poor more harshly than the rich as it would be a regressive tax, i.e., it would be counter-effective to economic equality.

As such, when including social welfare (the desire for economic equality), the Optimal Taxation theory states that a progressive tax is favoured. However, depending on the income distribution shape, i.e., being either Pareto or log-normal distribution, the system should either be fully progressive or become regressive tax after a certain income (Diamond, 1998). In the most extreme theoretical application for a log-normal distribution, the top marginal tax rate should even become zero for the income higher than the second-highest income in the system (creating an incentive to be the person reporting the highest income). Overall, the principal idea behind reducing the tax rate at the top is that it causes lower average tax rates with increasing income and thus being more favourable to report higher incomes.

However, Kleven et al. (2011) stated that regardless of the tax system, attempts at tax evasion will always occur as paying taxes is always more costly than not paying taxes. Therefore, they propose the revelation problem can also be (partly) circumvented by using third party reported income instead of using self-reported income. They showed that with third party reports the tax evasion becomes close to negligible because the (fear of) detection of fraud is higher when another party reports the income. As such, they concluded from their research that reducing the marginal tax rates is less beneficial when compared to rigorous tax enforcement in attempts to reduce tax evasion. Therefore, reduced marginal tax rates seem to be the lesser solution when compared to heightened enforcement.

Labour disincentive

Another important effect of income taxation is the influence on the labour market. This has been famously explained by the Laffer curve which relates tax revenues with taxation rates. The idea is that at the extremes no revenue is generated because at 0% no tax is levied and at 100% there is no incentive to work because there is no financial reward. This interaction between labour and tax can be described by the elasticity of labour supply, i.e., the measure for the amount of labour supplied versus the amount of (effective) wage obtained. In essence, taxes disrupt a market as it decreases the amount of wage gained per labour input (Meghir & Phillips, 2010):

> "*An elasticity of hours of work with respect to the wage, say, is the proportional change in hours of work caused by a proportional change in the wage. So an elasticity of 1 means that a 10% increase in the wage will lead to a 10% increase in hours. So suppose for the sake of argument that someone is facing a 20% tax rate and that his wage elasticity is 0.5. Suppose the tax rate is raised to 22%. This represents a 2.5% reduction in the after tax wage; with the 0.5 elasticity, this would imply a 1.25% reduction in hours worked*."

However, an important distinction for the elasticity of labour is that one should distinguish between the intensive and extensive margin of elasticity of labour supply. The intensive margin of labour supply is the number of hours worked, this is in contrast to the extensive margin of labour supply which represents the decision to enter/exit the labour market. As such, the intensive margin gives a smooth function of labour supply while the extensive margin functions as an on/off switch (Saez, 2002).

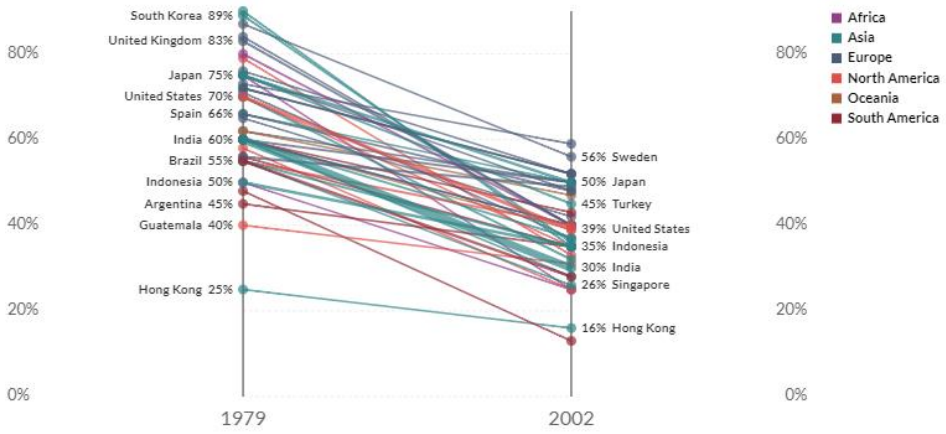

Figure 85 Top marginal income tax rate for various developed countries between 1979-2002. *Note: The results are based upon the author's inclusion of data from Reynolds* **(2008)**. *This figure has been obtained from* **(Ortiz-Ospina & Roser, 2016)**.

The differentiation between the intensive and extensive margin of elasticity of labour supply is of importance when reviewing specific populations groups. For example, when reviewing the participation of low educated employees, it is found that the number of hours worked barely changes with increasing taxation, i.e., the intensive margin, but their participation to stay within the job market is influenced, i.e., the extensive margin (Meghir & Phillips, 2010). In general terms, they either work or do not work, thus with rising taxation, they rather drop out of work than reduce the number of hours worked. This contrasts with educated employees for whom neither the labour supply nor the participation is influenced but the taxable income changes. In essence, they attempt to find different sources of income with more beneficial taxation policies (Meghir & Phillips, 2010).

An example of other recurring differences is that the elasticity of labour supply of women was higher than for men in all of the analysed countries by Evers et al. (2008) and has been supported by other articles (Keane, 2011; Guner, Kaygusuz, & Ventura, 2012). Evers et al. (2008) also showed that the elasticity of labour supply (at the intensive margin) for women was reduced by family status and the presence of children and increased with age. The evaluation of elasticities of labour supply also provides interesting tags for taxation. For example, Blundell & Shepard (2012) found that larger efficiency can be obtained by reducing tax rates when the children are of 'school going' age. While this is an example, the general advice is that elasticities are to be considered to retain high labour participation (reducing the disruption to the market) when tax reforms are devised.

In the past three decades the practical and theoretical tax policies have seem to be diverging. In the practical domain, policymakers attempted to improve economic growth by improving labour activity and increase purchasing power by reducing marginal taxation for the highest income (Ortiz-Ospina & Roser, 2016), as shown in Figure 85. It has been calculated that the marginal tax rate of the top earners decreased on average by 11% over the past 25 years for the OECD countries (Mankiw, Weinzierl, & Yagan, 2009). Interestingly, this reduction in marginal tax seems to move the tax rate further away from the theoretical (optimal) tax rate. For example, Lundberg estimated that the

optimum following from the Laffer curve for OECD countries lies around 61 to 65% (Lundberg, 2017). Kindermann & Krueger (2014) made a sub-analysis for the taxation of the top 1% income showing that the optimal taxation of this group is even drastically higher being around 89%. They conclude that the main driver of the high taxation rate is that the loss in consumption and loss in labour productivity is limited and the effect on social redistribution and increase in social insurance outweighs these effects[7]. Seemingly, it is debatable whether the reducing marginal tax rates are the 'right' course of action to help achieving improved economic growth. While a potential increase in top marginal tax rate could be advocated, it is important to note that reforms have short and long-run effects. Kindermann & Krueger (2014) showed that the dramatic increase in marginal top-rate taxation for the top 1% will continue to have its effect for 30-40 years after the change. In the short run, the government will have decreasing tax revenue from the top 1% due to adjustments in hours worked but will in the long run adapt and cause a net gain in tax revenue.

Moreover, we should also acknowledge that the 'demand' for a progressive system is dependent on the characteristics of the national economies. For example, in the research of Heathcote et al. (2017), they found that in the USA a less progressive system would be optimal. Following their reasoning, they mention that higher progressivity causes a reduction in labour for higher educational skilled workers which effectively causes a shortage in the supply of high education labour. This shortage in turn causes a wage increase and thus would negate the impact on reducing inequality. Furthermore, they state it would reduce investment in skills. Interestingly, these negative effects on investment are a predominant factor in a capital-intensive economy (of which the USA is one of the few within the OECD countries). Moreover, they also acknowledge that their model is missing the effect of improved investment possibilities for low income because of redistribution. In the end, the main takeaway is that best performing taxation schemes are dependent on the country's economy, the assumptions made are critical for the outcome.

Wealth tax

The second tax we will discuss is the wealth tax which taxes wealth in various forms, e.g., property, real estate, and assets. We will first review some general aspects of wealth tax after which we propose potential adaptions in regard to wealth tax, and close with a review of wealth transfers.

Basically, wealth tax in its design can be reviewed as a tax on the 'normal' return rate of wealth (Scheuer & Slemrod, 2021). As such, wealth tax is correlated to tax on income from capital by the formula

$$\frac{Wealth\ tax}{Return\ rate} = Tax\ on\ income\ from\ capital$$

For example, if an asset has an 8% return on capital and a 4% wealth tax rate is imposed, then this is equivalent to a 50% tax rate on income from capital, i.e., 4%/8%.

[7] This has been explained earlier when discussing the propensity of consumption in subsection **Error! Reference source not found.** in **Error! Reference source not found.**.

However, if the return rate would be 12%, then the equivalent tax on income from capital would have been 33%, i.e, 4%/12%, instead of 50%. As such, the design of a wealth tax does not compensate for under or overperformance of an asset but considers an average return rate which it taxes. Thus, if the recipient is obtaining higher return rates, then they will incur lower equivalent tax on income from capital or vice versa.

As wealth taxes and taxes on wealth income are often mentioned together, we want state three key differences between them as postulated by the OECD (2018): 1. a net wealth tax is also able to tax assets which do not have an (annual) return rate. For example, art and real estate do not create annual capital income (wealth is only generated when sold) and thus are left out of capital income tax, 2. a wealth tax is less prone to cause a "lock-in" effect of assets which generate wealth via wealth gains as opposed to a capital income tax which will levy the tax at transaction. This is caused by the fact that realisation of wealth gains can be postponed avoiding taxes while a wealth tax is based upon estimated value. This does create the difficulty of requiring to update registers of estimated values of the assets to be able to tax them fairly, and 3. a wealth tax can be more stable than an tax on wealth income as the latter can be more heavily dependent on the up and downswings of the economy. However, as seen during the financial crisis in 2008, wealth can certainly also experience swings in value.

Moreover, the Mirrlees Review (Mirrlees, et al., 2011) states that there are four other aspects of wealth tax which needs to be considered as it can impact the economy: 1. Differentiating between life cycle taxation and annual taxation, 2. Discerning between private wealth and corporate wealth (which can be a difficult distinction, especially for privately owned corporations), 3. Potential to influence the investment opportunities and allocation of wealth, and 4. Potential for consumption smoothening during non-income periods, i.e., periods of unemployment and retirement. We will not review these aspects separately as it would be diving in to too much depth, but when choosing wealth taxes opinions about these matters must be formed. For example, in the regard of the fourth issue it could be questioned if the government is responsible to safeguard people from making 'wrong' decisions. This comes as an issue as there is a correlation between (low) education level, (low) income, and (short) planning horizon. This 'cocktail' causes that these people are not making founded retirement plans which could cause impoverishment during their pension. As such, it can happen that the few who are unable to create a sufficient retirement plan can cause that the government will create a retirement system for the complete society (Mirrlees, et al., 2011).

There are various pros and cons to wealth taxation. In general, Adam & Miller (2021) conclude that the field is divided, and no concise answer exists on whether wealth tax should exist. In the following text, we will largely follow the arguments made in the review of Adam & Milers (2021). Currently, the debate is conflicted by the difficulty to implement the tax and the possibility to levy the tax via other routes. To avoid sidetracking, we will only review recurrent (annual) wealth taxes and will not inspect the one-off wealth tax, i.e., an unexpected once in a lifetime wealth tax designed to correct failures or grant (large) revenue stream in periods of great need (Adam & Miller, 2021). The reason for doing so is that a one-off wealth tax would not be judged as a policy which

could be implemented due to ethical issues and its inability to give supply a durable solution to inequality as it could only correct inequalities only once.

Adam & Miller (2021) state three arguments to be a proponent of wealth tax:

1. **Wealth possesses unperformed consumption and, as such, a loss for society**

As first formulated by Allais (1977), wealth taxation has the characteristics of "use-it-or-lose-it" which penalizes not spending wealth in present times. According to Guvenen et al. (2019), the wealth tax promotes present time consumption and/or investment which enhances productivity. This argument somewhat echoes with example of Fisher et al. (2020) showing that an income transfer from rich to poor would increase demand as the propensity to consume is larger for lower-income deciles (for further detail please go to section 1.4 and read Consumption). However, attempting to copy this narrative 1-on-1 for wealth can be a bit of a short corner as income concerns annual gains while wealth involves the optimization of when it will be spent.

Regretfully, the literature on the effect of wealth tax on economic growth is limited, as also stated by Hansson (2010) in one of the rare articles considering this topic. His findings were that wealth tax could potentially be causing negative economic growth, i.e., for every 1% wealth tax causing minus 0.02-0.04% economic growth. However, as stated by himself, the data is severely limited and depending on data inclusion/exclusion can also become (insignificantly) positive correlating. We will leave the discussion at this point but will state that the effect potentially is limited and will most probably be highly dependent on how it is implemented in relation to the whole tax system.

2. It taxes the able more than the unable, enabling redistribution

There are several indications that income and wealth are correlated with each other which holds (especially) at the ends of the distribution, i.e. low and high income populations are also those with low and high wealth respectively (Durand & Murtin, 2015), as shown in Figure 86. Not only do income and wealth correlate, but there is also a positive correlation between income inequality and wealth inequality. This would suggest that a wealth tax would target those with high incomes and becomes more effective when applied in countries with higher economic inequalities.

Summers (2021) states that wealth tax can have a position to cause redistribution, but it has to be designed properly. In his work, he poses the idea of alternative minimum tax (AMT) which sets a high cut-off for the relieved wealth tax base. This cut-off should be set at the point after which top income/ wealth is disproportionately able to safeguard their income (and wealth) from being taxed. As such, the added wealth tax enables taxing the missing income from the other evaded taxes. He poses further optimization by considering the (already) paid income tax which would avoid taking those who pay their taxes fairly. However, he does note that such a tax is costly and difficult to apply due to requiring multiple database inputs to measure if the relieved tax base has been surpassed (Summers, 2021). This is similar to the proposal of Saez & Zucman (2019) which propose a wealth tax for the top wealth owners. They state that the top can escape income tax due to their income characteristics, i.e., mainly dependent on capital income. Using a wealth tax for that specific group could decrease the wealth inequality when enforced aptly.

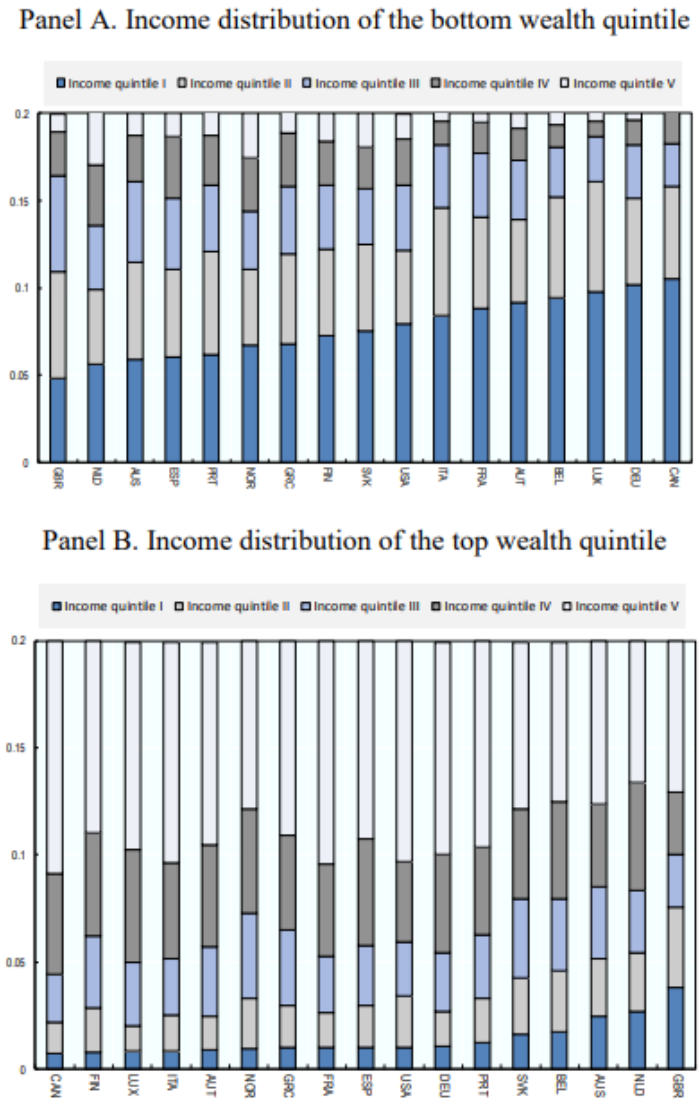

Figure 86 The relative contribution of an income quintile to panel A) bottom wealth quintile, and panel B) top wealth quintile for various OECD countries. *Note: Countries are ranked ascendingly according to the relative contribution of the first income quintile. In the top panel, the fourth income quintile for Canada represents the fourth + fifth quintile as they were not reported separately. The results are based upon data from the OECD Wealth Distribution Database and the OECD Income Distribution Database. This figure has been obtained from* **(OECD, 2018)**

This is also stipulated by Guvenen (2006) stating that the higher intertemporal elasticity of substitution for the rich would cause a proportionally larger decrease in their wealth upon increasing wealth taxes. As such, this would decrease their income from wealth which in turn would decrease their consumption. Guvenen (2006), showed that with a decrease in wealth tax the increase in return on capital caused an 0.83% increase in consumption. However, they showed that this was caused by a 5.4% improvement in consumption for the stockholders whereas the non-stockholders (70% of the population), which have a 2.1% decrease in consumption. In essence, should a tax reduction would be beneficial for the rich and counterproductive for redistribution.

3. Wealth is not 'without value'

There are indications that large stock of wealth causes (socio-economical) power. As described by Shaikh (2016), capital seems to function as a mediator in social relations. The ability of those who own wealth can ignore opportunities of venturing into labour acquisition causes a difference to those who need to find employment for their livelihood. When going into the more extreme, the capitalist could live of the interest of its capital not needing to perform labour, i.e., a rentier, while the labourer consistently needs to perform labour and in essence, becomes a "working slave". As such, Shaikh (2016) describes the gained function of wealth to give flexibility to the owner which contributes to the value of the wealth beyond its currency value.

Hansen & Toft (2021)describe a similar occurrence of added value to wealth through wealth-based opportunity hoarding. From the analysis of Scandinavian countries, they find class-origin gaps are correlating with wealth over the past decades and have enabled socio-economic advantages to perpetuate over the generations. They state that class-origin differences were dominated by the income & education perspective in the past, but recent developments are steering the narrative towards wealth & market governance. This could be seen as problematic from an opportunity perspective as the class-origin differences caused by income can be explained as the effectiveness to reproduce advantages via education while wealth dependent differences can be explained as the effectiveness to reproduce advantages through families (Bourdieu, 1998). As such, it seems that the family origin is becoming more important than education creating a more closed society (in regard to opportunity chances). However, the critical note is that there are some difficulties to explain why these correlations are existing. Potentially this could not be caused by the wealth but by the indirectly related access to social networks, ease of financial risk-taking, ability to use debt as an investment method, access to selective management services, and wealth transfers (Hansen & Toft, 2021). As such, it is not clear whether creating wealth equality will alleviate the opportunity differences.

As for the arguments to oppose a wealth tax, Adam & Miller (2021) supply the following arguments:

1. Alternative ways of taxing

Questions can be raised if wealth tax is the most efficient manner to achieve one's goal. Presumably, the costs to administer wealth tax are relatively much larger when compared to the average cost of taxation. For example, Burgherr (2021) shows that the wealth tax costs 15% of the generated revenue while the average tax administration costs are 0.52% of the total generated revenue. Moreover, as will be mentioned in the fourth argument, the goal of wealth taxation should be novel compared to the goals of other types of taxation to avoid double taxation. As of yet, according to Adam & Miller (2021), there are no apparent novel goals and therefore one should prefer improving other taxes instead of implementing a new type of tax with a similar goal.

2. Complexity of wealth tax due to numerous types of assets

In general, it is stated that measuring wealth is much more complex than measuring wealth and requires a more complex administration and higher costs (Brown R. A., 1991). In part, Brown (1991) explains that this is caused by the fact that income involves a

transfer which causes the necessity to assign value to a transfer which can subsequentially be taxed. This is in contrast to wealth which is owned without being assigned a certain value by a third party. Thus, the value has to be settled upon between the taxpayer and tax receiver which becomes difficult and (potentially) subjective. This is certainly the case as the current tax report systems involve a self-reported system when filing taxes (OECD, 2018).

The complexity of proper wealth taxes is rather abundant. For example, the Wealth Tax Commission (Troup, Barnett, & Bullock, 2020) stated that adaptation caused by the tax reforms, i.e., specifically IR35, made the tax administration excessively complex and caused a non-compliance rate of 90%. This is also highlighted by their finding that the tax administration requires often more than 12 months, with 2-5 years being common, to evaluate estates before being able to comply with the inheritance tax. They require to valuate every asset, ascertain (full) ownership, review the past 7 (and sometimes 14) years for anti-avoidance procedures, and account for every relief & exemption and interactions between those rules. This is by no means a strange phenomenon, for example in the Netherlands "easy" cases can already take up to 1 year (AllesOverErven.nl, sd) and in the USA the "easy" cases are judged to take 6 months but also several years to resolvement is not being uncommon (Carter & Mast, sd). Rather obviously, inheritance taxes are different from annual wealth taxes as they are a one-off wealth tax applied on wealth transfer. However, the severe complexity of evaluating wealth puts doubts about the ability to evaluate assets for annual taxation.

3. Taxation on capital is taxation on future consumption and not on current consumption, violating the concept of uniform taxation (Atkinson & Stiglitz, 1976).

An important aspect of wealth is that it is the accumulation of income which has not been spent but will be spent at a future point in time. In the perspective of intertemporal decision making, wealth is accumulated at such a level that the gains of the utility function of future consumption equals to the gains of the utility function of present consumption (Malinvaud, 2008).

In the matter of decision-making, various aspects alter the final decision, with one being wealth taxation which, interestingly, has a different effect on the rich and the poor (Bliss, 2018). The core issue is that the poor are not able to discriminate in consumption between the present and the future because they do not have enough funds to meet the required consumption in the present. As such, only the people who have funds beyond the necessary consumption can accumulate flexible wealth, i.e., the liberty to alter expenses between the present and the future. As such, only those with an income higher than the required expenses can change the size of their wealth to be efficient with wealth taxes on their decision making of asset allocation (Bliss, 2018). This is in contrast to the poor "Hand-to-Mouth" individuals, i.e., those who have considerable wealth but a high propensity to consume (as explained in section 1.4 Economy under Consumption), who will experience negative effects without the ability to alter their wealth. One can attempt to circumvent these issues by exempting real estate under the wealth taxes (the rich "Hand-to-Mouth" mostly own real estate), but this would create a more complex tax system.

In more technical terms, Archury et al. (2012) explain the difference in savings, i.e., asset composition, using the Stone-Gary utility functions. This function explains that an item only gives added value after a certain amount of the item has been accumulated. In terms of savings, this is explained as a minimum amount of wealth required to accommodate sudden expenses, after which wealth can be used as an investment tool. They also show that the risk aversion rate is almost three times as high for the poor as compared to the rich (Achury, Hubar, & Koulovatianos, 2012). The argument for this could be that the rich can afford a loss whereas the poor would run into a "financial crisis". As such, a wealth tax could potentially cause more harm to the poor than the rich.

4. Tax inefficient due to double taxation and compounding interest

Difficulty arises whether wealth tax should be considered as double taxation. Summers (2021) states this would be a matter of perspective whether the applied taxes have the same goal. In his example, there should be no relief for income tax when it is also subjected to the tobacco tax as they have different goals. However, if we would review wealth tax as an opportunity to cause redistribution one could state it to be a form of double tax as income tax already has (in part) that particular goal. Then again, if we would state that wealth tax is an incentive to promote present consumption in favour of future consumption, it could be perceived as a viable tax. As such, whether double taxation would a double tax is a matter of perspective and chosen narrative.

A vital notion is that one can only claim double taxation if the taxed based also has been taxed twice. While this seems to be an obvious notion, there are notable differences between the poor and the rich. Wealth owned by the poor is (mostly) gained from labour income, which experiences effective taxing. However, the wealth owned by the rich has a considerable part coming from capital income which experiences only limited forms of taxation caused by the various exemptions and untaxed base for capital income (OECD, 2018). Moreover, as described earlier in section 2.1 under Tax data, the rich have increased capabilities of tax evasion and avoidance which decreases the amount of tax experienced on their wealth (Alstadsaeter, Johannesen, & Zucman, 2018). The OECD (OECD, 2018) provides six examples of opportunities to avoid and evade taxation: 1. Tax shelters through concealing vehicles, 2. tax cap provisions, 3. exemption through business assets, 4. discrepancies in tax rate between tax bases, 5. Global reallocation of wealth, and 6. Failing to declare tax. In general, these occurrences are possible due to the complexity of the tax system, i.e., the various exemptions and reliefs, which combined with a narrow capital tax base cause large opportunities for avoidance and evasion (OECD, 2018). As such, double taxation would be more of an argument to limit wealth tax on the poor as compared to the rich.

Besides, the previous issues, there is also the problem of inflated marginal effective tax rates caused by the combination of wealth tax and tax on wealth income (OECD, 2018). Examples have been shown for France and Spain where the tax rate exceeded 100%, effectively not only removing income from wealth but also diminishing the size of the wealth base, as shown in Figure 87. As such, it would be disadvantageous to have savings as one would lose wealth. Thus, a wealth tax would require an evaluation from the perspective of the total system to be able to perceive the marginal effective tax rate.

