Charles University

Faculty of Social Sciences

Institute of Economic Studies

MASTER'S THESIS

The Effect of Financial Crises on Wealth Inequality

Author: **Bc. Vladyslav Ovcharenko**

Study program: **Economics and Finance**

Specialization: **Financial Markets and Data Analysis**

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

Academic Year: **2024**

Declaration of Authorship

I hereby declare that I 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.

I grant to Charles University permission to reproduce and to distribute copies of this thesis document in whole or in part.

Prague, July 28, 2024

Vladyslav Ovcharenko

Acknowledgments

I would like to express my gratitude to prof. Roman Horváth, Ph.D., who gave me valuable advice, recommendations and suggestions throughout the whole process of my master's thesis journey.

I am very grateful to my family who supported me during my studies and encouraged me to pursue my master's degree.

Abstract

Financial crises affect many aspects of modern society, first of all, the welfare of the population. However, in modern academic literature, the effect of financial crises on wealth inequality is not given enough attention, and empirical evidence of such a relationship is weakly studied. Therefore, we investigate the effect of financial crises on wealth inequality and examine the effect of the level of financial development on wealth inequality. We use panel data of the top 1 % and top 10 % shares of the richest layers of the population for the period from 2000 to 2019 inclusive for 119 countries, including a split between developed and developing country groups. As regressors, in addition to financial crises, we consider indicators that comprehensively characterize financial development, as well as a number of non-financial variables. Using a fixed effects model, we estimate their effect on wealth inequality. Based on our results, we cannot unambiguously confirm the association of financial crises with an increase in wealth inequality. We discover that, depending on the level of economic development of countries, not all crises are significant for wealth inequality. We obtain strong evidence of a significant effect of countries' level of financial development on wealth inequality and find that more developed financial systems contribute to lower wealth inequality. We also find that for each economic group of countries, financial crises affect the top 1 % and top 10 % wealthiest segments of the population differently.

JEL Classification	C33, E21, G01
Keywords	wealth inequality, financial crises, financial development, top 1 % share, top 10 % share
Title	The Effect of Financial Crises on Wealth Inequality

Abstrakt

Finanční krize ovlivňují mnoho aspektů moderní společnosti, především blahobyt obyvatelstva. V moderní odborné literatuře však není vlivu finančních krizí na nerovnost bohatství věnována dostatečná pozornost a empirické důkazy takového vztahu jsou jen slabě prozkoumány. Proto zkoumáme vliv finančních krizí na nerovnost bohatství a zkoumáme vliv úrovně finančního rozvoje na nerovnost bohatství. Používáme panelové údaje o podílech 1 % a 10 % nejbohatších vrstev obyvatelstva za období od roku 2000 do roku 2019 včetně pro 119 zemí, včetně rozdělení na skupiny rozvinutých a rozvojových zemí. Jako regresory uvažujeme kromě finančních krizí také ukazatele, které komplexně charakterizují finanční vývoj, a řadu nefinančních proměnných. Pomocí modelu fixních efektů odhadujeme jejich vliv na nerovnost bohatství. Na základě našich výsledků nemůžeme jednoznačně potvrdit souvislost finančních krizí s nárůstem nerovnosti v bohatství. Zjistili jsme, že v závislosti na úrovni ekonomického rozvoje zemí nejsou všechny krize pro nerovnost bohatství významné. Získali jsme silný důkaz o významném vlivu úrovně finančního rozvoje zemí na nerovnost bohatství a zjistili jsme, že rozvinutější finanční systémy přispívají k nižší nerovnosti bohatství. Zjišťujeme také, že v každé ekonomické skupině zemí mají finanční krize rozdílný dopad na 1 % a 10 % nejbohatších segmentů obyvatelstva.

Klasifikace	C33, E21, G01
Klíčová slova	nerovnost bohatství, finanční krize, finanční rozvoj, podíl 1 % nejbohatších, podíl 10 % nejbohatších
Název práce	Dopad finančních krizí na nerovnost bohatství

Contents

List of Tables

List of Figures

Acronyms

ARM An adjustable-rate mortgage

ATMs Automated teller machines

BMA Bayesian Model Averaging

CDOs Collateralized debt obligations

FD The Financial Development Index

FI The Financial Institutions Index

FIA The Financial Institutions Access Index

FID The Financial Institutions Depth Index

FIE The Financial Institutions Efficiency Index

FM The Financial Markets Index

FMA The Financial Markets Access Index

FMD The Financial Markets Depth Index

FME The Financial Markets Efficiency Index

GDP Gross Domestic Product

GMM Generalized Method of Moments

IMF The International Monetary Fund

IVBMA Instrumental Variable Bayesian Model Averaging

KOF Economic Cycle Research Institute

MBS A Mortgage-backed Security

OECD The Organisation for Economic Co-operation and Development

OLS Ordinary Least Squares

PIP Posterior inclusion probability

SCF The Survey of Consumer Finances

UNU-WIDER The United Nations University

WID The World Inequality Database

Master's Thesis Proposal

Institute of Economic Studies
Faculty of Social Sciences
Charles University

Author:	**Bc. Vladyslav Ovcharenko**	Supervisor:	prof. Roman Horváth, Ph.D.
Specialization:	NP_NEFFTDA	Defense Planned:	September 2024

Proposed Topic:

The Effect of Financial Crises on Wealth Inequality

Motivation:

To ensure high rates of economic development, economic policies of most countries are aimed at reducing wealth inequality. In turn, the effect of financial crises on wealth inequality is currently of great concern, as it can have a number of negative consequences, such as: slower economic growth, increased social instability, and weak cohesion in society. For instance, Bagchi and Svejnar (2015) find that an increase in the wealth of the richest segments of society reduces the average annual growth rate of the economy. Despite the increase in wealth inequality after the financial crisis at the end of the last century and the global financial crisis of 2008-2009, the empirical evidence on the relationship between wealth inequality and financial crises is currently poorly investigated. Therefore, in this master's thesis we want to study the effect of crises on wealth inequality, including in groups of countries depending on the level of economic development, in order to identify the predominant direction of the effect.

Hypotheses:

1. Hypothesis №1: Financial crises have a positive/negative effect on wealth inequality.
2. Hypothesis №2: Crises affect the richest 1 % and 10 % of the richest population of each economic group of countries differently.
3. Hypothesis №3: More developed financial systems contribute to lower wealth inequality.

Methodology:

In our thesis, we use fixed effects model for panel data. The data cover the period from 2000 to 2019 inclusive with annual observations (i.e., 20 time periods) and 119 countries, which are split into two groups: developed and developing countries from the classification by the United Nations.

As the dependent variable, we use the share of the richest 1 % and the share of the richest 10 % by country from the World Inequality Database. Compared to the Gini coefficient, these measures are more direct and intuitive measures of wealth concentration and can be useful for tracking trends in wealth inequality.

