Charles University

Faculty of Social Sciences
Institute of Economic Studies

MASTER'S THESIS

Globalization, Rule of Law and Wealth Inequality

Author: **Bc. Anežka Svěchotová**

Study program: **Economics and Finance**

Supervisor: **prof. Roman Horváth Ph.D.**

Academic Year: **2023**

Declaration of Authorship

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

The author grants to Charles University permission to reproduce and to distribute copies of this thesis document in whole or in part.

Pilsen, January 2, 2023 Bc. Anežka Svěchotová

Acknowledgments

I am very grateful to my supervisor prof. Roman Horváth Ph.D., for his guidance and endless patience throughout the research process. I would also like to express my sincere thanks to my family and my husband for always being there for me.

Abstract

We examine the determinants of wealth inequality using new dataset consisting of a rich set of explanatory variables including rule of law, as well as different measures of globalization. We use the Bayesian Model Averaging (BMA) approach to account for model uncertainty. The BMA methodology allows to thoroughly compare a large number of potential determinants. Due to large differences in wealth inequality across different countries, the variables included reflect countries' various aspects, namely economic, geographical, regulatory, institutional, finance, globalization, political and demographic factors. Examining 39 potential determinants, we find five robustly related variables. Among them there are three financial development indicators, GDP growth and one geographical dummy for countries in Latin America and the Caribbean. On the other hand, some of the measures of globalization are correlated with wealth inequality; however, they are not its determinants.

JEL Classification	C33, E21, G51
Keywords	wealth inequality, globalization, Bayesian Model Averaging (BMA)
Title	Globalization, Rule of Law and Wealth Inequality

Abstrakt

V této diplomové práci se zabýváme determinanty majetkové nerovnosti za pomocí nově sestaveného a rozsáhlého datasetu. Součástí tohoto datasetu je 39 nezávislých proměnných včetně měřítka právního státu a 6 dimenzí globalizace. Kvůli velkému počtu proměnných a nejistotě ohledně podoby ideálního modelu jsme použili metodu zvanou „Bayesian Model Averaging (BMA)“. Tato metoda je schopná vyhodnotit velký počet potencionálních proměnných a pomocí hodnoty „posterior model probability (PMP)“ vybrat determinanty majetkové nerovnosti. Metodou BMA jsme identifikovali pět determinantů – tři ukazatele finančního rozvoje, růst HDP a „dummy“ proměnnou pro země z regionu Latinské Ameriky a Karibiku. Ačkoli dimenze globalizace nejsou determinanty majetkové nerovnosti, úzce spolu souvisejí.

Klasifikace	C33, E21, G51
Klíčová slova	Globalizace, majetková nerovnost, Bayesian Model Averaging (BMA)
Název práce	Globalizace, měřítko právního státu a majetková nerovnost

Contents

List of Tables

List of Figures

List of Acronyms

IMF	International Monetary Fund
WHO	World Health Organization
WB	World Bank
GDP	Gross Domestic Product
OECD	Organization for Economic Cooperation and Development
GFCF	Gross fixed capital formation
WID	World Inequality Database
BMA	Bayesian Model Averaging
ML	Marginal Likelihood
PMP	Posterior Model Probability
PIP	Posterior Inclusion Probabilities
UIP	Uniform Information Prior

Master's Thesis Proposal

Author:	Bc. Anežka Komorová
Supervisor:	prof. Roman Horváth Ph.D.
Defense Planned:	June 2022

Proposed Topic:
Globalization, Rule of Law and Wealth Inequality

Motivation:
Globalization can be considered a nowadays' trend which affects almost everyone. It is a process of connecting people, companies and different economies worldwide through its impact on global economic growth. The number of studies discuss the link between globalization and labor outcomes moreover, some even consider alternative explanation such as technological progress. However, contrary to the large number of theories, there is a shortage of empirical studies that focus primary on whether the globalization has a significant effect on wealth inequality.

Moreover, the majority of the existing studies focus on different indicators of economic globalization, but globalization has also political and social dimensions. For example, to the deunionisation in OECD countries contributed largely social integration, while economic globalization did not truly matter (Dreher, 2005). Other dimensions of globalization are likely to have a significant effect on inequality as well.

For the purpose of this thesis, I have decided to find the overall effect of globalization on wealth inequality. Besides the aggregate measure of globalization, I will also use indicators of other dimensions of globalization. The rule of law will also be considered.

Hypotheses:
1. What are determinants of wealth inequality?
2. Do different types of globalization affect wealth inequality change with?
3. Is rule of law relevant to wealth inequality or its determinant?

Methodology:
The thesis will be divided into two parts - theoretical and empirical. The first part will be dedicated to literature review of existing literature on globalization and wealth inequality. There will be a review of methodology used in the globalization and wealth inequality measures as well. In the second part I will focus on the econometric analysis of the relationship between globalization and wealth inequality as well as whether this relationship depends on the rule of law. To avoid uncertainty regarding the choice of the regression model due to the large number of theories, the Bayesian Model Averaging or the Generalized Method of Moments will be chosen. Main sources of data will be the World Bank, the World Income Inequality Database and the KOF Globalisation Index.

Expected Contribution:

The aim of the thesis is to clarify the uncertainty about the effects of globalization on wealth inequality in both developed and developing countries. The main contribution lies in presenting empirical results based on the new extensive dataset while considering different dimensions of globalization such as financial, trade, cultural, political, etc. - contrary to the existing studies which focus mainly on various aspects of economic globalization. In addition, a part of the thesis will focus on whether the rule of law is relevant or determinant of wealth inequality.

The findings of the thesis could provide an empirical rationale for countries to establish integration policies in their favor.

Outline:

1. Introduction
2. Literature review
   - Globalization
   - Wealth Inequality
3. Data
4. Empirical model
5. Results
6. Conclusion

Core Bibliography:

[1] ASTERIOU, Dimitrios, Sophia DIMELIS a Argiro MOUDATSOU. Globalization and income inequality: A panel data econometric approach for the EU27 countries. *Elsevier* [online]. 2014. Available at: https://www.sciencedirect.com/science/article/abs/pii/S0264999313004203

[2] BERGH, A.; NILSSON, T. (2010). Do liberalization and globalization increase income inequality? European Journal of Political Economy 26, pp. 488-505.

[3] DREHER, A. (2006). "Does globalization affect growth? Evidence from a new index of globalization", Applied Economics 38(10), 1091-1110.

[4] DREHER, A. (2005). "The influence of globalization on taxes and social policy – an empirical analysis for OECD countries", European Journal of Political Economy 22(1), 179-201.

[5] DREHER, AXEL and GASTON, NOEL, Has Globalisation Increased Inequality? (June 2006). KOF Working Papers / KOF Swiss Economic Institute No. 140, Available at SSRN: https://ssrn.com/abstract=928403 or http://dx.doi.org/10.2139/ssrn.928403

[6] GYGLI, SAVINA, FLORIAN HAELG, NIKLAS POTRAFKE and JAN-EGBERT STURM (2019): The KOF Globalisation Index – Revisited, *Review of International Organizations, 14(3), 543-574* https://doi.org/10.1007/s11558-019-09344-2.

[7] IZA, Meschi, E., & Vivarelli, M. (2007). *Globalization and Income Inequality*. http://ftp.iza.org/dp2958.pdf

[8] LINDERT, P. H.; WILLIAMSON, J. G. (2001). Does Globalization Make the World More Unequal? NBER Working Paper No. 8228.

[9] MESCHI, ELENA & VIVARELLI, MARCO. (2007). Globalization and Income Inequality.

[10] POTRAFKE, NIKLAS (2015): The Evidence on Globalization, *The World Economy* 38(3), 509-552.

[11] THE WORLD BANK, 2020. Data.worldbank.org [online]. Available at: https://data.worldbank.org/

[12] WIDER, 2020. Wider.unu.edu [online]. Available at: https://www.wider.unu.edu/

WOOLDRIDGE, Jeffrey M., 2009. *Introductory econometrics: a modern approach*. 4. ed., internat. student ed., [Nachdr.]. Mason, Ohio]: South-Western, Cengage Learning. ISBN 978-0-324-66040-1

1 Introduction

Nowadays, one of the most urgent challenges we face is wealth inequality. In 2021, the world's top 1.2 % of adult population owned approximately 47.8 % of total wealth, whereas the poorest 53.2 % of adults possessed only 1.1 %. Moreover, the aggregate wealth of a group of the richest has grown significantly this century, from $41.4 trillion in 2000, to $221.7 trillion in 2021, i.e., five-fold. As for the global wealth's share, it has increased from 35 % to 48 %. With wealth comes power which is; however, concentrated in the hands of only a few people resulting in a wider gab between both groups. (Shorrocks et al., 2022)

Contrary to income which can be transferred, the wealth creation is long and demanding and is mostly partaken in families and households from one generation to another. Household wealth is a key factor in determining how resilient people and countries are to any kind of shock. That is especially the case in the recent years due to a series of challenges such as Covid-19, widespread inflation or the Russia-Ukraine war. The harmful consequences of Covid-19 have been especially evident in less wealthy countries caused likely by the absence of household's emergency funds. While common people in the word struggled with the economic and health consequences of the Covid-19 pandemic, the wealth of the millionaires have risen quite significantly. During 2021, the number of US dollar millionaires grew by 9 %. Furthermore, the number of multimillionaires with net worth exceeding $50 million increased at a substantially faster rate, with 21 % more members in 2021. The percentage of billionaires who control the global wealth has increased since 1995. (Shorrocks et al., 2022) Moreover, the pandemic has amplified this growth even more. While the richest people have benefitted from the pandemic, the same cannot be said about the poorest. It is estimated that 97 million people were pushed to extreme poverty in 2020 as a result of Covid-19 causing global poverty to rise for the first time since 1990s. Additionally, the combined crisis of the pandemic and the Russia-Ukraine war is predicted to lead to an additional 75 million to 95 million people living in extreme poverty in 2022. (Gerszon Mahler et al., 2022) While extreme shocks like Covid-19 are very uncommon, they serve as a "wake-up call" since they bring attention to serious problems. In this case,

Overall, the mentioned academic papers describe how different factors of countries (economic, financial, geographical, institutional, etc.) contribute to wealth or income inequality. Nevertheless, which aspects of these nations are truly determinants of wealth inequality? What about different measures of globalization? Is the rule of law relevant to wealth inequality, or its determinant? Therefore, the purpose of our thesis is to find the potential determinants of wealth inequality out of the rich collection of data on the countries' aspects.

Apart from using an extensive dataset, we find our thesis to have two main contributions to the literature. First, we review a large number of existing theories on wealth inequality and test them within the Bayesian Model Averaging (BMA) methodological framework. Generally, BMA is considered as a good approach to address the inherent model uncertainty within a unifying econometric framework. (Koop, 2003) We conduct BMA under different priors to check for robustness of our results. For the baseline scenario we choose UIP g prior with uniform model prior. On the other hand, alternative approach employs hyper-g prior with alternative MCMC sampler. Finally, We also address endogeneity by applying lagged explanatory variables and applying the Instrumental Variable Bayesian Model Averaging (IVBMA) by Karl & Lenkoski (2012).

Second, we examine the effects of different measures of wealth inequality, which is, to our knowledge, novel to the literature on globalization and inequality. The existing literature focuses mostly on overall globalization, or on a single dimension of globalization – typically economic dimension (Heimberger, 2020; Stolper & Samuelson, 1941). However, other dimensions of globalization such as social and political are presumed to affect inequality as well. (Atkinson, 1997; Dreher & Gaston, 2008) For example, while social integration contributed largely to the deunionisation in OECD countries, economic globalization had hardly any effect. (Dreher, 2006a)

To find what determines wealth inequality, we examine a rich dataset of 39 different explanatory variables (including six measures of globalization) across 89 countries. Due to a large number of variables, we use the BMA method to account for model uncertainty. Since the level of inequality varies greatly across nations, we consider explanatory variables that aim to describe different aspects of each country, e.g., globalization, political, financial, geographical, regulatory aspect. The dependent variable is wealth inequality denoted by the wealth Gini index from Credit Suisse Wealth Databooks. In addition, we also include a set of globalization measures.

The structure of the thesis is as follows. After the Introduction, the second chapter reviews the relevant theoretical and empirical literature. The third chapter describes data used in the analysis and their sources, as well as their statistics and reason behind their inclusion in the dataset. The fourth chapter introduces the Bayesian Model Averaging methodology (BMA) in more detail. The fifth chapter presents the BMA results for both the baseline, and alternative scenarios in the analysis. To check robustness of the results, different model priors and MCMC samplers are considered. The sixth chapter outlines the main findings and discusses the thesis's contribution to the academic literature. Finally, Bibliography and Appendix are also included.

2 Literature review

There are numerous research papers studying inequality; however, the majority focus on income inequality rather than wealth inequality. This section explores different types of literature with focus on wealth inequality. First, we mention studies exploring historical evolution of wealth or its distribution. These studies focus largely on the measures of wealth inequality rather than its causes. Next, we discuss the underlying causes of wealth inequality based on theoretical models. Also, we examine a number of studies that carried out empirical analysis on income inequality, a subject well related to wealth inequality. Finally, we examine research papers studying the relationship between globalization and inequality.

Irrelevant to the chosen approaches and methodologies, the majority of the literature on historical development of the wealth distribution reaches a similar conclusion. The most of the countries under focus are developed due to the better data availability. In general, it appears that the significance of wealth declined after the end of World War II until the 1980s. It has increased since then.

This change of attitude is addressed in Piketty & Zucman (2014). The article introduces a new wealth-income database based on national balance sheets from the period 1970-2010. The paper states that in the eight most economically developed countries the aggregate wealth has increased between 1970 and 2010, from approximately 200-300 % of national income to 400-600 %. As a matter of fact, the 2010's aggregate wealth appears to be close to the values from the eighteenth and nineteenth centuries in Europe – specifically, 600-700 %. The paper identifies the recent fall as an anomaly caused by the drop in productivity and population growth after the war. Naturally, under the assumption of substantial net savings and low growth, long-term wealth-inequality ratio can be as high as 600-700 %, or more.

The study by Davies et al. (2017) is considered as a significant contribution to the study of wealth inequality measurement. For a wide number of countries, it presents the measures of wealth inequality, i.e., Gini coefficients. It focuses preferentially on a shorter time period, only considering the differences in global wealth trends between 2000 and 2014, and discover that, while inequality was on the decline from 2000 to 2007, it began to rise steadily since the global financial crisis in 2007 except North America. Despite the fact that wealth inequality increased in the majority of the world regions, it did not increase globally. This "V-shaped"

pattern is likely caused by the fast-growing developing economies, such as India and China, as well as by a number of countries in the region of Asia. (Davies et al., 2017) present a comprehensive dataset on global wealth covering 215 countries all over the world, rather than the determinants of inequality. They estimate that 79 % of wealth inequality in the world is inequality between, rather than within countries. Furthermore, inequality within nations differs greatly, i.e., the richest 10 % in China, Russia, or the USA owning over 70 % of total wealth, while in Slovakia, Japan, or Belgium the wealthiest 10 % possess less than 50 %.

The aforementioned studies seek a better understanding of the wealth distribution development over a longer time period, whereas following studies attempt to identify some of the underlying causes of wealth inequality.