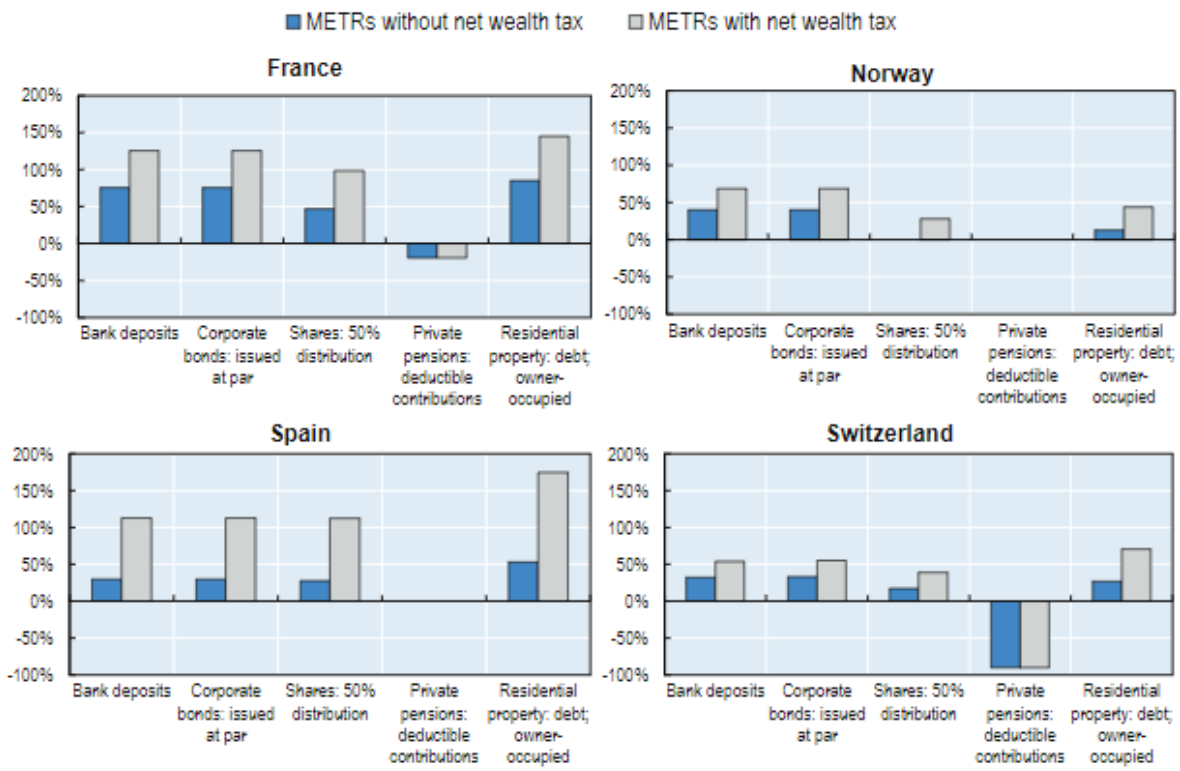

Figure 87 The marginal effective tax rates with and with wealth tax on various assets. *Note: The marginal effective tax rate has been based upon tax rules present on the 1st of July. The results are based upon data from the OECD Taxation of Household Savings. This figure has been obtained from* **(OECD, 2018)**

While this is not impossible, it does mean a more complex tax system which potentially needs exemptions and reliefs.

Another problematic nature of wealth taxation is its (annual) recurrence. Narrating the example of Adam & Stiller (2021), the difference between a 1% and 2% annual tax rate over an asset for 40 years (with a return rate of 5%), causes a difference of, respectively, almost a third or half of what could have earned without a capital tax. Considering the large impact, it could be questioned if such a penalty for future consumption is desired. This also causes the negative effect that investors are promoted to favour risky investments with higher (potential) returns in an attempt to obtain returns above the "normal return tax rate". The investments in more risk full assets steer the economy to instability with more pronounced up and downswings (Perret, 2021). As such, wealth tax can be (heavily) penalizing when increased return rates are not obtained and incentivize a more unstable economy.

The general statement is that wealth taxation is not preferred but has added value as the whole tax system is imperfect (Adam & Miller, 2021). Overall, Adam & Miller (2021) state that wealth taxation should be regarded as inferior to income, excess return rates, gifts & bequests, and consumption taxation, This is completely in line with the outcomes of the OECD (2018). However, the inability to properly measure certain parameters can make wealth taxation useful and as such, they prefer diversification of imperfect taxations over one larger imperfect tax (OECD, 2018; Adam & Miller, 2021). However, Adam & Miller (2021) believe that with improving statistics and measurements the necessity to use wealth tax diminishes because other types of taxes become more able

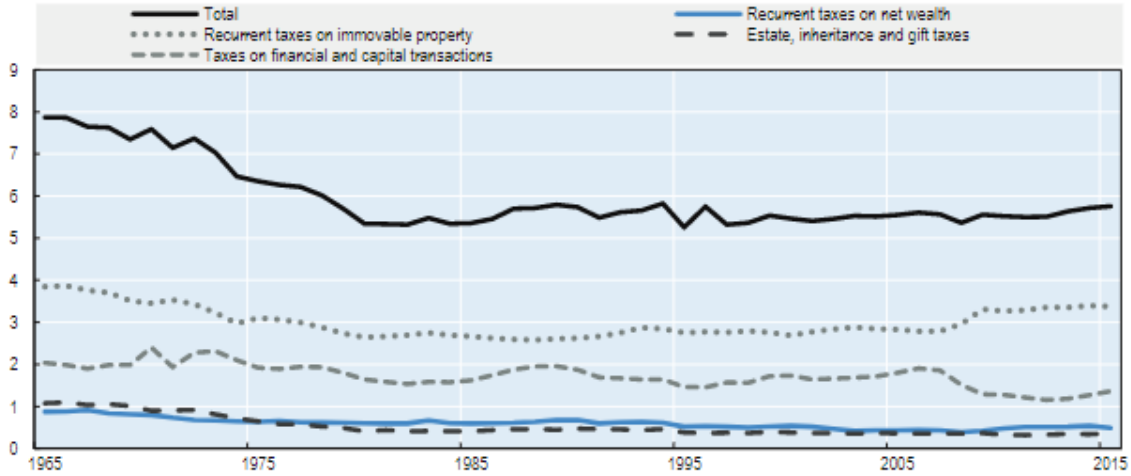

Figure 88 Historic evolution of the average capital related taxes for OECD countries. *Note: Results are based on OECD Revenue Statistics Database. This figure has been obtained from* **(OECD, 2018)**

to apt in differentiating between poor and rich in their tax scheme and, as such, other types of taxes will outperform a wealth tax type of system.

The fact that wealth tax is not a preferred tax type is also exemplified by the fact that in 2017 only four OECD countries were levying a wealth tax on overall wealth stock, i.e., France, Norway, Spain, and Switzerland (OECD, 2018). This is in contrast to the popularity of recurrent taxes on immovable property which is levied in every OECD country and taxes on financial and capital transactions in most of them and generating a noteworthy size of tax revenue, as shown in Figure 88. The OECD (2018) concludes that this is caused by the low revenues which were generated (accounting for 0.5-3.7% of total tax revenue), the high administrative costs, the flexibility of global (fiscal) wealth transfer for tax avoidance, and the low redistributive impact of the tax. Moreover, the current narrow tax base of wealth taxes, i.e., exclusion of financial assets (owned by the rich) and inclusion of immovable assets (owned by the many), severely limits the progressive abilities of the wealth tax (OECD, 2018). From a redistributive perspective, the current implemented versions of wealth taxes are therefore unfavourable.

Opting for a change

To bring change in the wealth related taxes, Mirrlees et al. (2011) bring forth the notion to make a distinction between 'normal' and 'excessive' interest. 'Normal' interest is defined as the interest required to retain the same value of the wealth, whereas 'excessive' rent is defined as the interest gained which causes an increase in the value of the wealth. Using this distinction, they argue that normal interest should not be taxed as one should be allowed to retain a stable amount of wealth, whereas excessive rent should be viewed as income and be added to the income from labour. The reason for doing so is that Mirrlees et al. (2011) state that excessive rent and income from labour bring forth the same amount of consumption capabilities. Figuratively, 100 euros gained from capital gives the same opportunities in the consumption market as 100 euros gained from labour. As such, discriminating between these two types of income would be arbitrary and, even more so, would create unnecessary complexity in the tax system.

According to Adam & Miller (2021), the advantage of only taxing excessive returns is that it does not distort the economy. They reason that having wealth is not being penalized, but only the amount of profit earned on the capital is impacted. When the tax rate is equal between assets, this would also not induce a preference for one asset over another asset. Decisions would then primarily be based upon risk aversion. Also, if the excessive tax rate would be equal to the labour tax rate, then information concealment is being reduced as advantages of concealment are negated.

Using the distinction between 'normal' and 'excessive' rent, Mirrlees Review (2011) provide three viable options which could achieve wealth related neutral tax systems. In their analysis of the UK, they state that these three options can all play a pivotal role in the tax system and should be applied in different situations.

1. The cash flow expenditure system

This would consider levying tax on withdrawal/expenditure of wealth and can play a pivotal role in the pension system. The idea is that investments can be made without or limited (tax) limitation to incentivize investments for pensions. However, to avoid that such investments are not foregone from taxes there should be regulations regarding withdrawal (having an age restriction and (annual) size restriction) to ensure the guided goal of income in later life.

However, one should account for various issues to avoid tax avoidance & evasion. First, there are various pensions systems with different investment (taxation) rules between the employer and the employee. When transitioning to a new system, one would need to account for this difference and avoid specific populations being proportionally more disadvantaged. Secondly, there are (sometimes) exemption rules for a one-time withdrawal without being taxed. This would effectively mean that a portion of the withdrawal is untaxed through income or consumption tax, which would benefit the people who experience higher marginal tax rates, i.e., the rich people. Preferably these exemptions are removed, or coherent taxes are applied. Thirdly, complicating the system is that the annual investment into the pension is size restricted, i.e., only a certain amount of investment is tax exempted, after which income tax needs to be paid. This creates a differentiation between present and future consumption which potentially is unwanted. Fourthly, tax rules should be universal and tightly regulated. For example, if the entity can invest tax-free into the fund, then it should be avoided that the entity can travel to a location where wealth can be withdrawn from the fund without taxation as this would create an untaxed wealth base. As such, potentially international regulations should be applied.

2. Taxing income, not wealth

To simplify matters it is advocated to tax income and not wealth. This is in part to avoid distortion of consumption inter-temporally. This would steer away from taxing wealth, especially those with low interests such as bank savings and building society accounts. They reason that these types of assets are not having excessive returns and, as such, do not need to be taxed on the return rate.

3. The rate-of-return allowance

This type of tax considers the 'excessive' returns which can be applied to (financial) assets such as stock options. These types of assets can generate larger return rates and provide considerable income revenue. These types of returns should be taxed at a similar rate as labour income. A large reason to favour these types of taxes is caused by the fact that in the current system large incentives are made to convert labour income into capital income (disguising it as corporate income) to gain favourable tax rulings. As the ability to do so is large for the rich than for the poor, these transformations are non-neutral.

However, the rate-of-return allowance system should, in the light of neutrality, also compensate when the rate of return is below the 'normal' to avoid non-neutrality between risky assets and safe assets. Without going into too much depth, they envision the ability to offset such "loses" by either averaging over the years or compensating by labour taxes, or off-set the loss of one asset over the gain from another asset. Overall, Mirrlees et al. (2011) consider the rate-of-return allowance system to be the easiest to be implemented and the highest odds of being accepted politically.

The unique position of wealth transfer

It is important to note that wealth transfers which transports wealth between generations have an important role when considering wealth. Problematic to taxing these transfers is the large complexity of the assessed assets and exemptions combined with negative public opinion. Overall, this has caused that wealth transfers are beneficial to the so-called "healthy, wealthy, and well-advised" (Mirrlees, et al., 2011). This has been counterproductive to the desire to bring equality of opportunity, as wealth transfers seem to be effective in propagating advantages over sanguine lines, as stated earlier in section 3.3 Economic ladder. Overall, there seems to be a base for a wealth transfer tax, as famously put forward by John Stuart Mill:

> *"I see nothing objectionable in fixing a limit to what anyone may acquire by mere favour of others, without any exercise of his faculties, and in requiring that if he desires any further accession of fortune, he shall work for it"* - (Mill, 1848, p. 267)

However, the OECD (2021) showed that public support for inheritance tax is low as it is perceived as being a double taxation (with a negative connotation of it being a 'death tax') and having its impact being misperceived. At first, the size of people being taxed is highly overestimated, for example in the US it was believed that >50% of the people were being taxed but only 0,1% are rightly so. Secondly, the tax rate has also been largely overestimated. For example, in France, it was believed that spouses experienced a 22% taxation rate while they were being exempted. Also, the progressivity of the taxation scheme was heavily overestimated believing that the lowest marginal rate was 20% while it was 5%. Thirdly, there has been a misconception about the number of assets which are being taxed. For example, yet again in France, on average 4-7% of all assets were being taxed while the majority believed that this would be >10%. Overall, the knowledge about inheritance tax is limited (potentially due to its complexity) which causes unjust resentment towards the taxation scheme overall (OECD, 2021).

Nonetheless, the OECD concludes that increased taxation upon inheritance would be an effective policy to curb increasing wealth inequalities (OECD, 2021). This would be

the most efficient when combined with a moderate, income taxation policy. To promote acceptance by the population it would be beneficial to rephrase inheritance taxation as a type of income taxation and it should be perceived to be motivated as creating more (opportunity) equality. It is deemed probable that higher awareness of the inequality of inheritance could cause higher empathy for a change in taxation scheme (OECD, 2021).

However, Mirrlees Review (Mirrlees, et al., 2011) states that there are certainly various inconsistencies which limit the functionality of inheritance tax. As such, they recommend the following improvements:

1. **Include both in vivo[8] and inheritance transfers**

Currently, often in vivo transfers are not taken into consideration due to measurement issues by the agent as these transfers are self-declared. However, in the likes of life-cycle income, and the related equality of opportunity, it would be deemed to be desired to tax all forms of wealth transfers. As mentioned earlier, the in vivo wealth transfers are potentially more capable of altering opportunity chances than inheritance. As such, ignoring these transfers will be unwanted. Moreover, not taxing in vivo transfers would cause a favouring of these types of transfers. However, as in vivo transfers are not accessible to all parts of the population, i.e., it would require redundant funds which are mainly accessible to the top portion of the wealth distribution, it would cause non-neutrality within the system. As of yet, the current research toward effectively taxing in vivo gifts (from the recipient side) has been extremely limited. As such, we are "in the dark" about the potential it can have as an effective tax system.

2. **Levied at the acceptor side**

Wealth transfers represent the transfer of unconsumed income and as such have not incurred any consumption tax. To correct for this issue, it is required to levy tax on the transfer but it is unclear whether this should be done by the donator or the acceptor of the transfer. This matter of perspective also frequently dictates the perspective on the taxation. Reviewed from the donator, the usual argument is that he/she has the right to spend the wealth as he/she pleases and as such no penalty should be incurred on the transfer. Being taxed upon the transfer would therefore constitute a limitation on this freedom and can be perceived as double taxation, i.e., it has already been taxed through income tax. Moreover, it could be perceived as an incentive to spend all earned wealth as else it would be "thrown away" to the government via tax.

However, when reviewed from the acceptor's perspective, the usual argument is that the transfer is an "unexpected" bonus to his wealth and therefore can be taxed as income. Moreover, it has been stated that by promoting wealth transfers through tax exemptions the donor is promoted to transfer wealth and the acceptor will account for this as a type of income. This could create the Carnegie effect which is named after Andrew Carnegie:

[8] In the Mirrlees Review (2011) they refer to in vivo transfers as inter vivo transfers. The difference is small (without a true practical implication for this thesis), where inter vivo states being a transfer between living people, whereas in vivo transfer refers to a transfer of a living person to another entity which could also be fduns, charity, and other fiscal entities which can receive wealth without being an actual person. To be consistent we will opt for in vivo transfers being a slightly broader term.

> *"the parent who leaves his son enormous wealth generally deadens the talents and energies of the son, and tempts him to lead a less useful and less worthy life than he otherwise would"* (Carnegie, 1891/1962, p. 56)

Overall, Mirrlees et al. (2011) put forth that the transferred wealth accepted by the acceptor does not experience a difference when wealth is gained from one donor or a multitude. For example, from an acceptor's perspective, receiving 500.000 euros from one parent would effectively be the same as obtaining 100.000 euros from five different family members. As redistribution is interested in the outcome of transfers, one would advocate levying the tax on the recipient side as this would allow to account for multiple wealth donors. Moreover, such a policy would also create the opportunity to review donations over the whole lifecycle and give potential to tax the total amount of wealth received in life instead of its annual contribution. This would also give opportunity to avoid high tax rates in the year when taxes are being received and average the tax base over one's total life span. However, measuring lifecycle donations is difficult as it would require an extensive database and tracking of all wealth received during life.

3. Broad to avoid influencing decision making

Currently, there are various exemptions and reduced tax rates during inheritance. For example, capital gains are foregone at death which favours having assets in the form of capital gains (as tax is being circumvented). This type of forgiveness is highly distortionary as it incentivizes the asset owner to avoid selling the asset (as favourable taxation is just around the corner) while potentially other assets are more favourable creating economic inefficiency. An important problem with inheritance taxation schemes is the interaction with business equity (OECD, 2021). Mostly business equity is being (largely) exempted from taxation schemes to ensure continuity of businesses. However, the performance of businesses after inheritance mostly underperforms and the generosity of the tax exemption is too large. Reinvestigation and more stringent conditions towards these types of inheritance are wanted as they are highly advantageous to the wealthiest of people within societies and are detrimental to wealth redistribution.

In general, it is unwanted to create distinction in the source of the wealth transmitted, being either coming in the form of business equity, trusts fund, foundations, or other types of wealth, they all represent a form of newly acquired wealth from the recipient perspective and should be treated similarly. Creating difference causes options for (wealthy) owners to abuse the system the artificially reduce the taxation. In essence, the tax rate should be based upon the recipient side creating a distinction between life cycle transfers or annual transfers, or being received by an individual, profit entity, or non-profit entity (OECD, 2021).

We will not be able to close the chapter on how the wealth transfer tax system should be designed. The problems are veiled by complex arguments and create subjectivity to the desired policy, as exemplified by the statement of the European Commission (2016)

> *"Economic theory provides arguments in support of taxation of inheritances, but the precise policy prescriptions are not clear."*

As such, we will leave this topic as it is. We deem it to be favourable to implement (and increase) wealth transfer taxes, but state that the full design is yet to be further researched and most probably will be influenced by the tax system per different nations. However, in line with Mirrlees et al. (2011), the design should avoid loopholes and attempt to be neutral.

Consumption tax

Consumption tax is an indirect tax which differs from direct taxes such as income & wealth related taxes, as explained earlier in the section

General construct. The consumption tax can be differentiated into two forms, i.e., the VAT and excise taxes. This differentiation is done based upon the fact that with the VAT the final consumer holds the statutory burden while for excise taxes this is the producer. However, producers can raise the prices of their goods and services such that the economic burden of the excise tax is transferred to the consumer (Ortiz-Ospina & Roser, 2016). For this thesis, we will simplify the analysis by only reviewing the effects of consumption tax on economic inequality of individuals and not on the effects on producers as the latter would fall outside of the scope of the thesis. However, it is to be noted that the following narrative will also hold for excise taxes which can have their economic burden transferred to the consumer.

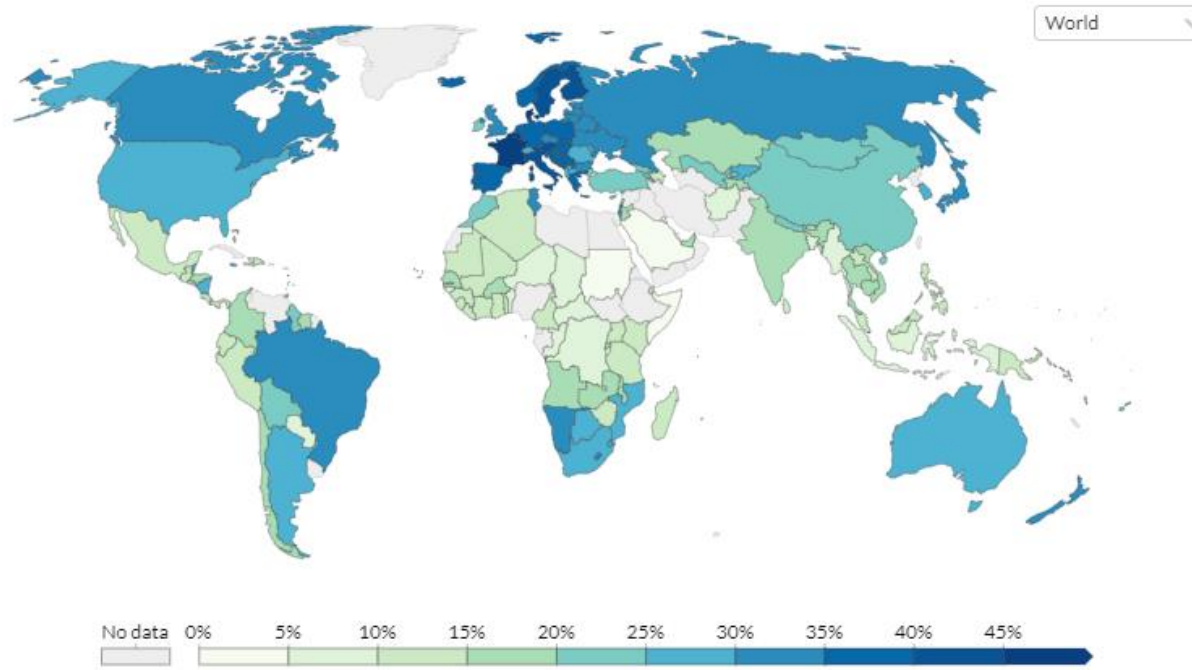

Figure 84 The total tax revenue as a relative share of the GDP per country in 2020. *Note: This figure has been obtained from .*

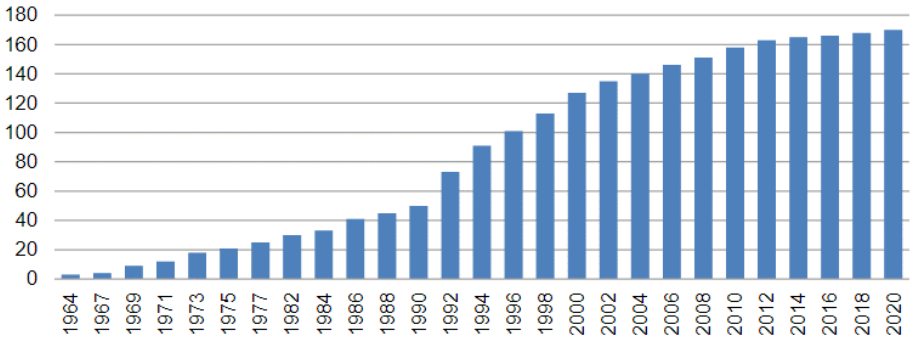

Figure 89 Number of countries with VAT between 1960-2020. *Note: The author's results are based upon the works of Annacondia* **(2019)**. *This figure has been obtained from* **(OECD, 2020)**

One of the largest reasons to discuss the VAT is that it is a dominant type of tax in almost in every country and gives a large contribution to the government revenue system. On average it has been contributing to almost 1/3rd of the tax revenue stream (OECD, 2020). However, this has not always been the case, in the early 60s, only a few countries levied VAT, as shown in Figure 89, while it is now implemented by 170 countries. The spread of the VAT has been foremostly connected to being a compensation for the decreasing import taxes which occurred due to trade liberalization. Moreover, not only the VAT has been implemented in more countries over the decades, but also the tax rate has on average been steadily increasing, as shown in Figure 90. However, as always, these are general statements and stark differences can be seen between countries. For example, the USA generates just over 10% of its revenue stream via VAT while Chili is hovering around 40%, as shown in Figure 91. As noted earlier, these differences can (partly) be explained as a consequence of the tax system design per country where developing countries are more dependent on the VAT while the developed countries lean towards income tax.

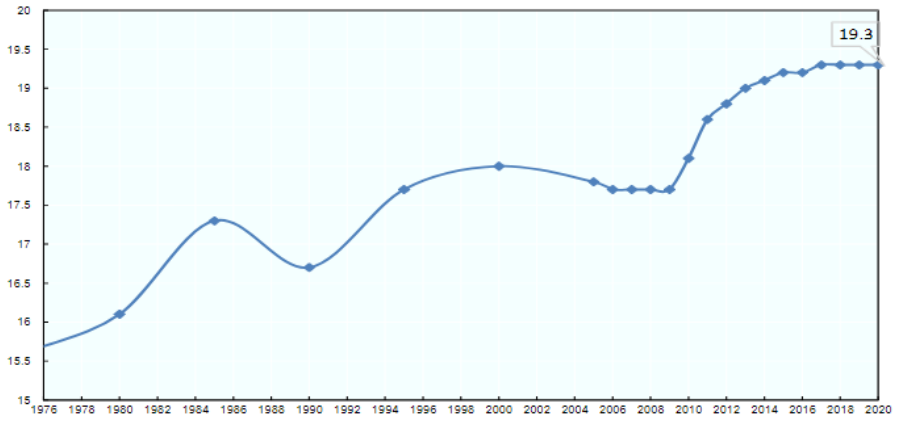

Figure 90 The evolutions of the VAT rates as an average of the OECD countries between 1976-2020. *Note: The author's results are based on their own calculations. This figure has been obtained from* **(OECD, 2020)**

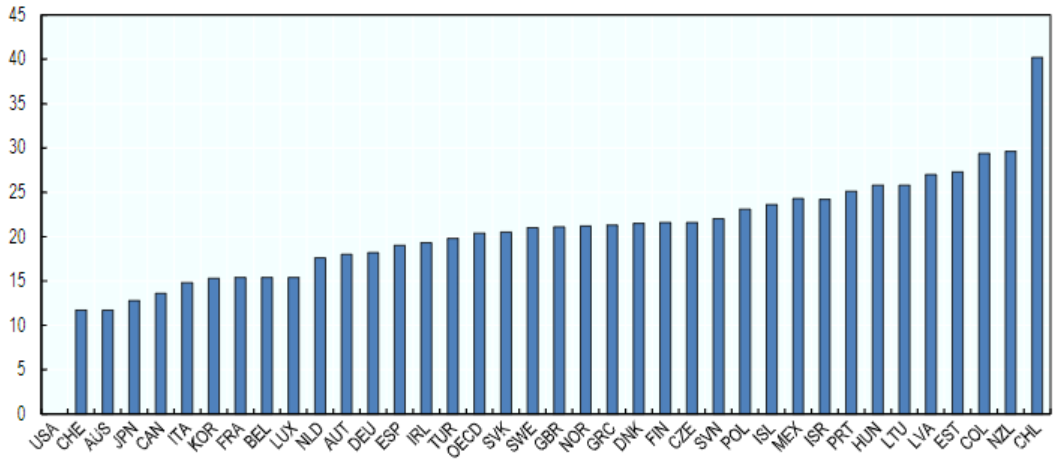

Figure 91 The relative contribution to the total tax revenues per country in 2018. *Note: The author's results are based upon an adaptation of the Revenue Statistics 2020 published by the OECD. This figure has been obtained from* **(OECD, 2020)**

In the light of this thesis, i.e., economic inequality, it is questionable what the abilities to redistribution are as it is not (directly) related to income and wealth. Literature has not reached its conclusion on whether consumption taxes are regressive, neutral, or progressive. As described by Thomas (2021), this is in part a consequence of which entity is being compared to the VAT, as shown in Figure 92. When compared to income, the VAT is regressive in nature, while when compared to expenditure, it is proportional or slightly progressive. As the nature is dependent on the comparative entity, one can question what the "true" answer is. Thomas possess that the tax should be valued on its targeted design, as the VAT is targeted at consumption, i.e., expenditure, it should be reviewed as such. He also argues that comparing VAT to income would create the difficulty that income is not directly spent. As such, income retained today can be expended in a later life cycle stage. To assess the nature of the VAT compared to income a life cycle analysis would be required, but this has not been done yet due to the complexity of obtaining quality data. However, we reason that there can be some truth in the regressive nature compared to income. This is caused by the fact that higher incomes have higher capabilities to transfer wealth to offspring (which is only marginally taxed) and as such circumvent the VAT which is not available to the less wealthy individuals.