We consider binary variables as independent variables: banking crises, currency crises, debt crises and twin crises. Also, for a more detailed analysis, we use a set of independent variables that Hasan et al. (2020) estimate to be particularly significant for the analysis of wealth inequality: agriculture, education, taxation, globalization, economic freedom, financial institutions, and financial markets indices. We use data for

financial variables from the International Monetary Fund and non-financial variables we retrieve from the World Bank, mainly from its World Development Indicators database.

Expected Contribution:

There are practically no publications on the effect of crises on wealth inequality, as there are almost no empirical works studying the determinants of wealth inequality. For example, we find only a few articles that examine wealth inequality together with financial crises Bogliacino and Maestri (2016), Grabka (2015), Shchepeleva et al. (2022), and Bagchi and Svejnar (2015). Hasan et al. (2020) examine the effect of financial development on wealth inequality, while Nguyen (2022) analyzes the impact of crises on income distribution.

This master's thesis empirically analyzes the effect of financial crises on wealth inequality, which makes it special. The innovation of this thesis lies in:

- using the share of the richest 1 % and the share of the richest 10 % by country as the dependent variable (existing papers generally use the Gini coefficient);
- in grouping countries by level of economic development;
- the use of a large data set, which includes data on 119 countries over a time interval of 20 years. In existing studies, the number of countries and time intervals analyzed are significantly smaller.

This thesis is an attempt to fill the lack of research on the effect of financial crises on wealth inequality and to contribute to the understanding of the causes of cross-country differences depending on both the level of economic development of countries and the degree of development of the financial system.

Outline:

1. Introduction.
2. Literature Review.
3. Data Description.
4. Basic Regressions.
5. Discussion.
6. Conclusion.

Core Bibliography:

1. 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. ISSN 0147-5967. https://doi.org/10.1016/j.jce.2015.04.002.
2. Baltagi, A. H., Demetriades, P. O., & Law, S. H. (2009). "Financial development and openness: Evidence from panel data." Journal of Development Economics, 89(2), 285-296. ISSN 0304-3878. https://doi.org/10.1016/j.jdeveco.2008.06.006.
3. Bogliacino, F., & Maestri, V. (2016). "Wealth Inequality and the Great Recession." Intereconomics, 51, 61–66. https://doi.org/10.1007/s10272-016-0578-y.
4. Grabka, M. M. (2015). "Income and wealth inequality after the financial crisis: the case of Germany." Empirica, 42, 371–390. https://doi.org/10.1007/s10663-015-9280-8.

5. Hasan, F., Horvath, R., & Mares, J. (2020). "Finance and wealth inequality." Journal of International Money and Finance, 108, 102161. ISSN 0261-5606. https://doi.org/10.1016/j.jimonfin.2020.102161.
6. Nguyen, T. C. (2022). "The effects of financial crisis on income inequality." Development Policy Review, 40(6), November. https://doi.org/10.1111/dpr.12600.
7. Piketty, T. (2014). "Capital in the Twenty-First Century." In: The Belknap Press of Harvard University Press, Cambridge, MA.
8. Shchepeleva, M., Stolbov, M., & Weill, L. (2022). "Has the Global Financial Crisis increased wealth inequality?" International Economics, 169, 148-160. ISSN 2110-7017. https://doi.org/10.1016/j.inteco.2021.12.004.
9. Stiglitz, J. (2012). "The Price of Inequality: How Today's Divided Society Endangers Our Future" (2nd ed.). In: W.W. Norton & Company, New York.
10. Zucman, G. (2015). "The Hidden Wealth of Nations: The Scourge of Tax Havens." The University of Chicago Press.

Author **Supervisor**

1. Introduction

Wealth inequality is one of the most pressing and debated issues in the world today. Despite the existing trend of decreasing cross-country wealth inequality (largely since China and India are becoming richer countries), nonetheless, within-country wealth inequality has increased in recent decades, as indicated in the book of Milanovic (2016). Therefore, the problem of existing global wealth inequality has reached a new level in the modern context. Despite significant successes in poverty reduction, which were achieved in the early 21st century and continued in the following years, subsequently, the rate of poverty reduction began to decrease due to the effects of the global financial crisis of 2008, crisis phenomena caused by the world pandemic COVID-19, local military conflicts (for example, a full-scale Russian invasion of Ukraine).

Attempts to solve the problem of poverty are most often realized through political and social mechanisms of influence, with less attention paid to economic factors. However, attempts to reduce poverty by such methods are fraught with the growth of populism and political instability, strengthening nationalist and anti-globalization sentiments, which we are currently witnessing. Wealth inequality has a multifaceted impact on many aspects of life: economic, social, political, environmental, and international. Accordingly, reducing wealth inequality requires comprehensive and coordinated efforts at all levels, from local to global. Nevertheless, implementing such a set of measures requires an understanding of the factors that influence wealth inequality.

In modern economic literature, considerable attention is paid to the income inequality of the population. As a rule, two main indicators of income inequality are considered - the Gini coefficient and decile ratio. These indicators are widespread in the economic literature. Nevertheless, in our opinion, understanding wealth inequality purely as income inequality somewhat masks the real inequality, because it does not take into account such an important component of wealth inequality as inequality in the distribution of wealth and access to wealth itself. Thus, the report by the United Nations Development Programme (2019) on page 97 says: "… the Gini coefficient is more sensitive to transfers of income in the middle of the distribution than at the bottom or the top—while in many countries most of the action on income and wealth dynamics is precisely at the ends of the distribution". That is why this master’s thesis uses the indicators of the top 1 % and top 10 % of the richest population as an indicator of wealth inequality, which, in our point of view, more fully corresponds to the term wealth inequality.

The top 1 % rich is a direct and intuitive measure of the concentration of wealth in the hands of the richest segment of the population, unlike the Gini coefficient, which characterizes the relative pattern of income distribution for the entire population. However, the top 1 % of the rich is only sensitive to changes in the wealth of the richest individuals or households, so we take another dependent variable as the top 10 % share (World Inequality Database, 2023b). By taking these variables, we can include them in the regressions and compare the dynamics of their changes when exposed to our control variables. A second plus for using these particular variables is the availability of a large number of countries and large time series data, in our case over 20 years with the possibility of not having missing values for 119 countries. Another advantage of studying the top 1 % and the top 10 % of the wealthy population is that we do not find literature that considers these indicators as wealth inequality.

Despite the growth of wealth inequality after the global financial crisis of 2008-2009 and the increased attention to this issue in the academic literature, empirical evidence on the relationship and effect of financial crises on wealth inequality is currently poorly researched.

Existing studies in the academic literature practically do not investigate the determinants of wealth inequality and, in most cases, are descriptive in nature with the purpose of collecting and summarizing data on wealth distribution inequality. This is due to the lack of data on wealth distribution, which is related to both the difficulty of assessing inequality and the reluctance of the richest layer of people to disclose data on their assets.