Hasan et al. (2020) examine the determinants of wealth inequality based on the cross-country level dataset of 73 countries. Due to a large number of explanatory variables, the researchers employ the Bayesian Model Averaging. The chosen dependent variable is wealth Gini index obtained from the Credit Suisse Global Wealth Reports. Only seven out of the total 39 economic, financial, social and political factors are estimated to be significant. These determinants account for approximately half of the wealth inequality variation.

According to the findings, the most important and complex role plays finance since three out of the seven aforementioned variables represent financial development. The authors claim that large financial markets tend to raise wealth inequality, whereas more efficient financial intermediaries and better access to finance tend to reduce it. Furthermore, the authors study the financial development's overall effect on wealth inequality, which appears to be negative. The negative effect signifies the association of more financially developed nations with smaller wealth inequality. Moreover, the results show that the lack of political stability (such as wars, civil conflicts) and globalization increase inequality while greater income distribution and higher education reduce inequality.

Despite the long on-going discussion about the relationship between economic growth and inequality, the empirical results remain inconclusive. Almost all studies; however, discuss possible links between growth and income inequality. The research paper by Islam & McGillivray (2020) contributes to the emerging literature that focuses on economic growth and wealth inequality. The paper empirically analyses the effect of wealth inequality on consequent economic growth from 2000 to 2012 using a recently released Credit Suisse panel data set on 45 countries. In the analysis, the authors consider six governance measures and their connections

to economic growth and wealth inequality. The main factors contributing to the country's decrease in wealth inequality, and consequently higher economic growth, suggested in the paper are: higher government effectiveness and political stability, larger voice and accountability, better rule of law and regulatory quality, and control of corruption. Based on the econometric findings, the researchers concluded two important policy implications. First, due to the adverse effect of wealth inequality on economic growth, the policy makers should seriously formulate redistributive policies to control wealth inequality. Second, to lessen the detrimental defects of wealth inequality on economic growth, institutional reforms that enhance any are of governance and encourage a fair allocation of wealth should be implemented.

Heldring et al. (2022) study the effects of bombing on wealth inequality in the Great Britain in the course of the Second World War. The bombing affected indirectly the social contract, and thus policies. More specifically, the war contributed to the coalition of voters who were in favor of new social reform. This reform was soon implemented, which caused wealth inequality to decline. Considering the direct effect, the only direct consequence of the bombing on wealth inequality is the destruction of the capital stock and the assets.

After the World War II, the majority of the conflicts concerned internal disputes within a country or a small number of antagonized nations. "These conflicts have adverse macroeconomic effects, undermine the rule of law, cause violent confiscation of private property by militias and reduce trust in society, especially if these conflicts occur repeatedly." (Bircan et al., 2017) According to Bircan et al. (2017), civil wars tend to temporarily increase income inequality. However, income inequality eventually drops back to the steady-state.

Since data availability for income inequality is significantly better, the academic and empirical literature on income inequality is more common. On the contrary, the study of wealth inequality is due to its data insufficiency rather complicated and there still remains much to be understood. Some researchers substitute wealth distribution patterns with income distribution considering their strong, albeit far from perfect, correlation. (Bagchi & Svejnar, 2015) One of the reasons for this imperfect relationship is that the concentration of the wealth distribution is higher. Therefore, it is beneficial to review the literature on income for the purpose of this thesis.

Despite the fact that wealth is important quantitatively, empirical studies on wealth inequality receive less attention in comparison to income inequality. The most likely reason is the problematic measuring of wealth. (Zucman, 2019) Although data collection on wealth has some limitations, Davies & Shorrocks (2000) attempt to portray both current and historical wealth patterns using household surveys, tax returns, and various other sources.

Alvaredo et al. (2013) argue that income inequality in the United States experienced a sharp increase between 1976 and 2011 – more specifically, the gross income shares almost doubled from 9 % to 20 %. A number of other countries with high income also experienced a similar trend, although more modest. In the paper, the authors present four main reasons behind the growing income shares: tax policy, a better understanding of the labor market, capital income, and correlation between capital income and earned income.

Bhagat (2020) emphasizes the importance of the rule of law in reducing income inequality. They argue that countries with either greater adherence to the rule of law, or higher GDP per capita tend to have lower income inequality. However, once we account for the rule of law, the negative correlation between inequality and GDP per capita disappears emphasizing the role of the rule of law in the income inequality reduction. With a focus on Latin America, Sonora (2019) also investigates the impact of the rule of law on income inequality, as well as the poverty gap. Given that inequality in Latin America is worse than inequality across the world, the author argues that enhancing the rule of Law in the Latin American countries would improve the income distribution. The paper suggests that improvements to the legal system, particularly the property rights protection, will result in a reduction in the poverty gap, as well as a decrease in wealth inequality.

The classical theoretical model used by economists is the Heckscher-Ohlin model, also referred to as H-O model. “It explains the inequality effect of globalization as a result of productivity differences and the relative factor endowment of countries, and the extent to which individuals depend on labor or capital income.” (Dorn et al., 2018a) The distribution of resources around the world is uneven. Fortunately, the H-O model can be used to evaluate the trade between two countries whose production resources vary. A country should place an emphasis on the production of goods whose production resources are domestically in abundance. These goods are perfect for export. On the other hand, a country should import natural resources or goods that cannot be obtained or produced efficiently at home. Within the context of the Heckscher-Ohlin model, the Stolper-Samuelson theorem describes how changes

in the output price influence the price of production factors. According to Stolper & Samuelson (1941), trade openness does not affect developed and developing countries in the same way. In the developing countries there is an abundance of unskilled labor force. Thanks to international trade, there is a high demand for such workforce resulting in the rise in real wages, and consequently a decrease in income inequality. In the case of developed countries, the prediction is the right opposite. To sum up, economic globalization increases income inequality within developed countries and decreases income inequality within developing countries.

The Heckscher-Ohlin trade theory has collected a lot of criticism due to many limitations. For example, the main assumption of the H-O model is that both countries are, with the exception of their resources, identical. This assumption does not hold in majority of the cases. Another limitation concerns the reallocation of goods and resources. While the Heckscher-Ohlin model addresses between-sector reallocations, the production shifts within-sector are overlooked. This issue was addressed by Feenstra & Hanson (1999). They argue that in advanced economies outsourcing of unskilled workforce to low-wage countries within a sector leads to a higher demand for skilled workers. However, the shift decreases wage and bargaining power of those unskilled workers.

There are numerous research papers studying the relationship between globalization and inequality, but the majority of them considerer only theoretical aspect. These theoretical papers can help us gain basic understanding behind the relationship however, they cannot provide us with concrete evidence of what exactly are the effects of globalization on inequality. Moreover, the focus was narrowly on economic dimension of globalization which is easier to measure. Fortunately, recent studies discovered that social and political globalization have noteworthy impact as well.

Dreher & Gaston (2008) examine the issue whether globalization has any effects on income and wage inequality. They used data on industrial wage inequality, household income inequality as well as measures of the economic, social and political dimensions of globalization and proved that globalization and inequality are positively related, especially in the case of the OECD countries. Contrary, the authors found no conclusive effect in less developed countries.

A large number of studies focuses mainly on economic or financial globalization; however, social and political globalization are presumed to affect income inequality as well. There are papers such as Dreher & Gaston (2008)

or Atkinson (1997) that study a potential effect of political and social globalization on income inequality. Dreher & Gaston (2008) argue that political globalization is correlated with economic globalization. The higher the economic integration, the higher political competition and interest in politics. Moreover, political integration provides a good incentive for countries to set common policies among standards promoting equality. The change in social norms should also be considered. Due to the benefits received outside the conventional norms, it has become harder to stand by these norms. This may affect the behavior of people and potentially lead to the change in socially acceptable range for worse. For example, large wage differences within the workplace have become, for exogenous reason, socially acceptable. Thus, changing social norms could lead to a change in social acceptance of income inequality. (Atkinson, 1997)

With increasing integration into the world markets, governments and people face new tough challenges. “Governments are likely to influence market outcomes by setting agreements, regulations and tariffs; and design taxation and social policies to redistribute income from the rich to the poor.” (Dorn et al., 2018b) It remains unknown to what extent does globalization affect government spending on welfare policies (social security, health care etc.) and income inequality. However, there are three competing hypotheses which try to address this relationship – - the "race to the bottom" hypothesis, the "race to the top" hypothesis and the compensation hypothesis.

The "race to the bottom" hypothesis describes the situation when international and domestic companies prefer to lower their operating costs including tax burden rather than having an access to productive workforce of high quality. To attract foreign investment and help domestic firms at the same time, government will decide to constrain public spending, i.e., government will cut down expenditures on social programs and welfare. Therefore, globalization is expected to increase income inequality. (Guo, 2013)

On the contrary, the "race to the top" hypothesis describes the opposite effect of globalization on public spending. Firms in the process of choosing a location for their business make decisions based on many factors including the quality of human capital. To improve the quality and productivity of labor force, the access to good education and health care is necessary and governments that recognize this should increase public expenditures on human capital formation. (Guo, 2013)

The compensation hypothesis predicts similar impact of globalization on public spending as the "race to the top" hypothesis, however, the underlying

cause of increased public spending differs for both hypotheses. Compared to the "race to the top" hypothesis that focuses on human capital formation largely through education and health care, “the compensation hypothesis is more relevant to government's welfare expenditures on such programs as social security, unemployment benefits, retraining, etc. that provide income supplements.” (Guo, 2013)

2.1 Inequality

Inequality refers to an unfair and/or unequal distribution of resources and opportunities among the people within a society. Its meaning may differ when it comes to different people, different things or different situations. Additionally, there are various aspects of inequality such as economic, social, etc. Before beginning the discussion, it is crucial the determine what kind of inequality we deal with. Sen (2004) claims that inequality is a fundamental concept in all social theory literature. He states that the “inequality of what” is the basic question that may result in significant policy consequences. At the same time, the author also provides hisanswer (the preferred interpretation of inequality), which is based on the function capability. Income inequality is the most widely known. However, there is also wealth inequality, as well as horizontal (among groups defined by typical culture) and vertical (among individuals or households) inequality.

2.1.1 Income inequality

Income inequality can be defined as an uneven distribution of income within a single economy. There are various segments to income inequality. For example, the population can be separated to show diverse levels and forms, such as income inequality by region, gender, race, education or social status. While most of the economists could not agree on possible implications, they agree that a nation definitely does not benefit from large income inequality. Excessive inequality can undermine social cohesion, induce political polarization, and eventually slow down economic growth. (Ostry et al., 2011) However, to find an answer when is inequality considered inevitable (caused by differences in effort, luck, and talent), or when is it excessive, is quite difficult. Some of the key determinants proposed in the theoretical literature are global factors, such as globalization, and technological progress, or country-specific factors, such as factors pertaining

to domestic policies, economic development, as well as to economic stability. For instance, people with higher education have an advantage in manipulating new technologies hence, the technological progress contributes to the skill premium. (Card & DiNardo, 2002)

A common method to measure the level of income inequality is the Gini coefficient, which measures the degree to which the observed cumulative income distribution differs from perfectly equal distribution across a population. The more equal the distribution, the smaller income inequality is. The Gini index[1] ranges from 0 (or 0 %), implying perfect equality where everyone obtains the same share, to 1 (or 100 %), indicating perfect inequality where one person or a group receives 100 % of economy's income. However, values larger than one are theoretically feasible due to negative wealth or income. Due to the problematic collection of data (especially on less developed countries), the GINI coefficient is more of an estimate rather than an exact measure.

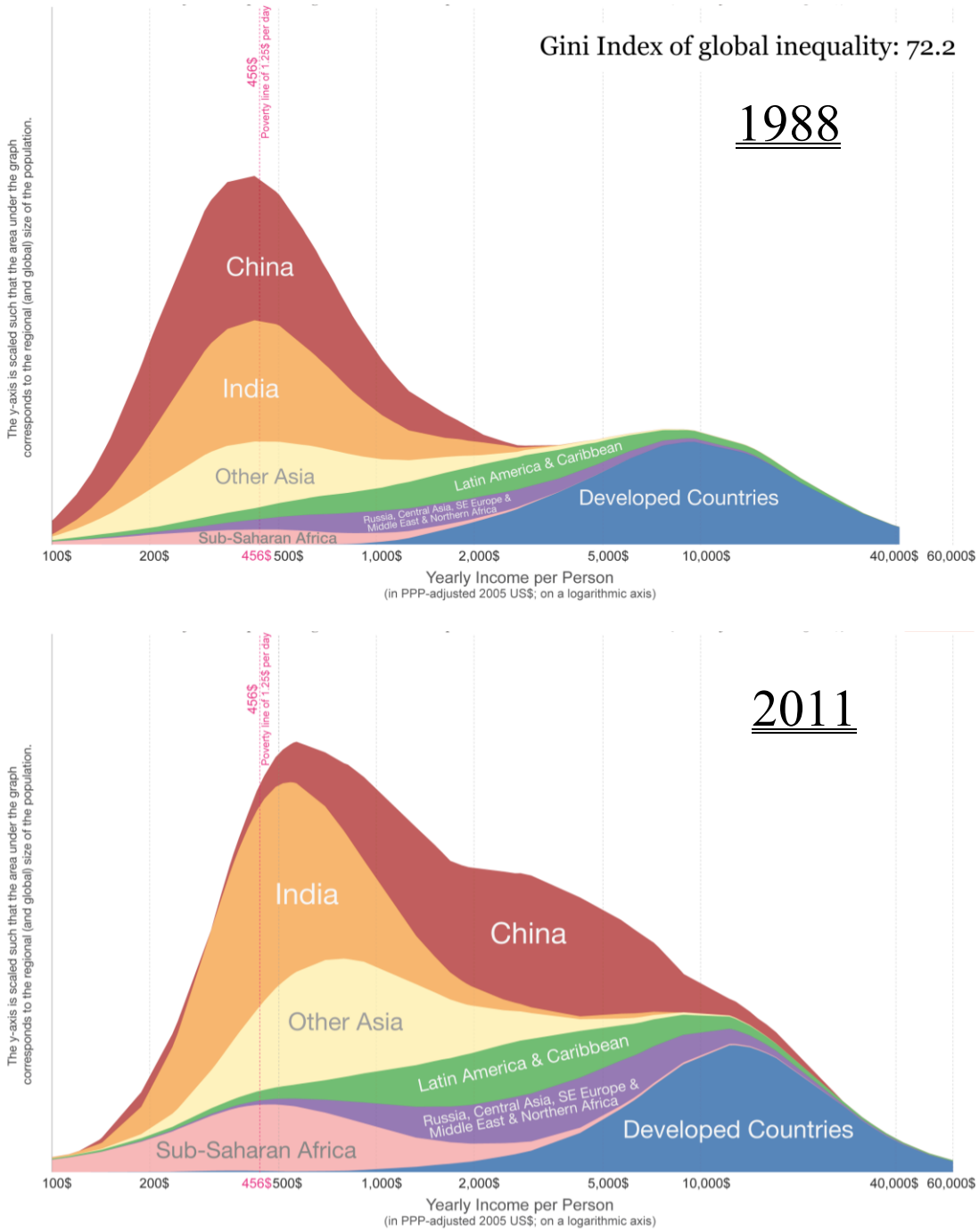
Over the last two centuries, global inequality increased drastically, showing growing disparities in per capita income between countries as advanced economies boomed in comparison to the rest of the world. In the middle of the 20th century, the international (economic) cooperation was renewed leading to a period of growth and development. Particularly in less developed countries (e.g. countries in Asia), per capita GDP growth rates accelerated, which resulted in convergence in the levels of income across countries. (Bourguignon & Scott-Railton, 2015) As a result, over the past three decades, the income inequality in the world first stabilized before beginning to significantly drop. Nevertheless, not all world regions experience income convergence with more developed countries as shown in the following visualization. Figure 1 illustrates the distribution of incomes in the years 1988, the earliest household study, and 2011. The estimates were compiled by the economists (Lakner & Milanovic, 2016) and are based on data on household incomes at each decile of the income distribution. Incomes are adjusted for the prices changes over time, as well as for the price differences between nations. Although the charts are not very detailed, they give us a rough idea about the development of income distribution over the last three decades. Both charts show the income for different world regions. Largely thanks to China, we can see a significant improvement in the world income distribution in 2011. In 1998, the distribution was very unequal – "two-humped" shape of camel. The first hump was below the international poverty line, the second belonged

[1] The Lorenz curve is often used as a graphical representation of the Gini index.

to the part with higher incomes. In comparison, in 2011 the distribution still remains unequal but the gap is considerably smaller. Moreover, the distribution has also shifted to the right—the incomes of many of the world's poorest citizens have increased and extreme poverty has fallen.