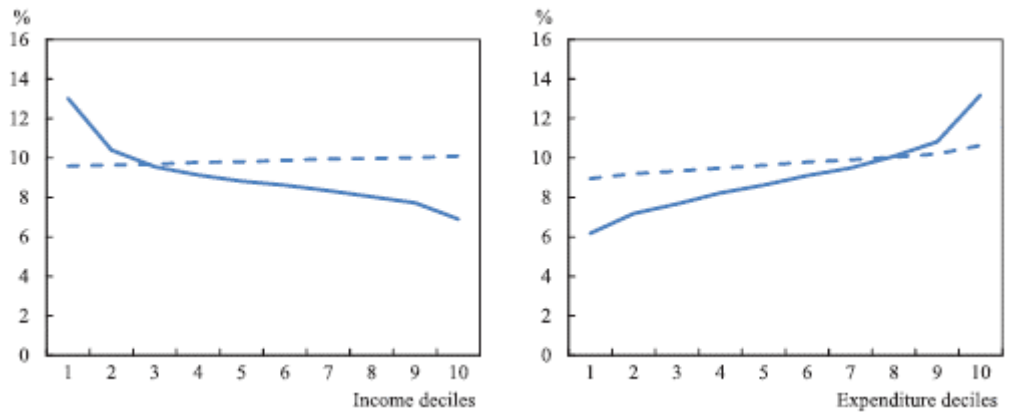

Figure 92 The average VAT burden for households according to left panel) income deciles or, rights panel) expenditure deciles. *Note: Solid line indicates VAT/income and the dashed line indicates VAT/expenditure. This figure has been obtained from* **(Thomas, 2021)**

When reviewing the consumption tax from a tax system design, it is argued by Mirrlees et al. (2011) that one should review it on its intended design, i.e., to tax the benefits gained from the consumption. As such, they argue that other type of goals is to be questioned, which includes the effort to obtain redistribution. In their line of reasoning, they state that other taxes are more apt in achieving that goal, e.g., income tax for redistribution. Following this reasoning, they also state that real estate and financial assets should be excluded from consumption tax as it would be taxing a transaction instead of consumption of the commodity. They argue that taxing transactions penalizes trading, i.e., attempts to optimize welfare between the parties, for which they find no economic justification to punish more frequent sales than infrequent ones. Even more so, it could cause that those items are being held for a longer period than deemed wanted. As such, they propose that the tax should be based upon what the asset does. In the case of real estate, the benefit of housing is based (partly) on the location and can therefore be taxed as residency tax instead of a tax on real estate transactions. As for financial assets, the benefits are gained from obtaining income and, therefore, the income from the asset should be taxed. In essence, they state that transaction taxes have limited economic logic. This is part of the optimal taxation theory which demands that disruption of the economy should be minimized. This should occur by minimizing the influence on the market, i.e., there should be no taxation between firm transactions, and taxation should only occur on end products.

Another conclusion of the Mirrlees Review (Mirrlees, et al., 2011) is the preference for simplicity through uniform VAT rates. In their reasoning varying the VAT rates for different products creates unwanted complexity. This would create advantages in the political arena where different stakeholders will attempt to lobby for favourable tax rates if differences are present. This creates pressure for the political system to explain why certain commodities have a preferable tax rate over other commodities. In their report, they narrate the comical example where a certain product, Jaffa Cakes, needed a court ruling to be typed as either a biscuit or a cake. The cause for this was that cholate topped biscuits were subjected to VAT while chocolate topped cakes were not. The producer brought a stale example to court and stated that cakes go hard while biscuits go soft. As their product went hard it should be regarded as a cake (and the judge favoured their appeal). While only being an example, it shows the difficulty for the tax administration to create a “sane” system and adequate ruling which becomes more complex with every exemption and differentiation. As such, the tax system becomes agile by simplicity and enables them to perform their tasks more efficiently.

However, there are some arguments to differentiate VAT rates between products, but these are often weak and do not compel as ground-breaking arguments to steer away from uniform VAT rates (Mirrlees, et al., 2011). The only strong argument Mirrlees et al. (2011) finds are when commodities cause spillover effects, i.e., externalities which cause extra benefits or damage to society which is not (automatically) incorporated into the price of the commodity. The prime examples are alcohol, tobacco, and fuel, which all have negative consequences, either on personal health and/or the environment. As such, the difference in tax attempts to promote or discourage certain behaviour. There seems to be a base to cause such differentiation but implementing these types of taxes can be difficult.

For example, a sugar tax should discourage excessive consumption of sugars but due to the widespread of sugar in both healthy and unhealthy food products, it is difficult to cause to wanted behavioural change through a sugar tax. It would require many exemptions to products, being potentially some arbitrary as the previous cake example, and create higher complexity to the system. In such a sense, it could be more favourable to have policies outside the tax system arena which can be more efficient in achieving the wanted goal, e.g., forbidding added sugars to food products, instead of creating a complex consumption tax system.

The overall conclusion of consumption taxes is that it should primarily be seen as a possibility to collect tax revenue neutrally. As such, this would encourage making the system broad and uniform with minimal exemptions. The potential exemptions which can be applied are: 1. Commodities which favour performing labour, e.g., childcare, 2. Commodities correlated to negative/positive externalities requiring behavioural "steering". In all other cases, it would be creating a more complex system with goals which can be achieved more easily and effectively by other types of taxes or benefits, or by policies outside the scope of the tax & benefit system. In regard to inequality, the consumption tax has a minimal effect and should not be used in an attempt to do so otherwise. Other taxes (and benefits) are far apt in creating equality and such be used as such. This returns us to the principles that the tax & benefit system should attempt to comply with a certain (envisioned) policy, the separate type of taxes may differ in their outcome.

4.2 Benefits

Benefit schemes are inherently different from tax schemes as they give monetary support to society instead of tacking it. As such, they also have distinctive other objectives for which we can distinguish three (Joumard, Pisu, & Bloch, 2013): 1. Redistribution over the life cycle, 2. Insurance against unforeseen, uninsurable risk, and 3. Avoid poverty or large discrepancies in income distribution. For this specific thesis, we will mainly review the third objective, but the objectives are non-exclusive in respect of each other. For example, the focus of the pension system is on the first objective, but pension given can be done regressively which would also consider the third not. Another example is the out of work compensation, which focuses on the second objective, being (potentially) distributed using means-tested benefit (which will be explained later) by which it would also comply with the third objective. As such, our focus is potentially more semantical than causing hard limitations when reviewing benefits.

The use of benefits to combat inequality can be explained by the large ability to specifically target people who require assistance. However, designing benefits can be complex and non-trivial. To give a global consideration of the issues at hand, it is required to (at least) answer the following questions when contemplating benefits (Hidrobo, Hoddinott, Peterman, Margolies, & Moreira, 2014):

- Who needs to receive?
- How much such should be given?
- How frequent should the transfers be?
- For which period should the benefit be given?

- In which form does the benefit come?
- What are the conditions to be applied?
- Does the benefit cause the desired outcome?
- How cost-effective is it compared to other options?

We will not answer all the questions, but we can give some direction to which form does the benefit come. In essence, benefit is a general overarching term which represents three separate forms of benefits (Hidrobo, Hoddinott, Peterman, Margolies, & Moreira, 2014): 1. Cash, 2. Near cash (vouchers and food stamps), and 3. In-kind (also referred to as non-cash). While these separate forms all can contribute to the goal of influencing inequalities, we will primarily review the first type of benefit, i.e., cash transfers, as it functions as a direct intervention method which is the most efficient when redistributing (IMF, 2014).

Moreover, there are also other reasons to not review the other two types of benefits in this thesis. For near-cash benefits it has been found by Hoynes & Schanzenbach (2009) that the propensity to consume food stamps in the form of food is similar to that of cash equivalents. According to the them this follows the general economic theorem that in-kind transfer acts the same as a monetary transfer of similar size when they are distributed in a smaller size compared to consumption of that product. As such, the near cash and cash benefits are of such close resemblance in their consumption outcome that it would be creating an unnecessary complexity to this analysis to create a division between these two types. As for the in-kind/non-cash benefits, these are largely decided by the investments done by the government in public services with the most important policies revolving around health, education, and housing (Callan & Keane, 2009; Paulus, Sutherland, & Tsaklogluo, 2010), but also social protection (IMF, 2014). We have already reviewed most of these items in the first chapter making further analysis of these types of policies somewhat superfluous. Moreover, according to Paulus et al. (2010) the relative size of non-cash benefits compared to cash benefits is fairly limited. This is made even more complex by the fact that the outcome of in-kind transfers on inequality can be dependent on the type of benefit. For example, education is an in-kind type of benefit in which primary education is progressive while tertiary education is regressive in nature (Callan & Keane, 2009). Overall, the main lesson to be learned is that it is important to realize that redistribution can occur through different types of benefits, but the size and impact of cash benefits are the largest when compared to the others.

In regard to cash benefits, it is important to understand a few basic principles. For every principle, it is important to state that the intentions, i.e., the primary schedule of the benefits, do not necessarily coincide with the outcome, i.e., the size of aid and the individual who receives it. As such, the following principles are theoretical in notion and the practical outcome is dependent on adherence, application, and access (Van Lancker & Van Mechelen, 2015):

1. Universal benefits: Everyone has the right to financial aid
2. Selective benefits: Only a portion of the people meeting a criterion has the right to financial aid. As an example, Hood & Keiller (2016) showed that the two following types of selective principles are being used in the UK

    a. Contributory: A benefit scheme eligible for everyone who contributed
    b. Qualification: A benefit scheme based upon certain eligibility criteria
3. Targeting benefits: The amount of financial aid given is unequal among the population. As such, selective benefits are targeted by definition, but universal benefits can also have targeting properties.
    a. Means-testing: Relates income to the amount of financial aid received.

Means-testing

Means-testing is (one of) the important efficiency procedures to improve the targeting of the poor with benefits (IMF, 2014). In this process, the size of the benefit is calculated in consideration the income received by the recipient. In general, to lower the disincentive to work the means-testing schedule will decrease the benefit more slowly than the increase in income. As an example, if one would earn 100 euros more then the means-tested benefit will decrease by 10 euros. As such, a 10% penalty is given on the extra gained income. Mostly, in this process also minimum hours worked are frequently applied. The reason for this is to avoid that an individual with a high paid job can mimic poverty through working part-time hours while also having gained the benefits of increased leisure time (IMF, 2014). For example, child support for a parent who works 20 hours for 2000 euros is deemed to be lesser need of assistance when compared to a parent who has 40 work hours with also 2000 euros of salary.

Problematic to the means-testing is that it can result in high effective marginal tax rates (Congressional Budget Office, 2012). This can be a consequence of the complex eligibility rules of the benefit system and its interaction with other taxes. Therefore, people are often unaware of which marginal tax rate they are experiencing. However, these rates can run up to 80% with records of >100% marginal tax rates. The Congressional Budget Office (CBO) reviewed the interaction between earnings and disposable income and found that the increase in disposable income is limited below an earnings income of 20.000 dollars for a single parent with a child, as shown in Figure 93. As such, these limited gains in income while performing (more) work will cause the potential to provide a disincentive to venture into the labour market.

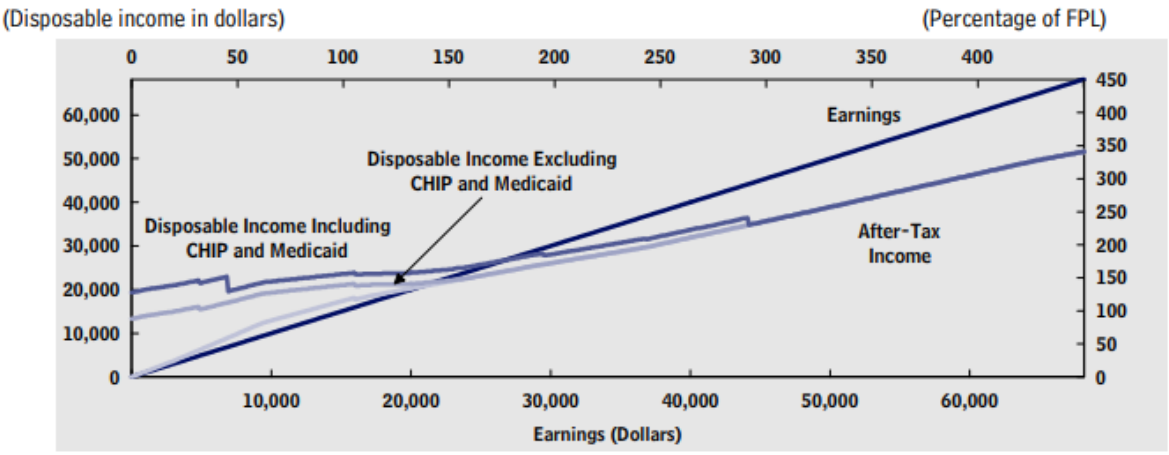

Figure 93 The relation between earnings and disposable income. *Note: The results are shown for the unmarried (financial) head of a household with one child and qualifies for both EITC and CTC in 2012. Moreover, all income is received from labour and tax deductions are efficiently claimed at state and governmental levels. Disposable income has been calculated as the sum of income and transfers minus tax liabilities. The market value of Medicaid has been estimated as the benefits given to a non-disabled child and adult living in the Commonwealth of Pennsylvania using data from the 2011 Annual Social and Economic Supplement of the Census Bureau's Current Population Survey. Results are based upon the author's calculations using survey data from the Census Bureau. FPL = Federal Poverty Guideline, CHIP = Children's Health Insurance Program, EITC = Earned Income Tax Credit, CTC = Child Tax Credit, TANF= Temporary Assistance for Needy Families, SNAP = Supplemental Nutrition Assistance Program. This figure has been obtained from* **(Congressional Budget Office, 2012)**

Overall, the CBO (2012) claims that the problems revolving around means-testing occur due to the absence of complete income data of the recipient hampering the required discount on the benefit. Moreover, as the benefits are declared via various offices there is unawareness of already active benefits. As such, if all the benefits apply means-testing, the effective marginal tax rate can rapidly increase. Solutions to these problems are either: 1. having the complete data for the various enrolled benefits per person and adjusting the means-testing benefit accordingly (which has high bureaucratic costs), or 2. assuming that people enrol for every eligible benefit and adjust the benefit rates accordingly (Congressional Budget Office, 2012). However, the latter is known to be untrue by the CBO (2012) but is also debunked by Mirrlees et al. (2011), stating that for every £1 entitled benefit there is 20p not being declared. They also point toward the complexity and the large abundance of different benefits causing that people are unaware that they can enrol for a certain benefit. This seems to be a likely cause when reviewing the full list of various benefits and tax credits present in the UK, as shown in Figure 94.

	Expenditure (£m)[a]	% of total expenditure	Claimants[b]
Personal tax credits			
Child tax credit	21,733[c,d]	10.27%	3,864,000[e,f,g]
Working tax credit	5,908[c,d]	2.79%	2,374,200[e,g]
Total personal tax credits	*27,642*	*13.06%*	*4,400,800*[h]
Benefits for families with children			
Child benefit (including former one-parent benefit)	11,281[i]	5.33%	7,153,935[j]
Guardian's allowance	2[i]	0.00%	Not available
Statutory maternity, paternity, shared parental & adoption pay	2,449	1.16%	269,000[k]
Maternity allowance	443	0.21%	63,000
Sure Start maternity grant	30[j]	0.01%	59,400[l]
Total benefits for families with children	*14,205*	*6.71%*	
Benefits for unemployed people			
Income-based jobseeker's allowance	2,024	0.96%	692,000[m]
Contribution-based jobseeker's allowance	306	0.14%	
New enterprise allowance	23	0.01%	13,390[n]
Total benefits for unemployed people	*2,352*	*1.11%*	
Benefits for people on low incomes			
Income support	2,705	1.28%	706,000
Housing benefit	24,273	11.47%	4,781,000
Discretionary housing payments	125	0.06%	Not available
Funeral payments	40[j]	0.02%	28,700[l]
Cold weather payments	4[l]	0.00%	154,700[l]
Total benefits for people on low incomes	*27,146*	*12.82%*	
Benefits for older people			
Basic state pension (contributory)	68,003	32.12%	12,857,000
Basic state pension (non-contributory)	108	0.05%	46,000
Additional state pension (and pension transfers)	21,177[o]	10.00%	Not available[p]
Financial Assistance Scheme	209[e]	0.10%	Not available
Pension credit	6,078	2.87%	2,074,000
Over-75s television licences	620[e]	0.29%	4,429,000[e]
Winter fuel payments	2,080	0.98%	12,260,000
Total benefits for older people	*98,275*	*46.43%*	
Benefits for sick and disabled people			
Incapacity benefit	75	0.04%	68,000
Employment and support allowance	14,276	6.74%	2,367,000
Severe disablement allowance	464	0.22%	122,000
Personal independence payment	2,991	1.41%	584,000[q]
Disability living allowance	13,225	6.25%	2,987,000[q]
Attendance allowance	5,489	2.59%	1,458,000[q]
Carer's allowance	2,560	1.21%	762,000[q]
Motability grants	17[r]	0.01%	Not available
Industrial injuries benefits	869[s]	0.41%	313,000
War pensions	795[e,t]	0.38%	130,178[e,t,u]
Armed forces independence payment	7	0.00%	896[v]
Other[w]	55	0.03%	Not available
Total benefits for sick and disabled people	*40,823*	*19.28%*	
Benefits for bereaved people			
Widow(er)s' and bereavement benefits	569	0.27%	92,000[x]
Industrial death benefit	28	0.01%	5,000
Total benefits for bereaved people	*597*	*0.28%*	
Other benefits			
Christmas bonus	160	0.08%	16,035,000
Universal credit	483	0.23%	225,002[y]
Total other benefits	*643*	*0.30%*	
TOTAL	211,683	100.00%	

Figure 94 All various kinds of benefits and tax credits within Great Britain in the year 2015-16. *Note: This figure has been obtained from* **(Hood & Keiller, 2016)**.

Complexity of benefit

The effectiveness of targeting is largely dependent on the execution of the benefit programs but can cause large poverty reductions when done effectively (Van Lancker & Van Mechelen, 2015). However, it will be important to properly target the poor which is a difficulty in itself (Brown, Ravallion, & Van de Walle, 2017), as shown in Figure 95. Problems are that assumptions are made based upon a limited dataset which is extrapolated into a presumed wealth/income. While their research involves Africa which has a much less apt administration system when compared to Western civilizations, it will still be an impossibility to have 100% accuracy in the regards to finding the poor/rich. In part, the reliance on data has caused those individuals who are living 'off the radar' are being missed, e.g., the homeless and institutionalized individuals. Moreover, slum dweller households are notorious for being missed and require more intense data collection methods (Falkingham & Namazie, 2001). In general, it should be warned that only targeting the individuals with known problems is a limited perspective of the actual problems occurring in society. As such, improvements and limitations of poverty measurements and coupled (targeted) benefits are to be aware of.

These findings are not 'new'. The Mirrlees Review report (Mirrlees, et al., 2011) narrates a similar story where the abundance of different benefits caused a large network of interactions and perquisites of enrolment. This makes the system (inherently) complex, which is enhanced by the pressure to avoid multiple support claims via different benefit programs. Moreover, comprehending the programs in-depth, i.e., understanding changes in personal accounts, becomes almost impossible which causes those benefits are being missed. While the applicants have issues with filling for support, the administrative institutes must deal with complex cases which require (extra) resources to complete the claims adequately. This becomes even more complex because the benefit programs are enrolled via various institutes which complicates the coordination of the programs. As such, the desire to improve targeting can cause counterproductive effects on the ability to achieve the primary goal of aiding those who need it.

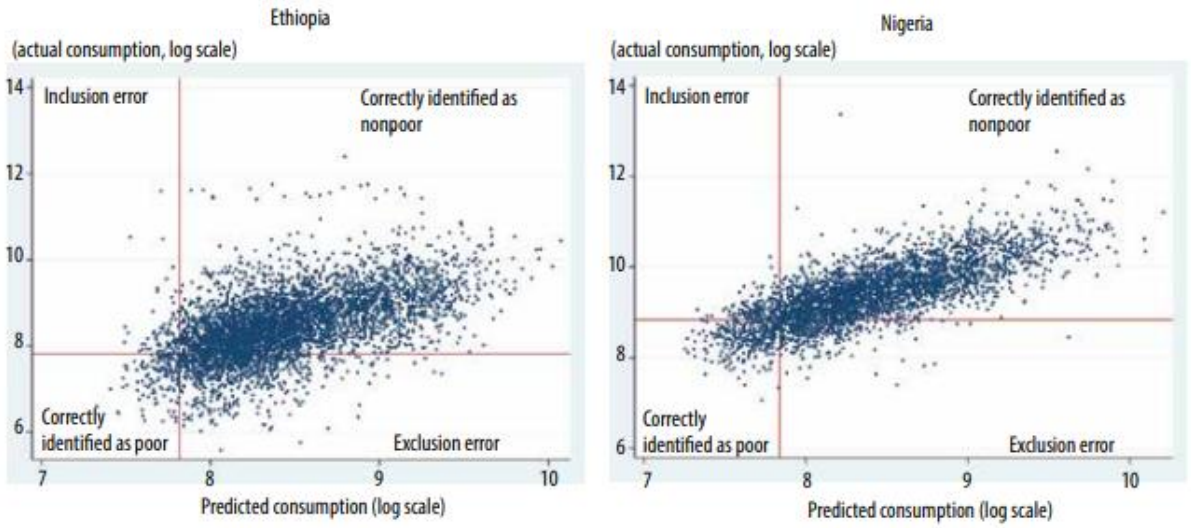

Figure 95 The ability to correctly identify the poor versus the non-poor. *Note: Red lines divide the population sample into the lowest 20% consumption group (poor) and the upper 80% consumption group. This figure has been obtained from* **(Brown, Ravallion, & Van de Walle, 2017)**

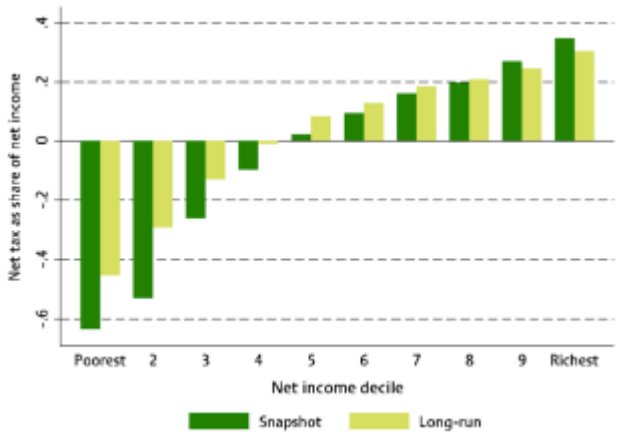

Figure 96 Difference in the short term and long-term net taxation across the income distribution. *Note: Results are based upon the author's calculation using BHPS data. 'Snapshot' series are based upon individuals observed in the first wave and the long-run series are based upon individuals observed in each wave running from the first to eighteenth wave. Individuals were included when they were older than 16 and were not dependent children. Income has been measured in real values, equivalised, and discounted for in the long-run series. The changes in the net tax as a share of net income represent averages for every decile. This figure has been obtained from* **(Roantree & Shaw, 2018)**

To add to the complexity of the design in benefits, it is highlighted that the short-term and long-term effects of benefits can differ. In this matter, Roantree & Shaw (2018) find that benefits seemingly mainly contribute to the short-term alleviations of poverty but are less apt in reducing long term poverty, as shown in Figure 96. They reason that in part this is caused by the fact that long-term inequality is lower than short-term (thus there is less to redistribute in the first place). But also, benefits are aimed at alleviating short-term problems such as assisting people who are out of work, a group who predominantly reside in the lower decile group. However, larger groups of the population will be out of work at some point in life (in the long-run assessment), making the assistance more of an intra-personal transfer than one might perceive at the start. The difference in short-term and long-term effects is also found in the public transfer domain overall. Bovenberg et al. (2008) showed that the redistribution in Denmark viewed from a long-term perspective is more of a matter of intra-personal transfers, i.e., from one's younger self to one's older self, than inter-personal transfers, i.e., between rich and poor persons. This is predominantly an effect of the pension system which causes that approximately 75% of the income tax dedicated to public transfers comes back to the same person later in life due to the pension funds. This has also been found by Falkingham & Harding (1996) showing that in the UK 62-71% of the redistribution is a matter of intra-personal transfer. As such, when designing a benefit, one must be aware of the difference (and goals) in short- or long-term changes where long-term effects can potentially be much more subtle.