There is also a concept in the academic literature according to which wealth inequality arises due to differences in households' motivation to save, in their ability to save, and in initial conditions (De Nardi and Fella, 2017). The savings function underlying such a concept is greatly facilitated by the development of financial markets and financial institutions that allow both individual households and society as a whole to optimize savings in accordance with their preferences. Thus, the level of development of financial markets and financial institutions can have an effect on wealth inequality, as greater access to financial markets and institutions can provide greater tools for saving, and the depth of financial markets and institutions can provide access to greater financing opportunities. We focus on this aspect of wealth inequality, namely exploring the relationship between the level of financial development and wealth inequality. A similar issue was raised in the work by Hasan et al. (2020), the results of which we use in this master's thesis.

In those works that to some extent attempt to study the factors affecting wealth inequality, either the dependence of wealth inequality on financial crises is not studied, or inequality is considered as income inequality. In particular, these are the works of authors such as Agnello and Sousa (2012), Nguyen (2022), and Shchepeleva et al. (2022). In addition, there are virtually no studies that consider the top 1 % and top 10 % of rich people as wealth inequality and study the effect of crises on wealth inequality across groups of countries depending on the level of economic development of countries.

To this day, there are no clear criteria for determining the determinants of wealth inequality in the academic literature, moreover, this topic has not been practically investigated. This master's thesis does not aim to determine the essential determinants of wealth inequality. We attempt to make up for the lack of research on the effect of financial crises on wealth inequality and to outline possible directions for further research on the problem of wealth inequality.

The innovation of this thesis lies in:

- using the share of the richest 1 % and the share of the richest 10 % by country as the dependent variable (existing studies generally use the Gini coefficient).

- in grouping countries by level of economic development.

- the use of a large data set, which includes data on 119 countries over a time interval of 20 years. In existing studies, the number of countries and time intervals analyzed are significantly smaller.

This thesis has the following structure: chapter 1 "Introduction" describes the relevance and degree of innovation of the study; Chapter 2 "Literature Review" provides a brief review of the relevant scientific literature; Chapter 3 "Data Description" discusses the properties of wealth data, descriptive analysis of both the dependent variable - top 1 % and top 10 % of rich people and the independent variables that are used in the main model of this master’s thesis, Chapter 4 "Basic Regressions" conducts the regression with fixed effects and robust estimates, and describes the results of the basic regressions along with robustness checks; Chapter 5 "Discussion" interprets the results; Chapter 6 "Conclusion" formulates the main conclusions of this thesis.

2. Literature Review

This section begins by examining the origins and causes of the two major world crises and the European debt crisis, followed by the types of crises and their impact on the economy through changes in key economic variables. The relevance of the chapter is related to the lack of studies directly devoted to identifying the effect of financial crises on wealth inequality. With this in mind, this chapter examines the effect of financial crises on income inequality and how income inequality affects key economic variables. The next stage of the thesis focuses on wealth inequality. The last stage of this section is devoted to identifying additional financial variables that are determinants of wealth inequality.

2.1 Financial crises

One of the most diverse and insightful studies of the causes of the Great Depression is White's article. White (1990) characterizes the technological and structural changes that in the 1920s revitalized the economy, caused a surge in business activity, and led to a boom in the stock market, generating higher profits and dividends. In parallel, such transformations introduce complexities in the valuation of financial instruments, making it more difficult to assess the adequacy of the economy and financial market, setting the stage for a potential economic bubble. The fall panic was triggered by early indicators of recession, reflecting a mismatch between dividends and stock prices. Even attempts by the Federal Reserve Bank of New York to intervene in the money market during the panic failed to prevent the collapse of the financial system.

Another study focuses on, credit supply shocks, which the authors argue played a crucial role in the development of credit during the Great Depression, with a significant reduction in bank capital potentially being the main reason for the reduction in credit supply and hence the decline in overall output (Cortes et al., 2022).

Hogan and White (2021) compare Gustav Cassel's theory and Friedrich Hayek's theory of the causes of the Great Depression. Gustav Cassel accurately predicts global deflation, draw conclusions (although inaccurate) about the decline in gold production, and emphasizes the impact of gold supply and demand on global deflation. At the same time, Hayek's economic cycle theory attributes the investment boom of the 1920s to excessive monetary expansion, which caused an unwarranted business revival and high expectations. The mismatch between the money supply and the real needs of the economy played a crucial role in causing the Great Depression in the United States.

In a continuation of Gustav Cassel's theory, a study by Crafts and Fearon (2010) confirms the significant impact of the gold standard in deepening the recession during the Great Depression worldwide and views the abandonment of the gold standard as a way of recovery.

Studies by Brunnermeier (2009), Demyanyk and Van Hemert (2011), Maddaloni and Peydró (2011), and Mian and Sufi (2015) also focus on the Great Recession and identify the main causes and contributing factors that triggered its expansion:

1. The first of the major triggering factors of the crisis was the real estate market bubble when house prices in the United States rose rapidly and unreasonably due to overly affordable mortgage lending schemes. This led to a speculative frenzy where people bought houses using mortgages they could not afford. The bulk of the mortgages were at an adjustable rate of interest (ARM), which was initially low but was expected to rise gradually.
2. A second important reason was that financial institutions engaged in aggressive lending practices, inflating their loan portfolios by offering subprime loans to unreliable borrowers. These risky loans were pooled together with standard loans into common pools and sold as collateralized debt obligations (CDOs) and mortgage-backed securities (MBS). The complexity and opacity of these financial products made it difficult to value them properly and correctly.
3. The third reason was the lack of regulatory oversight, which allowed some financial institutions to engage in unscrupulous lending and high-risk financial practices without the threat of adequate sanctions from government authorities. This allowed the subprime mortgage market to grow unchecked.
4. The fourth reason was that credit rating agencies unjustifiably assigned high ratings to many MBS and CDOs without sufficient analysis, and without considering the presence of risky subprime mortgages. These ratings were the basis for creating a misperception of risk among investors.
5. A fifth reason can be attributed to the highly leveraged nature of a large portion of financial institutions, which meant that they borrowed large amounts of money to speculate in financial markets and invest. When the value of their assets, especially MBS and CDOs, declined, the solvency of these investors was threatened given their high portfolio weighting. As housing prices declined and unemployment rose, consumer confidence fell, leading to lower payouts. This, in turn, caused more damage to businesses and further exacerbated the economic downturn.
6. By then, the global financial system was tightly interconnected through the mutualization of investments and the purchase of derivative securities, and institutions around the world owned

these complex financial products. The crisis spread rapidly throughout the developed world and its effects, in the form of massive bankruptcies, affected not only U.S. financial institutions but also financial institutions in other countries.

To explore further why the Great Recession or the mortgage crisis spread so quickly across markets and countries, it is necessary to mention the transmission mechanism of financial markets. The mechanism is that problems from one part of the financial system can quickly and unexpectedly spread to other parts, potentially leading to a broader and more systemic crisis. Researchers identify 3 ways as the main transmission pathways:

- Brunnermeier and Pedersen (2005), Kodres and Pritsker (1998) describe a transmission channel through liquidity. It consists of the fact that a financial crisis covering one market can lead to a decrease in liquidity in other markets. This situation makes it difficult for investors to trade in other markets and leads to further price declines.