Figure 1: Global income distribution in 1988 and 2011

Source: Roser (2013); Data source: Lakner & Milanovic (2016)



2.1.2 Wealth inequality

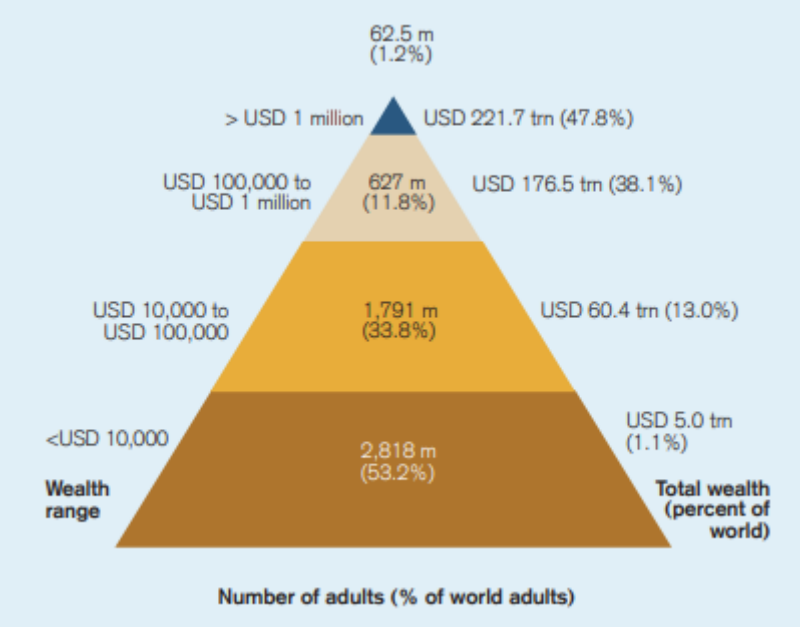
Wealth inequality is the uneven distribution of wealth. In contrast to income inequality, there is not much academic literature or empirical studies on wealth inequality. This is most likely caused by a lack of proper data and its collecting difficulties since measuring wealth is quite complicated.

Large wealth inequality within countries tend to magnify the differences in average levels of wealth across nations. A special attention should be paid to how household wealth is dispersed across the world's adult population. Figure 2 shows the wealth pyramid portraying the distribution of wealth among the adult population of the world presented by Shorrocks et al. (2022). At first glance, there is a large base representing adults with low wealth. As the holder's wealth increases, we move to the higher tiers with visibly smaller number of adults. In 2021, it is estimated that about 53.2 % of the world's adults (2.8 billion people) had wealth of $10,000 or below, which amounts to about 1.1% of world's total wealth. The largest boost in numbers experienced the population within the wealth range of $10,000 to $100,000, more specifically, from $504 million of individuals in 2000 to $1.79 billion in 2021. This is a reflection of the expanding middle class, as well as the rising prosperity of the emerging economies, particularly China. The group's average wealth is $33,724. On the contrary, the middle class in the developed countries is included in the group with wealth ranging from $100,000 to $1,000,000. The size of the top tier is relatively small. It comprises of high-net-worth individuals (or USD multimillionaires) who, in terms of total wealth holding and their global wealth share, appear to be very dominant. The reason behind is that the aggregate wealth of this group has grown significantly this century, from $41.4 trillion in 2000, to $221.7 trillion in 2021, i.e., five-fold. As for the global wealth's share, it has increased from 35 % to 48 %.

Generally, the wealth inequality analysis can be simplified into two straightforward questions: "How far are the top wealth groups ahead of the average citizen?" and "How far below the average do the bottom groups lie?". These questions are frequently discussed in terms of the share of wealth belonging to the top 1 %, the share of the top 10 %, etc. Nevertheless, due to their insensitivity, these statistics do not reflect the changes in the bottom half of the wealth distribution. (Shorrocks et al., 2022) The same analysis as for the income distribution can be applied to the wealth distribution resulting in the wealth Gini index. As a broad measure of inequality, the Gini index is capable of capturing alterations at both extremes of the spectrum.

Figure 2: The global distribution pyramid 2021

Source: Shorrocks et al. (2022)



The wealth Gini coefficients are typically substantially larger than for income. The prime example is Denmark which has the highest reported wealth Gini index in our dataset despite being one of the countries with the lowest income inequality.[2] However, the majority of the studies suggests that there is a strong, albeit not perfect, correlation between wealth and income inequality.

2.2 Globalization

Globalization – what it truly is? Although the definition may vary depending on the source, the fact is that all of us face globalization every day in different ways. We can order a new shipment of products from the other side of the world, contact our friends from another country, buy a new car or work in the international company. Furthermore, everything seems more connected that ever before. Globalization makes the world more available since, with the right technology, long distances are no longer a problem. The ongoing rise in integration brings new possibilities for everyone.

[2] See Chapter 3 for more information.

The significance of globalization lies in its ability to bring different regions and people around the world together. With today's technology, international corporation manufacturers are able to gain a competitive advantage, i.e., they are able to reduce costs by buying, selling and manufacturing goods in different places across the world. The location is chosen where it is the most cost efficient. The World Health Organization (WHO) describes globalization as: "…the increased interconnectedness and interdependence of peoples and countries. It is generally understood to include two inter-related elements: the opening of international borders to increasingly fast flows of goods, services, finance, people and ideas; and the changes in institutions and policies at national and international levels that facilitate or promote such flows. Globalization has the potential for both positive and negative effects on development and health" (*World Health Organisation*, 2020)

To understand globalization better it is necessary to study its history. While the term "globalization" is associated with a modern phenomenon, the history of globalization starts at the beginning of human civilization. Since ancient times, numerous caravans traveled vast distances to purchase luxury commodities (silk, spices etc.) in order to sell them in their home country. These often-frequented trade routes are considered an early form of integrated economics. Likely the most famous example of the trade routes is the Silk Road – a network of trade routes connecting Asia with Persia, the Arabian Peninsula, East Africa, and finally Southern Europe. Later, with the spread of Islam religion, Islamic merchants traveled on so-called Spice routes in all directions from the Arabian Peninsula. The period from the 15th to the 18th century is known as the Age of Discovery. In this period, travelers tried to discover new trade routes from East to West, which led to Columbus discovering America.

Nevertheless, only after the Industrial Revolution in the 19th century when new inventions and means of transportation such as telegraph, railroads and steamships were invented, the true global integration began. Regrettably, the first wave of globalization is also associated with the colonization of Africa by European countries. In a similar negative way, countries like India, China, Mexico or Japan were either not able or not allowed to truly integrate with global trends. (Vanham, 2019)

According to Peterson Institute for International Economics (PIIE), the positive integration trend continued until the World War I when nations decided for more conservative approach and levied import taxes to protect their own industries. However, the damage to countries and their citizens was already done. Globalization stagnated through the Great Depression in the U. S. until after the World War II.

By the end of war, trade had fallen to the historically lowest value in more than a hundred years, i.e., 5 %. (Vanham, 2019)

The end of World War II symbolized a new beginning for the global economy. Together with the technologies form the Second Industrial War (car, plane, etc.), the United States took necessary measures to revitalize the economy and global trade. In 1995, the newly established World Trade Organization (WTO) encouraged all countries to make free-trade agreements. Despite being quite seclusive, even China joined the WTO in 2001 and became the first big world manufacturer. With the Third Industrial Revolution came internet which made communication across the globe much easier. In the 2000s, global exports reached about one quarter of global GDP.

Nowadays, the world faces a challenge of virtual economy and two large powerhouses - the US and China. Since war times and crisis, governments around the world implemented many policies which helped to reduce or remove tariffs and promote the international trade. Considering the trade in the world, the globalization trend has been increasing since 1500 and still prevails.

Due to its complexity, reactions to globalization vary widely. Among the advantages of globalization is the most noticeable the impact on economy. The increased number of trade and economic exchanges has led to strong global economic growth consecutively contributing to the development of the country. Also, outsourcing to developing countries creates new jobs and brings new knowledge and technology through increased manufacturing. This may help with the economic growth of the developing country and bring that country closer to the industrialized nations. Human exchanges such as migration or traveling are benefits of globalization as well since they lead to cultural exchanges. A good example of cultural exchange is trading of coffee. Originally, coffee was produced only for local population in Ethiopia but due its popularity, it is now a globally sought-after commodity. However, the benefits mentioned are not likely to be distributed equally.

Critiques of globalization mention a potential domino effect, i.e., economic problems in one country may affect trade partners in another country. For example, in 2008, the financial crisis in Europe affected European Union’s Portugal, Ireland, Greece and Spain severely. The European Union (EU) was then forced to bail out these debt-ridden countries. Another criticism received mentions the concentration of wealth and power in the hands of corporation elite. There is also a concern about the reallocation of some industries. There were cases when entire industries disappeared abroad. From the cultural aspect, the process of homogenization poses a large problem. Many specific cultures, languages and industries are disappearing

around the world and are replaced by global commercial brands such as Starbucks or Nike. It is also necessary to mention a potential negative effect on the environment due to the development of the means of transport.

In 2000, the International Monetary Fund (IMF) introduced the four aspects of globalization: trade, capital movements, movement of people and spread of knowledge. Globalization is often considered only as an economic or financial phenomenon since trade and financial exchanges are often discussed. However, it concerns much more. Here are some examples of globalization phenomena:

- **Economic globalization:** the development of trade system with intention to promote cross-border movement of goods, services, technology and capital
- **Political globalization:** a growing influence of intergovernmental organizations such as the World Trade Organization (WTO), the United Nations (UN) or World Health Organization (WHO)
- **Sociological globalization:** information and people move all the time which results in mixing and integrating different societies
- **Financial globalization:** an integration of all financial markets around the world into one (e. g. stock market)
- **Social globalization:** an interaction among various cultures across the globe
- **Cultural globalization**: an exchange of ideas, values, arts or customs among different cultures (communities) around the world
- **Technological globalization:** the spread of technologies around the world which enables people to connect with each other - use of digital platforms such as Facebook, Twitter, etc.
- **Geographic globalization:** a new organization of different regions and the idea of borderless world; a possibility to travel around
- **Ecological globalization:** an idea that the Earth should be treated as a single global entity that should by protected by everyone, i.e., an effect of global alliances on ecological issues

The KOF Globalisation Index, developed by the KOF Swiss Economic Institute, addresses the economic, social and political dimensions of globalization. For better understanding, Table 1 presents the aforementioned dimensions of globalization and their measures.

Table 1: Underlying components of globalization

Index	Subindex	Measure
Globalization (overall)		
	Economic globalization	
		Trade globalization
		Financial globalization
	Social globalization	
		Interpersonal globalization
		Informational globalization
		Cultural globalization
	Political globalization	
		Political globalization

According to the Globalization Index, the overall globalization has an upward trend; however, compared to the previous years, the rise since 2012 is very little. Moreover, the OECD countries actually experienced a small fall. Considering the individual countries, the top 10 most globalized countries, astonishingly, all of them are in Europe. The most globalized country in the world in 2022 was Switzerland that switched ranks with Netherlands compared to the year before. The top 3 most globalized countries are Switzerland, Netherlands and Belgium. On the contrary, the top 10 least globalized countries are located in Africa, Southeast Asia Middle East. Among the top 3 least globalized countries are Eritrea, Somalia and Afghanistan.

2.2.1 Economic globalization

"The widespread of international movement of groups, capital, services, technology, and information that increase the interdependence of world economies." (Liu et al., 2019) Economic globalization promotes the trade among international agents through an increase in cross-border movement of goods, services, technologies, investment, revenue flows in relation to GDP and capital transaction restrictions. (Gygli et al., 2019) The KOF index for economic globalization utilizes variables such as trade in goods, trade in services, trade partner diversity, trade regulations or trade taxes. Thus, the index can be divided into two measures: trade and financial globalization. Economic globalization had experienced a large upward trend until the financial crisis in 2008. Since then, economic globalization has continued to rise again, although not as much as before the crisis. Also, there was another small decline in economic globalization due the fall in international trade and flows. (Gygli et al., 2019) As of now, the three most politically globalized countries are Singapore, Netherlands and Belgium (in descending order). In contrast, the worst three are Nepal, Islamic Republic of Iran and Ethiopia (in ascending order).

2.2.2 Political globalization

Political globalization refers to the new political system which includes both governmental and intergovernmental organizations as well as the organizations formed by the global society (e. g. social movement organizations). In this system, the intergovernmental organizations such as the World Trade Organization (WTO), the United Nations (UN) or World Health Organization (WHO) are new agents on the political scene. They grow influence in order to take actions at international level. Compared to economic globalization during the 2008 financial crisis, political globalization has been steadily increasing without any large disturbances. There was a sudden rise in 2012 largely due to a number of countries becoming members of the international organizations. As of now, the 3 most politically globalized countries are Italy, France and Germany (in descending order). In contrast, the worst three are Greenland, Virgin Island and French Polynesia (in ascending order).

Leading organizations of globalization

After the World War II, it was necessary to establish new global economic system. This system would be based on mutually accepted rules, cooperation among the countries to advocate for peace and prosperity and create better world for future generations. In order to prevent future disputes, free trade and the rule of law became the system's two pillars. For the purpose of overseeing the countries, new intergovernmental organizations were created.

- **International Monetary Fund (IMF)**

The International Monetary Fund was established in 1944 as an international organization comprising of 190 member countries. Key idea behind is to prevent any potential conflict among members and help countries to obtain financial stability.

- **United Nations (UN)**

The United Nations was established in 1945 and has currently 193 member states. It seeks to prevent conflicts with global security norms and assistance for humanitarian crises. It is the only organization where leaders of countries can gather, discuss their nation's problems and find solutions to them together.

- **World Trade Organization (WTO)**

The World Trade Organization, established originally as the General Agreement on Tariffs and Trade (GATT) in 1948, is an intergovernmental organization that regulates international trade among nations. It sets the rules of international trade and arbitrates trade disputes. The WTO has currently 164 member states. All member states follow the WTO rules however, they can negotiate trade agreements among each other.