Pension funds

As of yet, we have discussed benefits in general terms, but we want to highlight the pensions shortly as they are the largest benefit program in most countries. As shown by Marx et al. (2016), in most countries >50% of the redistribution is aimed at pension funds. This is in correspondence to the OECD report finding that 55% of the benefits by distributed via the pension system (Joumard, Pisu, & Bloch, 2013). Whiteford (2021) found other indications of the larger size of the pension funds, stating that in the retired population almost everyone in the income distribution is a tax consumer except for a few countries which have a tipping point in the 10th decile from going from consumer to producer. On average, people older than 65 years have 90% of their total received benefits coming from the pension funds (Joumard, Pisu, & Bloch, 2013). As such, the size of the pension program in the benefit system is enormous.

However, from a redistributive point of view, the efforts are only mild. The OECD (Joumard, Pisu, & Bloch, 2013) highlights that the benefits obtained from pensions differ starkly between social classes with large importance for the shorter life expectancy in the lower socioeconomic classes. As stated by Sanchez-Romero et al. (2020) this age effect is the largest denominator in making the pension system regressive in its format. According to Bartels & Neumann (2021), there is a tendency for countries with relatively more elderly to have increased annual redistributive transfers but are causing less redistribution in the long run. This could be caused by their increasing relative votive power, i.e., increased bargaining power, due to the increased presence of elderly in society to demand beneficial treatment.

While we stated that benefit programs should always be reviewed in the coherence of the whole system, the fact that the benefit program, which is more than half of the size of the complete system, is regressive would suggest that potential reforms can be warranted. In the recent publication of Klos et al. (2022), it is also stipulated that reform seems essential as current demographic developments will not be able to maintain the current pension systems and the desired outcomes for intra- and inter-generational transfers should be reviewed. As such, there seems to be potential to review the format of the pensions with the necessary reforms which are yet to come.

Other aspects

Not only the design of the benefit, but also the perception and framing of a benefit have an impact on the support and the implementation of a benefit policy (Marx, Salanauskaite, & Verbist, 2016). In this one can observe a difference in universal and targeted benefits. Those benefits which attempt to target (parts of) the population non-specifically mostly have higher support as there is no discrimination between people. The benefits are exemplified by the child benefit and universal pension benefits which are accessible to all residents (at some point in life) and are also expected regardless of income. As such, these benefits command high acceptance as they are not creating a significant advantage for a specific group in the population (Cavaillé & Trump, 2015). However, targeted benefits tend to become stigmatized due to their focussing nature. For example, jobless support is scrutinized as the receivers are "lazy" for being jobless. This effect causes that the benefit receives ill support and is being conditionalized to qualify for the benefit (Cavaillé & Trump, 2015). For example, one can only obtain jobless support while meeting the condition that the receivers respond to job vacancies regularly. Moreover, sometimes the narrative of a benefit is disconnected from the system and being discussed as an individual entity creating favour or discontent for that particular benefit. This can be done to simplify matters or to influence public opinion while missing the point that the benefit has its particular purpose within the system (Adam, et al., 2010).

In general, when creating a benefit system, one should take note that a targeted nature can cause problems for its reception in the arena of political support. One could envision that a progressive format for a pension system could be perceived as a punishment to the 'smart and planned' individuals who have adequate retirement plans and incentivize the 'dumb and short-sighted' individuals without these plans. If such a narrative will be brought to life, it could be difficult to acquire political support for the implementation of such a policy. However, these issues regarding perception and support

are not only occurring for benefits but also taxes are subjected to these kinds of problems. For example, Rowlingson et al. (2022) showed that wealth taxes are being scrutinized and people tend to avoid paying them. We will stop further discussion of these issues, but we highlighted them to be a potential problem when reforms are attempted and should be accounted for when doing so.

While we are discussing the benefit system, it certainly is not disconnected from the other topics in this thesis. For example, Kristal et al. (2018) showed that there is benefit inequality which correlates with income inequality, i.e., low-wage earners obtain fewer benefits. In part, this is caused by the fact that "bad" jobs have less legal protection to prevent from being cut in social contributions. The painful situation occurs that low-wage workers are being disadvantaged through income, but also systematic disadvantages are created because the jobs on which they enrol are mostly flexible positions with limited social security protection. This in part is correlated to the lower wage bargaining strength of the lower-income population (Kristal, Cohen, & Navot, 2018), which already came to pass in the subsection Diverging income under 3.1. As such, improved functioning of the benefit (and tax) system will also be dependent on other items and should be reviewed in totality.

4.3 Chapter Conclusion

In this chapter, we reviewed the governmental opportunities to draft policies which impact economic inequality. This can be shaped through the tax and benefit system. We have brought to attention some basic principles but also pointed at various problematic notions which should be considered when drafting these policies. However, doing so can be difficult as shown by Sørensen (2010), stating that the process to maximize social welfare is complicated by missing information and subjective inputs to the social welfare function. As such, we are uncertain what kind of effects would be caused by increased taxation rates as pre-emptive assets fail to adequately predict the outcome.

However, this does not mean that there haven't been any historic strides to alter inequalities. According to Haveman et al. (2015), the 'War on Poverty' in the US had its marks initially on poverty among the elderly and has been fought off effectively using the pension system. However, it got in turn problems with single mother households and children which is seemingly a larger struggle. In part, we have already discussed this problem in the Conclusion of Chapter 3 where in the UK it was attempted to battle poverty among children with the Child Poverty Act but has severely failed in doing so. Overall, the tax and benefit system has a notion of trial and error to it, but we attempt to properly use academic knowledge which is known.

Conceptual model's building blocks

To complete the analysis for this chapter, we have retrieved the following "building blocks" for our conceptual model. In contrast to the previous chapters, the separate sections are bundled into one overarching header. The reason for doing so is the close interaction of the tax and benefit system. As mentioned earlier by Mirrlees et al. (2011), it is advised to review it as a complete system instead of standalone programs.

Taxes & Benefits

a) Tax & benefit design – tax evasion and avoidance

The various forms of different taxes and a multitude of exemptions and reliefs enables the potential for tax evasion and avoidance. More complex tax design requires higher administration which in turn costs higher work pressure for the administrator. As such, they have less ability to reduce evasion and avoidance as they are experiencing divided attention due to other tasks.

b) Tax & benefit design – Income inequality

The interaction between tax and benefits through means-testing and exemptions and reliefs causes that the bottom deciles experience higher tax rates than the top incomes. As such, relative income redistribution is hampered by the design.

c) Tax & benefit design – Bargaining power

The lower deciles are employed in types of jobs which limit social security and have reduced opportunities in bargaining for favourable incomes. This is in contrast to top incomes who are enabled to bargain for income types with favourable taxation rates.

d) Tax & benefit design – Wealth inequality

The inherent design of the tax systems gives preference for capital income which supports the investment into assets with a (high) return rate. The access to these types of returns is predominantly experienced by the top of the wealth distribution. However, the solution to the inequality is not offered through a recurrent wealth tax but by reducing the income and favourability attached to wealth.

e) Tax & benefits design – Public perception

Tax & benefits are importantly connected to the perception of society. While economic theory can direct favourable tax design, society should also accept it to create political momentum to draft its implementation.

f) Wealth transfer – Wealth inequality

The ability to transfer wealth with low tax rates causes that wealth inequalities can be transferred along sanguine lines.

g) Wealth transfer – Inequality of opportunity

The ability to transfer wealth (with low tax rates) causes the ability to transfer socio-economic position from the parent to the offspring. As such, offspring with rich parents have larger opportunities as compared to their poorer counterparts.

h) Public perception – Tax avoidance & evasion

Depending on the perception of a tax & benefit design, the forcefulness to cohere to its policy will differ. Taxes which are deemed to be 'bad' will have more problematic enforcement than those that are perceived as 'good'. Similar narratives are warranted for benefits, those that are scrutinized experience a lower willingness to be enrolled for.

5 Netherlands and inequality – Flat income and Himalayan wealth

In the previous four chapters, we have created our fundamental research which we apply to our analysis of the Netherlands. For the sake of consistency, we will review the topic in the same order as the chapters. Besides the four chapters, we will also include a review concerning the COVID epidemic. In the last two years, the epidemic has created an enormous impact on society and has resulted in various financial regulations to support various entities. We will attempt to review the social impact of the coronavirus and the effect of the financial regulations in relation to economic inequality.

It should be mentioned that the review will be short as it mainly functions as a proof of principle for analysis. As such, it will sometimes be difficult to persuasively create distinguishment between certain characteristics. For example, mobility and stratification are two highly related concepts. Moreover, due to time constraints and the reduced information available, i.e., by only reviewing the Netherlands we are bound to information reviewed for the Netherlands which is a much smaller scope than a global perspective, we will not be able to find information on every interaction. If so, we will mention that that specific subject needs more attention.

5.1 Inequality influences

In this first part we want to investigate the found correlations within the framework concerning health, education, democracy, and economy. However, we do note that these are indeed not the only interactions which are related to economic inequality. For example, the interaction between crime and poverty can be exemplified by cases within the court room of Schiphol where impoverished individuals are resorting to drug trafficking. These incidents occur because they cannot meet financial needs to buy essential goods, e.g., medication for their children (NRC, 2022). But also, climate sustainability and inequality have some clear interactions. This has been exemplified by a report of the CE Delft showing that of the 750 million euros of subsidies, 624 million euros was dedicated to the upper 50% household incomes and 153 million to the lower 50% household incomes (CE Delft, 2017). With the increasing energy prices (which occurred drastically by almost doubling in 2022 compared to 2021 (CBS, sd)) and the related energy poverty, unsustainable housing can increase inequalities by enhancing expenditure of the less wealthy (TNO, 2021). Therefore, we make notice that in a future extension of this thesis we would strongly advice to also include justice & crime and climate sustainability in the review of economic inequality.

Health

In the framework we found that health was related to three aspects: 1. Economic inequality, 2. Stratification, and 3. Inequality of opportunity.

Economic inequality

Van der Veer & Jungmann (2016) found that there is a correlation between financial problems and health problems. They also state that the causation between the two remains yet to be unknown. In general, it follows the absolute income hypothesis, i.e., individuals have financial limitations to afford "healthy" behaviour. This can also cause stress which in turn causes bad decision making, e.g., starting to smoke to cope with stress. However, they also note that backward relation could occur, due to health-related

issue they incur higher costs or lose income. In their conclusion, they highlight that although the exact causation is unclear (and most likely bi-directional), there is large support for integrative policy which connects aid in both health and finances to improve outcomes.

Stratification

There are large indications that stratification, positively correlating with educational level, is being predictive for health outcomes, as shown in Figure 97. It is shown that problems within the social layers are occurring due to deficiency in financial, cultural, and social resources (André, Meuleman, & Kraaykamp, 2018). In total, these differences cause a 7 years life expectancy discrepancy for females and 6 years for males. However, when discerning good health years, the differences become even large averaging 17 and 14 years for females and males respectively (CBS, 2015).

These correlations occur due to lifestyle differences between(educational) groups For example smoking is much more common among low educated people when compared to university level, i.e., 33% compared to 10% respectively, and the average BMI level also shows similar trends, i.e., 26.8 compared to 24.4 respectively (André, Meuleman, & Kraaykamp, 2018). These differences become the most apparent when reviewing the cumulative differences in healthy behaviour. From that perspective it is found that high educated people are 50% more likely to perform combination of healthy behaviour as opposed to low educated people (André, Meuleman, & Kraaykamp, Een (on)gezonde leefstijl: Opleiding als scheidslijn, 2018). In part this effect is caused by differences in knowledge about health-related information and the ability to convert that knowledge into healthy behaviour (Rademakers, 2014).

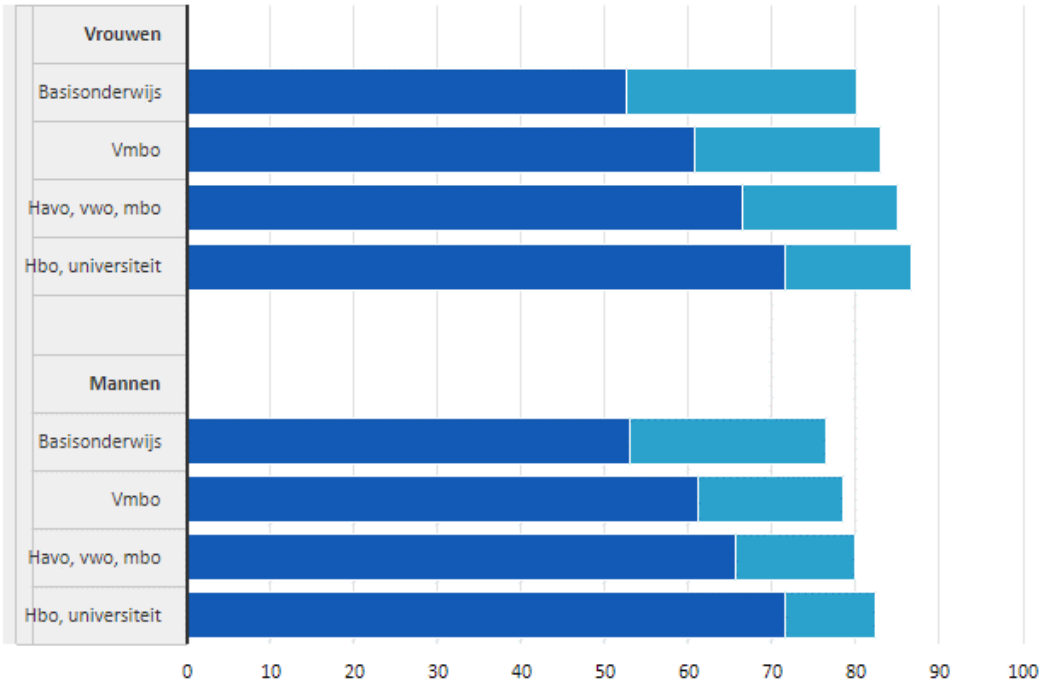

Figure 97 Life expectancy at birth according to educational level. *Note: Dark blue indicates life in good health and light blue indicates life in less good health. Upper bars indicate female and lower bars male life expectancy. Educational levels (from top to bottom) are primary schooling, lower high school diploma, upper high school diploma, college & university level. This figure has been obtained from* **(CBS, 2015)**.

However, while health related differences between socio-economic groups are increasing, there are also differences within these groups. Mierau (2021) finds that there are people who achieve good health within poor neighbourhoods and vice-versa for rich neighbourhoods. As such, he hypothesizes that there could be specific indicators which are not specifically related to socio-economic groups, but certain type of behaviour. Therefore, he advocates that investigating differences within groups can potentially be of higher importance to find policies which can contribute to good health.

Inequality in opportunity

There has been limited research in the regard of correlation between health and equality of opportunity. Mostly it has been connected to differences between immigrants and non-immigrant. For example, Social and Cultural Plan bureau (Huijnk, 2020) found that 12% of 29% of non-Western immigrants not participating in the job market is related to health issues. The health issues causes that individuals refrain from entering the job market. However, reviewing the relative importance to job employment differences between non-Western immigrations and Dutch residents, health is of much lesser importance when compared to job experience and educational level (2,1% versus 15,6% and 3,7% respectively). CPB & SCP (2020) state that potential causes of (perceived) health issue among immigrants and job opportunity can be related to "the refugee entry effect", i.e., after entering a country, mental health issues cause prolonged reduced job opportunities. However, in the long run they find that health and opportunity is only mildly related.

However, it is of interest to realize that flex work causes more physical and psycho-social strain on employee as compared to fixed contracts. Moreover, due to the reduced social support, income insecurity, and reduced autonomy, they incur higher risks for their health and prolonged availability in the job market. These factors are especially hurting young employees between 25-45 which causes increased burn-out among this group. In sum, the nature of flex work increases health issues and prolonged sick leave (Goudswaard A. , 2017). As we have noted earlier, we also know that low-incomes are more frequently employed as flex workers. As such, we could make the educated guess that they will incur greater odds of having negatives health effect from work which could potentially reduce their opportunities to develop either their career or human capital.

Vrooman et al. (2014) gives indications for such a connected in their theoretical model stating that health, as part of personal capital (consist out of physical, mental, and esthetical health), contributes to the opportunities one has in life, as shown in Figure 98. The value of this personal capital correlates positively with educational level. Especially mental health, e.g., self-confidence, seems to be important in the odds on the job market. As we have seen earlier, lower incomes endure more stress and have problems in their mental health and, as such, could potentially suffer negative consequences on their opportunity on the job market.

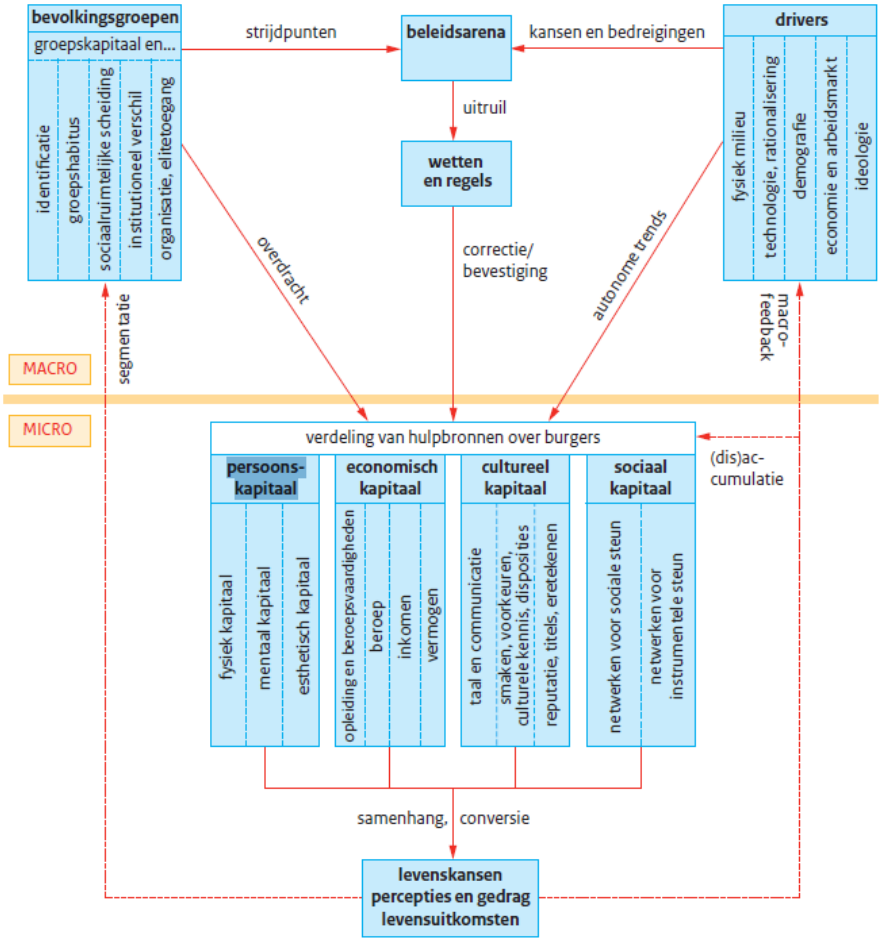

Figure 98 Theoretical model explaining opportunities and outcomes in life. *Note: this figure has been obtained from* **(Vrooman, Gijsberts, & Boelhouwer, 2014)**

Democracy

In the framework we found that democracy was related to five aspects: 1. Disconnection, 2. Unawareness, 3. Stratification, 4. Economic inequality, and 5. Policy approval.

Disconnection

The National Electorate Research (Nationaal Kiesonderzoek) (Sipma, Lubbers, van der Meer, Spierings, & Jacobs, 2021) finds that there is an increase in resentment towards the "The Hague" politics. This has coincided with globalisation of politics which reviews issues of global warming, multicultural societies, and European integration. However, the resentment is also connected to the trust in the political system which is a fluctuating characteristic. In 2021 the trust in the government had severely diminished (after having risen sharply due to the "rally around the flag" principle during the start of corona) due to the long formation period which was heavily slowed due to the "Omtzigt functie elders" note. This process seems troubling as the individuals with increased resentment have a lower tendency to vote during the elections which is correlating with low-education, low income, and (non-Western) migration background. However, the National Electorate Research does remark that non-voting is rather a combination of lack of interest in politics, resentment, and lack of self-confidence (distrust to make the right political

decision) instead of resentment alone (Sipma, Lubbers, van der Meer, Spierings, & Jacobs, 2021).

The National Ombudsman of the Netherlands (Nationale Ombudsman, 2021) has warned for increasing distance between the government and the population. In the year report the very first theme is poverty (mainly concerning the "toeslagenaffaire") and the consequences of the corona virus causing rising financial problems within certain groups of the population. Next to this problem, they also find that the government and municipalities are attempting to improve input and participation among the citizens, but they refrain from giving them consequential influence. As such, people feel their input is a mere façade but don't feel change (Nationale Ombudsman, 2021). An example of this problem is exemplified in Amsterdam. The municipality's ombudsman wrote an extremely negative report about the policy of the municipality regarding agreements revolving around markets. He wrote that the markets had zero influence on the policy while they have the required knowledge. This has caused distrust and disconnect between citizens and policy makers (NRC, 2022).

Unawareness

We could not any literature on the awareness of inequality within the Netherlands. The closest research we could find was from Salverda et al. (2013) showing that the increase in inequality did not cause a significant shift towards left-winged parties (those who mostly favour redistribution). As such, there are no indications of the redistributive perspective. However, we cannot distinguish whether this is caused by unawareness or because of the unequal power perspective.

Policy approval

Schakel (2021) found that unequal policy approval occurs within the Netherlands which correlates along the lines of economic inequality, as shown in Figure 99. He shows that the opinion of the 90th income percentile has high influence on the approval rate of policy. This in contrast to the 10th income percentile and the mean levels. According to his research, this is mainly caused by corporate lobbying entities which have a more predominant effect on policy approval as compared to civil society groups. As such, the Netherlands seems to suffer from the unequal power perspective. If so, continuous efforts to increase involvement of society in the democratic process seems to be less worthwhile as opposed to reducing the ability of the rich to shape policies to their demands (Schakel, 2021).

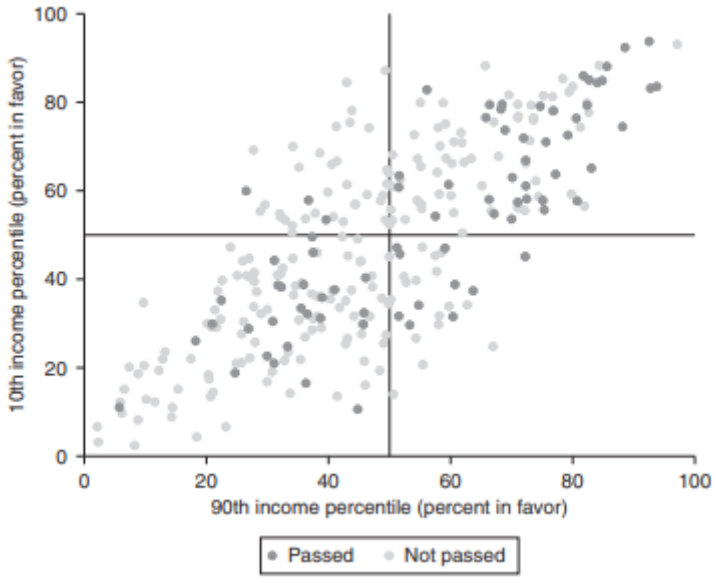

Figure 99 Policy approval according to favouring of the rich and poor. *Note: The x-axis represents the rich and the y-axis the poor. Light shaded grey unapproved policies and dark grey approved policies. This figure has been obtained from* **(Schakel, 2021)**.

Economic inequality

Kremer et al. (2014) in find that there has been a decrease in voter turnout with increasing Gini values, as shown in Figure 100. As such, one could state that there is potential influence of economic inequality on democracy. However, while similar trend was noticed by Salverda et al. (2013),they show that the decrease in voter turnout is distributed overall all socio-economic groups. As such, increasing inequality does not seem to be an evident causation to discrepancy in voting between social groups. Therefore, it seems unlikely that economic inequality can cause a difference in democratic power.

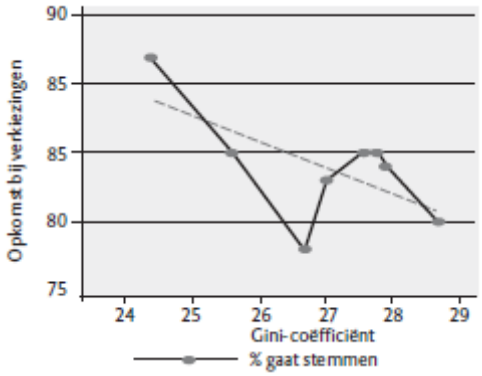

Figure 100 Correlation between Gini index and voting participation. *Note: This figure has been obtained from* **(Kremer, Bovens, Schrijvers, & Went, 2014)**

Stratification

While in the health domain we found that there is a tendency for the absolute income hypothesis, i.e., having shortage of funds to buy "essential" needs. We find that in the political and social domain that a variant of the relative income hypothesis, i.e., psycho-social theorem, is the most explanatory theorem to explain occurrences within the

Netherlands (Kremer, Bovens, Schrijvers, & Went, 2014). In this theorem the differences between social groups causes a variety of problems, including disconnect in politics, distrust in (governmental) institutes, and social segregation between income groups, this echoes with the relative income hypothesis.