- Claessens et al. (2001), Kiyotaki and Moore (2002) characterize a correlated information transmission channel arising from the similarity of information flows. This type of transmission occurs when market participants believe that events in one market provide valuable information about potential risks and returns in other related markets, which causes agitated and unreasonable behavior that contributes to the spread of the crisis.

- Acharya and Pedersen (2005) highlight the risk premium transmission channel. This stipulates that when a financial crisis occurs in one market, it might lead to an increase in the risk premium demanded by investors in other markets. This may increase the cost of borrowing for businesses and reduce investment and economic growth.

The presence of these three main approaches forms the question: what exactly was the specific type or combination of transmission modes during the Great Recession? Longstaff (2010) finds that the financial crisis was transmitted through a combination of risk premium and liquidity channels.

In assessing the effect of the Great Recession on Germany, there was a strong but temporary decline in real GDP and financial assets, while the labor market experienced only a minor slippage. There were no significant changes in income distribution, poverty rates, or wealth inequality during the recession, although the effect on poverty risk and income inequality is justified in the long run (Grabka, 2015).

The European debt crisis emerged after the Great Recession at the end of 2009. It was characterized by excessively high structural government budget deficits and rising debt levels. Sovereign risk, which can be seen as the level of creditworthiness of the government, played a major role in this crisis, and it was the risk that the government would default on its debt. The article by Beirne and Fratzscher (2013) concludes that several factors influenced the cost of sovereign risk and the spread of the downturn during the European sovereign debt crisis, including the size and severity of the crisis in each country, the interconnectedness of institutions in the European financial system, the credibility of government policies, and the availability of liquidity. The article also emphasizes that transmission mechanisms played a significant role in the crisis, with countries that were more closely linked to the most affected countries experiencing higher sovereign risks.

The article by Babecký et al. (2014) helps to study the types of financial crises and their devastating impact on the economies of countries. In this research three types of crises are investigated: banking, debt, and currency crises. Banking crises are among the most common and have higher costs, their frequent consequences are debt and currency crises. During debt crises, sovereign borrowing costs tend to rise, often leading to the imposition of severe economic measures. These measures tend to have a positive impact on borrowing costs but also have a negative impact on domestic demand (Borensztein and Panizza, 2009). Currency crises arise from persistent balance of payments deficits and hence they are also called balance of payments crises (Kaminsky and Reinhart, 1999). Based on panel vector autoregression Babecký et al. (2014) find that all three types of crises damage the real economy and currency crises are preceded by both banking and debt crises. Consistent with a Bayesian averaging model, they find that banking crises often follow increases in domestic private credit, and it is important to monitor indicators such as increases in money market rates and global corporate spreads as leading indicators. In the case of currency crises, their findings confirm the importance of increased domestic private credit and rising money market rates. In addition, they identify the importance of identifying local currency overvaluation as a relevant factor. In their article, the most important variable as an early warning predictor is the ratio of domestic private credit to GDP.

In contrast to Babecký et al. (2014), Nguyen et al. (2022) show that currency crises have a higher frequency of occurrence than other financial crises, but they have a much shorter average duration. This is in strong contrast to debt crises, which typically last on average more than ten years. In addition, the results of Nguyen et al. (2022) emphasize the recurring cyclicality of financial crises, indicating a natural tendency for them to occur in waves.

Nguyen et al. (2021) take a comprehensive look at the impact of financial crises on various aspects of human development, covering not only income but also other socio-economic aspects such as education and health. The article highlights four key findings:

First, financial crises have a more significant impact on human development than political, institutional, and economic factors, which emphasizes the need for further research on the dynamics and consequences of financial crises.

Second, all types of financial crises impede both short- and long-term human development, with banking crises being less destructive than double and triple crises.

Third, the negative effects of financial crises affect life expectancy, education, and income, contradicting Granados and Ionides (2017), and Davis et al. (2010) that such crises can temporarily bring health benefits.

Finally, education is least affected by financial crises, due to its recognized role in generating long-term economic growth. The study highlights the need to maintain fiscal balance in normal times to counter the decline in welfare during financial crises, prevent the erosion of human development gains, and address the vulnerability of low-income groups.

2.2 Income inequality

One of the earliest articles where a cross-country regression is used is an article by Forbes (2000). Forbes (2000) applies pooled OLS and fixed effects to find a positive and significant relationship between income inequality and economic growth in the short and medium term, a finding that is consistent with the theoretical model proposed by Greenwood and Jovanovic (1990) but disputes other studies that claim a negative effect between these two variables (Cingano, 2014, Ravallion, 2014).

To learn more deeply about income inequality and its relationship with main financial variables we use the results from Berisha et al. (2018) where they analyze the connection between household debt, interest rate, and equity returns. They apply data for 100 years in the US covering the Great Depression and using structural vector autoregression. Berisha et al. (2018) research leads to several conclusions including income inequality is notably influenced by the stock market and household debt, interest rate effects directly only on the top 1 % share, and the most important conclusion about an inverse relationship between household debt and equities with an interest rate,

and these factors are associated with higher levels of income inequality which are supported by different studies (Kumhof et al., 2013, Stiglitz, 2016).

Bittencourt et al. (2019) find that financial development generally deepens income inequality in all 50 US states. However, a non-linear relationship emerges when states are categorized by initial levels of inequality. States with above-average inequality experience an accelerating effect, while states with below-average inequality exhibit an inverted U-shaped pattern. Large margins suggest that financial development can reduce inequality by providing services to low-income households, but intensive margins can widen the unequal distribution of income.

The same results are described by Jauch and Watzka (2016), who assess the within-country situation and find a positive relationship. Developed financial markets are associated with higher gross and net income inequality, which is a significant but moderate effect. Since all groups can benefit, but the rich benefit more, this situation exacerbates inequality.

Nguyen (2022) investigates the relationship between financial crises and income inequality over the past six decades using cross-country data and GMM estimation. His findings suggest that all types of financial crises contribute to the income gap between rich and poor people. Notably, the debt, twin, and triple crises cause greater disparities than the banking and currency crises. The effects of income inequality have been particularly severe in low- and middle-income countries, where all types of financial crises increase inequality in the country. In contrast, high-income countries have experienced increased inequality mainly during banking crises.

Nguyen's (2022) study emphasizes the importance of government regulation and support to mitigate the growing post-crisis income gap by implementing credible budget plans, expanding the social safety net through cash transfers, protecting education and health budgets during financial crises, raising the minimum wage, and adopting long-term and flexible social assistance programs. The article also argues that appropriate policies should be implemented in non-crisis periods to effectively address the impact of future financial crises on income inequality. Such policies can be implemented by maintaining fiscal balance, avoiding cuts in social spending during crises, and considering measures such as raising the top marginal income and inheritance tax, which is in line with the findings of Goda et al. (2017), and Piketty and Saez (2003).