- **North Atlantic Treaty Organization (NATO)**

The North Atlantic Treaty Organization is an intergovernmental political and military alliance. It has a system of collective defense in which an independent member state can decide to cooperate with NATO in response to an attack from any external party. The NATO was established in 1949 and currently has 30 member states from Europe and North America.

- **World Bank (WB)**

The World Bank is an international financial institution established in order to help to reconstruct postwar Europe. Currently, the institute provides loans and financial advice. The WB was established in 1945, along with the IMF, and today has 189 member states.

2.2.3 Social globalization

Social globalization refers to the interaction among various cultures in order to share new ideas and information among each other. Nowadays, the access to internet and many social media platforms makes the integration even easier. The KOF Globalisation Index differs three categories in order to measure social globalization. First, the Index determines cross-border personal contacts such as phone calls, letters, tourist visits etc. Second, the Index evaluates cross-border information flows considering the access to the TV, internet or foreign press. Lastly, the Index estimates the level of cultural affinity to the global mainstream through the means of the number of McDonald's ad Ikea's branches, book imports and exports in relation to GDP. (Gygli et al., 2019) These categories are called interpersonal, informational and cultural globalization, respectively. Social globalization exhibits a similar upward trend. Nevertheless, social globalization has maintained almost the same level since 2012. As of now, the 3 most politically globalized countries are Luxembourg, Hong Kong and Monaco (in descending order). In contrast, the worst three are Chad, Burundi and Democratic Republic of Congo (in ascending order).

3 Data

For the purpose of the thesis, we construct a comprehensive dataset of 89 countries and 39 explanatory variables to examine the determinants of the wealth distribution. The BMA methodology allows for a large number of included variables, this allows us to capture a variety of different aspects of the examined countries - specifically, the several measurements of economic, financial, political, institutional, geographical (natural), demographic, and other factors. The variables selected are based on the various theoretical models and the existing empirical papers studying wealth inequality.

As our dependent variable we choose wealth inequality represented by the Gini index which is based on the wealth distribution obtained from the Credit Suisse Global Wealth Reports. The Gini index is expressed as a percentage, in which 0 % stands for perfect equality, whereas 100 % is the most severe inequality. The data are obtained on yearly basis over the entire period 2010-2016. However, only the average of each country is used. Table 2 illustrates the descriptive statistics of our dependent variable. The mean value of wealth Gini index across the dataset is 72.02 % with the standard deviation of 5.96 %. Note that the mean and median are approximately close. Examining the data, the country with the lowest average wealth Gini of 53.9 % appears to be the Slovakia. On the other, the highest wealth Gini of 91.50 % belongs to the Denmark. This finding seems very surprising considering the fact that Denmark is one of the countries with the lowest income inequality. Nevertheless, the large difference between income and wealth inequality in Denmark proves that wealth inequality is much more severe and is harder to deal with than income inequality.

Table 2: Descriptive statistics of the dependent variable wealth Gini index

Min	Max	Mean	Median	Std. dev.
53.90	91.50	72.02	71.20	5.96

Along with the wealth data the dataset includes a large number of variables that are expected to have an effect on inequality. As already mentioned, each explanatory variable is able to capture different aspect of the countries in our data. Due to a small number of existing studies, the variable selection relies to a certain extent on literature on the determinants of income inequality while considering potential connections between income and wealth inequality. (Roine & Waldenström, 2015) We take averages of the data over their availability period, which is mostly from 1980 to 2009. Further information about the selected variables and their complete list can be found in Table A1 in the Appendix.

The thesis places special emphasis on globalization and how it affects the wealth distribution within economy. The KOF Globalization Index contains information on more than 40 indicators of globalization. The index differentiates among three subindexes of globalization - economic, political and social. These dimensions are further divided into six measures whose data are included in our dataset. The measures are as follows: financial globalization, trade globalization, interpersonal globalization, informational globalization, cultural globalization, and political globalization.

As with other variables, we employ the same procedure, i.e., we average all data before the year 2009. However, data are available since 1970. Table 3 reports the descriptive statistics for the aforementioned six measures of globalization and wealth inequality, whereas Table 4 presents a correlation matrix for wealth inequality and the globalization measures.

Table 3: Descriptive statistics of the globalization measures

	Min	Max	Mean	Median	Std.
Trade globalization	18.72	85.75	49.02	46.90	17.06
Financial globalization	17.83	88.42	50.65	50.84	15.46
Interpersonal globalization	12.79	84.25	47.90	47.86	18.70
Informational globalization	12.30	78.15	47.68	45.85	18.66
Cultural globalization	9.56	88.17	49.54	50.37	22.95
Political globalization	27.04	94.53	60.74	60.34	17.40

Table 4: Correlation matrix of wealth inequality and globalization

	A	B	C	D	E	F	G
A: Wealth inequality		-0.06	0.10	-0.00	-0.00	0.05	0.09
B: Trade globalization	-0.08		**0.76**	**0.84**	**0.81**	**0.81**	**0.48**
C: Financial globalization	0.12	**0.74**		**0.77**	**0.79**	**0.80**	**0.58**
D: Interpersonal	-0.01	**0.85**	**0.77**		**0.92**	**0.91**	**0.54**
E: Informational	-0.01	**0.82**	**0.79**	**0.92**		**0.96**	**0.64**
F: Cultural globalization	0.03	**0.83**	**0.80**	**0.92**	**0.96**		**0.64**
G: Political globalization	0.07	**0.48**	**0.59**	**0.55**	**0.62**	**0.62**	

Number of observations: 89. Correlations with significance levels below 5% appear in bold print.

Correlation indicates the strength and the direction of the relationship between two variables. The results suggest that all globalization measures have a positive relationship with each other. A positive correlation signifies that the two variables are varying in the same direction. According to the expectations, the correlations between globalization measures are relatively close to unity, with the exception of the correlation between political and trade globalization, which suggests that different variables portray different information.

The strongest link is between interpersonal and informational or cultural globalization. On the other hand, the weakest statistically significant relationship appears to be between political and trade globalization. Although the coefficients for wealth inequality are slightly different from zero, the results are not statistically significant, i.e., the correlation coefficients are in fact not significantly different from zero in the population. Considering only the sample, wealth inequality appears to be slightly correlated with globalization measures, positively with financial, cultural and political globalization, and negatively with trade, interpersonal and informational globalization.

General economic variables include net national savings, gross domestic product growth, gross fixed capital formation, industry value added, agriculture value added, inflation, labor force participation and government consumption. The majority of inequality literature studies the relationship between income inequality and economic growth. If such relationship is thought to exist, or is worthy of examination, then there is a reason to believe that a link between wealth inequality and growth exists.

Additionally, we examine financial development indicators and how they affect the wealth distribution within the economy. The International Monetary Fund (IMF) database collects information on the access, efficiency, and depth of the countries' financial institutions and financial markets. We consider six indices for our dataset. Specifically, the Financial Institutions Depth index, the Financial Institutions Access index, the Financial Institutions Efficiency index, the Financial Markets Depth index, the Financial Markets Access index, and the Financial Markets Efficiency index. According to Hasan et al. (2020), the financial development indicators play a crucial role when it comes to wealth inequality. The authors claim that large financial markets tend to raise wealth inequality, whereas more efficient financial intermediaries and better access to finance tend to reduce it. Furthermore, the authors imply that the financial development's overall effect on wealth inequality is negative indicating the connection between countries that ate more financially developed and smaller wealth inequality.

Demographic characteristics of the countries used in our analysis are age dependency ratio, human capital index and completed tertiary education. Education is likely one of the key factors causing income inequality. "Increasing educational attainment will not significantly change overall earnings inequality. Increasing educational attainment will, however, reduce inequality in the bottom half of the earnings distribution." (Hershbein et al., 2015) Moreover, Yang & Qiu (2016) argue that a large gab in early education contributes to greater income inequality. Although the study emphasizes the importance of education, it also mentions that the process behind the formation of income inequality is too complicated. One way that education could impact income inequality is through other factors, such as health, the number of children, marriage match, etc. Next, the human capital index is based on the years of schooling and the returns to education.

Among political and institutional variables, we have rule of law, control of corruption, political stability, civil liberties, political rights, education expenditure, education index, dummy for OECD countries, military expenditure and war years. All variables represent, to a certain extent, political conditions in the observed countries. The variable war years represents a number of years each country suffered from war over the period 1946-2009. Contrary to the conventional belief, Heldring et al. (2022) claims that bombing during the World War II significantly decreased wealth inequality in the north of Britain. The indirect effect of bombing is reflected in the changes of the social contract, and thus policies. On the other hand, the direct effect is the infrastructure destruction, which affects economic growth in a negative way. Since we obtained data from 1946, i.e., after World War II, the variable is based

mostly on smaller internal conflicts or conflicts that involve a small number of countries. “These conflicts have adverse macroeconomic effects, undermine the rule of law, cause violent confiscation of private property by militias and reduce trust in society, especially if these conflicts occur repeatedly.” (Bircan et al., 2017) According to Bircan et al. (2017), civil wars tend to temporarily increase income inequality. However, income inequality eventually drops back to the steady-state. Intuitively, military expenditure is closely linked to war since not many countries would spend excessively on their military in times of peace. The index of education is based on the numbers of expected and average years of schooling.

Explanatory variables representing geographical and natural factors are population growth, total natural resources and dummy variable for Latin American countries. The population growth reflects demographic aging, which may, to some extent, influence pensions. There also regulatory variables such as cost of business start-up procedures, government transfers and subsidies, business regulations and regulations. These variables are components of the Economic freedom summary index. All aforementioned explanatory variables are believed to be the determinants of our dependent variable wealth Gini index.

3.1 Data sources

Due to the large number and variety of estimated variables, there are several data sources for our analysis. First, to examine wealth inequality we use the wealth Gini coefficient from the Credit Suisse Wealth Databook (CSWD), which was constructed following the Davies et al. (2017) approach. There is also the World Inequality Database (WID). The WID provides one of the most extensive sets of income inequality statistics in developed, developing countries and transition countries. From the original focus on income share series, the database gradually expanded into aggregate wealth series as well. Nevertheless, due to a lack of data on many countries, the WID series is found to be imperfect. The only dataset with adequate country coverage is the CSWD, and therefore it is a better choice for us. In our thesis, we utilize the wealth data from the CSWD annual databooks covering 172 countries over the period 2010-2016.

Second, the main source on globalization data is the KOF Database. The KOF has compiled extensive databases of economic statistics covering Swiss and international data since its establishment in 1938. "The KOF Globalisation Index

measures the economic, social and political dimensions of globalization. Globalization in the economic, social and political fields has been on the rise since the 1970s, receiving a particular boost after the end of the Cold War." (Gygli et al., 2019) The original index was proposed in 2002 by Dreher (2006b) and later updated in Dreher et al. (2008). The KOF Globalisation Index is computed annually for the majority of countries in the world since 1970. According to Potrafke (2015), it is the most frequently used globalization index in the academic literature.

Next, data on many explanatory variables were obtained from the World Bank (WB), more specifically its research datasets - the Worldwide Governance Indicators (WGI) and the World Development Indicators (WDI). The WGI provides information on aggregate and individual governance indicators over the period 1996-2018 for six aspects of governance for more than 215 territories and countries. On the other hand, the WDI is the primary WB database of development indicators, and it is compiled from internationally recognized official sources. It comprises of global, national, and regional estimates and provides the most recent and reliable data on world development. The first WDI's data dates back to 1960.

Due to the complex nature of financial development, the Financial Development Index was created for the IMF discussion not in 2015, which we also choose for our study. The index "summarizes how developed financial institutions and financial markets are in terms of their depth (size and liquidity), access (ability of individuals and companies to access financial services), and efficiency (ability of institutions to provide financial services at low cost and with sustainable revenues and the level of activity of capital markets)." (Financial Development Index Database, 2022) The index database includes information on over 180 countries collected annually from 1980 onwards.

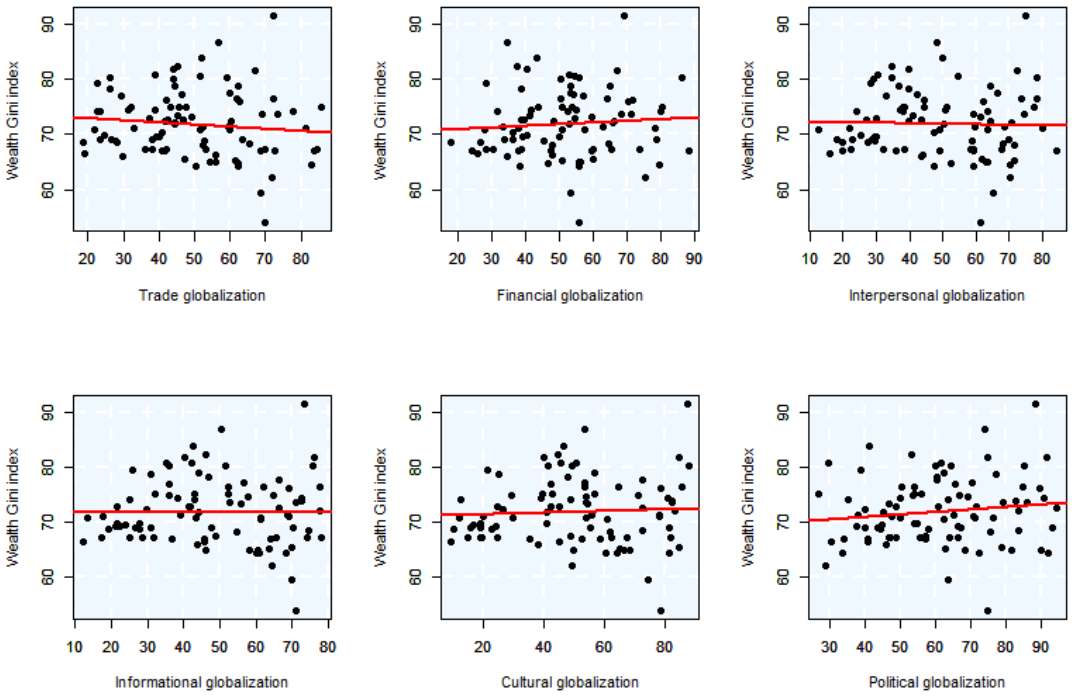
The rest of our data was obtained from the following sources: the Standardized World Income Inequality Database (SWIID), the Barro-Lee Educational Attainment Dataset, the Fraser Institute, Powell & Thyne (2011), the Penn World Table (PWT), and Freedom House,

3.2 Correlations

In this subsection, we present a few scatter plots to provide a visual insight into the relationship between wealth inequality and the measures of globalization, as well as the rule of law. Figure 3 illustrates six scatter plots of wealth inequality and globalization indexes that reveal weak, yet expected association patterns. We observe financial and political globalization to be positively correlated with wealth inequality. Cultural globalization appears to be positively correlated with inequality as well, however, the link is slightly weaker. Trade globalization exhibits negative relationship with inequality, i.e., trade globalization is lower in countries with higher wealth inequality. On the other hand, interpersonal and informational globalization appear to be either very slightly correlated with inequality, or not correlated at all. In conclusion, the scatter plots indicate that there exists some relationship between globalization measures and wealth inequality. Nevertheless, the to the complexity of this connection, some aspects of globalization may lead to higher inequality, while other aspects cause the opposite.