Education

In the framework we found that democracy was related to four aspects: 1. Health, 2. Stratification, 3. Economic inequality, and 4. Mobility.

Mobility

While the Netherlands attempts to correct stratification by giving the ability to climb the ladder between educational levels by, pilling diploma's, this procedure has become increasing difficult and promoting inequality of opportunity (CPB, 2022). Overall, the CPB states in a different report that differences between children from different socio-economic backgrounds persist throughout life. The exceptions are for children with migration background which tend to play "catch-up" with the other children from the same socio-economic background. However, the differences between the socio-economic levels will persist, also for the children with a migration background (CPB, 2020).

While in international reports, advantages have been shown of pre-primary schooling to improve mobility and educational outcome, the outcomes within the Netherlands have shown to be limited. The government implemented the 'Regeling voor-vroegschoolse educatie' in the 2000s that was primarily aimed at children from disadvantaged backgrounds. This has changed around 2010s to include all children, but the outcomes are yet to become known (Salverda, Haas, de Graaf-zijl, Lancee, & Notten, 2013). The CPB (2020) gives a similar statement that the data is inconclusive and further research is required to assert the impact of the pre-primary schooling.

Stratification

In the report of the Salverda et al. (2013), they state that the educational system is actively increasing inequality between groups. The process of early differentiation in high school between VMBO, HAVE, VWO is causing that the lower educational levels don't have able peers as reference point to which can develop. As such, they are less able to grow their qualities more adequately. This in contrast to the higher secondary level which is surrounded by only able peers benefitting from each other's abilities. Salverda et al. (2013) also states that stratification occurs due to the free school choice system. This enabled segregation of schools by admission differences, causing, e.g., schools with predominantly white or black students (especially in the large cities). As such, students with better opportunities can claim better schools which enhances future opportunity differences. This in part coincides with the process of higher quality teachers avoiding to work at schools with low educational performing schools (CPB, 2020).

Inequality of Income

An increase in the educational level is also occurring within the Netherlands. As shown by the CBS (Maslowski, 2020), individuals who obtained higher educational level, i.e., HBO + WO, increased from 32% in 2008 to 40% in 2019. However, it is uncertain whether this is leading to social congestion. As noted by the CBS (ter Weel,

Loonongelijkheid in Nederland stijgt, 2012), the demand for higher educated individuals seems to be increasing which causes that demand and supply is keeping track of each other. Moreover, the incomes of higher educated people seem to increase more quickly as compared to the other educational level jobs. The troubles in job market is more among the middle educational level jobs. They are having issues due to technological advancements, i.e., ICT, which is causing their job supply to dwindle. As such, they have to attempt to either climb up (which is complicated due to the already large supply of high educated individuals) or fall down (potentially causing social congestion at the bottom) the job ladder. In sum, the problem does not so much seem to occur among the upper levels, it's the middle level which is potentially in danger of congestion and depending on their movement, can cause troubles in other positions.

Inequality of Opportunity

The 'Onderwijsraad' warned for increased inequality of opportunity due to paid assistance within the educational system. They note that shadow education is becoming increasingly entangled with the public education. Currently, about a quarter of the students in primary and high schools are using supplementary support offered by the shadow education in the aid of their curriculum. Even more so, parents are being advised in public schools to enrol their children into the shadow education curriculums to improve their grades. This causes that the parents are hurdled with extra costs, which especially poor will have troubles to afford (Onderwijsraad, 2021). Overall, there has been a trend of increasing revenue generation by the shadow education corporations (rising from 48.5 million to 69.2 million between 2015-2017) and increasing number of private primary schools, which increased from 35 in 2015 to 60 in 2018 (NRC, 2021).

The reason to do so seems obvious when reviewing the results of shadow education. Bisschop et al. (2019), for example, showed that within the Netherlands the students who enrolled in supplementary education via shadow education scored 0,7 points higher at their central exam than those who did not enrol. This enrolment into supplementary education was most strongly correlated to income, and not educational level nor education level of the parents.

To avoid shadow education hurdling further into the educational system, the 'Onderwijsraad' concludes that there should be prohibition on the advertisement of shadow education and assistance inside public schools. The consensus should be that every educational aspect is supplied via the public system and should conform to its public characteristic, i.e., availability to everyone (Onderwijsraad, 2021). However, researcher Elffers states that shadow education is here to stay as parents will promote the existence of shadow education because of their desire to get the best perspectives for their children (NRC, 2021). Moreover, also the government is aiding the existence of shadow education after the quality issues caused in education as consequence of the backlash of corona. As it is deemed impossible for the public education to repair the damages by itself, educational institutes have become dependent on the aid of shadow education (NRC, 2021). This is the complete opposite of the desired perspective of the Onderwijsraad (2021) mentioned earlier.

Economy

In the framework we found that economy was related to one aspect: 1. Economic growth.

Economic growth

In the report of Kremer et al. (2014), the notion that economic inequality can cause reduced growth has been highlighted as a known problem. While they do not directly make the same investigation for the Netherlands, i.e., inequality versus economic growth, they do state that the tendency of wage moderation has significant consequences for the domestic market. They state that the continuous (past) wage moderation caused hinderance in the demand for goods. Although it profited international operating corporations, the domestic operating corporations are suffering from reduced demand. To improve the market, the wage moderation should be cancelled, and more effort should be brought to increases wages.

This notion has been echoed by Storm (2021) stating that reduced economic growth can most likely be connected to a reduction in aggregate demand. This is a consequence of increasing income inequality causing reduced disposable income which in turn reduces demand by the poor. This can be put into a wider perspective where globalisation causes (higher income) jobs to be moved overseas leaving relative larger number of low-income jobs within the Netherlands. This is aggravated by financialization accruing wealth from the real economy stunting investments and R&D causing consequential reduced productivity growth. This fit the idea that the Netherlands, being a wage-led economy, is hindered by reducing wages (Servaas & Naastepad, 2013).

5.2 Quantifying inequality

What we have learned from the model is that data is important when reviewing economic inequality. It is required to know what is occurring within a country, i.e., data collection, and how to communicate the finding, i.e., quantification. These issues connect, for example, to public awareness and the ability to properly. In the regard of income inequality, there are strong indicators that life isn't a beautiful as often represented. For example, while we have one of the lowest disposable income inequalities (van Bavel, 2014), we have suffered from incredibly low increase in median gross income. The income rise is even lower when compared to the US (Salverda, 2014), as shown in Figure 101. The increasing gap between top and bottom becomes more easily interpretable when reviewing the evolution of the incomes for the various income deciles (Salverda, 2014), as shown in Figure 102. Overall, while we can state that the Netherlands has one of the lowest Gini coefficients, the story of income evolution seems less rosy.

When reviewing wealth inequality, the picture does not become much brighter. The Ministry of Finance (Ministerie van Financien, 2020) found that wealth inequality within the Netherlands is one of the most extreme worldwide, being second worldwide with the top 10% owning 2/3rd of all the wealth. Dutch citizens have accumulated roughly 3.000 billion euros, which is four times the national GDP. Of this wealth, about 46% in in pension funds, 21% in housing, 14% in substantial interest, 11% in financial assets, and the remaining 8% in other kinds of wealth. It is interesting to note that the type of asset is also unequally distributed. For example, for a large group of people, being 90-95% of

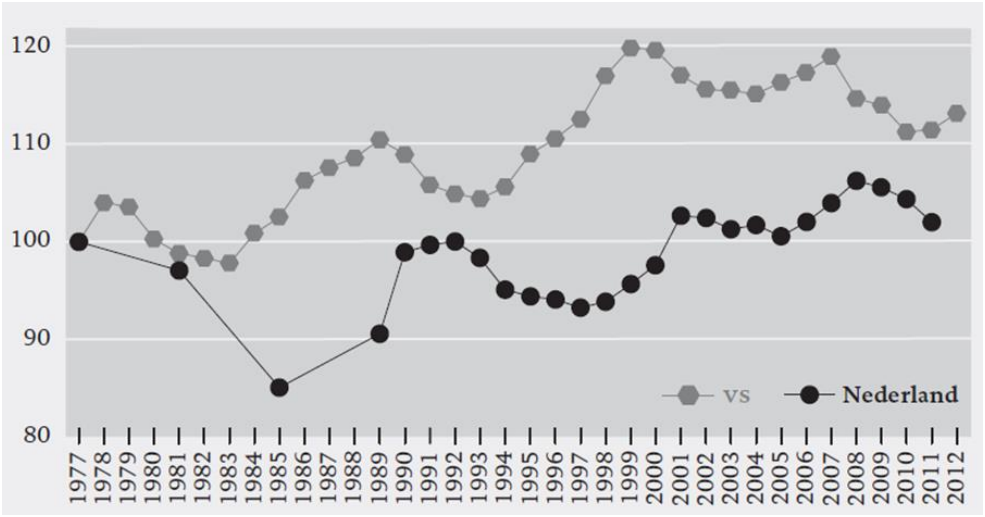

Figure 101 Comparison in real gross household income between US and the Netherland. *Note: Dark line represents the Netherlands, grey line represents the US. Income has been normalized to income in 1977. This figure has been obtained from* **(Salverda, 2014)**.

the people the main contributor (being either positive or negative) to wealth is real estate. However, the richest 1% of the population owns over 80% of the "aanmerkelijk belang" (which are options and stocks) (Ministerie van Financien, 2020).

While these finding relate to known data, it has recently been found that the CBS made errors in their calculations and 147 billion in aanmerkelijk belang (te memorize, owned by the top 1%) and 5.9 billion in debt (primarily among the poor) was "missed" (NOS, 2021). It is of interest to note that data presentation is also of high importance. For example, Salverda & Van Bavel (2017) state that the CBS also meddles in presenting the data, giving a more positive narrative of the inequality data by selectively presenting outcomes while they state that inequality within the Netherlands is not that rosy. As to

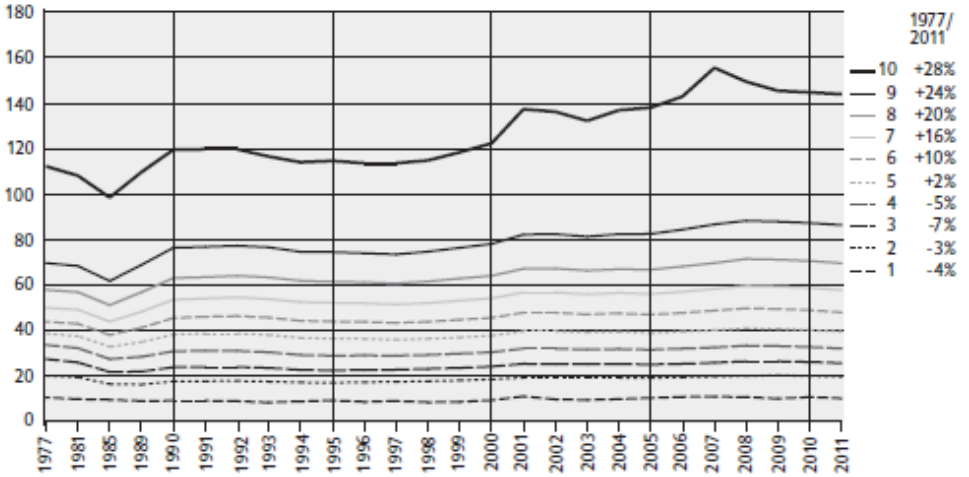

Figure 102 Trend of the decile gross income group between 1977-2011. *Note: Y-axis represents gross income. In 2000 calculations changed due to different inclusion of pension and rent benefits. This data used the older calculation method which knowingly decreased inequality slightly. The jump in income in 2017 for the top 10% is caused by a once-in-a-lifetime tax exemption which predominantly caused advantages among the top 1%. As such, it represents an anomaly which should be interpreted as a straight line between 2006-2008. Results have been calculated by the article's author using data from the CBS. This figure has been obtained from* **(Kremer, Bovens, Schrijvers, & Went, 2014)**

say, one needs the proper data which presented transparent and effectively, to be able to devise proper policy.

"CBS meet méér ongelijkheid, maar verkoopt het als mínder" - (Salverda & van Bavel, 2017)

Data collection

In the framework we found that data collection was related to two aspects: 1. Data collection. and 2. Undocumented inequality.

Data collection

The CBS states that they use tax & benefits data to evaluate the whole population (CBS, 2017). As such, they do not use cut-off values for the upper incomes. They do not attempt to refine their data with population surveys, nor with rich list data sets. Recently, there has been put doubt to this procedure as shown by Toussaint et al. (2020). They stated that the data collection mistakes made by the CBS led to undervaluing the wealth inequality within the Netherlands. When comparative analysis would be performed with the rich list, i.e., Quote 500, more information could be acquired regarding the very rich. Moreover, the CBS (2017) calculate inequality based upon the standardized household level (adjusting household income for household size) instead of the individual level which is done by the OECD and Eurostat. Interestingly, countries are obliged to deliver income data to Eurostat in a uniform manner. This process consists out of providing a random sample of 10.000 household and, as such, differs from the national statistical method (Bos, van den Brakel, & Otten, 2018).

Undocumented inequality

The CPB estimates that 60 billion euros (6% of the Dutch GDP) is residing in tax heavens in an attempt to benefit from tax evasion and avoidance[9] (Lejour, Leenders, Rabaté, & van 't Riet, 2020). The usage of these tools predominantly occurs among the richest household, i.e., top 10% of the household were responsible for 95% of the voluntary disclosure scheme between 2002-2018, but becomes more prominent with increasing percentiles, as shown in Figure 103. Interestingly, when the voluntary declaration scheme has been used, the declared wealth stays within the tax system in the following years and brings a consistent rise in tax revenue. However, the impact of unreported wealth has a significant impact on the inequality measurement. For example, the voluntary declaration scheme has caused an adjustment of the wealth owned by the richest 10% from 64% to 66% percent.

While we note financial undocumented inequality, there are various other types of undocumented data which also concern inequality. For example, there has been a growing number of homeless people with income but without housing (Klein, 2022). It could thus occur that financially the data states that everything is "okay", but in the regard of non-financial parameters there could be a growth in issues. The CBS also notes this that the

[9] According to the fiscal professor Anna Gunn tax avoidance could better be termed tax planning, being less loaden term and more accurately representing the occurrence. Moreover, she notes that tax avoidance can also be illegitimate due to fraus legis doctrine, i.e., a procedure solely performed to oppose the spirit of the law is unlawful and prosecutable (Kuys, 2021).

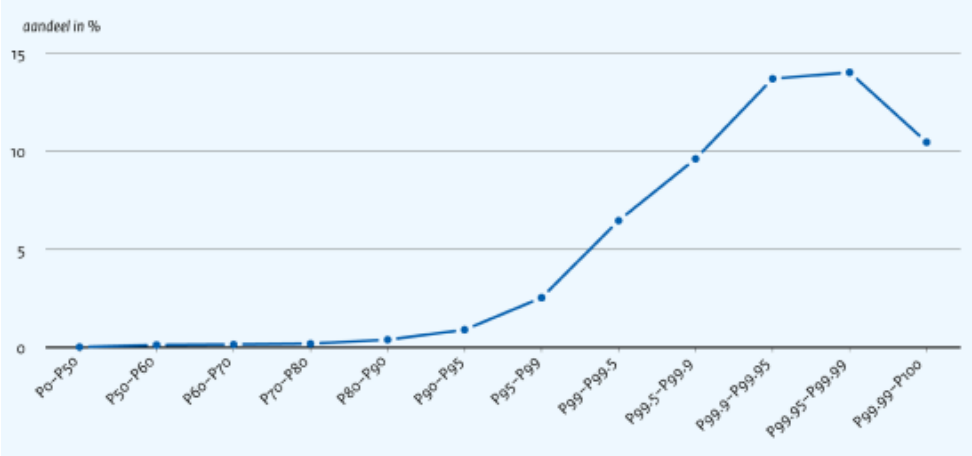

Figure 103 Relative contribution per wealth group to the voluntary declaration scheme. *Note: The data considers all declarations made between 2002-2018. This figure has been obtained from* **(Lejour, Leenders, Rabaté, & van 't Riet, 2020)**

economic data can give an incomplete representation of inequality and are working on an integration of economic, social, and human capital (Bos, van den Brakel, & Otten, 2018).

Quantification

In the framework we found that data quantification was related to one aspect: 1. Measurements.

Measurements

The CBS (2021) reviewed inequality in the past 40 years and found that there has been increase in inequality. The Gini index of market and expendable incomes rose from 45,9 and 23,8 in 1977 to 54,4 and 29,1 in 2019. While most of this increase was caused between 1977-1990, the story is different for the top-bottom decile ratio. The Gini index hardly increased after 1990, but the top-bottom decile ratio has been steadily increasing (Kremer, Bovens, Schrijvers, & Went, 2014), as shown in Figure 104.

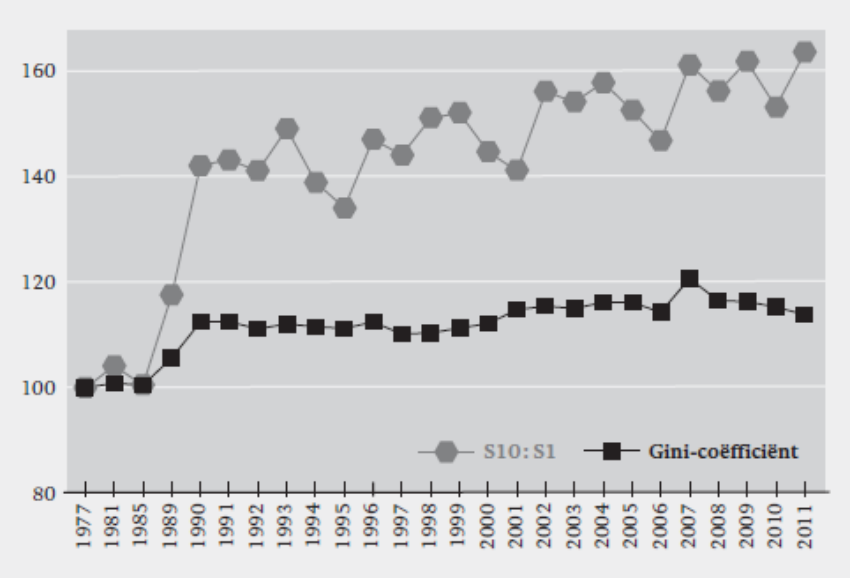

Figure 104 Trend in top-bottom decile ratio and Gini coefficient. *Note: Indices are calculated using market income between 1977-2011. The indices have been normalized at 100 in 1977. Results have been calculated by the article's author using data from the CBS. This figure has been obtained from* **(Kremer, Bovens, Schrijvers, & Went, 2014)**

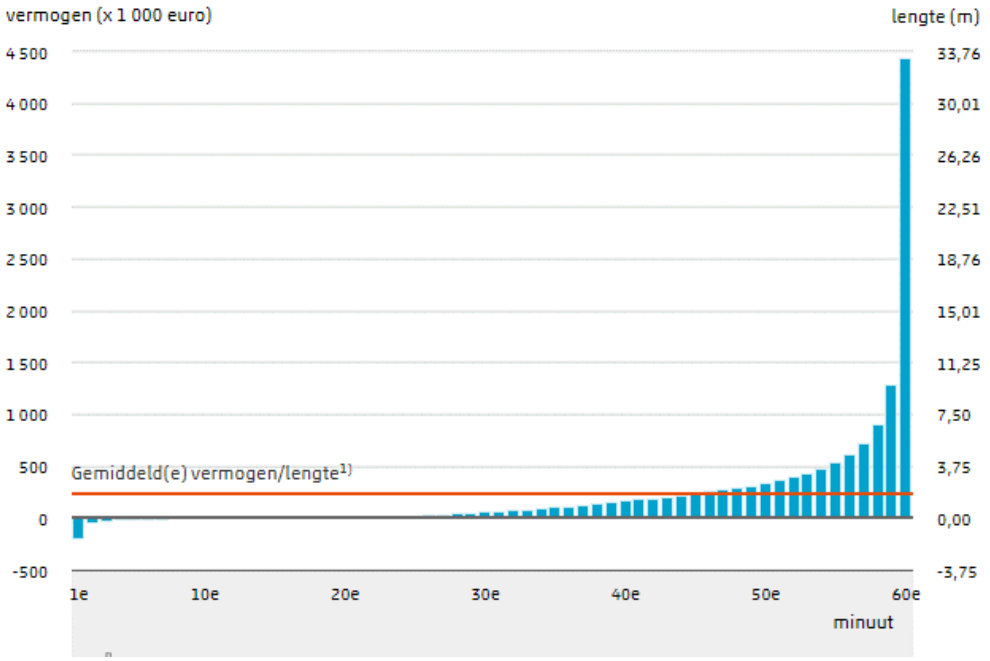

Figure 105 Pen's parade for Dutch wealth distribution in 2020. *Note: The average height/wealth owned is 1,74/231.000 euros. Left y-axis represent wealth size in thousands and right y-axis represents height in meters. X-axis represents time in minutes. This figure has been obtained from* **(CBS, 2021)**

However, in agreement to earlier notifications, inequality within the Netherlands is smaller when measured over a life cycle perspective. This is a consequence of the lower (two) deciles which have low to negative income but those being frequently temporary. For example, students will earn income later in life and bad years for companies will average out with better years. In the end the annual inequality is 48 Gini points while the life course is 26 Gini points (Waaijers & Lever, 2013). This is an important notion, as we stated earlier inequality is considered less of a problem when high mobility is occurring. The fact that life-cycle inequality is much lower indicates that a form of income mobility is occurring.

Wealth inequality is second highest worldwide, only excelled by the USA. (Toussaint, van Bavel, Salverda, & Teulings, 2020), with a Gini-index around the 0,8 (van Bavel, 2014). While the CBS had been reporting that wealth inequality was decreasing until 2021, NOS (2021) reported in the same year that the CBS had made mistakes during the calculation. Upon recalculation, they "found" 132 billion in missing wealth (compared to the total of 1669 billion) which is primarily owned by the top 10% wealth owners. Moreover, the found 5,9 billion in "missing" debt (compared to the total 113,8 billion) which is primarily owned by the poor. The CBS hasn't published any new reports regarding wealth inequality as of yet. The latest publication of the CBS, representing inequality as Pen's parade[10], as shown in Figure 105. The data shows that the first 15% of the distribution owns negative wealth and the median is 60.500 euros, compared to an average of 231.900 euros. Put more strikingly, the bottom 60% owns a mere 1% of all the

[10] Pen's parade is a visualisation where the income distribution is a march of people passing by within one hour. The height of the passing individuals is normalized by stating that the individual with average wealth also has the average height of the population. It has been developed by Jan Pen, a Dutch economist, in 1971 (Crook, 2006).

minimaal noodzakelijke kosten		additioneel pakket sociale participatie en ontspanning	
huur[a]	443	contributies en abonnementen	18,5
gas	60	bezoek ontvangen	19,5
elektriciteit	20	op bezoek gaan	5,5
water	9	vakantie/uitgaan	39
telefoon, televisie en internet	54	vervoer	13,5
verzekeringen[b]	45	**totaal sociale participatie**	**96**
contributies en abonnementen	2		
vervoer	14		
kleding en schoenen	56		
inventaris	74		
onderhoud huis en tuin	24		
voeding	201		
was- en schoonmaakartikelen	6		
persoonlijke verzorging	21		
diversen	10		
totaal minimaal noodzakelijke kosten	**1039**		

Figure 107 Indexation of reference budget for poverty boundary for the Netherlands in 2017. *Note: Left list indicate poverty budget and right list indicates the supplementary level. This figure has been obtained from* **(Sociaal en Cultureel Planbureau, 2019)**.

wealth and the top 10% owning roughly 2/3rd of the wealth (Kremer, Bovens, Schrijvers, & Went, 2014).

In the regard of the poverty, the lower poverty line is set €1039,- per month (when a 'bonus' living package is added it comes to €1135,-) (Sociaal en Cultureel Planbureau, 2019), indexation is shown in Figure 107. According to CBS, there were approximately 1 million people beneath the low-income boundary, of which 398 thousand were beneath this boundary for more than 4 years (CBS, 2020). The social groups with the highest relative risk to be beneath the poverty boundary were non-Western immigrants, (19,9%, (CBS, 2020)), solitary living adults without a child (21%, (CBS, 2019)), and solitary living parents with a child younger than 18 (22%, (CBS, 2019)). When reviewing the chances of getting into poverty, it can be shown that the pension system is highly effective in lowering the odds on poverty, as shown in Figure 106. This is caused by the state provided pension which provides security in income (CBS, 2019).

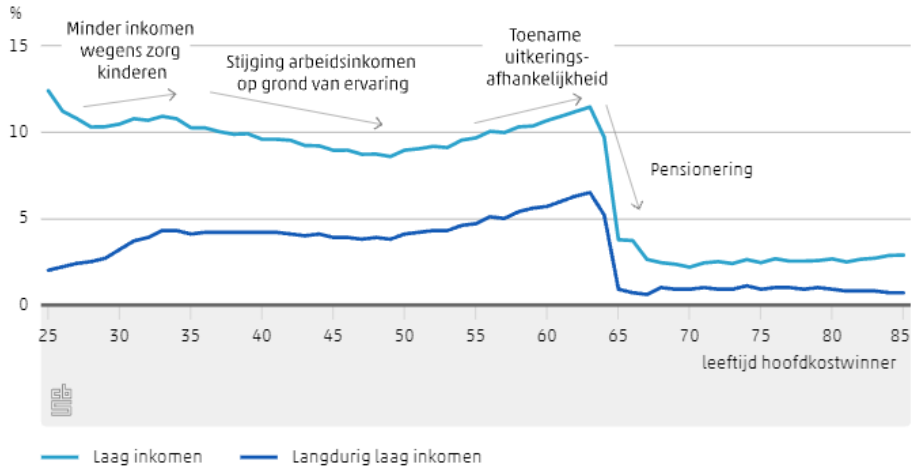

Figure 106 Risk of being in poverty according to age. *Note: This figure has been obtained from* **(CBS, 2019)**

5.3 Economic inequality

Salverda et al. (2013) found that inequality has risen within the Netherlands with 14% between 1977 and 2011. The top 10% now earns 27% of the total income whereas this was 19% earlier, which has mostly been the effect of households earning higher income due to woman also producing income. This rise mostly occurred between 1985 and 1990, which coincided with an increase from 8 to 13.5% of the households living in poverty. However, they state that this rise in inequality severely underestimates what is occurring with inequality, the deciles at the extreme (which are being weighed less heavily with the Gini index) are having more severe changes. The top-bottom decile ratio showed an 78% increase in inequality (Salverda, Haas, de Graaf-zijl, Lancee, & Notten, 2013), as shown previously in Figure 104. While inequality was potentially viewed as of lesser importance, the corona pandemic brought significant change to the perspective as indicated by the following quote from Kim Putters, director of the SCP.