Another study by Bodea et al. (2021) argues that there is strong evidence that in the long run, crises such as currency, banking, inflation, and debt crises contribute to inequality by widening income gaps between different segments of society. The article underscores the importance of addressing

inequality as part of the response to economic crises, taking into account the potential adverse political and social consequences.

Bazillier and Héricourt (2014) find a positive causal relationship between inequality and credit, both directly (increased demand for credit due to high inequality) and indirectly (government support for consumers). The study underscores the need for policymakers to account for the impact of inequality on credit booms, a key factor in financial crises.

Kirschenmann et al. (2016) investigate potential predictors of financial crises in advanced economies over the century. The researchers analyze various macroeconomic factors and find that income inequality, often overlooked in empirical evidence, is an important predictor of financial crises.

In addition, Atkinson and Morelli (2011) point to evidence that countries with higher levels of inequality tend to have more volatile financial markets and thus are more susceptible to banking crises. This is because inequality can lead to higher moral hazard, as the rich are more likely to engage in risky behavior since they expect government support in the event of a collapse.

The International Monetary Fund (2002) argues that banking crises are generally likely to reduce income inequality in the long run because crises can lead to the restructuring of the financial system, which can make it more difficult for the rich to exploit their wealth.

Agnello and Sousa's (2012) analysis indicates that income inequality experiences a notable increase at the beginning of a banking crisis but tends to decrease in the aftermath. Notably, in OECD countries, the distributional effects on income occur post-crisis, leading to a reduction in inequality. In contrast, non-OECD countries witness a significant rise in inequality before the start of the crisis.

2.3 Wealth inequality

The biggest part of empirical research and studies are based on income inequality, nevertheless, a much smaller part is based on the distribution of wealth. Specifically, there are only several articles on the effect of financial crises on wealth inequality.

Bagchi and Svejnar (2015) examine the relationship between economic growth, wealth, and income inequality using panel data for cross-sectional regression analysis. They apply fixed-effects specification which is quite similar to Forbes' (2000) model with a tiny difference that they

use as their main regressors of interest except wealth and income inequality also poverty. They get several results including economic growth tends to be adversely affected by wealth inequality, with income inequality having a little positive effect on growth and the influence of poverty on growth being considered insignificant. Additionally, wealth inequality associated with political connections has a significant negative effect on overall economic growth.

The scale and scope of wealth inequality are explored in the following two articles. Borgerhoff et al. (2009) present a dynamic model emphasizing the effect of intergenerational wealth transfer within families, which can be seen as the basis of long-run inequality. The study analyzes three types of wealth (material, corporeal, relational) in 21 historical and contemporary populations, revealing substantial transmission and associated inequality among pastoralist and agricultural societies compared to more egalitarian gatherer groups.

De Nardi and Fella (2017) investigate the impact of bequests, human capital, preference diversity, rates of return, entrepreneurship, earning processes, and medical expenses on wealth distribution. The main findings emphasize the significant impact of bequests, human capital, entrepreneurship, and medical expense risk on savings and wealth inequality.

Stiglitz (2012) using the US as an example, not only shows how growing inequality hurts the economy but also reveals the impact of inequality on political, legal, and social processes in society while exploring how monetary and fiscal policies and globalization have contributed to increasing inequality.

The causes of wealth inequality in the US are described by Hsu (2015) and include tax policy, corporate and intellectual property law, estate and gift taxation. The author reasons that tax laws favored capital gains over labor income, effectively subsidizing the rich, features of corporate law facilitated the concentration of wealth in the hands of the largest shareholders. Expanded intellectual property protection provided monopoly control over valuable intangible assets, further enriching the rich, and laws governing estate and gift taxation allowed wealthy families to pass on their fortunes intact, perpetuating intergenerational inequality. Hsu (2015) also proposes some reforms to achieve greater economic equality, such as raising taxes on capital gains and dividends, reforming corporate laws to reduce the power of large shareholders, limiting intellectual property protection, and restructuring inheritance and gift taxes.

The same conclusions are reached by Keister and Moller (2000), and the United Nations Development Programme (2019), and adding to the reasons highlighted by Hsu (2015) are

differences in access to quality education, health care, and other opportunities, as well as differences in political power and social mobility.

One of the most important factors in wealth inequality is inheritance. Elinder et al. (2018) provide a causal assessment of the effect of inheritance on wealth inequality using data from the Swedish population register on inheritance and wealth. The results show that inheritance leads to a drop in relative wealth inequality as determined by top wealth shares and the Gini coefficient but contributes to an increase in absolute wealth inequality. This double effect results from the greater importance of inheritance for less wealthy families, even if richer heirs inherit larger amounts. Behavioral adjustments, such as increased consumption among poorer heirs, partially counteract the equalizing effect of inheritance. In addition, inheritance taxation initially exacerbates wealth inequality, but redistribution of tax revenues can reverse this effect. The study also points to an increase in intragenerational wealth mobility after inheritance, although the effect is short-lived.

Wolff (2002) conducts a study on the estimation of the size and distribution of inheritance flows and their impact on wealth accumulation by analyzing data from the Survey of Consumer Finances (SCF). The author finds that inheritance plays a significant role in wealth accumulation, accounting for 40 % of the wealth growth of the richest 1 % of households. Between 1989 and 1998, the distribution of inheritance was highly skewed, with the richest 1 % of households receiving 55 % of all inheritance; accordingly, inheritance contributed to increasing wealth inequality, widening the gap between the richest 1 % and the bottom 50 % of households.

Leitner (2018) uses data from nine European countries in his article on wealth inequality: Austria, Belgium, Denmark, Finland, France, Germany, Italy, Portugal and Spain. Leitner investigates the factors contributing to wealth inequality. As in previous studies, the author argues that differences in inheritance and gifts received by households have a significant impact on wealth inequality, with inheritance explaining on average 30 % of wealth inequality in the nine countries. The impact of this factor is found to be stronger than other factors, including income differences. The work also finds that the observed wealth inequality depends on the distribution of household characteristics such as (age, number of adults and children in the household, and marital status), these factors, as well as education and employment opportunities, can also influence wealth inequality.

To delve deeper into this topic, it is important to look at the effect of globalization on inequality. Mills (2009) conducted a study reviewing various literature on the topic, which identifies

conflicting views, with some claiming that globalization exacerbates inequality and others claiming the opposite. Methodological issues, including the definition of inequality and globalization, data quality, and calibration methods, contribute to the different results. The effect of globalization on inequality is explored through interrelated mechanisms such as market internationalization, tax competition, and technological progress, and it is difficult to find factors with a direct proximate relationship.