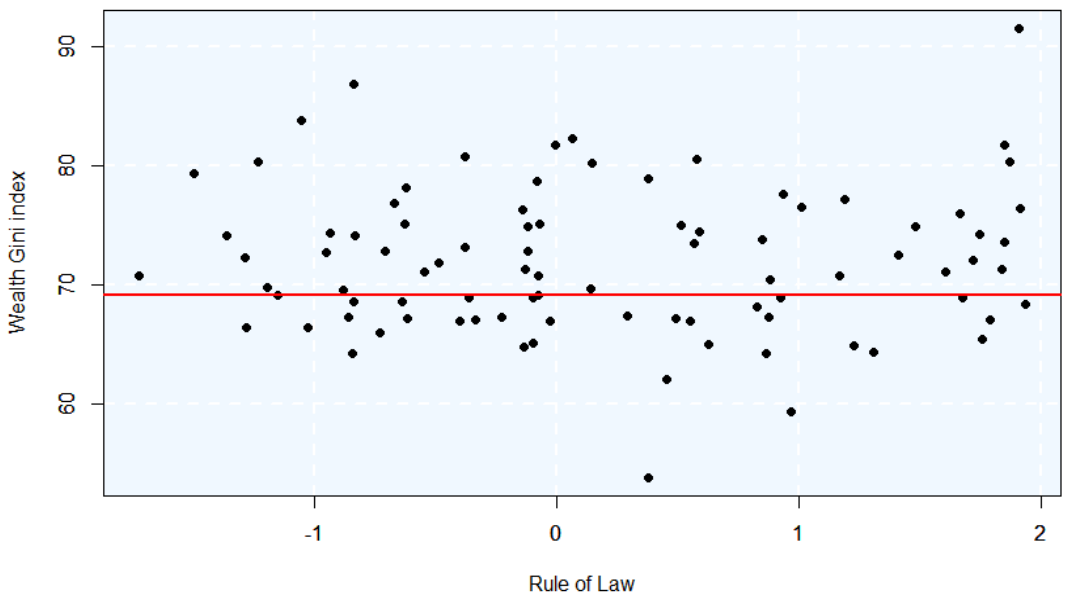
We also observe the behavior of the rule of law estimate. There is a number studies emphasizing the role of the rule of law in reducing income inequality. (Bhagat, 2020; Sonora, 2019) Considering the strong correlation between income and wealth distribution, we observe the rule of law mostly due to its novelty. Figure 4 shows the scatter plot representing the relationship between wealth inequality and rule of law. Contrary to the expectations, both variables seem to be uncorrelated.

Figure 3: Wealth inequality and Globalization



Note: the measures of globalization from the KOF Globalisation Index and wealth Gini index representing wealth inequality from Credit Suisse Wealth Report

Figure 4: Wealth inequality and Rule of Law



Note: Rule of Law from World Bank and wealth Gini index representing wealth inequality from Credit Suisse Wealth Report

4 Methodology

In this section we focus on the methodology used for estimations. We provide the motivation behind choosing the Bayesian Model Averaging and provide its introduction. To understand BMA, it is necessary to start with a classical linear model structure

$$y = \alpha + X\beta + \varepsilon \qquad ,\varepsilon \sim N(0, \sigma^2 I) \qquad (1)$$

where y is a response variable, α a constant, X a matrix of explanatory variables, β the corresponding coefficients, and ε a normal independent identically distributed (i.i.d.) error term with variance σ^2. In this framework, it is often the case that there are many potential explanatory variables in a matrix X. However, this is a cause for concern because the form of "true" model is unknown thus, it remains uncertain which variables should be included and how important they are for the model. In this classical linear model, this uncertainty about selection of variables is solved by including all the explanatory variables into the model. Nevertheless, this direct approach is inefficient since it produces imprecise results due to a larger number of regressors increasing standard errors leading to a less accurate estimation. This problem is usually addressed by removing the least significant variables one by one based on the results of various statistical tests and creating the best model. However, this approach does not guarantee the correct choice of explanatory variables.

The problem of model uncertainty is addressed by Bayesian model averaging (BMA) method. BMA solves the problem by "estimating the models for all possible combinations of X and constructing a weighted average over all of them". (Feldkircher & Zeugner, 2022) Hence, let us consider a more detailed model in the following structure:

$$y = \alpha_j + X_j\beta_j + \varepsilon \qquad ,\varepsilon \sim N(0, \sigma^2 I) \qquad (2)$$

Where y is a response variable, α_j a constant, X_j is a subset of X, β_j are the corresponding coefficients, and ε represents and error term which is normally i.i.d. with a variance of σ^2. Further, we assume a total number of possible explanatory variables K. Hence, there are 2^K of different combinations of X resulting in a total of 2^K potential models and $j = 1,2, \dots, 2^K$.

4.1 Bayesian approach

Compared to the standard econometric methods when the researcher must make arbitrary assumptions concerning model construction, Bayesian approach offers a rigorous framework. The centerpiece of the Bayesian methodology is the Bayes' rule, this rule combines "prior beliefs with objective probabilities based on repeatable experiments." (Ramírez-Hassan, 2022) Suppose A and B are random variables, after applying the rules of probability, the Bayes theorem can be derived from conditional probability:

$$p(A|B) = \frac{p(A \cap B)}{p(B)}, \text{if } p(B) \neq 0, \tag{3}$$

$$p(B|A) = \frac{p(A \cap B)}{p(A)}, \text{if } p(A) \neq 0, \tag{4}$$

Solving Equation 3 for $p(A \cap B)$ and substituting it in Equation 4, we get the Bayes' theorem in Equation 5

$$p(B|A) = \frac{p(A|B)p(B)}{p(A)} \quad , \text{if } p(A) \neq 0, \tag{5}$$

Since the focus is on observed data, we need to make few alternations to the previous equation. This adjustment gives us the posterior density

$$p(\beta|y, X) = \frac{p(y, X|\beta)p(B)}{p(y, X)} \tag{6}$$

where $p(y, X|\beta)$ is the Marginal Likelihood (ML), $p(\beta)$ the prior density, and $p(y, X)$ the probability of the data. As previously stated, BMA is used for comparison of a large number of different models. Assuming K as the number of possible explanatory variables, there are 2^K variable combinations, i.e., potential models. If $j = 1,2, \dots, 2^K$, then each model can be denoted by M_j. In a situation when many models are under consideration, it is important to be clear about which model is considered. Taking into account all the prior knowledge, we get posterior probability

$$p(\beta_j|M_j, y, X) = \frac{p(y|\beta_j, M_j, X)p(\beta_j|M_j)}{p(y|M_j, X)} \tag{7}$$

4.2 Posterior model probability

According to Feldkircher & Zeugner (2022), BMA constructs a weighted average over all possible models. The model weights for averaging of model coefficients across all models come from Posterior Model Probabilities (PMP) $p(M_j|y,X)$ that originate from Bayes' theorem

$$p(M_j|y,X) = \frac{p(y|M_j,X)p(M_j)}{p(y|X)} = \frac{p(y|M_j,X)p(M_j)}{\sum_{s=1}^{2^K} p(y|M_s,X)p(M_s)} \quad (8)$$

Here, $p(y|M_j,X)$ is the probability of the data given the model M_j, $p(M_j)$ the prior model probability, and $p(y|X)$ is the integrated likelihood. Since integrated likelihood is constant across all models, it can be expressed as a simple multiplicative term. Therefore, the PMP is proportional[3] to the marginal likelihood of the model times a prior model probability, then Equation 8 can be rewritten as follows

$$p(M_j|y,X) \propto p(y|M_j,X)p(M_j) \quad (9)$$

In other words, how probable is the model M_j before examining the data. Before looking at the data, the researcher also has to obtain model prior which should reflect prior beliefs. The prior model probability $p(M_j)$ considers model M_j as the "true" model (given true model exists). A popular practice is to set a uniform prior probability for each model $p(M_j \propto 1)$ to reflect the lack of prior knowledge about the "true" model. Further information about the model priors will be provided in Subsection 4.7.

4.3 Posterior mean

Bayesian framework also enables for the point estimates of the model parameters. (Feldkircher & Zeugner, 2022) mention the model weighted posterior distribution for the coefficients β

[3] Proportionality is represented by the sign $\propto$.

$$p(\beta|y,X) = \sum_{j=1}^{2^K} p(\beta_j|M_j,y,X)p(M_j|y,X) \tag{10}$$

Here, $p(M_j|y,X)$ denotes the PMP of the corresponding model M_j from Equation 8. To obtain point estimates, the expectation of the Equation 10 must be taken. Given g, the estimated posterior means, i.e., the expected values of parameter in M_j, are then constructed as

$$E(\beta_j|y,X,g,M_j) = \frac{q}{1+g}\hat{\beta}_j \tag{11}$$

Where $\hat{\beta}_j$ is the standard OLS estimator for model j. It can be seen that the posterior mean is highly dependent on the prior g.

4.4 Posterior Variance

Similarly, the choice of prior g affects the posterior variance of the parameters

$$Cov(\beta_j|y,X,g,M_j) = \frac{(y-\bar{y})'(y-\bar{y})}{N-3}\frac{g}{1+g}(1-\frac{g}{1+g}R_j^2)(X_j{}'X_j)^{-1} \tag{12}$$

Here, $\bar{y}$ is the mean of vector y, N is the sample size, and R_j^2 is the R-squared of model M_j. Moreover, (Moral-Benito, 2009) calculated the posterior variance as

$$\begin{aligned} V(\beta|y,X) = &\sum_{j=1}^{2^K} p(M_j|y,X)Var(\beta_j|M_j,y,X) + \\ &+ \sum_{j=1}^{2^K} p(M_j|y,X)\left[E(\beta_j|M_j,y,X) - E(\beta|y,X)\right]^2 \end{aligned} \tag{13}$$

Where $E(\beta|y,X)$ is the posterior mean from Equation 11, $Var(\beta_j|M_j,y,X)$ is a weighted average of the variance estimates in particular models, and $\sum_{j=1}^{2^K} p(M_j|y,X)\left[E(\beta_j|M_j,y,X) - E(\beta|y,X)\right]^2$ is the weighted variance in the estimates of the β 's across different models. Nevertheless, the inclusion of both the weighted average of the estimated variances and the weighted variance in estimates leads to the possibility of a significant parameter uncertainty if those

estimates are different across specifications. “In words, the logic of Bayesian inference implies that one should obtain results for every model under consideration and average them using appropriate weights.” (Moral-Benito, 2009)

4.5 Marginal Likelihood

From the prior mentioned BMA framework, a simple marginal likelihood can be deduced as

$$p(y|M_j, X, g) \propto (y-\bar{y})'(y-\bar{y})^{-\frac{(N-1)}{2}}(1+g)^{-\frac{k_j}{2}}\left(1-\frac{g}{1+g}R_j^2\right)^{-\frac{(N-1)}{2}} \quad (14)$$

Where $\bar{y}$ is the mean of vector *y*, *N* the sample size, R_j^2 the R-squared of model M_j, and k_j is a size penalty factor adjusting for model size. In this case, the choice of the form of the parameter g is also very important. In general, marginal likelihood can be also calculated using the posterior probability in Equation 7. It can be done by integrating both sides of the equation with respect to β_j and employing $\int_\beta p\left(\beta_j \middle| M_j, y, X\right) d\beta_j = 1$, leading to

$$p(y|M_j, X) = \int_\beta p(y|\beta_j, M_j, X)p(\beta_j|M_j, X)d\beta_j \quad (15)$$

In this case, the result largely depends on the choice of priors as well.

4.6 Posterior inclusion probability

Another part of standard Bayesian framework is Posterior Inclusion Probability (PIP). The significance of PIP lies in its ability to reflect the importance of a regressor in explaining the data. This ability can be also interpreted as the probability of a particular variable being included in the “true” model. Feldkircher & Zeugner (2022) reports PIP as “the sum of PMPs for all models wherein a covariate was included”. Assuming *k* as the variable in question, PIP can be denoted as follows

$$PIP = p(\beta_k \neq 0 | y, X) = \sum_{j=1}^{2^K} p(M_j | \beta_k \neq 0, y, X) \quad (16)$$

4.7 Priors

In the process of deriving standard Bayesian framework, we discovered that PMP, maximum likelihood, posterior variance, and mean depend significantly on priors[4]. Therefore, the following section presents prior framework in detail, as well as the reasoning behind the choices for our parameter and model priors.

In the BMA methodology, we need to first determine two types of priors. The first prior is the prior g on the parameter space. The second is the prior $p(M_j)$ on the model space. Both priors are essential in determining the posterior probabilities as stated in studies such as (Ciccone & Jarociński, 2010; Feldkircher & Zeugner, 2009; Liang et al., 2008).

4.7.1 Parameter priors

We use a specific prior structure called "Zellner's g prior", which is considered as a common approach in the literature. Under the assumption of each individual model M_j with a normal error structure as in Equation 2, the Zellner's prior structure places non-informative priors on the constant α_j and error variance σ

$$p(\alpha_j) \propto 1$$

$$p(\sigma) \propto \sigma^{-1}$$

Which implies that they are evenly distributed. The most significant prior is the one on the coefficients β_j. Prior examining the data, it is necessary to first formulate our beliefs. We assume that the coefficients β_j are normally distributed with a mean and variance. A conservative approach is to assume mean of zero which

[4] For more information on how the choice of g affects posterior variance and the posterior distribution of coefficients, read (Feldkircher & Zeugner, 2022).

reflects the lack of prior knowledge about the coefficients. In addition, Zellner's g defines the coefficients' variance structure as $\sigma^2 \left(g\left(X_j{}'X_j\right)^{-1}\right)$.

Altogether, we get the coefficient distribution, which is dependent on the prior g

$$\beta_j|g \sim N\left(0, \sigma^2 \left(g\left(X_j{}'X_j\right)^{-1}\right)\right) \tag{17}$$

Here, the approximated posterior variance $\left(X_j{}'X_j\right)^{-1}$ is proportional to the prior variance. The parameter g demonstrates how much weight is attributed to the prior variance compared to the posterior variance from the data. In other words, the researcher believes the coefficients to be zero and their variance-covariance structure to be generally consistent with that of the data. The parameter g shows the researcher's level of certainty of the coefficients β_j being truly zero. A small g leads to low variance, and thus signifies that the researcher is very certain (conservative) about the coefficients being zero. On the contrary, a large g indicates that the researcher is highly uncertain. (Feldkircher & Zeugner, 2022) It is important to note that as $g \to \infty$, the coefficient estimator of β_j approaches the OLS estimator β_j^{OLS}.

The three most popular choices for the parameter g include

- Unit Information Prior (UIP)[5]
$$g = N$$
- Benchmark prior (BRIC)[6]
$$g = max\{N, K^2\}$$
- Hyper-g prior (hyper-g)[7]
$$\frac{g}{1+g} \sim Beta(1, \frac{a}{2} - 1), \text{ where } a \in (2,4]^{8}$$

[5] See (Fernández et al., 2001)

[6] See (Fernández et al., 2001)

[7] See (Feldkircher & Zeugner, 2022; Liang et al., 2008)

[8] Beta distribution with mean $\frac{a}{2}$

Where *K* is the total number of dependent variables, and *N* is the total number of observations.