> *"We weten al heel erg lang dat de kansenongelijkheid in ons land groot is, dat de verschillen tussen groepen groot zijn. Maar twee jaar coronacrisis heeft ze veel meer zichtbaar gemaakt."* - Kim Putters, director of the SCP (NOS, 2022)

Income inequality

In the framework we found that income inequality was related to five aspects: 1. Financialization, 2. Technology, 3. Globalization, 4. Welfare state, and 5. Labour bargaining.

Financialization

Bezemer (2021) states that financialization is on high rise in the Netherlands which causes income inequality. This is exemplified by the finance to GDP ratio in which the Netherlands ranks 4th according to the World Input-Ouput Database (of the 29 recorded countries). But also, by the income gained from wealth (through financialization) in non-financial companies rising from 28% in 1995 to 94% in 2019, or by the private debt rising from 162% in 1990 of bbp to 262% in 2020. According to Bezemer (2021) this caused reduced productivity growth, drain of talent towards finance, reduced R&D, and shift in debt allocation. As a result, low incomes in the Netherlands have suffered from stunted growth.

Technology

According to Smid (2015) technology is influencing the job market in the Netherlands which has negative consequences for income inequality. He explains that the Netherland (and other countries) suffer from job polarisation, i.e., increased offer in low- and high-income jobs at the cost of middle income, as shown in Figure 108. This is a consequence of improvements in technology, and specifically ICT, and can be explained by using the Routine Biased Technical Change (RBTC) model, famously put forward by Autor et al. (2003). The core essence of the theorem is that technology is especially capable of replacing routine jobs. In this paradigm, ICT is the motor which can perform cognitive routine tasks, e.g., accounting, logistic planning, and other administrative tasks, which are typical middle-income jobs. This leave non-routine jobs, of both high and low cognitive input, on the job market (routine, low-cognitive jobs, e.g., assembly line jobs, already have

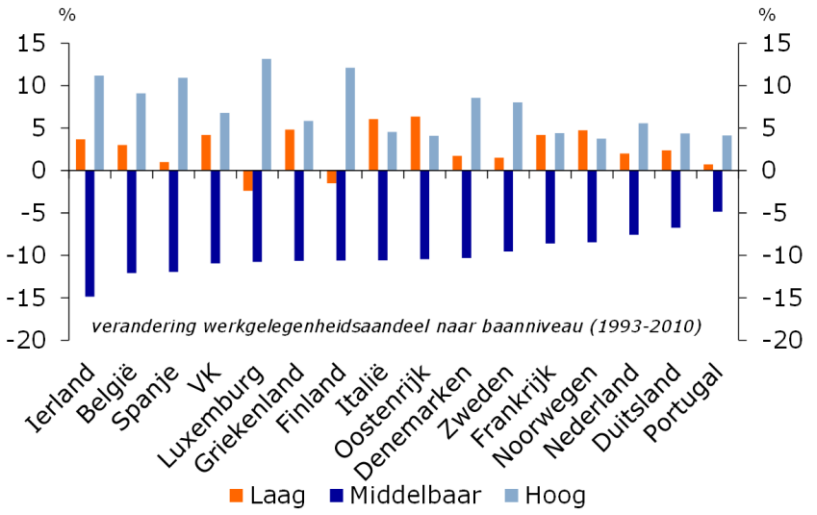

Figure 108 Relative changes in job offers for low-, middle-, and high-income jobs. *Note: Change in job offering between the period 1993-2010. Orange indicates low-income jobs, blue indicates middle-income jobs, light blue indicates high-income jobs. Countries are (from left to right), Ireland, Belgium, Spain, United Kingdom, Luxembourg, Greece, Finland, Italy, Austria, Denmark, Sweden, France, Norway, Netherlands, Germany, and Portugal. This figure has been obtained from* **(Smid, 2015)**

been replaced by mechanisation) which are characterised as low- and high-income jobs (Smid, 2015).

Globalization

According to Smid (2015), globalisation is affecting income inequality by repressing low-income jobs. This occurs through intensified competition with low-income labourers from other countries. He notes that this stands in contrast to high-income jobs that are enabled to improve their conditions due to improved demand. In short, his narrative echoes with the Stolper-Samuelson theorem we explained earlier. These conclusions are also agreed upon by the CPB (Euwals & Meijerink, 2018), noticing that globalisation causes increased gross income differences. Although the CPB estimates that income effects of globalisation are lower within the Netherlands as compared to other European countries, they still advocate thorough research in the matter as it could cause negative effects on the economic, social, and cultural domains. However, they note that ability to combat the effects of globalisation is potential limited as globalisation itself cannot be intervened.

Welfare state

Kremer et al. (2014) states that the size of the welfare state is reducing which causes a change in requirements of the citizens which impacts low socio-economic positions more severely. This is caused by the fact that formerly society did not have to save wealth for potential problems occurring in life as the social security system plus state supplied pension would suffice in their needs. Due to reducing welfare state expenses the security system is directed towards self-supplied investments. For example, the educational system which is leaning more heavily on supplementary shadow education as noted earlier, or the increase in own risk policy for health care from 150 euros in 2008 to 385 euros in 2017 (Verkaik, 2017). As such, the combination of the reducing welfare state

combined with the (current) lack of wealth by large group of the population, but more prominently by the low socio-economic positions, causes that that opportunity differences occur in the domain of human capital development enable an increase in income inequality (Kremer, Bovens, Schrijvers, & Went, 2014).

The WRR (2006) aims that the solution should be to revise the "historical" welfare state, focussed upon care and social insurance, into an enabling state or social investment state, focussed upon unifying society and improving living standards. In short, this would entail a more rigorous policy into human capital development, both in early life as student as well as when being an employee, and applying promoting policy, e.g., enabling human capital investment without perquisites, instead of restitution policy, e.g., necessity to meet a prerequisite before being able to apply for a benefit.

Labour bargaining

De Beer and Keune (2018) showed that the influence of trade unions on the labour market is decreasing caused (partly) by their waning number of members. The CBS (2019) reported that the number of trade unions members has been decreasing since 2009 with the third largest decrease ever recorded in 2019, i.e., 101.000 members. Moreover, they show that of all non-members, about half hasn't taken any consideration to enrol into a trade union. De Beer & Keune (2018) believe that a part of the issue of trade union lies in the free-rider problem where Dutch inhabitants gain profit from the work of trade unions without the necessity to join them. In their view innovation to the "poldermodel", i.e., the bargaining of collective agreements between trade unions, corporations, and government, should be pursued.

Nonetheless, De Beer and Keune (2018) narrate that the ability to claim advantageous collective agreements by trade unions has reduced and corporations are more apt in finding their favourable conditions. Moreover, there are even corporations who are retracting from the collective agreement system and are creating their own contracts. They connect these processes to limited growth in productivity, limited social innovation, increase wage gaps, reducing social security, and destabilizing influence of increasing job market flexibility going on since the 2000s.

Problematic to the rise in flex contracts, as shown in Figure 109, is their negative prospects in the labour market (UWV, 2015). This is exemplified by the increased odds to fall into unemployment and reduced odds on gaining a fixed contract of employees with a fixed contract. The latter effect has even become stronger in the past years. This is exemplified by the fact that it takes about 10-15 years before 80% of the flex contracts is turned into a fixed contract while in the past this took 6-10 years. The UWV (2015) notes that, even though flex contracts are on the rise, the fixed contracts are the preferred type of contract, but employees seem unable to get their hands onto those type of contracts.

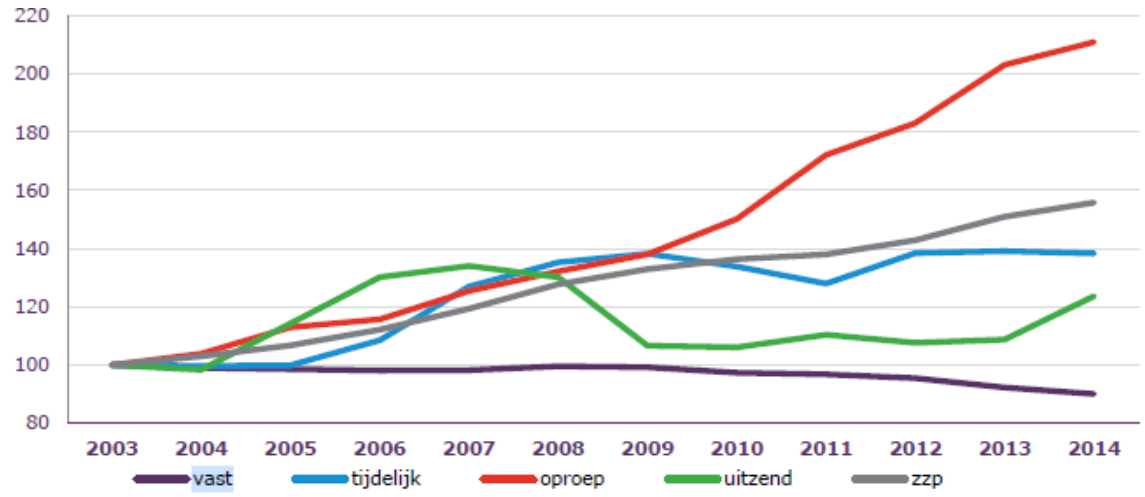

Figure 109 Trend in type of contracts within the Netherlands between 2003-2014. *Note: All contracts have been normalized at 100 in 2003. Purple is fixed contract, blue is temporary contract, red is on call contract, green is detachment contract, grey is self-employed. Results are based upon article's author using data from the CBS. This figure has been obtained from* **(UWV, 2015)**

Not only the trade unions are of importance, also the government plays a role in the labour bargaining process by their policy setting. In the most recent coalition agreement called 'Omzien naar elkaar, vooruitkijken naar de toekomst' proposal have been made to improve the labour market. These policies include improving social security, increasing the minimum wage by 7.5% (reaching 10.90 euros per hour), reducing the difference in flex and fixed contracts, and simplifying the tax & benefit system (Rijksoverheid, sd).

However, the commission 'Regulering van Werk' (2020) notes that policy drafting is difficult as it is subjected to political influences. They hightlight that inconsistency causes ineffective progress and inability to bring lasting change to the system. In the current situation they mention that a large group of people are in structural problems which is primarily a consequence of the laws and regulations made by the government itself. It has been warned by the OECD that the current developments are causing differences in the labour market (and consequential opportunity) which is close the point of no return causing definitive problems within the society (OECD, 2019).

The commission created five corner stones which are needed to be fixed (Commissie Regulering van Werk, 2020): 1. The flexibility of employee to change work should be based within companies and not between companies. This would increase the durable labour relations and would increase the incentive to invest in human capital. This in turn would create the ability for companies and employee to enable innovation and increased productivity. 2. Reducing the various forms of contract types to three, i.e., employees, independents, and temp workers, and clarifying the differences between these types of contracts. In general, the effort should be that the factual employer also becomes the judicial employer which causes that the collective labour agreements of the factual employer will be of effect removing abuse of independents and temp workers to reduce wages. 3. Enhancing the capabilities of individuals to keep investing in their human capital throughout their career independent of the labour contract. This enables employees to switch between jobs and retain work even though their physical and mental status changes or advancements in the labour market causes lay off in their field. 4. Fiscal

treatment between independent and employees should be aligned. In the current system independents need to contribute less to the social security system causing discrepancy in contributions within the labour market. This causes that they have an advantage in the labour market by having higher access to labour, but also causing less social security. These gaps should be lessened. 5. Creating an inclusive and activating labour market policy. There too many individuals who are absent from the labour market for a prolonged period of time. There should be more tailored incentives and assistance for these individuals.

Wealth inequality

In the framework we found that wealth inequality was related to four aspects: 1. Income inequality, 2. Wealth transfers, 3. Real estate, and 4. Financialization.

Income inequality

Ter Rele & Voogt (2016) analysed the interaction between income and wealth inequality by relating it to the consumption inequality, i.e., the ability to consume goods and services. Interestingly, interaction between income and wealth becomes more prominent with increasing age, as shown in Figure 110. They find that income and wealth are positively correlated, i.e., a correlation coefficient of 0.47, and when including both income and wealth the consumption inequality is increases from 0.248 to 0.305. Yet again, the influence of wealth on consumption increases with increasing age, as shown in Figure 111.

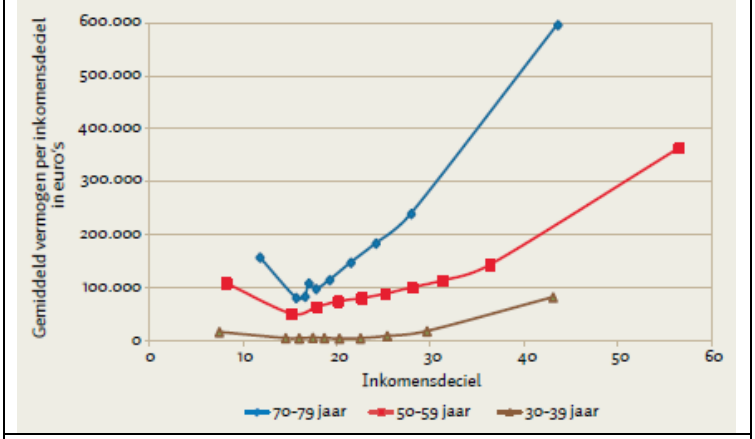

Figure 110 The correlation between income decile and owned average wealth owned. *Note: This figure has been obtained from* (Ter Rele & Voogt, 2016)

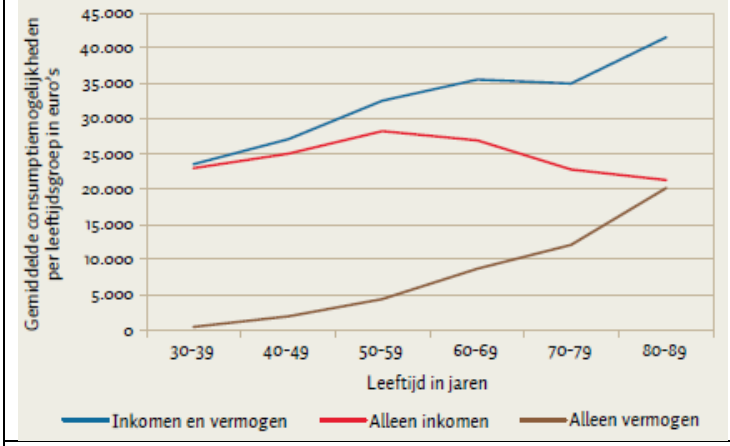

Figure 111 The average consumption possibilities per age group. *Note: This figure has been obtained from* (Ter Rele & Voogt, 2016)

Wealth transfers

It is estimated that about 40% of all wealth in the Netherland originates from inheritances. Moreover, due to the rise in wealth inequality, the projections in the future are that this will increase even further. For example, the wealth owned by the people older than 65 rose from 350 billion in 2006 to 500 billion in 2017. Moreover, due to the large and sudden decline in the number of children per women, as shown in Figure 112, and it being below the 2, causes that a concentrating effect is to be expected in the near future. Using a rough estimate of 80 years life expectancy this concentrating effect will happen after 2050 (Ministerie van Financiën, 2020).

However, when reviewing the effect of in vivo transfers and bequests, the CBS (2019) concluded that they are reducing wealth inequality even though the transfers are highly unequal, as shown in Figure 113. This is caused by the fact that the relative amount of wealth received through transfers decreases with increasing wealth deciles. Moreover, the transfers are also occurring from richer to poorer people which also gives an equalizing effect (Groot, Lever, & Möhlman, 2019). The important remark to be made is that the analysis consists out of 8 years, thus evaluating short-term effects. As of yet, there is no report concerning the long-term effect of wealth transfers. Moreover, the current demography and wealth distribution among society can cause a different outcome than is to be expected in several decades from now.

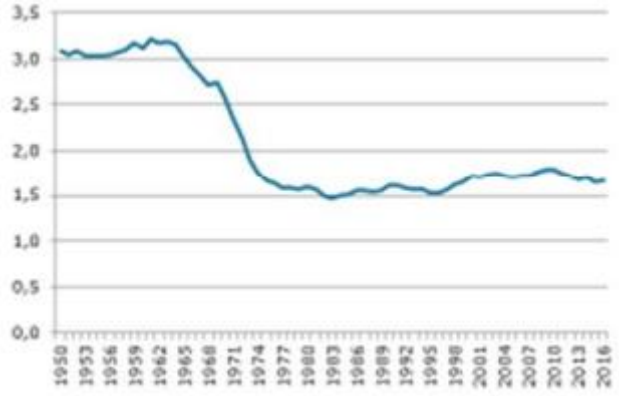

Figure 112 Number of children per women between 1950-2016. *Note: This figure has been obtained from* **(Ministerie van Financiën, 2020)**

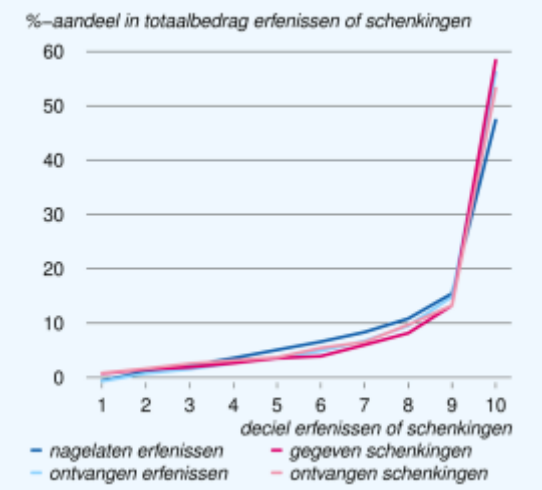

Figure 113 Distribution of wealth transfers in 2015. *Note: The results are based upon article's author calculation use CBS-micro data. This figure has been obtained from* **(Groot, Lever, & Möhlman, 2019)**

Real estate

As shown by Wind (2017), real estate plays an important part in the wealth owned within the Netherlands. It is encompassing more than half all wealth owned, and up to the 9th decile accounts for 80% of all wealth owned within that decile. According to him, the dominance of real estate in wealth inequality is in part caused by the policy design of the government. For example, it actively chose to support private real estate ownership. Although it succeeded in increasing ownership among various level in society, the financial gains of real estate ownership have primarily accrued by the early entrants (before governmental liberalization of the market) and those of high socio-economic position. Party this is caused by larger access to the real estate market enabling the trich to find high return rate assets, but also due to the necessity of low socio-economic position to use their financial gains as income supplement (Wind, 2017).

Overall, Wind (2017) finds that the real estate market is causing segregation between real estate owners versus renters, low and high socio-economic position, and causing spatial segregation. He states that the solution should be found in re-regulating the mortgage market, pointing at the current policies in Scandinavian countries. Moreover, a large portion of the real estate boom is caused by the profitability of (mostly) untaxed financial gains. By taxing these gains, the ability of investors to enter the market for financial reason would significantly reduce and curb the growth in real estate pricing. Also, it is advised to enhance social inclusion in neighbourhoods to increase the average value of real estate by upward effects of richer residents. This would cause that small house owners would incur profits which would else stay out of reach. Pivotally, Wind agrees that inequality in the real estate market is not a simple adaptation of a single policy, but requires integration of labour market-, spatial planning, fiscal policy, and housing policy (Wind, 2017). This is a rather returning issue within this thesis, integration of various factors is required to cause the desired outcome.

Financialization

Bezemer (2021) states that financialization has strongly increased wealth inequality since 1995 and has partly been mediated by the real estate market. The CPB (Ciurila, Nicoleta; Kramer, Bert; Luginbuhl, Rob; Smid, Bert;, 2021) notes similar trends, where the policy favourability pressures wealth towards the real estate market. Problematic to real estate is that it is illiquid which poses vulnerability to economic cycles. In a downturn, the households have limited opportunity to convert their illiquid wealth to aid their consumption causing a consumption market which responds more strongly to the economy. Overall, André (2018) found that the financialization causes to split society more strongly in those who own real estate and those who do not but also reduces the demand for redistribution.

Mobility

In the framework we found that mobility was related to three aspects: 1. Stratification, 2. Real estate, and 3. Income inequality.

Stratification

Tolsma & Wolbers (2010) find that the Netherlands experiences reduction in social mobility. The is exemplified by the reduction in inter-generational mobility between parent-child. They explain that this is a consequence of increased educational levels which has caused social congestion in the top. As there is an oversupply in high level educated individuals, the value of a diploma decreased which caused a decrease in relative social mobility for children who obtained the same educational level as their parents. Moreover, the diploma inflation causes a potential increase in the importance of social origins instead of educational performance which further limits social mobility (Tolsma & Wolbers, 2010). Salverda et al. (2013) showed similar findings, noting that intergenerational mobility is less dependent on education causing a heightened value of socio-economic position which can be transferred between generations. However, they state that it is difficult at best to correlate the various effect of, e.g., health inequality, stratification, social connection, and housing, to income inequality.

Real estate

The reports involving the interaction between real estate and economic mobility are limited, but there are indications that the real estate market is causing social inequality. Boelhouwer (Boelhouwer, 2020) explains that the current explosive Dutch real estate market is causing segregation by creating poor and rich neighbourhoods. Moreover, due to the strict requirements of the social renting market, it almost only accessible to unemployed people causing social segregation in that market. As such, we can note that at least in spatial and social considerations there is potentially increased inequality.

Income inequality

Salverda et al. (2013) shows that there is reasonable mobility in the middle income but becomes more rigid at the far ends of the distribution. In essence, when born into the richest or poorest quintile the odds are roughly 1/3rd of staying within that income group, as shown in Figure 114. Of interest is that the educational intergenerational mobility has steadily been decreasing for men, where upward mobility was the norm before 1970, “only” 50% attained upward mobility in the period 1970-1984. Important to note is that the

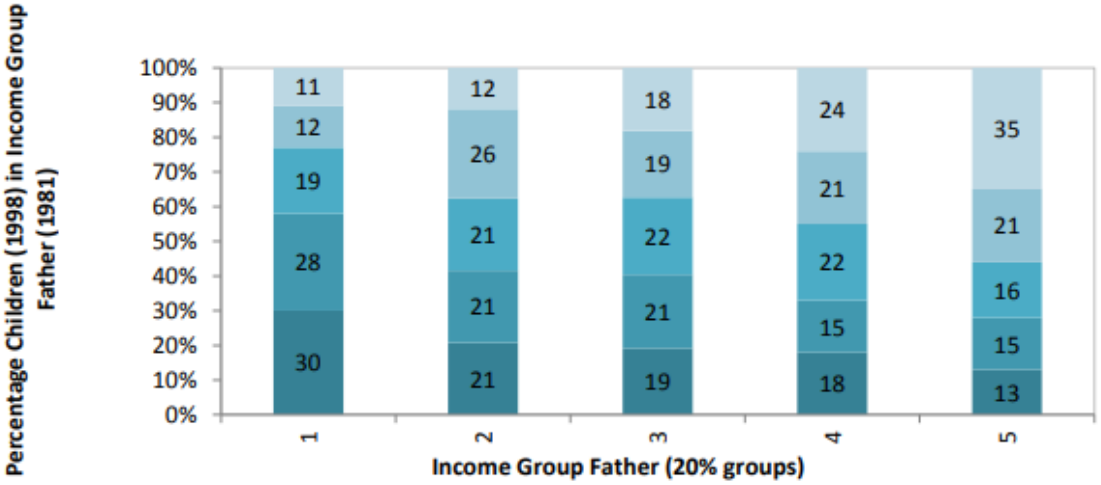

Figure 114 Correlation between income of the father and child. *Note: Income has been divided over quintile groups with on the left of the X-axis the lowest quintile and on the right the highest quintile of the father's income. On the Y-axis the son's income has been represented, with the darkest blue indicating the lowest quintile and lightest blue indicating the highest quintile group. The data represents the inter-generational mobility between 1981-1998 and has been obtained from the CBS Welvaartsverdeling from 2000. This figure has been obtained from* **(Salverda, Haas, de Graaf-zijl, Lancee, & Notten, 2013)**.

diploma inflation has steadily been increasing after 1984 as noted earlier in this thesis. As such, we could suspect that the downward trend in educational intergenerational mobility continues and increased opportunity for income to become stratified.