Zucman (2019) suggests that several factors including globalization, technological change, and financialization have contributed to the rise in wealth inequality. Globalization facilitates the movement of capital around the world, allowing wealthy individuals to invest in assets with higher returns. Technological advances make it easier for businesses to automate tasks and displace workers, especially low-skilled workers, resulting in lower wages. Financialization leads to a shift from traditional assets such as housing and stocks to financial instruments that are more difficult to manage and value, which benefits wealthy investors. Another conclusion from Zucman's article is that wealth inequality has significant implications for economic growth, social mobility, and political stability. A highly unequal distribution of wealth can lead to slower economic growth because the rich are less likely to spend their money than the poor. It can also inhibit social mobility as people from low-income families find it increasingly difficult to accumulate wealth. Ultimately, it can contribute to political instability as the rich can use their power to influence political outcomes.

In support of Zucman's study, Karmakar and Jana (2022), and Stiglitz (2002) assert that globalization increases wealth inequality because globalization makes it easier for rich people and corporations to accumulate wealth, while it becomes more difficult for middle and low-income people to do so.

There are only several articles that explain the effect of financial crises on wealth inequality. The first one is Shchepeleva et al. (2022). They take 8 years after the Great Recession and investigate the effect of banking crises on Gini change using data from 143 countries. It was conducted a cross-country regression with the 4-time windows from 2010 to 2018. They didn’t find a notable relationship between the Great Recession and the change in wealth inequality in these years. At the same time, they argue a crisis with higher fiscal costs tends to worsen wealth inequality, while a crisis with greater output loss has the opposite impact on wealth inequality, whereas with the same dataset Agnello and Sousa (2012) discovered a decrease in income inequality coming

banking crisis episodes. The last result is that greater economic and financial development, along with lower initial wealth inequality, contributes to the Great Recession having a more significant impact in increasing overall wealth inequality.

Hauner (2020) investigates the connection between financial crises and wealth inequality. Analyzing nine countries' panel data over more than a century, the author uses a linear probability model that accounts for various factors, emphasizing the impact of wealth distribution on macro-financial stability. The results confirm a strong positive relationship between wealth inequality, aggregate wealth, and the probability of financial crises. The empirical evidence supports the view that the concentration of accumulated assets, especially stocks, reveals structural vulnerabilities that contribute to financial instability in rich countries. The research suggests that escalating wealth inequality may increase macroeconomic instability by increasing the risk of financial crises.

Chesters (2019) examines the effect of economic growth on wealth distribution and inequality in 11 Asian countries from 2000 to 2016 using data from the World Bank, Credit Suisse, and Forbes. Growth in GDP per capita, in countries such as China, Hong Kong, and Vietnam, was accompanied by a significant increase in wealth inequality, leading to the emergence of super-rich billionaires. The article recognizes the limitations associated with problems in accessing detailed data on wealth distribution from national sources. It emphasizes that in non-democratic systems there is a clear role for capital accumulation in concentrating wealth at the top and creating social inequality.

Bogliacino and Maestri (2016) underline the growing importance of wealth, debt, and wealth inequality during crises, emphasizing the need for better measurement and analysis methods. Recognizing the efforts of the Household Finance and Consumption Network limited to Eurozone countries, the authors examine different levels of wealth inequality around the world, with Anglo-Saxon and Scandinavian countries illustrating higher levels. Institutional factors and policies such as social spending and taxation play a key role in determining a country's wealth inequality. The article notes the rise in wealth inequality since the Great Recession, affecting most wealthy economies. Despite policy interventions, factors of wealth inequality persist, favoring house taxation over financial regulation.

Zucman (2015) explores the mechanisms and scale of tax evasion of the richest and the role of offshore in the global economy. The author emphasizes that transferring a significant part of capital offshore contributes to the increase in wealth inequality, as the richest avoid taxation, resulting in disproportionately lower tax rates compared to the rest of the population and households.

Furthermore, the European debt crisis has exacerbated existing inequalities, with the rich benefiting more from state aid and higher asset prices than the poor and middle class (Goda et al., 2017).

The analysis of Pozo (2021) shows that the financial crisis significantly affected wealth and income inequality. The crisis caused a precipitous decline in asset prices such as stocks and housing, which disproportionately affected poor and rich households. This decline in asset prices furthermore caused the value of household wealth to drop, which widened the gap between rich households and middle- and low-income households.

Piketty (2014) explores the evolution of wealth inequality based on extensive historical data and analyzes long-term trends in the distribution of wealth. The book notes that the global crisis has had a negative impact on the global economy, but the wealth of the wealthiest layer of the population continues to increase. The author emphasizes that growing wealth inequality affects the slowdown of economic growth and political stability of the global system and offers policy recommendations to address these problems which aligns with the book by Milanovic (2016).

Hasan et al. (2020) investigate 37 independent variables to study determinants of wealth inequality covering financial, economic, institutional, and geographical indicators. They applied instrumental variable Bayesian model averaging which estimates parameters by averaging the predictions from various models, under conditions, each weighted by its model probability and this model accounts for endogeneity approached by Karl and Lenkoski (2012). As a result, they discover that the financial role plays a significant factor in influencing wealth inequality specifically linked to financial development. Countries with larger financial markets revealed by variables such as stock market capitalization and the size of debt securities markets tend to have bigger wealth inequality, and countries with war experience demonstrate greater wealth inequality. Simultaneously countries that have more advanced financial systems in terms of access and financial intermediaries experience lower wealth inequality. Also, economic indicators such as education and income distribution are connected to lower wealth inequality.

Baltagi et al. (2009) reveal how important are two key financial development indicators—private credit and stock market capitalization using GMM estimator. It also emphasizes the theory of Hasan et al. (2020) on the importance of depth as a financial development variable. Baltagi et al. (2009) study partly supports Rajan and Zingale's (2003) theory that openness significantly influences the development of the banking sector. Nonetheless, the results also indicate a negative

correlation between the marginal effects of trade openness and the level of financial openness and a negative correlation between the marginal effects of financial openness and the degree of trade openness meaning that there is no evidence to propose that the openness in one aspect without the simultaneous opening of the other could hurt financial sector development.

3. Data Description

The dataset consists of 119 countries which are separated into two groups: developed (ID - 0) and developing (ID - 1) countries. For developed, and developing countries the classification is based on the United Nations's data (United Nations, 2022). As a result, there are 43 developed countries, and 76 developing countries, as can be seen in Table A1 in the appendix.

In the selection of the countries, we consider sovereign countries and try not to include very small countries and islands. Another concern is the lack of data for some countries from Africa, Asia, and Latin America continents.

The main source of data on global development indicators is the World Bank. Most often, the World Bank data, presented as a time series dataset, is used for analysis and visualization of various economic and financial topics. "World Development Indicators" is the database for relevant and comparable data that, at the global level, provide an opportunity to assess poverty reduction.

Additionally, to the World Bank, we use the following sources of data in this master's thesis:

1. The World Inequality Database (WID) analyzes the historical evolution of wealth and income distribution, both within countries and internationally, and provides open access to extensive data on this topic.