The UIP and BRIC priors are known as "fixed-g" priors which means that the parameter prior is set for all considered models. On the other hand, hyper-g prior allows for updating the prior with regards to an individual model. This feature limits unforeseen consequences of prior choice on posterior results. Note that setting $a = 4$ is equivalent to the UIP, whereas setting $a = 2$ concentrates prior mass to unity, corresponding to $g \to \infty$. For more information on hyper-g prior see (Liang et al., 2008).

4.7.2 Model priors

The second type of prior, prior $p(M_j)$, is set on the model space. The study by Moral-Benito (2009) reports the binomial distribution to be the most widely used setting in the Bayesian literature. The prior probability on model M_j is then

$$p(M_j) = \theta^{k_j}(1-\theta)^{K-k_j} \tag{18}$$

Where K is the total number of regressors, k_j the subset of explanatory variables chosen, and θ is the probability of a specific regressor being part of the model. By assigning $\theta = \frac{1}{2}$, we get probably the most popular setting known as uniform model prior. This setting assigns equal probability $p(M_j) = 2^{-K}$ to all considered models.

Besides the uniform model prior, the BMA literature also states alternative model priors. One of them is the so-called beta-binomial model prior introduced by Ley & Steel (2009). This prior deals with θ as random rather than fixed. Moreover, George (2010) describes the collinearity-adjusted dilution model prior. We use alternative model priors for the purpose of sensitivity checks of the results.

4.8 MCMC sampler

Although the BMA appears to be a promising method to deal with uncertainty concerning the "true" model, it faces computational difficulties when the number of predictors K is larger. The larger the number, the more time-consuming

is to enumerate all potential variable combinations (models) in the process of obtaining the posterior results. “In such a case, MCMC samplers gather results on the most important part of the posterior model distribution and thus approximate it as closely as possible.” (Feldkircher & Zeugner, 2022) The BMA mostly uses the Metropolis-Hastings algorithm that is more closely described in Feldkircher & Zeugner (2022) in a following way:

At any step j, the sampler lies at a random (current) model M_j with PMP $p(M_j|y,X)$. At step $j+1$, the sampler proposes to replace the model M_j with model M_m. The probability that the sampler agrees to accept the new model M_m is

$$p_{j,m} = min\left(1, \frac{p(M_m|y,X)}{p(M_j|y,X)}\right) \tag{19}$$

In a case that the model M_m is accepted, the sampler then considers this model as the new current model. Contrary, if the model M_m is rejected, the sampler continues with the next model M_n and compares it with M_j. As the number of iterations grows, the number of times each model is kept converges to the distribution of posterior model probabilities $p(M_j|y,X)$.

Generally, there two MCMC samplers used to estimate models

- Birth-death sampler (bd): A commonly used model sampler in most BMA. A randomly chosen explanatory variable from K is either included in the current model M_j, or excluded because it is already present in M_m.

- Reversible-jump sampler (rev.jump): The sampler either behaves as birth-death sampler (with 50 % probability), or it randomly excludes one of the regressors from M_j, and randomly swaps it with one regressor that was previously excluded from model M_j (with 50 % probability).

It is not unusual for the sampler to start from a model that might not be considered particularly good because the number of draws the sampler does plays a crucial role as well. This “poor” model has usually low PMPs thus, the initial iterations (so called burn-ins) are to be excluded from the results. The quality of the MCMC approximation is then based on the correlation between analytical PMP and the MCMC sampling’s PMP. Feldkircher & Zeugner (2022) claim that a correlation around 0.9 implies a “good degree of convergence”. If the measured correlation between PMPs is smaller, an increase in the number of iterations is suggested.

5 Results

In this section, we report the empirical results of the analysis. We present the BMA results of our baseline estimation to identify the determinants of wealth inequality. The baseline model employs the UIP g prior along with the uniform model prior. Next, we present robustness checks using alternative model and parameter priors, as well as different MCMC samplers. In particular, we use hyper-g prior with "reversible-jump" MCMC sampler. Including the baseline model, we estimate a total of four BMA models, from which we decide the best performing one. Finally, we address some issues linked to our analysis.

To conduct our analysis, we employ the statistical software R, which includes the "bms" package developed by Feldkircher & Zeugner (2022). The "bms" stands for Bayesian Model Sampling. The package uses standard Bayesian linear model as a base and "Zellner's g prior" as a prior structure choice. Considering $K = 39$ explanatory variables, BMA examines $2^{39} = 549{,}755{,}813{,}888$ possible model combinations using Markov Chain Monte Carlo (MCMC) for approximation.

5.1 Baseline results

In order to address model uncertainty caused by a large number of explanatory variables, we use Bayesian Model Averaging (BMA) methodology. First, it is crucial to choose our parameter and model priors. In the thesis, we employ the UIP g prior (in our case $g = 89$ observations) combined with the uniform model prior to estimate the baseline scenario model. The unit information prior (UIP) has a mean at the Maximum Likelihood Estimation (MLE) and the precision equal to the amount of information contained in a single observation, while the uniform model prior assigns the same prior probability to each model. This indicates that $K/2 = 19.5$ is the expected size of the model space prior. We use "bms" package in R by Feldkircher & Zeugner (2022) for our analysis. As the most popular type of the MCMC sampler, we use the MC^3 birth-death sampler (mcmc=bd). Also, we set the number of consecutive iterations to be retained as iter=15,000,000; and the number of burn-ins (models omitted) as burn-ins=3,000,000.

We start with the basic model diagnostics of the baseline BMA estimation presented in Table 5. In addition to the previously specified arguments for the types of priors, the number of observations ("No. Obs."), iterations ("Draws") and burn-ins ("Burnins"), the table includes additional information into the estimation, such as "Shrinkage-Stats". Additionally, "% Topmodels" represents the sum of the posterior model probabilities (PMP) for the best 5,000 models and is equal to 7.2. The parameters "Modelspace 2^K", "No. models visited", and "% visited" denote how many possible model combinations exist, the number of models (combinations) visited, and what percentage of the model space is visited, respectively. As previously stated, the model size equals 19.5, which is very different from the estimated "Mean no. regressors" of 9.3582. The mean number of regressors suggest that "true" model most likely includes 9 variables. Finally, the correlation coefficient ("Corr PMP") between estimated MCMC PMPs and posterior PIPs serves as an evaluation of the quality of the approximation. "Corr PMP" of 0.9878 is close to perfect, which indicates "a very good degree of convergence". (Feldkircher & Zeugner, 2022) The fact that we specified a considerably large number of draws is likely the reason behind.

Figure 5: Model diagnostics, baseline BMA estimation

Mean no. regressors	**Draws**	**Burnins**	**No. models visited**
9.3582	1.5e+7	3e+6	5956290
Modelspace 2^K	**% visited**	**% Top models**	**Corr PMP**
5.5e+11	0.0011	7.2	0.9878
No. obs.	**Model prior**	**g-prior**	**Shrinkage-Stats**
89	uniform/19.5	UIP	Av=0.9889

Table 5 presents the top three models with the best performance[9]. We can see a binary matrix, where 1 indicates inclusion of the given variable in the model, whereas 0 indicates exclusion Their performance is reflected in their posterior model probability value, the higher PMP, the better performance. Nevertheless, only 0.05% of the posterior probability is accounted for by the model with the highest PMP. This model consists of following variables: *GDP growth, financial markets efficiency, financial institutions depth, financial institutions access* and *dummy for Latin American and Caribbean country*. In other words, those five variables are considered to be the determinants of wealth inequality. However, there still remains 99.95% of model mass unexplained. Thus, despite the fact that it is regarded as the best model, it could be misleading to rely solely on this model's results, i.e., the findings reveal a significant model uncertainty. The second and third reported models, both with PMP of 0.03%, can be interpreted similarly.

Table 5: Model inclusion for the Top 3 models, baseline estimation

	#1	#2	#3
KOFTrGI	0	0	0
KOFFiGI	0	0	0
KOFIpGI	0	0	0
KOFInGI	0	0	1

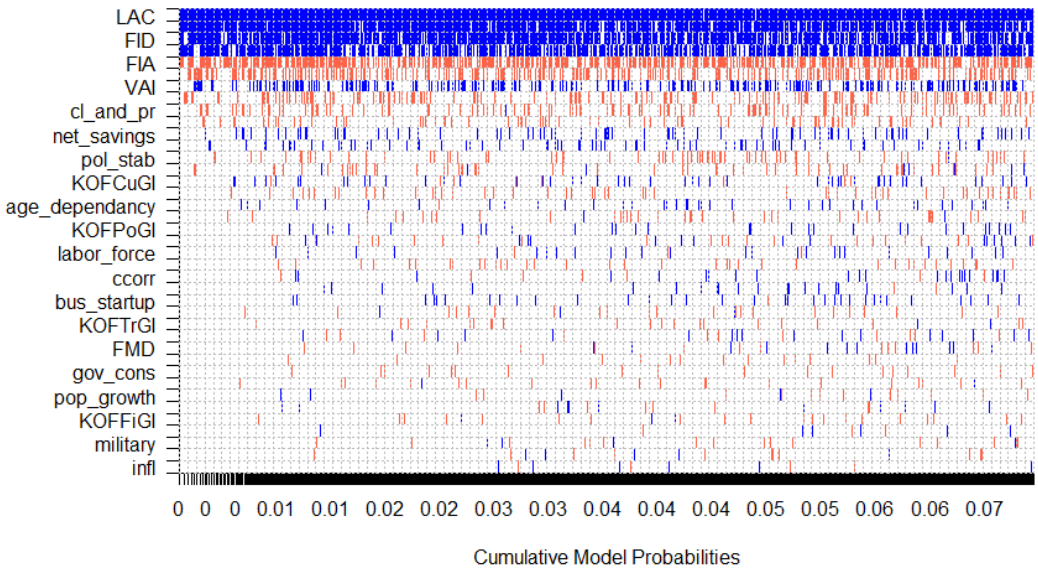
[9] For the sake of brevity, we do not include all variables in Table 5. For the complete list, please see Table A3 in Appendix.

KOFCuGI	0	0	0
KOFPoGI	0	0	0
net_savings	0	0	0
gdp_growth	1	1	1
VAI	0	0	0
labor_force	0	0	0
VAA	0	0	0
rol	0	0	0
ccorr	0	0	0
FMD	0	0	0
FMA	0	0	0
FME	1	1	1
FID	1	0	1
FIA	1	0	1
FIE	0	0	0
bus_reg	0	0	0
educ_index	0	0	0
hci	0	0	0
cl_and_pr	0	0	0
oecd	0	1	0
LAC	1	1	1
PMP (Exact)	0.0004795	0.0002788	0.0002628
PMP (MCMC)	0.0004763	0.0002761	0.0002795

In order to gain a better understanding of the models, in addition to the previously mentioned top 3 (see Table 5), we conduct model inclusion analysis. Figure 6 presents cumulative posterior model probabilities of the baseline BMA estimation based on the best 5,000 models. The ranking of the variables corresponds to their importance in the model, the variable with the highest PIP is at the top Here, the horizontal axis shows the individual models, scaled by their PMPs, while the vertical axis denotes variables in descending order according to their respective posterior model probabilities. The colors blue and red correspond to positive and negative coefficients, respectively, whereas white denotes the absence off the corresponding variable in the model. A column's width corresponds to a model's individual posterior probability. Hence, only a select few models are regarded as highly informative given the very small observed PMPs. The selected ones in the best models account for approximately 20% of all explanatory variables. From the graph it is clear

that the parameters' signs stay unchanged across all models, making them robust to the inclusion of additional regressors.

Figure 6: Model Inclusion Probabilities on Best 5000 Models, baseline BMA estimation



Note: LAC: Latin American and Caribbean country dummy; FID = financial institutions depth; FIA= financial institutions access; VAI=agriculture value added; cl_and_pr=civil liberties and political rights. For the remaining variable names please see Table A1 in Apperndix.

Finally, Table 6 reports the coefficient results of the baseline BMA including the PIPs. The second column, posterior mean ("Post Mean"), describes the averaged coefficients across all models, even those in which the regressor was not included. *financial institutions depth* appears to have comparatively larger coefficient than other variables suggesting its importance. The first column, posterior inclusion probabilities ("PIP"), holds a crucial information on how likely the explanatory variable is added to the "true" model. According to the classification introduced by Havranek et al. (2017), we identify four different levels of significance based on PIP. The predictors with the PIP values of less than 0.5 have no importance. If a predictor's PIP is between 0.5 and 0.75, the variable is regarded as weak. Additionally, PIP values between 0.75 and 0.95 show positive significance, whereas those between 0.95 and 0.99, and between 0.99 and 1 suggest strong and decisive significance, respectively.

Table 6: Determinants of wealth inequality, BMA estimation

	PIP	Post Mean	Post SD	Cond. Pos.Sign
Latin America and Caribbean	0.83994	4.40501	2.55800	1.00000
GDP growth	0.80031	0.00512	0.00332	1.00000
Financial institutions depth	0.72027	9.46232	7.45995	1.00000
Financial markets efficiency	0.58271	4.58062	4.71217	0.99995
Financial institutions access	0.53418	-5.07123	5.77142	0.00051
Industry value added	0.46335	0.09032	0.12136	1.00000
Informational globalization	0.35587	-0.06321	0.10908	0.00739
OECD member	0.27569	-0.90047	1.86276	0.00416
Civil liberties and Political rights	0.26965	-0.32640	0.69764	0.01669
Political stability	0.21002	-0.30986	0.82414	0.01264
Natural resources	0.19902	-0.02950	0.09050	0.13685
Cultural globalization	0.19328	0.02348	0.07912	0.83977
War years	0.18377	0.03462	0.10283	0.98793
Education index	0.18201	-1.69782	5.51118	0.04900
Regulations	0.17914	-0.19670	0.64501	0.07676
Net national savings	0.17828	0.00002	0.00006	0.99340
Labor force	0.17720	0.01594	0.05081	0.95785
Human capital index	0.17291	-0.35285	1.35804	0.12115
Tertiary education	0.17277	0.05276	0.16911	0.97427
Political globalization	0.16740	0.00913	0.03051	0.98011
Control of corruption	0.15860	0.23439	1.01182	0.83052
Age dependency	0.15667	0.00928	0.03681	0.90012
Education expenditure	0.15225	-0.00005	0.00002	0.00042
Rule of law	0.14786	-0.17893	1.09844	0.25805
Financial markets depth	0.14429	0.03717	3.39912	0.62514
Trade globalization	0.14316	-0.00635	0.03458	0.23483
Gross fixed capital formation	0.13790	-0.00331	0.03009	0.01437
Government consumption	0.13768	0.00125	0.01492	0.14729
Interpersonal globalization	0.13716	-0.00104	0.03980	0.42992
Business start-up cost	0.13582	0.00000	0.00002	0.93637
Agriculture value added	0.13482	-0.00217	0.04838	0.42174
Population growth	0.13219	-0.06861	0.42289	0.21621
Financial institutions efficiency	0.12179	0.25886	2.26321	0.66988
Business regulations	0.11826	-0.04753	0.34239	0.18023
Transfer and subsidies	0.11703	0.00407	0.20681	0.51172
Military expenditure	0.11077	-0.00995	0.14551	0.31618
Financial globalization	0.11061	0.00000	0.02427	0.44058
Financial markets access	0.10419	0.00029	1.35540	0.54255
Inflation	0.09944	-0.00004	0.00116	0.34887

Note: Dependant variable – average wealth Gini index 2010-2016, 89 observations, baseline BMA (UIP + uniform model prior)

There are three weakly significant explanatory variables with PIP between 0.5 and 0.75: *financial markets efficiency, financial institutions depth* and *financial institutions access*. Moreover, there are two variables with positive significance (i.e., PIP between 0.75 and 0.95): *dummy for Latin American and Caribbean country* and *GDP growth*. The remaining variables do not have sufficiently high PIP (i.e., PIP > 0.5); hence we do not consider them very important. Thus, there exist five explanatory variables robustly related with the dependent variable. Note that more than half of the regressors (i.e., three out of five) are robustly related variables representing financial development, which suggests that finance plays a significant role in determining wealth inequality. This conforms to the paper by (Hasan et al., 2020) that reached similar findings. Considering the global sample, we deduce that the differences in wealth inequality among nations can be attributed to the combination of effects arising from finance, economy and geographical location. We also take into consideration that the sum of all PIPs is equivalent to the posterior model size of 9.3582.