5.4 Redistribution policy

The Dutch government incurred 300 billion euros in tax revenue with the top three revenue sources being: 1. Income tax, 2. VAT, and 3. Social security contribution, as shown in Figure 115. The tax revenue is for 61% used to pay for the welfare state, e.g., social security, health, and education, 21% paid to public services, e.g., police, defence, roads, and municipal and provincial expenses, and 11% paid to governmental expenses, e.g., foreign relations and rent on debts (Ministerie van Financiën, 2020). The sum of the tax & benefit system causes that the high pre-distribution income inequality, i.e., Gini-coefficient of 0.57, shifts to one of the lower after-distribution income inequalities, i.e.,

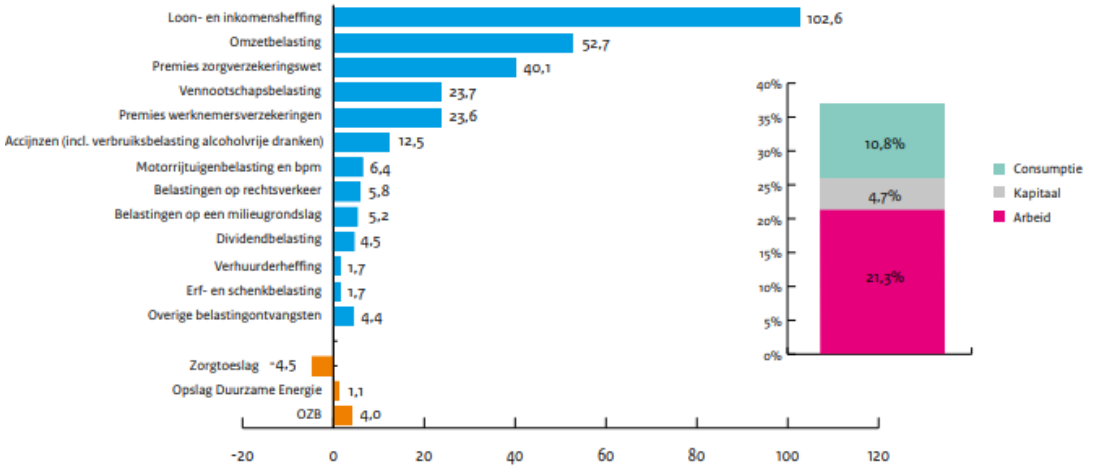

Figure 115 The amount of received taxes in absolute value (left) and relative to GDP (right) for the Netherlands in 2018. *Note: The left graph indicates the size of the separate entities in billions. The right graph indicates the relative size to GDP. This figure has been obtained from* **(Ministerie van Financiën, 2020)**

Gini-coefficient of 0.33. However, the redistribution largely occurs through the pension system, i.e., the 46,5% redistributed Gini index value can be decomposed as 28,3% pension funds, 6% social security, and 12,3% tax and benefits (Kremer, Went, & Bovens, 2014). This limits the ability of inter-personal transfer as state pensions are largely self-financed, i.e., 68% of the pension is self-financed which largely exceeds the 32% of transfers from rich to poor. Roughly 64% of the total benefit package (WW+AO+AIW+ social assistance) is self-financed (Waaijers & Lever, 2013), which is relatively close to the 74% of self-financed benefits in Denmark (Bovenberg, Hansen, & Sorensen, 2008). In general, the result of the dominant function of the pension system causes that within the population between 15-65 years old redistribution has been relatively underwhelming (Caminada, Been, Goudswaard, & de Graaf-Zijl, 2014; Hoff, Vrooman, Iedema, Boelhouwer, & Kullberg, 2021).

To gain a grasp of the effects of the taxes & benefits, Koot & Gielen (2019) made an efficient analysis of the benefits, shown in Figure 116. They find that "algemene heffingskorting" is the most impactful benefit, reducing the Gini coefficient by 11,7%, but reviewed to its cost is vastly out competed by the rent assistance which is three times as effective. When comparing the effects of benefits and taxes they find that the income tax is slightly less effective in lowering inequality when compared to health care benefits or rent assistance benefits (4% versus 4,3% and 4,9% on the Gini coefficient respectively).

The tax bureau commission has found seven different issues which need to be tackled with policy (Ministerie van Financiën, 2020): 1. Heightened tax pressure on labour income, 2. Tax system depletion of flexibility, 3. The emergence of flex and platform economy, 4. Inequality in average tax rate among wealth, 5. Difficulties in taxing profit of international companies, 6. Lack of discounting climate and health damages in tax pricing, and 7. Decrease in effectivity of the national tax system.

The issues of the tax system also resonate into the benefit system as it causes increased complexity due to the increased use of tax reliefs for the poor to compensate for a ragged system. However, the use of a wide variety of exemptions causes issues with cashing the reliefs which hinders efficiency of the system. In sum, tax bureau is faced a complex interaction between taxes and benefits which is strongly limiting the

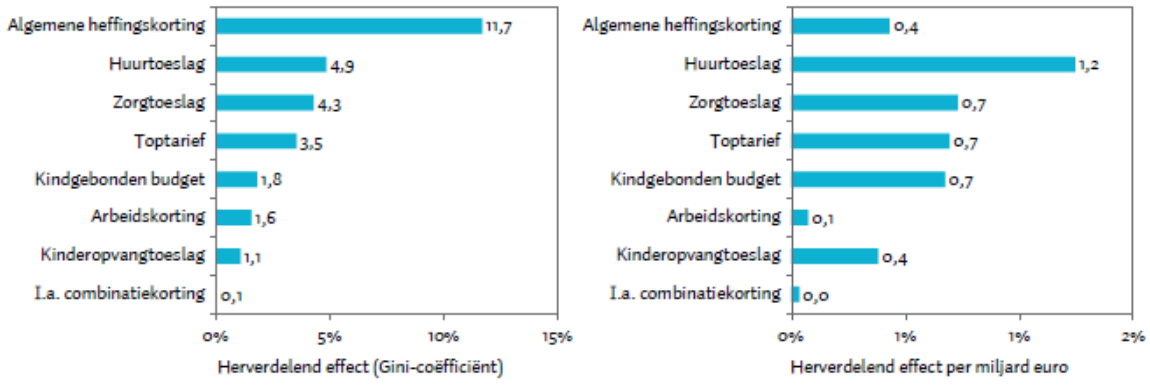

Figure 116 Redistribution effects of various benefits within the Netherlands *Note: The left panel indicates the redistribution effect with the costs (in billions) of the benefit next to the bar. The right panel indicates the redistribution effect per 1 billion investments. The results are based upon the article's author's calculations using the MIMOSI simulation model. This figure has been obtained from* **(Koot & Gielen, 2019)**

opportunities for enhancing redistribution (Ministerie van Financiën, 2020). These problems with the tax & benefit system are in no sense new. As noted by Cnossen & Jacobs (2019), reforms were already advised since 2010 and been advised many times over in different reports. In essence, they state that the non-neutral, non-transparent, and overly complex tax system should be transformed into a tax system favouring neutrality, purpose, simplicity, and transparency.

> *"Tot slot, in het leven zijn twee dingen zeker: de dood en belastingen. Aan de dood kunnen economen weinig doen, maar aan de belastingen wel."* – Cnossen & Jacobs (2019, p. 16)

Taxes & Benefits

In the framework we found that taxes & benefits are related to five aspects: 1. Inequality of income, 2. Inequality of wealth, 3. Wealth transfer, 4. Undocumented inequality, 5. Labour bargaining, and 6. Public perception.

Income inequality

According to Cnossen & Jacobs (2019), the Dutch tax system is non-neutral and not transparent which causes increased tax avoidance and evasion and increased surveillance costs. The current system of taxes & benefits is a matter of increased circulation to fix problems which are caused by the system itself. Indicative for this issue is that fact that almost 60% of the Dutch household receive benefits (which can be significant amounts even for the upper quintiles, as shown in Figure 117) while simultaneously also paying taxes. When reviewed next to the tax system, of which the Ministry of Finance (Ministerie van Financien, 2020) found that only 8 of the total of 104 tax policy are deemed to be effective and have genuine purpose within the system (Ministerie van Financien, 2020), we find that the redistributive abilities of the tax & benefits has become overly complex.

Even more so, we have come to the outer extent in which redistribution is possible. In report of the government, it has been found that lower incomes are paying close to zero tax causing that further distribution in the lower segment is only possible through benefits as opportunities through the tax system has been exhausted (Commissie Draagkracht, 2021). In general, there is call (if not cry out) for a tax system which is

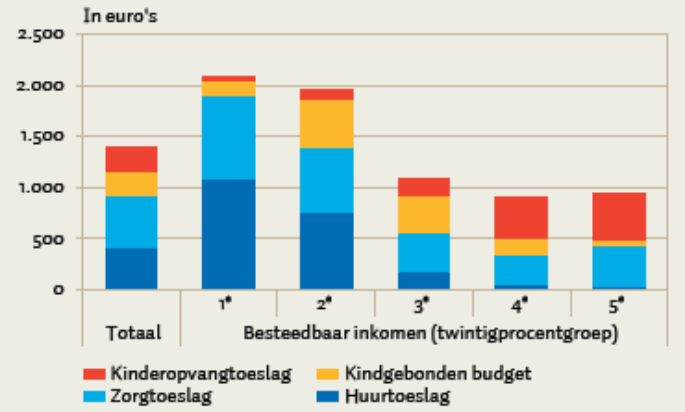

Figure 117 Average benefits per household decile *Note: Y-axis represents the yearly average amount in 2015, the X-axis represents the household income quintiles with on the left the overall average. The (preliminary) data has been obtained from the CBS Inkomensstatistiek.This figure has been obtained from* **(Bos, 2017)**

simple, transparent, neutral, and effective (Cnossen & Jacobs, 2019), echoing similar desires as the Mirrlees review.

The CPB (van Essen, Leenders, Lejour, Möhlmann, & Rabaté, 2022) states that the tax system is working favourable towards the higher wages. For example, the top 0,01%'s average tax rate on income incurs is only half of the average tax rate of the third decile group, i.e. 21% versus 46% respectively, as shown in Figure 118. In summary, the CPB finds that the incurred average tax rates, as shown Figure 118, is caused by three effects: 1. increased tax rates in the lower segment by the loss of benefits, 2. the reduced tax rates in the upper segment due to favourable tax rates on capital income (dominating in higher incomes) and regressive nature of the social security contribution, and 3. the regressive shape of consumption tax (in relation to income) (van Essen, Leenders, Lejour, Möhlmann, & Rabaté, 2022).

However, the opportunity to alter the effect of the consumption tax on inequality is rather limited. In general, the focus of the consumption tax should be on simplicity and neutrality as currently the Dutch system is ill-conceived and is overly complex, causing undesired disruption to the economic system (Cnossen, 2019). As such, in agreement to the works of Mirrlees, Cnossen (2019) concludes that the Dutch consumption tax should implement a single VAT rate (set somewhere between the lower and normal VAT rate). Moreover, it would be advised to enlarge the scope of the VAT, e.g., including governmental institutions, schools, health care, real estate, and financial sector. These inclusions would coincide with the removal of transaction taxes, e.g., reverting real estate transaction tax into a VAT based upon added value of the real estate. Overall, such adaption would remove the ability to create equality through the consumption tax. It should be noted though that these are difficult to implement as, e.g., European Union laws prohibit VAT on governmental institutions. However, one would strive for a simpler

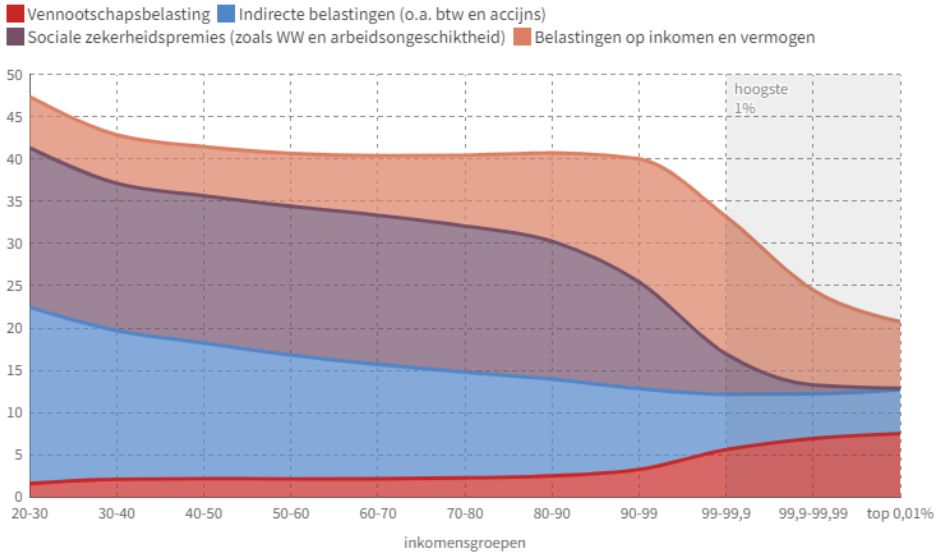

Figure 118 The average effective tax rate per income decile within the Netherlands. *Note: Data has been retrieved from the CPB and concerns income data from 2016. Red indicates corporate income tax, blue indicates VAT, purple indicates social security tax, orange indicates income & capital tax. This figure has been obtained from* **(NRC, 2022)**

consumption tax system as it would cause welfare gains for society and decrease costs of regulations (Cnossen, 2019).

In the regards of excise taxes, Cnossen (2019) notes that while excise taxes are regressive in nature (similar to the VAT), it should not lead to the false conclusion that increased excise rates are to be deterred. Efficient law making could create a solution to those with addictive or vital necessity of certain excises regulated goods. However, the excise should not be seen as the golden solution to various issues, echoing the Mirrlees review. For example, negative externalities such as fireworks and plastic usage are not to be reimbursed using excise taxes (Cnossen, 2019). In sum, VAT and excise taxes are to be used in regulation of wanted/unwanted behaviour but should not be used in the form of regulation of inequality.

While the consumption tax has limited possibilities to improve inequality, there are significant opportunities to improve the first issue concerning elevated tax rates in the lower income deciles due to loss of benefits can be solved. At first, there is a concern for the complexity of the benefit system causing limited understanding by its users. The CPB (Berkhout, Bosch, & Koot, 2019) found that only a small minority of individuals receiving benefits are receiving the right amount of benefit and that 10-15% of the benefits are not claimed. Problematic to these issues is that according to the WRR (2017) they are dependent on mental capacity and require adequate plans and the ability to make the "right" decisions. However, those struggling to make the "right" decision, are also those who are suffering from difficult problems and financial issues. In short, those who are making mistakes are also those who need the system the most (WRR, 2017). The complexity of the benefit system has been acknowledged by The Ministry of Finance (Ministerie van Financien, 2020) who desire to integrate taxes & benefits in a single policy.

The efficiency to integrate benefits could already prove to be a large solution. According to Koot & Gielen (2019) this is partly caused by the high complexity of the benefits caused by the fragmented number of benefits with each having his own design

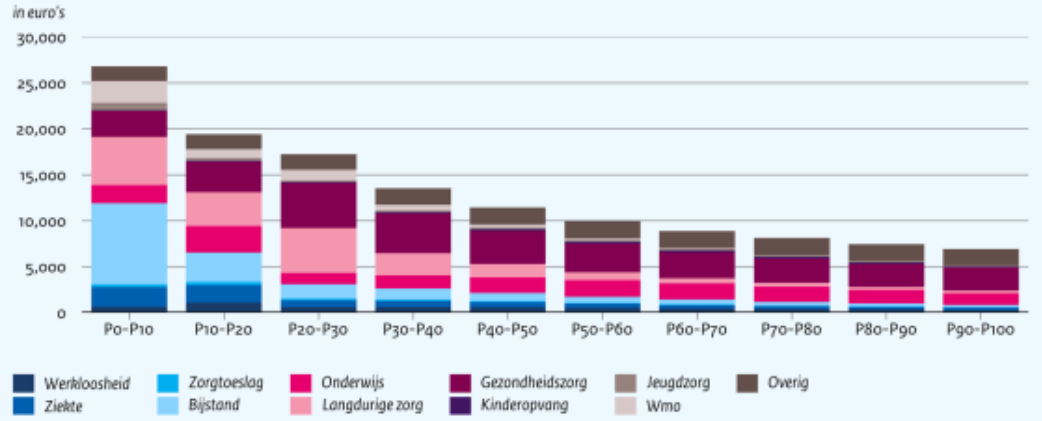

Figure 119 Government expenses in 2016 per income decile per benefit type. *Note: The x-axis indicates amount of government expenses in euros per year and the y-axis the income deciles. The legenda indicates the following: dark blue, unemployment benefits; blue, sick leave benefits; light blue, health care benefits; lightest blue, social assistance benefit; pink, education; light pink, long term health care benefit; purple, health care; dark purple, day care; brown, youth care; light brown, social support benefits; dark brown, other benefits. This figure has been obtained from* **(van Essen, Leenders, Lejour, Möhlmann, & Rabaté, 2022)**

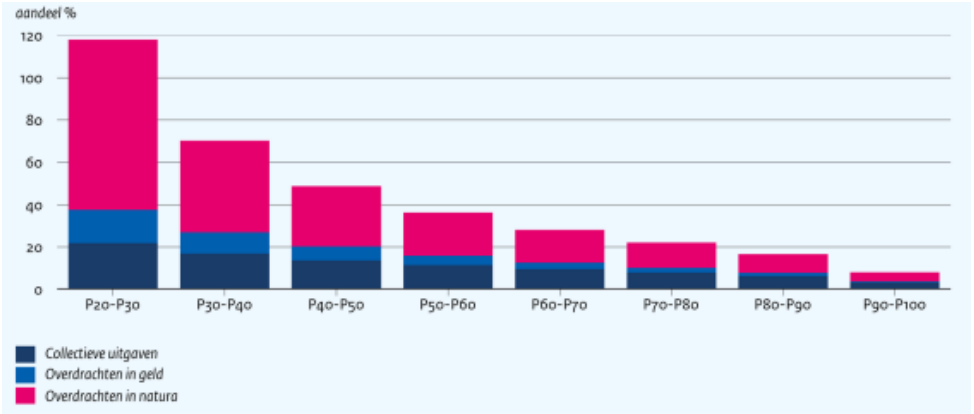

Figure 120 Government expenses in 2016 relative to the income per income decile *Note: Dark blue indicates, collective expenses, blue indicates in-cash benefit transfers, pink indicates in-kind benefit transfers. This figure has been obtained from* **(van Essen, Leenders, Lejour, Möhlmann, & Rabaté, 2022)**

and being dependent on different parameters. For example, the rent assistance benefit measures wealth differently when compared to the child support assistance. As such, a potential solution would be to unify the rent assistance, health assistance, child support, and the algemene heffinskorting, into one benefit. With such a change, the redistributive effect of these benefits is reduced by 0,1% Gini points while significantly reducing the administrative complexity[11]. However, this would leave the most important redistributive benefits, i.e., WLZ, bijstand, and sick leave assistance, as shown in Figure 119, out of the scope of improvements. Moreover, it should be noted that according the CPB in-kind transfers are relatively of the largest importance when reviewing redistribution (van Essen, Leenders, Lejour, Möhlmann, & Rabaté, 2022), as shown in Figure 120.

As a last notion, Salverda (2014) state that selective policy causes that specific type of households/individuals are receiving disadvantages, such as single households, but Kremer et al. (2014) is also highlighting that "ZZP'ers" are falling behind. In general, this is a consequence of the government favouring dual-income households and fixed contract workers (Cnossen & Jacobs, Inleiding, 2019). These concerns are not new, since the conception of the current benefit system in 2007 it has already been criticized continuously for the same problems again, and again, and again (Ministerie van Financiën, 2020).

Wealth inequality

When reviewing the wealth tax policy, it is found that the Netherlands incurs low (implicit) tax rates on income from wealth when compared to other EU-countries (Jacobs, 2019), as shown in Figure 121. However, it is important to note that the Dutch wealth income tax in practice functions as a wealth tax as it taxes a standard rate of return on capital, i.e., it assumes a 'normal' rate of return on wealth (Rijksoverheid, 2019)[12].

[11] The amount of benefit given would be calculated using the following formula: *Benefit household* = 80% × *rent* + €980 × *# childrens* + €3.130 × *single parent* + 73% × *health costs* − 29% × *means-tested income*

[12] Currently large overhauls are being made to the tax system which assumed a tax on the 'normal' return rate as the 'Hoge Raad' ruled the tax to be unlawful. The current vision is to tax the 'real' return rate on income from capital. However, the design is yet to be drafted and has not been finished at the moment of writing this thesis (Rijksoverheid, 2022).

Moreover, Jacobs (2019) states that the Dutch tax system is a large complex network of varying tax rates on income from wealth with little economic logic behind it. The net effect of the current system pushes wealth towards real estate and pensions. The size of these 'subsidies' is rather enormous, in total 35 billion euros tax revenue is forfeited[13] which equates roughly to the total expenditure of the government on education, i.e., 38,5 billion. Problematic to these types of assets, i.e., real estate and pensions, is that they are (highly) illiquid. This causes a negative effect on the ability of household to compensate for economic shocks, especially if it would concern a collapse of the real estate market.

In general, Jacobs (2019) advocates a single tax rate on capital income which is broad, including dividends, rents, and capital gains. This would also entail removing tax on financial transactions, such as the overdrachtsbelasting, as it causes disruption to the economic system. Interestingly, he also proposes to tax unrealised capital gains as this would avoid the offset of selling assets which have capital gains which is also being mentioned in the new proposal of the government (Rijksoverheid, 2022)).

However, Kremer et al. (2014) also state that the tax & benefit system, more specifically the welfare state, is contributing to the wealth inequality within the Netherlands. This interaction occurs because the state supply security of income during retirement with a state supplied pension. Moreover, the social security system also supplies a safety net for those who become unemployed or incur health issues during life. Due to these systems, there is no necessity to accumulate wealth to provide security during daring times. This mainly causes the lower deciles will not accumulate wealth causing stronger inequalities.

[13] These results were calculated by the article's author. Jacobs (2019) hypothetically taxed real estate like savings and investments, and implemented similar tax on income rates before and after retirement.

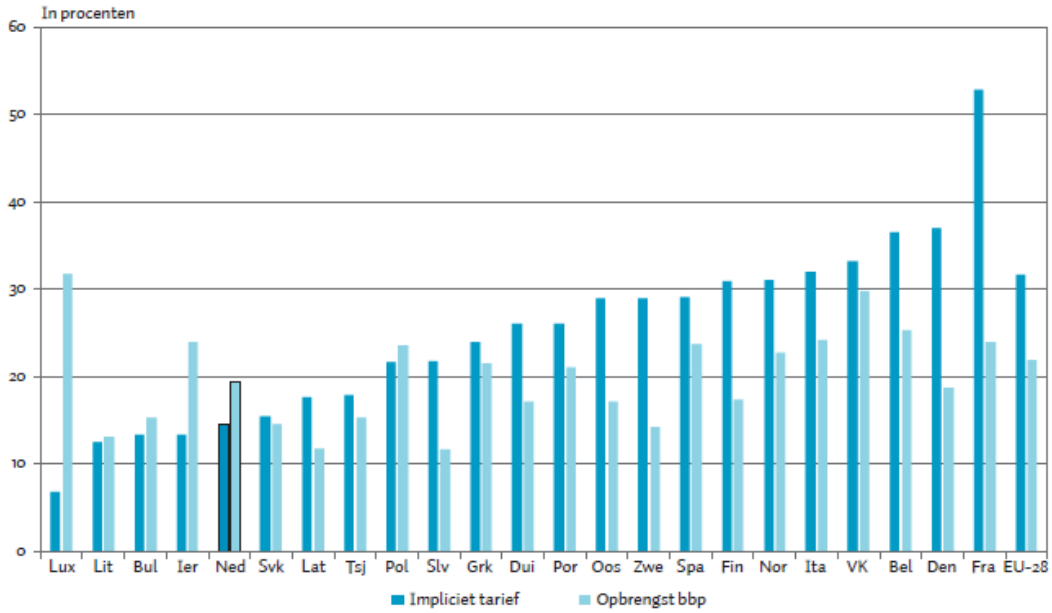

Figure 121 The effective tax rate on income from wealth and the relative contribution of wealth tax compared to total tax revenue. *Note: Blue bar indicates the effective tax rate calculated as total capital income tax revenue divided by the total capital income. Light blue indicates the relative amount of wealth income tax compared to the total tax revenue. EU-28 indicates the average of all EU-countries plus Norway. This figure has been obtained from* **(Jacobs, 2019)**

Wealth transfer

In the Netherlands wealth transfers are incurred by the acceptor of the wealth with equal tax rates for in vivo and inheritance tax rates. The marginal tax rate is trenched over two discs for the amount of wealth transferred and is trenched in two discs by closeness of relation, favouring partners and 1st degree relatives with a lower rate as opposed to further distanced relation. Moreover, the wealth transfer system also uses exemptions for both inheritances as in vivo transfers. For inheritance the exemption is 661.328 euros for partners, 20.946 for children and grandchildren, and 2.208 euros for all other inheritance recipients. In the regard of in vivo gifts, there is a yearly exemption of 5.515 euros for children and 2.208 euros for other recipients. There is also a once in a lifetime in vivo transfer exemption of 103.643 euros but earmarked to be used in 3 years for real estate expenditure, i.e., the 'jubel-ton' (Ministerie van Financien, 2020).

The Ministry of Finance (Ministerie van Financien, 2020) narrates a bird's eye view perspective with 17.5 billion flowing through inheritance transfers (in 2016) of which 9.1 billion euros of inheritance incurred taxation (in 2015) which generated 1.5 billion in tax revenue. The average tax rates in 2015 were 11.8% for inheritance, 6.4% for in vivo gifts, and 1.1% company succession. Moreover, the Dutch demographics result into inheritances being received 50 years, as they note, way past the window when financial aid is required. This is partly compensated by using in vivo gifts at an earlier stage and also right before death, as shown in Figure 122. When reviewing inequality, the Ministry of Finance (2020) explains that the current birth rate per women (~1.7) will result in a strong concentrating effect of wealth transfer in the future.