2. The International Monetary Fund (IMF) provides comprehensive data on the financial development of more than 180 countries. This data, presented in the form of financial development indices, provides an overview of the integration and efficiency of financial markets and institutions in different economies.

3. The United Nations University (UNU-WIDER) accumulates and makes information on income inequality in developed and developing countries, and countries with economies in transition.

4. The KOF Globalization Index is a comprehensive indicator of globalization, which was developed by the KOF Swiss Economic Institute at the Swiss University of Technology Zurich to measure globalization based on economic, political, and social variables.

5. The Fraser Institute indicators assess the level of institutional support for economic freedom in countries.

6. The article by Nguyen et al. (2022) is a source of new evidence on the origin, impact, and duration of different types of financial crises.

In this cross-sectional analysis, we are using a time-series variable starting from 2000 and ending in 2019. Only 20 years are covered in a dataset since the dependent variables "top 1 % share" from the World Inequality Database (World Inequality Database, 2023a), or "top 10 % share" from the World Inequality Database (World Inequality Database, 2023b) have as a starting point year 2000 with several country exceptions such the United States where earlier observations are available. In addition, our main independent variables which are types of crises have observations by 2019 including.

3.1 Description of variables

The top 1 % share refers to the richest 1 % of people in a certain country, this group usually holds a large portion of the nation's wealth (World Inequality Database, 2023a). We decide to take the top 1 % share in comparison to the Gini coefficient because the top 1 % more direct and intuitive measure of the concentration of wealth at the top of the distribution, and it might be useful to monitor trends in wealth inequality. Concurrently, the drawback of it in contrast to the Gini coefficient is only sensitive to changes in the wealth of the very richest individuals or households. That is the reason we choose to take one more dependent variable as the top 10 % share (World Inequality Database, 2023b). Taking two variables we are able to include them in regressions and compare them. The second plus to consider these variables is the availability of a lot of countries and larger time series data, in our case 20 years with an opportunity to have no missing values for 119 countries. The third advantage is that we find no literature that considers some % share for wealth inequality.

To represent independent variables, we consider binary variables such as banking crises, currency crises, and debt crises with a value of 0 for a given year and country without the crisis and a value of 1 with the crisis. Additionally, we examine twin crises (Nguyen et al., 2022).

The simultaneous realization of crises in the banking and currency sectors is called twin crises. In such a situation, the crises reinforce each other. In a currency crisis, when the national currency weakens, it is much more difficult for banks to survive the banking crisis and continue to fulfill

their obligations. Twin crises are often based on a combination of factors: weak economic fundamentals, dependence on foreign capital, and rapid financial liberalization.

Since identifying the determinants of wealth inequality is not the purpose of this master's thesis, we use as control variables the set of wealth inequality independent variables identified by Hasan et al. (2020) as the most relevant to the study of the effect of financial crises and the level of financial development of countries on wealth inequality. We use the 10 control variables from the article by Hasan et al. (2020) from BMA estimation and IVBMA estimation where the posterior inclusion probability (PIP) is more than 0.5 in both estimations. Some variables from the Hasan et al. (2020) article such as outward orientation, redistribution, and financial market development we change to the globalization index, tax including social contributions (% of GDP), and the Financial Markets Access Index accordingly. The reason for this is that we do not have enough data or lack of sources to cover 20 years for 119 countries. The following variables we describe in this section in ascending order, except for the financial variables, which are grouped at the end of this section:

Agriculture, forestry, and fishing value added (% of GDP) encompassing forestry, hunting, and fishing, as well as crop cultivation and livestock production. Value added is calculated as the difference between total net output and intermediate costs incurred. Value added in these industries does not take into account the depreciation of artificial assets, depletion, and degradation of natural potential (World Bank, 2023a). This control variable since the ownership of land used for agriculture and forestry might be concentrated in the hands of a few individuals or corporations, this concentration of land ownership can contribute to wealth inequality.

Economic Freedom Summary Index is the index that assesses the level of economic freedom in five keys: Government Size; Legal System and Property Rights Security; Sound Money; International Trade Freedom; and Regulation (Fraser Institute, 2022).

Globalization is the KOF Globalisation Index used to assess its socio-economic and cultural-political manifestations. It considers some variables, including financial flows, financial constraints, information and communication data, interpersonal relationships, and cultural closeness (Gygli et al., 2019). Zucman (2019) and Karmakar and Jana (2022) argue that globalization raises wealth inequality.

School enrollment, tertiary (% gross) is the proportion of all enrolled individuals, age unaffected, to the population in the age range that formally corresponds to the university or college level of study. Secondary education must typically be completed successfully to be admitted to tertiary

education (World Bank, 2023b). Access to qualitative tertiary-level education can drop wealth inequality (Keister and Moller, 2000).

Tax including social contributions (% of GDP) represents the total revenue that was collected to the budget and non-budgetary funds in the form of taxes and social contributions (to finance social security programs, health care, and other social needs). It is calculated as the ratio of these revenues to a certain indicator in percentage (UNU-WIDER, 2023).

Financial variables play an important role in influencing wealth inequality (Hasan et al., 2020, Baltagi et al., 2009). A comparative evaluation of nations' financial markets and institutions based on their depth, accessibility, and efficiency is provided by the Financial Development Index (FD) (International Monetary Fund, 2023). It combines the Financial Markets Index (FM) and the Financial Institutions Index (FI), two important components:

The Financial Institutions Index (FI) comprises the Financial Institutions Depth Index (FID), which encompasses metrics such as bank credit to the mutual fund assets, pension fund assets, private sector, and insurance premiums as percentages of GDP. Additionally, it includes the Financial Institutions Access Index (FIA), measuring bank branches and ATMs per 100,000 adults, and the Financial Institutions Efficiency Index (FIE), incorporating various banking sector indicators (International Monetary Fund, 2023).

The Financial Markets Index (FM) integrates the Financial Markets Depth Index (FMD), evaluating stock market capitalization, stocks traded, international debt securities, and total debt securities as percentages of GDP. Furthermore, it consists of the Financial Markets Efficiency Index (FME), which measures the stock market turnover ratio, and we do not use this variable in the regressions, because the PIP from Hasan et al. (2020) article is less than 0.5, and the Financial Markets Access Index (FMA), which evaluates the market capitalization distribution and the number of debt issuers per 100,000 people (International Monetary Fund, 2023).