Further information of the BMA estimation is provided in posterior standard deviations ("Post SD") column, as well as in "Cond.Pos.Sign", which stands for "sign certainty". The closer the coefficient is to 1, the more likely is the coefficient's sign positive.

In order to observe the quantitative effects on wealth inequality, we check the posterior mean of our robustly related variables exhibit unexpected quantitative effects. The most important variable appears to be *dummy for Latin American and Caribbean country* with PIP=83.99%. The estimated effect is in accordance with various reports since the countries in Latin America and the Caribbean region suffer from greater inequality than countries in other regions with comparable levels of development. Despite the years of effort, the region continues to have the second highest inequality in the world.

GDP growth reports the second highest PIP and shows unexpected quantitative effect. The regressor demonstrates how quickly an economy is changing, but can be also interpreted as a rise in productivity. In most of the studies, *GDP growth* is associated with lower inequality, especially when talking about income inequality. Nevertheless, our results show the opposite effect. The average of coefficients across all models is 0.00512, which; however, suggests only a slight increase in inequality. Although our estimated negative effect is unexpected; it is not impossible. For example, when it comes to policies such as the removal of trade barriers, financial

deregulation or incentives for development and research, policy makers may have to face trade-off between growth or inequality.

The better *financial institutions access,* the more uniform distribution of wealth. This finding is in accordance with the study by (Claessens & Perotti, 2007) regarding the determinants of income inequality. The authors argue that instead of the depth of the financial market, the access to financial resources is the main driver in lowering income inequality. We also observe high PIP for *financial institutions depth*. Moreover, depth of financial institutions tends to increase wealth inequality and has on average the highest coefficient across all models, i.e., the value of 9.46232. Our findings of *financial markets efficiency* suggest that large financial markets, increase differences in wealth. Stocks are often owned by wealth households that is why stock price booms are most likely to increase wealth inequality.

Finally, we assume that because other explanatory variables included in the BMA estimation have low PIPs (i.e., under the level of 0.5), they are unable to explain the cross-country variations in wealth inequality.

OLS estimation

To determine how well can this group of regressors explain wealth inequality, we employ a simple Ordinary Least Square (OLS) regression. For our independent variables we choose five variables that are included in the model with the largest PMP, i.e., we choose GDP growth, financial markets efficiency, financial institutions depth, financial institutions access and dummy for Latin American and Caribbean country. Table 7 presents the OLS estimates including the R-squared value. The R-squared value of 0.31 means that we can explain around 31% of the variation in the cross-country wealth inequality differences using the 5 robustly related variables. All coefficients are statistically significant.

Table 7: OLS estimates of the restricted model

GDP growth	0.006*
	(0.011)
Latin America and Caribbean	5.905***
	(0.001)
Financial markets efficiency	7.849*
	(0.010)
Financial institutions access	-11.112**
	(0.002)
Financial institutions depth	12.124*
	(0.011)
Observations	89
R^2	0.312
Adjusted R^2	0.271
Residual Std. Error	5.229 (df = 83)
F Statistics	7.537 (df = 5;83)

Note: * p < 0.05; ** p < 0.01; *** p < 0.001.

5.1.1 Model size

Figure 7 presents both the prior and posterior model size distributions. We can see that the posterior model distribution skews to the left and equals to 9.3582, which coincides to our results in Figure 5 on the mean number of regressors. On the other hand, the prior distribution is symmetric and approximately twice as big. It is equal to 19.5. A smaller posterior model size can be also observed in the variable inclusion of the top three models. To illustrate the impact of the uniform model prior assumption, we perform BMA estimation with two different model priors - random and fixed. Figure 8 shows the comparison of posterior inclusion probabilities under three different model priors. We can see that the fixed model priors and the uniform model priors are similar. The random model priors, on the contrary, are comparatively low, whereas the observed PIPs of the baseline BMA analysis are high.

Figure 7: Prior and Posterior Model Size Distributions

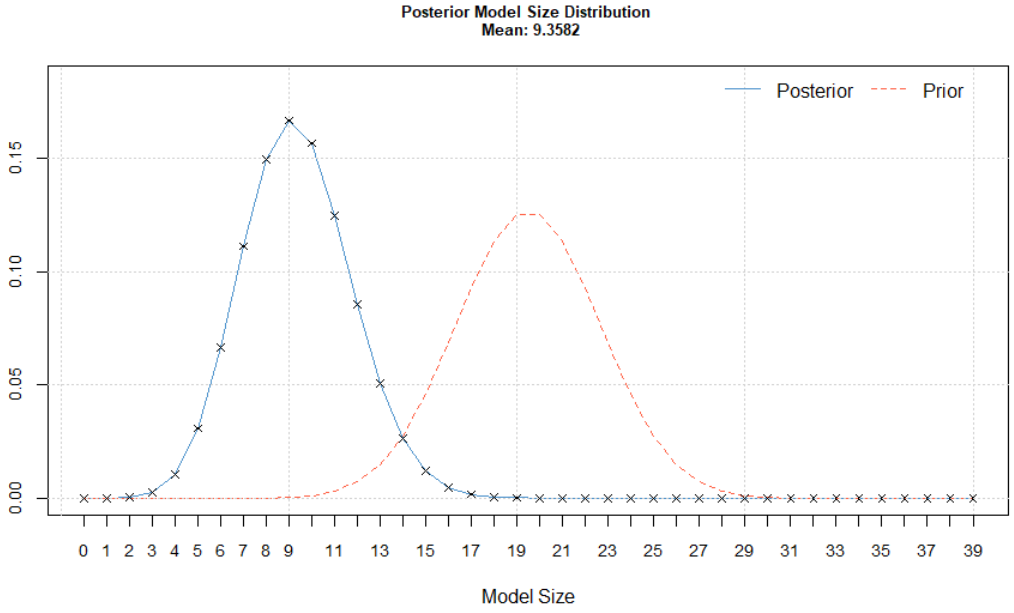
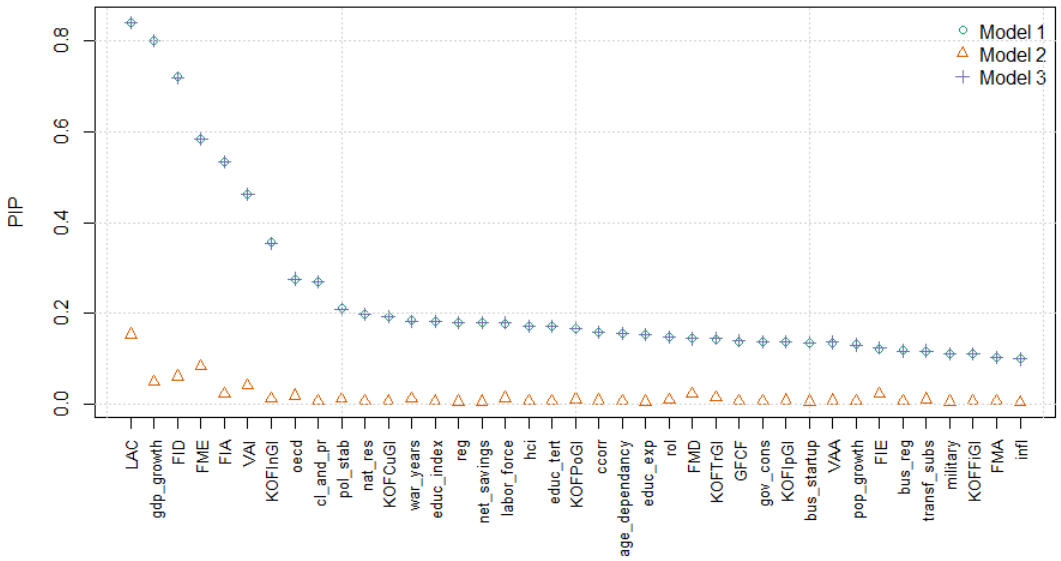


Figure 8: Posterior inclusion probabilities for Uniform, Random and Fixed Model Priors



Note: Parameter and model prior comparison. Model 1: UIP + uniform; Model 2: UIP + random; Model 3: UIP + fixed

5.1.2 Sensitivity Analysis of MCMC Sampler

The model diagnostics presented in Table 5 show that the correlation PMP coefficient is equivalent to 0.9878. In the baseline BMA model, we employ the most standard birth-death MCMC sampler. In order to determine whether the used MCMC sampler is superior, we repeat the same BMA model with alternative samplers. Hence, we employ "reversible-jump" and combined sampler, and present model diagnostics for each in Table 8. Considering the combined MCMC sampler, the correlation coefficient is slightly higher than for each sampler individually, but PIPs remain mostly the same. Therefore, neither of the two alternative MCMC samplers has a significant effect on the previous results. This way we conducted our first robustness check to check.

Table 8: Model diagnostics, BMA under different MCMC samplers

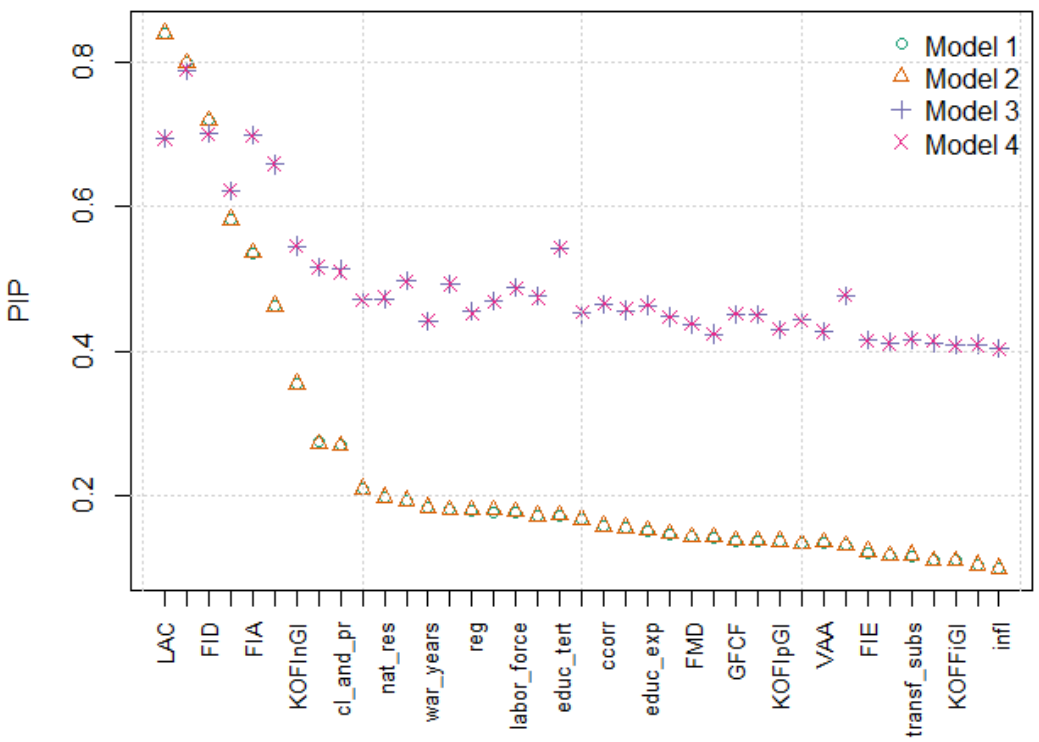
BMA under Reversible-jump Sampler			
Mean no. regressors	**Draws**	**Burnins**	**No. models visited**
9.3631	1.5e+7	3e+6	12796020
Modelspace 2^K	**% visited**	**% Top models**	**Corr PMP**
5.5e+11	0.0023	7.2	0.9935
No. obs.	**Model prior**	**g-prior**	**Shrinkage-Stats**
89	uniform/19.5	UIP	Av=0.9889

BMA under Reversible-jump Sampler			
Mean no. regressors	**Draws**	**Burnins**	**No. models visited**
9.3680	1.5e+7	3e+6	6839730
Modelspace 2^K	**% visited**	**% Top models**	**Corr PMP**
5.5e+11	0.0012	7.1	0.9866
No. obs.	**Model prior**	**g-prior**	**Shrinkage-Stats**
89	uniform/19.5	UIP	Av=0.9889

5.2 Alternative results

Since the results of the Bayesian Model Averaging are sensitive to the data revisions under different prior structures Ciccone & Jarociński (2010), we conduct robustness checks either using alternative priors, or using different MCMC sampler (see Subsection 5.1.2). In this subsection, in order to check robustness of the baseline results, we conduct the BMA estimation using hyper-g prior and MCMC sampler "reversible-jump". Figure 9 shows model comparison of both baseline, and alternative BMA specifications. It is a perfect graphical representation of the robustness checks.

Figure 9: Model comparison



Note: Model 1 = UIP + uniform + bd; Model 2 = UIP + uniform + rev.jump; Model 3 = hyper-g + uniform + bd; Model 4 = hyper-g + uniform + rev.jump

Here, Model 1 illustrates the baseline specification. Model 2 applies the "reversible-jump" MC^3 algorithm while using the same parameter and model priors. In Model 3 and Model 4 we use hyper-g prior combined with "birth-death" and "reversible-jump", respectively. We can conclude that while using "reversible-jump" sampler only slightly changes the PIPs, replacing UIP with hyper-g prior significantly

increases the posterior inclusion probabilities, as well as model size. Such a substantial increase reveals high sensitivity to the parameter prior.

5.3 Endogeneity issues

We find 2 major issues concerning our analysi . here I will describe them and briefly state how to address them nevertheless, employing them is out of the scope of the thesis

6 Conclusion

This thesis contributes to the growing academic literature on wealth inequality. In the thesis we explore the relationship between wealth inequality and different measures of globalization, which, to our knowledge, is very novel itself. With increasing wealth gab between rich and poor in the recent years, there is more attention, thus studies on wealth inequality than ever before. Nevertheless, the majority of them focus on the measurement of wealth inequality rather than its determinants. As a result, despite the existence of wealth inequality literature, there is no consensus on the predictors that ought to be used. Thus, we deal with a certain degree of uncertainty about the correct model.