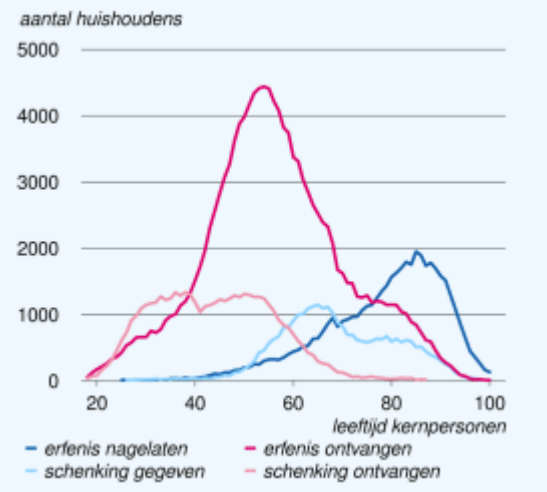

Figure 122 Relation between age and number of received wealth transfers. *Note: The results are based upon article's author calculation use CBS-micro data. This figure has been obtained from* **(CBS, 2019)**

According to Van Gilst et al. (2008), wealth transfers incur too low tax rates and significant rise could (read should) be applied. In part this is caused that just over half of the inheritance transfers are accidental which from economical perspective can incur high tax rates. Moreover, the difference in wealth transfer tax of 10% and the standard VAT rate of 21% causes economic inconsistencies. However, they acknowledge that the decision making occurs within the political arena which is subjected to subjective arguments. Also De Kam & Caminada (de Kam & Caminada, 2010) note that there are four (main) reason to increase wealth transfer tax: 1. It's a limited opportunity to target wealth inequality, 2. Acceptability as the acceptor has provided zero input for the (expected) gained wealth, i.e., "windfall gain", 3. Limited economic disruption due to savings being uncorrelated to expected wealth transfer to the acceptors, and 4. The gain tax revenue can be used to relief tax on labour. The advantages of increased wealth transfer tax rates have been acknowledged by the Ministry of Finance (Ministerie van Financien, 2020), but states that the narrative is complicated the negative perception in society causing limited political support to enforce such taxes.

Undocumented inequality

Besides the earlier noted untaxed wealth, there is also an issue of undocumented inequality which limits the ability to supply appropriate funding for the poor. For example, an 'new' occurrence is the existence of individuals with income but with-out housing, i.e., economic homeless. Problematic to this group is that it is composed out a wide variety of different problems but are (partly) invisible to the government. This is caused as they either fail to ask for assistance (as they have some sort of financial resources) or when they apply for assistance are not being registered as there requested aid is small (overestimating their self-reliance). Due to the mismatch in what is known and what is being offered, the economic homeless are receiving inefficient aid. The severity of the issue mainly revolves that the economic homeless are now falling of track causing deepened impoverishment while their problematic issues can be resolved with small assistance when tackled early (Lorkeers, van der Velden, & 't Hooft, 2021).

Besides being unaware of the people requiring aid, there is also possibility of misjudging the required assistance needed by individuals. Another exemplary case for this is that the social assistance for homeless people is reduced compared to people with housing. Social assistance consists out of 70% of the minimum wage, however when homeless this amount is reduced to 50%. Problematic to this reduction is that it based on the false presumption that homeless people have lower costs of living as they do not have to pay for housing expenses. However, people without housing have increased transportation costs and increased turnover of owned items due to loss, theft, and degradation caused by their homeless situation (Brendel, 2020). In general, there are indications that the government is always able to adequately measure those in need nor are able to properly estimate their required needs.

Labour bargaining

The commission "Regulering van Werk" (Commissie Regulering van Werk, 2020) noted that the differences in contracts are causes that differences occur in the qualification for various benefits. For example, flex workers are experiencing negative consequences in their social security based on their contract type. Low incomes with flexible contracts are often dependent on benefits. However, due to their varying income there is limited consistency in their aid causing financial instability (Commissie Draagkracht, 2021). For example, due to their changing employment status there benefits can be put to a halt, but the "reboot" of their benefit can last a while after losing their income source causing financial issues in the meanwhile. Moreover, as shown by the 'Toeslagaffaire' the reliance on the benefit system can be destructive for families when wrongly applied, with the report being called "Ongekend onrecht" (Parlementaire ondervragingscommissie Kinderopvangtoeslag, 2020). In most recent events it has even come to the point where the government openly acknowledged institutionalized racism within the 'Belastingsdienst' negatively impacted households with low income, single income, and having a different nationality (Rijksoverheid, 2022).

The commission "Regulering van Werk" (Commissie Regulering van Werk, 2020) also concluded that the current labour market laws and regulations are not supporting investment into human capital adequately. For example, they note that the budgets aimed at activating labour market of the government institutes has been cut in half and municipalities have been cut by 2/3rd. Moreover, the unemployment benefits are first supplied by the UWV but after two years this is supplied by the municipality. This transition causes problems as the two institutes have different operating policy causing inconsistencies and unclarity for the benefit receiving individual (Commissie Regulering van Werk, 2020). In general, the reintegration of employees into the labour market has seen reduced support from the government.

Public perception

Regarding the perception towards taxes, it is considered to be a civilian's duty and there is discontent for tax fraud (76% finds this intolerable). This is in contrast to tax avoidance, which is considered more to be a fair game (40% finds this intolerable while 32% accepts it). However, tax reports are also considered to be difficult and a third of the populations uses some form of aid in the declaration while only 18% does tax declaration on his own accord. The low number of own declarations is caused by the perception that

the tax system is difficult, especially the "heffingskorting" and the "aftrek voor zorgkosten" are considered to be difficult tax regulations (Blauw Research, 2020).

Regarding the perception towards benefits, there is negative view for those who require benefits. This causes that there is shame and denial of the individuals are filling for the benefits, exemplified by the targeted renewable packages which caused shame by its targeted audience (NRC, 2022). But also, there are frequent stories concerning people who have large debts (and requiring benefits) who are unwilling to be quoted by their full name due to shame of their debt burden (NRC, 2022). Further aggravation to the negative perception is the difficulty during the filling process. This requires large bundles of declaration files and justification papers of the used benefits which frequently requires aid from other to help during the process. This can be as simple as needing to ask others to print the required files as (due to lack of funds) they do not own a printer. This causes tension between the perceived shame and the required to ask for help (NRC, 2022).

5.5 Crises

In the past years economies worldwide have been impacted by large crisis, e.g., the corona crisis and the Ukraine war, causing large shifts in the labour and international trade market. These events have the potential to impact various social classes differently that could lead to affecting economic inequality. We will refrain from extensive research regarding crises as this would lead to requiring to determine the definition of a "crisis" which could prove to be difficult. Moreover, it could well be that there are various types of crises which are having different impact. For example, one could make a distinction by determining the corona crisis as a health-related crisis while the Ukraine war could be determined as an international market-related crisis. It is unclear whether such a distinction would be of value to the model.

The clear goal of this particular section will be to evaluate (by case examples) whether economic shocks can directly impact certain specific parameter. The reason to evaluate such an effect is that it could be that certain parameters are more susceptible to crises than others. As such, this could lead to the recommendation to devise policies which attempt to strengthen these specific parameters to become less susceptible.

Corona Pandemic

SEO (ter Weel, Bussink, & Vervliet, 2021) concludes that the corona pandemic had a significant larger negative impact on individuals from low educational levels. In short, they conclude that job opportunities were already favouring higher educated individuals before the corona crisis, but this aggravated became aggravated during and (shortly) after the corona crisis, as shown in Figure 123. The CBS (CBS, 2021) made a similar finding, showing that in 2020 about 10% of all minimum jobs were lost while only 0,7% of the jobs above minimum wage were lost.

The CBS (Schulenberg, 2022) finds in an evaluation report that the corona crisis had significant unequal impact on society, hurting the lower incomes more harshly than others. Problematic to the effect was that the financial support given by the government to aid companies, attempting to prevent jobless, mainly the fixed contracts which are possessed by the higher incomes. The lower incomes, having flex contracts, incurred income losses but also had the lowest financial buffers to compensate for this loss. The CPB concludes that the corona crisis made structural problems in the labour market apparent and calls for a change, especially mentioning that the security differences between flex and ifxed contracts should be closed.

Bol (Bol, 2020) states that corona has aggravated problems which were already present before the corona crisis. They find that inequality of opportunity increased due to the inability of the less fortunate to participate in education by distance, i.e., digital education. Moreover, the students who were dependent on practical education, mostly connected to lower education, were unable to fill for internships to receive adequate training. Also, the problematic students got "off the radar" and could not be followed in their progression.

Overall, corona seems to have acted as a catalyst, aggravating already present issues and making them more prominent. At the one hand, this can be seen as an opportunity, as the issues give direction to which issues require a solution. On the other hand, many of the issues seem to have been know before the crisis. As such, they could have bene prevented from having a large impact on society by making the system more resilient to impacts.

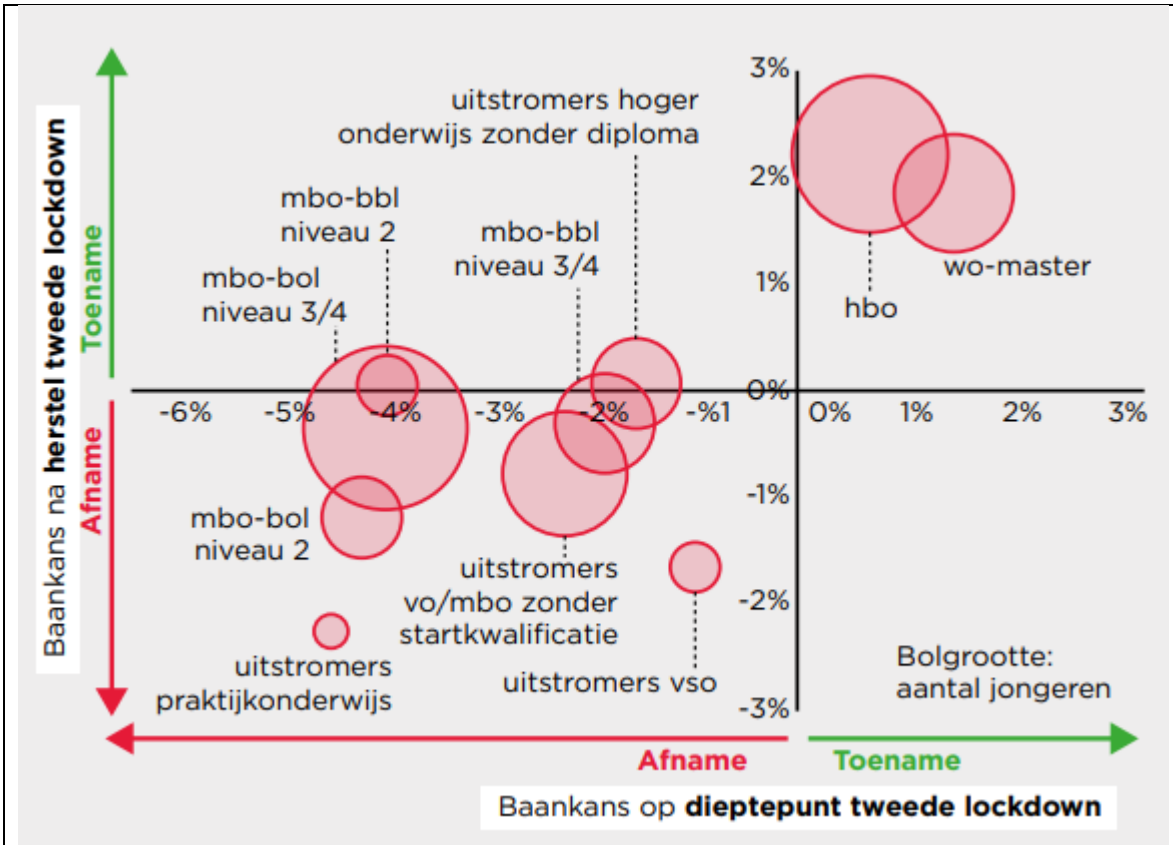

Figure 123 Note: This figure has been obtained from (ter Weel, Bussink, & Vervliet, 2021)

Ukraine war

In the recent Ukraine war developments, the fossil fuel prices have risen dramatically causing large increases in energy bills. In an attempt to lower costs for the middle incomes, attempting to avoid to large economic burdens, the Dutch government decreased taxes on fuel and energy. However, the compensation technique caused that mainly the rich household are being compensated (receiving 660 million euros) instead of the targeted group, i.e., middle incomes (receiving 418 million euros). The poor are being reached even more poorly and were only compensated for 240 million euros. However, there were other plans for the poor (those with income up to 120% of minimum wage) by compensating them with 800 euros in direct fuel and energy benefits (Estrada, 2022).

6 Conclusion & Discussion – Framework and policy

The main conclusion of this thesis is that economic inequality involves a large array of parameters which are interconnected. We have represented these interactions using a conceptual framework based on graph theory, i.e., the parameters are depicted as nodes and connected to each other using edges, as shown in Figure 124[14]. When reviewing the conceptual model, we find that parameters are often heavily interconnected. Even when using this model, it is noticeable that keeping a comprehendible view remains difficult.

We state that there is necessity for a comprehensive overview as we found that economic inequality cannot be solved with a 'silver bullet'. In the various branches of this thesis, we found that topics are being referred to as highly important but coincided with a disclaimer that other parameters are also impacting the system and their functioning should also be included. As such, when drafting policies, it will be required to review its effect beyond its specific targeted parameter to other interconnected parameters.

In sum, due to the grave consequences of economic inequality and its high complexity, we would advise that a single governmental body should be dedicated to "solve" economic inequality. Such an institute would need to create a comprehensive plan

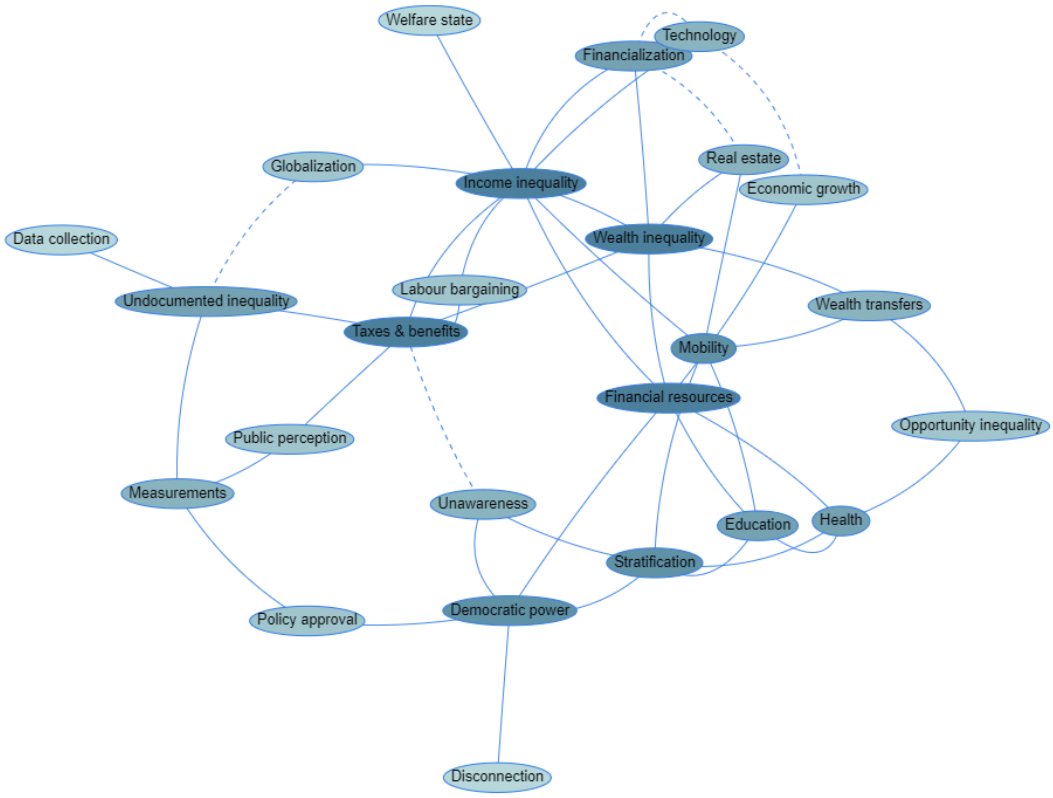

Figure 124 The conceptual framework synthesized from this thesis' review. *Note: The shading indicates the number of interactions occurring with other parameters, going from 1 to >5.*

[14] The conceptual model has also been published on the internet. The interactions can be viewed in a web tool that gives information about the nodes and edges. Moreover, one can switch between the generalized concept and the Netherlands. Link: Conceptual framework for economic inequality

to tackle economic inequality and review drafted policies on its subsequential effects on other parameters. When doing so, it can use the conceptual framework created in this thesis to as a central knowledge bank to understand the topic and become able to discern the influenced parameters. However. further deepening of the model will be required to make it functional as an operative tool.

6.1 Conceptual Framework

There are three characteristics to the conceptual framework which need to be highlighted to better understand its functioning, these are: 1. Incompleteness of the analysis, 2. Biased in reviewed data, and 3. The absence of mode of interaction.

In regard of the first notion, we can state that it is impossible to review the complete arena in full depth. In every chapter we have stated that we refrained from analysing a certain topic in larger depth to keep the thesis within its scope and to attempt to keep the thesis 'brief'. We even skipped certain topics at all. For example, the potential correlations between economic inequality and justice & crime or the environment have not been discussed. Moreover, the topics for which we attempted to review them from multiple angles certainly have dozens of other papers which have not been included during the review due to time constraints. Also, we limited ourselves to review topics by its relation with economic inequality but this misses the interaction between other parameters. For example, we have not specifically searched for the relation between education and tax evasion & avoidance, but the hypothesis can be drafted that more educated individuals are more likely to understand tax rules and thus be able to use loopholes. Another example would be that globalization could have caused foreign investments into the national real estate market causing a more overheated real estate market and additional abilities for foreign rich people to gain profits.

While we acknowledge these limitations, we review these issues as a consequence of the ambitious setup of this thesis. Most probably, the analysis is ever growing and can never be assigned as finished. However, at the completion of this thesis we have included … unique citations to various type of references, have identified … separate interactions between parameters, and has reached … pages in total length. As such, we pose that this thesis has attempted to do most it can do within the available time, and it requires more work to make the framework more complete.

In regard of the second notion, we want to highlight that one should be warranted when attempt to assign significance to specific findings. For example, the finding that income inequality has the most interactions within the model could lead to a potentially false conclusion that this is the most important parameter. Even disregarding the notion that the highest number of interactions would be a somewhat arbitrary parameter in the regard of finding the "most important parameter", it is also a somewhat expected outcome as literature is 'biased' in its reporting towards income. This has been highlighted by several articles and is explained as being a consequence of the fact that income has a much larger amount of data which can be analysed. In large part, this data 'overflow' is caused due to rigorous income taxes being the norm in developed countries while comparatively wealth taxes are only sparsely implemented (as to remember, only four

countries have extensive wealth taxes). As such, the number of written articles concerning income inequality is simply higher which increases the odds of finding an interaction.

In a sense, we could state that the framework (and number of interactions) acts as a representation of intensiveness of the reports considering these topics in relation to economic inequality. This could either mean that the parameters with larger number of interactions are indeed having large connectivity to other parameters or they have been reviewed in greater depth, either by the research field or by this thesis itself. As we are not able to validate whether it is the first or the second argument (and most probably a combination of the two), we envision that it could be desired to keep track of this occurrence when completing the framework. One could for example attempt to count the number of articles written about a certain topic and compare it to the to other topics within the framework. Moreover, one could attempt to grade the scientific support for certain interactions, e.g., it being "certain" or "conflicting support", to know its importance within the framework. In essence, this framework operates as the foundation of potential spin-offs and meta-analyses which can be performed in the future.

In the regard of the third notion, we haven't indicated the direction of interaction nor whether the interaction is positive or negative within the conceptual framework. The reason for doing so is because the literature is not always clear as to whether interactions are forward or backward. For example, the quality of education is a consequence of stratification, but education also causes stratification. As such, it could be highly possible that interactions will primarily be bidirectional. As for the effect of the interaction, it is highly dependent on the specific of the interaction. For example, investments in primary education have the tension to improve equality of opportunity while investments higher education tends to decrease the equality of opportunity. As such, the specific type of investment in education leads to a different outcome in what will occur in regard of inequality.

Therefore, we state that depicting more details in the conceptual framework would create a false pretence of what is occurring as it is highly dependent on specific conditions. We rather put focus on the interactions which gives direction to which parameters need to be reviewed when drafting a policy. During this review one can ascertain whether they have a negative or positive effect on the subsequential parameters.

6.2 Policies

In this thesis economic inequality has been reviewed in connection with the income, wealth, and opportunity, and reviewed the extremes represented by poverty and the super-rich. Problematic to the narrative of economic inequality is that it frequently mingles the general characteristic of inequality and the specific cases of poverty and super-rich. In general, we note that inequality is a common occurrence, and our policies should attempt that the outcomes are the result of 'fair input', i.e., equality in opportunity. However, even in a world with complete equality in opportunity, there can be various reasons why people to run into poverty, e.g., bad luck, or to become rich, e.g., exploiting the system. There are potentially ethical and philosophical reasons that these occurrences are unwanted, especially when reviewing poverty. As such, creating policies will be a

balancing act between reviewing the average tendences and opposing unwanted features at the extremes.

However, it could be highly likely that attempting to enable equality of opportunity will require a different policy perspective as opposed to attempting to avoid unwanted features at the extremes. Therefore, we advise to have two different perspectives for policies. The first should focus upon creating equality of opportunity and the second should focus upon opposing the extremes (and most likely the prevention of poverty). However, as we did not review the extremes in depth during this thesis, we will refrain from giving specific policy advises in that regard. We do advise that future extensions of this conceptual framework will attempt to discern interaction between an inequality perspective and an extreme perspective, as they may look similar but will have distinct features and will require different policies.

To summarize, this thesis states that economic inequality is a problem of a large network of parameters which is influencing the opportunities people have in their financial development. Because of the interacting parameters, it will not be possible to develop a policy which will solve all the problems on its own accord. To become effective, policies should be drafted as a system which attempts to strengthen the effectiveness of individual policies through positive interaction. This framework will be postulated as a starting position for this new perspective. In future work, this framework should be enhanced by adding other parameters and reviewing other interactions. Moreover, one should describe the various policies which could solves the issue for a specific characteristic or interaction and describe its influence within the system. Overall, it will be essential to review economic inequality not as a problem of a specific socio-economic group, but as a problem for the whole society. Once we are able to see that improving the whole system will mean that we improve society and, thus, ourselves, then the opportunity arises to fix the problem. Until that moment, we can only help people to understand the problem more accurately. We hope that this thesis will aid in that process.

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Appendix A

Description of the ten characteristics of a wicked problem as provided by Rittel & Weber (1973):

1. No definitive formulation

The problem of economic inequality can be defined in various manners, for example, we can investigate income inequality, wealth inequality, or inequality in access to education, or health care. The description of the problem directly influences the possible solutions. The inherent nature causes that the problem cannot be identified without knowing the possible solutions.

2. No stopping rule

There is no quantifiable end goal for economic inequality, i.e., we cannot describe when the problem of economic inequality is solved (because there is no agreement on what the 'optimal' degree of inequality is).

3. Solutions are not true/false, but better/worse

We cannot formulate a testable result that can be verified. There are various stakeholders with different interests regarding economic inequality, but none of the stakeholders can state formal rules to judge the correctness of the result. As such, results are only better-worse and never true-false.

4. Solution cannot be tested

An implemented policy "solving" economic inequality can never be tested as the effects have trickling-down effects on other parameters. Therefore, the time necessary to reach the complete effect of a solution will be prolonged, if not infinite. Moreover, as policies affect various parameters, which are different for various people and differ over time (the effect can be positive in the short run, but negative in the long run) we are unable to model the effects.

5. One-shot operation

Implemented policies have a lasting effect on society. The effects of an implemented policy cannot be reverted as the people will already have experienced the effects in their life, these experiences are fixed for life. As such, one only has a single opportunity to fix the current problem as the problem changes after the solution has been implemented.

6. Only a sub-set of all solutions can be identified

There is no possibility to test if all potential solutions to solving economic inequality have been reviewed. Because the problem cannot be definitively defined, and as such, the solution is also not defined, and there is no formalized set of rules for a potential solution, the potential solutions are based upon own.

7. Essentially unique

Economic inequality is unique compared to other problems, but also in its own right. The inequality experienced in various countries differs, but also the economies of various countries differ. There are commonalities in the problem and possible solutions, but it will not be possible to create a 1-on-1 copy of the solution implemented in one country in another country, also because different countries/societies differ in how much inequality they find politically acceptable (e.g., compare the U.S. and the Scandinavian countries).

8. Symptom of another problem

A problem is the effect of another problem, which is the effect of another problem and so on, without a natural hierarchy to these problems. For example, we can state economic inequality is caused by unequal wage pay, which is caused by differences in education, which is caused by differences in opportunity to obtain an education, which is caused by differences in living conditions, which are caused by economic inequality. We cannot create a hierarchy of importance for these issues and, therefore, it should be reviewed as a system's problem requiring taking all parameters into account to attempt to change the system.

9. The perspective of the analyst determines the solution to the problem

As we cannot state what the most important cause is of the wicked problem, nor have an opportunity to test the importance of causes, the approach of the analyst is the most important determinant to the potential solution of the problem.

10. No right to be wrong

The effects of potential policies can be detrimental to individuals causing serious harm to their well-being. Regarding economic inequality, one can state people who stay in poverty, become impoverished, or have a large setback on their living standards, are experiencing negative effects of the policies. One can state that a policymaker cannot risk these conditions as they could be deemed to be unethical.

Appendix B

Table 4 Keywords for search input used for this thesis

Thesis	Section	Key Concept	Topic
Economic inequality	Quantifying Inequality	Measurements	Taxation, Household Survey, Rich Lists
		Indicators	Lorenz Curve, Gini Coefficient, Generalized Entropy, Theil Index, Atkinson's Index, Ratio, Palma, Poverty
	Causation of Inequality	Income	Labour Productivity, Labour Market, Trade Union, Minimum Wage,
		Wealth	Return on Capital, Elasticity of Substitution, Inheritance, Bequests
		Mobility	Equality of Opportunity, Relative/Absolute Mobility
	Effects of Inequality	Education	Social Congestion, Entrapment
		Democracy	Distributive democracy perspective, unequal democracy perspective
		Economy	Propensity to consume, Galor-Zeira model
		Health	Absolute inequality hypothesis, Relative inequality hypothesis
	Influencing Inequality	Taxation	Elasticity of Labour, Optimal Taxation Theory
		Benefits	Pension System, Income Insurance