To overcome these obstacles, we apply Bayesian Model Averaging (BMA) methodology, which allows to thoroughly compare a large number of potential determinants recognized in the literature. We collect a rich cross-country dataset consisting of 89 countries and 39 explanatory variables. Due to large differences in wealth inequality among different countries, the variables included reflect countries' various aspects, namely economic, geographical, regulatory, institutional, finance, globalization, political and demographic factors. For the purpose of the thesis, we use UIP g prior with uniform model prior to estimate the baseline scenario model. After addressing endogeneity issues, using a rich dataset, and conducting a series of robustness checks, we discover that only a small number of variables are robustly related to wealth inequality. More specifically, the results of our baseline specification report five regressors with PIP values greater than 50%. These regressors explain about 30% of the variations in wealth inequality among countries. We find that cross-country differences in wealth inequality come from a combination of factors including finance, economic and geographical factors. Among the five robustly related variable, three are indicators of financial development.

Among the financial development indicators, large depth of financial institutions and large efficiency of financial markets are associated with greater wealth inequality. On the contrary, countries with better access to finance observe lower wealth inequality. Our findings also suggest that large gross domestic product (GDP) growth is, quite unexpectedly, associated with higher wealth inequality. Finally, the most relevant variable is a geographical dummy for countries in Latin America and the Caribbean. The countries from this region exhibit larger wealth inequality.

Despite the fact that our thesis did not manage to confirm the globalization measures to be the determinants of wealth inequality, we believe that our analysis can still valuably contribute to the literature on wealth inequality since we discovered five determinants. As our findings suggest the globalization measures may not be determinants of wealth inequality, but they are connected in other ways. The same applies to wealth inequality and the rule of law.

Bibliography

Alvaredo, F., Atkinson, A. B., Piketty, T., & Saez, E. (2013). The Top 1 Percent in International and Historical Perspective. *Journal of Economic Perspectives*, *27*(3), 3–20. https://doi.org/10.1257/jep.27.3.3

Atkinson, A. B. (1997). Bringing Income Distribution in From the Cold. *The Economic Journal*, *107*(441), 297–321.

Bagchi, S., & Svejnar, J. (2015). Does wealth inequality matter for growth? The effect of billionaire wealth, income distribution, and poverty. *Journal of Comparative Economics*, *43*(3), 505–530. https://doi.org/10.1016/j.jce.2015.04.002

Bhagat, S. (2020). Economic Growth, Income Inequality, and the Rule of Law. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3736171

Bircan, Ç., Brück, T., & Vothknecht, M. (2017). Violent conflict and inequality. *Oxford Development Studies*, *45*(2), 125–144. https://doi.org/10.1080/13600818.2016.1213227

Bourguignon, F., & Scott-Railton, T. (2015). *The globalization of inequality*. Princeton University Press.

Card, D., & DiNardo, J. E. (2002). Skill-Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles. *Journal of Labor Economics*, *20*(4), 733–783. https://doi.org/10.1086/342055

Ciccone, A., & Jarociński, M. (2010). Determinants of Economic Growth: Will Data Tell? In *American Economic Journal: Macroeconomics*.

Claessens, S., & Perotti, E. (2007). Finance and inequality: Channels and evidence. *Journal of Comparative Economics*, *35*(4), 748–773. https://doi.org/10.1016/j.jce.2007.07.002

Davies, J. B., Lluberas, R., & Shorrocks, A. F. (2017). Estimating the Level and Distribution of Global Wealth, 2000-2014. *Review of Income and Wealth*, *63*(4), 731–759. https://doi.org/10.1111/roiw.12318

Davies, J. B., & Shorrocks, A. F. (2000). Chapter 11 The distribution of wealth. In *Handbook of Income Distribution* (Roč. 1, s. 605–675). Elsevier. https://doi.org/10.1016/S1574-0056(00)80014-7

Dorn, F., Fuest, C., & Potrafke, N. (2018a). *Globalization and Income Inequality Revisited*. – Leibniz Institute for Economic Research at the University of Munich.

Dorn, F., Fuest, C., & Potrafke, N. (2018b). *Globalization and Income Inequality Revisited* (Č. 6859; CESifo Working Paper Series). CESifo.

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics*, *38*(10), 1091–1110. https://doi.org/10.1080/00036840500392078

Dreher, A., & Gaston, N. (2008). Has Globalization Increased Inequality? *Review of International Economics*, *16*(3), 516–536. https://doi.org/10.1111/j.1467-9396.2008.00743.x

Dreher, A., Gaston, N., & Martens, W. J. M. (2008). *Measuring globalisation: Gauging its consequences* (1st ed). Springer.

Feenstra, R. C., & Hanson, G. H. (1999). The Impact of Outsourcing and High-Technology Capital on Wages: Estimates For the United States, 1979-1990. *The Quarterly Journal of Economics*, *114*(3), 907–940. https://doi.org/10.1162/003355399556179

Feldkircher, M., & Zeugner, S. (2009). *Benchmark priors revisited: On adaptive shrinkage and the supermodel effect in Bayesian Model averaging*. International Monetary Fund.

Feldkircher, M., & Zeugner, S. (2022). *Bayesian Model Averaging with BMS*. http://bms.zeugner.eu.

Fernández, C., Ley, E., & Steel, M. F. J. (2001). Benchmark priors for Bayesian model averaging. *Journal of Econometrics*, *100*(2), 381–427. https://doi.org/10.1016/S0304-4076(00)00076-2

Financial Development Index Database. (2022). International Monetary Fund. https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B

George, E. I. (2010). Dilution priors: Compensating for model space redundancy. In *Institute of Mathematical Statistics Collections* (s. 158–165). Institute of Mathematical Statistics. https://doi.org/10.1214/10-IMSCOLL611

Gerszon Mahler, D., Yonzan, N., Hill, R., Lakner, C., Wu, H., & Yoshida, N. (2022). *Pandemic, prices, and poverty*. World Bank Blogs. https://blogs.worldbank.org/opendata/pandemic-prices-and-poverty

Guo, G. (2013). *Race to the Top or to the Bottom: Globalization and Education Spending in China*. *16*. https://www.gtap.agecon.purdue.edu/resources/download/6419.pdf

Gygli, S., Haelg, F., Potrafke, N., & Sturm, J.-E. (2019). The KOF Globalisation Index – revisited. *The Review of International Organizations*, *14*(3), 543–574. https://doi.org/10.1007/s11558-019-09344-2

Hasan, I., Horvath, R., & Mares, J. (2020). Finance and wealth inequality. *Journal of International Money and Finance*, *108*, 102161. https://doi.org/10.1016/j.jimonfin.2020.102161

Havranek, T., Rusnak, M., & Sokolova, A. (2017). Habit formation in consumption: A meta-analysis. *European Economic Review*, *95*, 142–167. https://doi.org/10.1016/j.euroecorev.2017.03.009

Heimberger, P. (2020). Does economic globalisation affect income inequality? A meta-analysis. *The World Economy*, *43*(11), 2960–2982. https://doi.org/10.1111/twec.13007

Heldring, L., Robinson, J. A., & Whitfill, P. (2022). The Second World War, Inequality and the Social Contract in Britain. *Economica*, *89*(S1). https://doi.org/10.1111/ecca.12419

Hershbein, B., S. Kearney, M., & H. Summers, L. (2015). *Increasing Education: What it Will and Will Not Do for Earnings and Earnings Inequality*. The Hamilton Project. https://www.hamiltonproject.org/assets/legacy/files/downloads_and_links/impact_of_edu_earnings_inequality_hershbein_kearney_summers.pdf

Islam, Md. R., & McGillivray, M. (2020). Wealth inequality, governance and economic growth. *Economic Modelling*, *88*, 1–13. https://doi.org/10.1016/j.econmod.2019.06.017

Karl, A., & Lenkoski, A. (2012). *Instrumental Variable Bayesian Model Averaging via Conditional Bayes Factors*. https://doi.org/10.48550/ARXIV.1202.5846

Koop, G. (2003). *Bayesian econometrics*. J. Wiley.

Lakner, C., & Milanovic, B. (2016). Global Income Distribution: From the Fall of the Berlin Wall to the Great Recession. *The World Bank Economic Review*, *30*(2), 203–232. https://doi.org/10.1093/wber/lhv039

Ley, E., & Steel, M. F. J. (2009). On the effect of prior assumptions in Bayesian model averaging with applications to growth regression. *Journal of Applied Econometrics*, *24*(4), 651–674. https://doi.org/10.1002/jae.1057

Liang, F., Paulo, R., Molina, G., Clyde, M. A., & Berger, J. O. (2008). Mixtures of *g* Priors for Bayesian Variable Selection. *Journal of the American Statistical Association*, *103*(481), 410–423. https://doi.org/10.1198/016214507000001337

Liu, W., Zhang, Z., Chen, J.-X., & Tsai, S.-B. (Ed.). (2019). *The Belt and Road Strategy in International Business and Administration:* IGI Global. https://doi.org/10.4018/978-1-5225-8440-7

Moral-Benito, E. (2009). *Determinants Of Economic Growth: A Bayesian Panel Data Approach*. The World Bank. https://doi.org/10.1596/1813-9450-4830

Ostry, J., JOstry@imf.org, Berg, A., & ABerg@imf.org. (2011). Inequality and Unsustainable Growth: Two Sides of the Same Coin? *Staff Discussion Notes*, *11*(08), 1. https://doi.org/10.5089/9781463926564.006

Piketty, T., & Zucman, G. (2014). Capital is Back: Wealth-Income Ratios in Rich Countries 1700–2010 *. *The Quarterly Journal of Economics*, *129*(3), 1255–1310. https://doi.org/10.1093/qje/qju018

Potrafke, N. (2015). The Evidence on Globalisation. *The World Economy*, *38*(3), 509–552. https://doi.org/10.1111/twec.12174

Powell, J. M., & Thyne, C. L. (2011). Global instances of coups from 1950 to 2010: A new dataset. *Journal of Peace Research*, *48*(2), 249–259. https://doi.org/10.1177/0022343310397436

Ramírez-Hassan, A. (2022). *Introduction to Bayesian Econometrics*. BEsmarter. https://bookdown.org/aramir21/IntroductionBayesianEconometricsGuidedTour/

Roine, J., & Waldenström, D. (2015). Long-Run Trends in the Distribution of Income and Wealth. In *Handbook of Income Distribution* (Roč. 2, s. 469–592). Elsevier. https://doi.org/10.1016/B978-0-444-59428-0.00008-4

Sen, A. (2004). *Inequality reexamined* (Reprint). Oxford Univ. Press.

Shorrocks, A., Davies, J., & Lluberas, R. (2022). *Global Wealth Report 2022*. Credit Suisse Research Institute.

Sonora, R. (2019). *Income Inequality, Poverty, and the Rule of Law: Latin America vs the Rest of the World* (MPRA Paper 91512). University Library of Munich.

Stolper, W. F., & Samuelson, P. A. (1941). Protection and Real Wages. *The Review of Economic Studies*, *9*(1), 58–73. https://doi.org/10.2307/2967638

Vanham, P. (2019, leden). *A brief history of globalization*. World Economic Forum. https://www.weforum.org/agenda/2019/01/how-globalization-4-0-fits-into-the-history-of-globalization/

World Health Organisation. (2020). https://www.who.int/about/who-we-are/frequently-asked-questions

Yang, J., & Qiu, M. (2016). The impact of education on income inequality and intergenerational mobility. *China Economic Review*, *37*, 110–125. https://doi.org/10.1016/j.chieco.2015.12.009

Zucman, G. (2019). Global Wealth Inequality. *Annual Review of Economics*, *11*(1), 109–138. https://doi.org/10.1146/annurev-economics-080218-025852

Appendix

Table A 1: Selected variables and their complete list

Variable name	R shortcut	Category	Source
Wealth inequality	gini_wealth		Credit Suisse
Age dependency	age_dependancy	Demographic	WB
Human capital index	hci	Demographic	Feenstra et al.,
Tertiary education	educ_tert	Demographic	Barro-Lee
Net national savings	net_savings	Economic	WB
GDP growth	gdp_growth	Economic	WB
Gross fixed capital	GFCF	Economic	WB
Industry value added	VAI	Economic	WB
Agriculture value added	VAA	Economic	WB
Inflation	infl	Economic	WB
Labor force	labor_force	Economic	WB
Government consumption	gov_cons	Economic	WB
Financial markets depth	FMD	Financial	IMF
Financial markets access	FMA	Financial	IMF
Financial markets	FME	Financial	IMF
Financial institutions	FID	Financial	IMF
Financial institutions	FIA	Financial	IMF
Financial institutions	FIE	Financial	IMF
Population growth	pop_growth	Geographical/Natural	WB
Natural resources	nat_res	Geographical/Natural	WB
Latin America and	LAC	Geographical/Natural	WB
Trade globalization	KOFTrGl	Globalization	KOF Swiss Economic
Financial globalization	KOFFiGl	Globalization	KOF Swiss Economic
Informational globalization	KOFInGl	Globalization	KOF Swiss Economic
Cultural globalization	KOFCuGl	Globalization	KOF Swiss Economic
Interpersonal globalization	KOFIpGl	Globalization	KOF Swiss Economic
Political globalization	KOFPoGl	Globalization	KOF Swiss Economic
Rule of law	rol	Institutional	WB
Education expenditure	educ_exp	Institutional	WB
Education index	educ_index	Institutional	UN
Civil liberties and Political	cl_and_pr	Political	Freedom House
Control of corruption	ccorr	Political	WB
Political stability	pol_stab	Political	WB
Military expenditure	military	Political	WB

War years	war_years	Political	Powell and
OECD member	oecd	Political	SWIID
Transfer and subsidies	transf_subs	Regulatory	Fraser Institute
Business start-up cost	bus_startup	Regulatory	WB
Business regulations	bus_reg	Regulatory	Fraser Institute
Regulations	reg	Regulatory	Fraser Institute

Table A 2: All variables included in top 3 performing models (complete, just visual)

	#1	#2	#3
KOFTrGI	0	0	0
KOFFiGI	0	0	0
KOFIpGI	0	0	0
KOFInGI	0	0	1
KOFCuGI	0	0	0
KOFPoGI	0	0	0
war_years	0	0	0
pop_growth	0	0	0
age_dependancy	0	0	0
net_savings	0	0	0
gdp_growth	1	1	1
GFCF	0	0	0
VAI	0	0	0
infl	0	0	0
labor_force	0	0	0
VAA	0	0	0
nat_res	0	0	0
gov_cons	0	0	0
military	0	0	0
educ_exp	0	0	0
bus_startup	0	0	0
rol	0	0	0
ccorr	0	0	0
pol_stab	0	0	0
FMD	0	0	0
FMA	0	0	0
FME	1	1	1
FID	1	0	1
FIA	1	0	1
FIE	0	0	0
transf_subs	0	0	0
bus_reg	0	0	0
reg	0	0	0
educ_tert	0	0	0
educ_index	0	0	0
hci	0	0	0

cl_and_pr	0	0	0
oecd	0	1	0
LAC	1	1	1
PMP (Exact)	0.0004795	0.0002788	0.0002628
PMP (MCMC)	0.0004763	0.0002761	0.0002795