3.2 Wealth inequality dependent variables

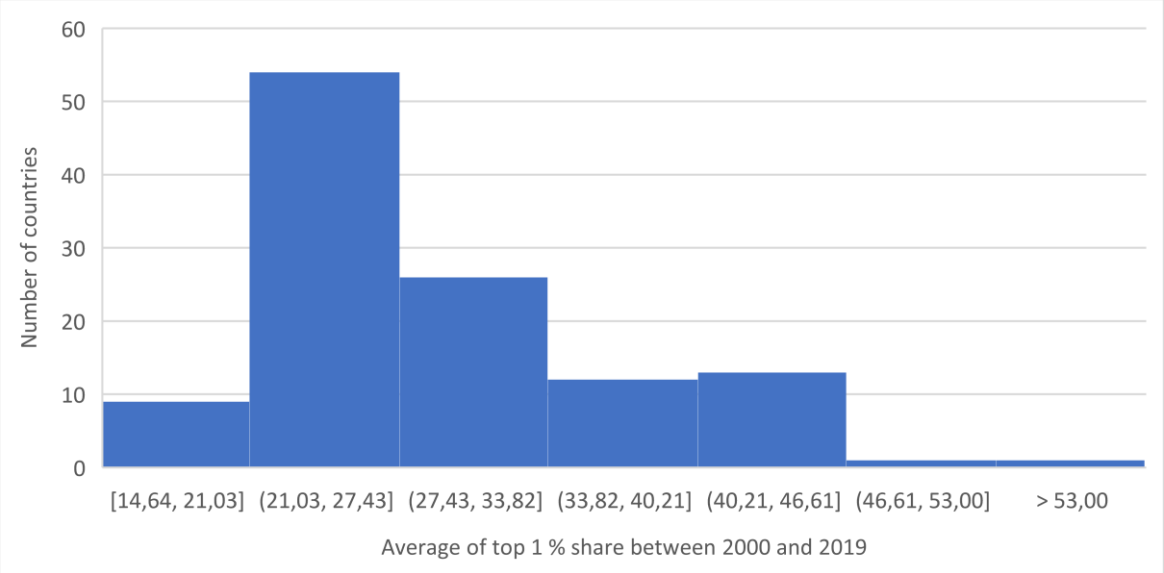
In this subsection, we compare two indicators of wealth inequality: the top 1 % share and the top 10 % share, and how it changes from 2000 till 2019.

Table 1: Descriptive statistics of the top 1 % share and the top 10 % share

	Top 1 % share	**Top 10 % share**
Mean	29.374	62.674
Std	8.135	7.636
Min	12.090	42.020
25%	24.020	57.787
50%	26.620	60.210
75%	33.782	67.102
Max	57.000	89.150

First and foremost, let's compare our dependent variables by descriptive statistics. Table 1 shows a striking inequality: the richest 1 % of the population owns a larger share of wealth than the other 99 %. The richest 1 % account for approximately 29 % of all wealth, while the remaining 99 % account for 71 %. Table 1 also reveals that the richest 10 % concentrate around 63 % of all wealth in their hands, while the other 90 % of the population owns only 37 %. Interestingly, the standard deviation is higher for the richest 1 %, indicating that the variation between them is higher than between the richest 10 %. The minimum value for the top 1 % share is 12 and belongs to Slovenia from 2000 to 2001, whereas the maximum value is for South Africa in 2011 with a value of 57. In the case of the top 10 % share, the minimum value is 42 and it is Slovakia in 2000, simultaneously the maximum value is the same for South Africa with a value of around 89 in 2008. From the tables, it is easy to notice that the means and the medians are not very close in both cases, meaning the variables do not have symmetrical distributions and are skewed a bit to the right side because the means are larger than the medians.

Figure 1: Average of the top 1 % share between 2000 and 2019



Notes: The figure reveals a histogram of the distribution of countries according to the group of values of the average of the top 1 % share between 2000 and 2019.

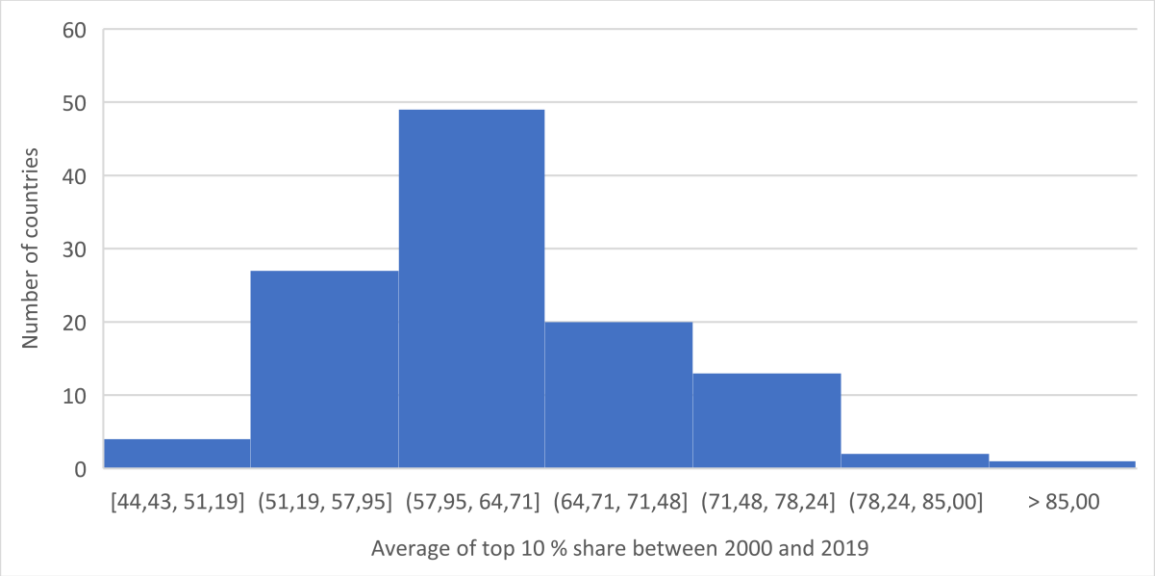
We calculate the mean of the top 1 % share for each country between 2000 and 2019 and then create a histogram (see Figure 1), on the x-axis, there are the means of all the countries of the top 1 % share splitting into 7 mean groups, and on the y-axis, there are a count of countries. The highest number of countries is in the mean group of 21.03 to 27.43 with a value of 54 countries, the second largest value of 26 countries is between 27.43 and 33.82. The whole interval for all the countries is from 14.64 to 53.08 and the distribution of data is right skewed.

An interesting point is to look at each group separately which is represented by a variable ID (developed and developing countries). For developed countries, the average top 1 % share is lower in contrast to another group with the lowest value of 14.64 and the maximum value of 42.35. The largest number of countries is between 22.76 and 26.82, and it consists of 19 countries and then it gradually declines (see Figure A1 in the appendix). The developing countries with the highest point at 24 countries in an interval of 22.69 to 26.91, then reduces to 17 countries in the range of 26.91 to 31.12 and slowly declining till the end of the range to 2 countries with the maximum point at 53.08 of an average top 1 % share. The plot can be seen in Figure A2 in the appendix.

As a result, the top 1 % of the population own the least in developed countries (in percentage) and hence wealth inequality is the lowest in contrast to other groups. A group of developing countries has higher wealth inequality. A difference in contrast to developed countries is a group of

developing countries, meaning the top 1 % of the developing countries population are richer in terms of their populations and wealth inequality is larger in this specific group.

Figure 2: Average of the top 10 % share between 2000 and 2019

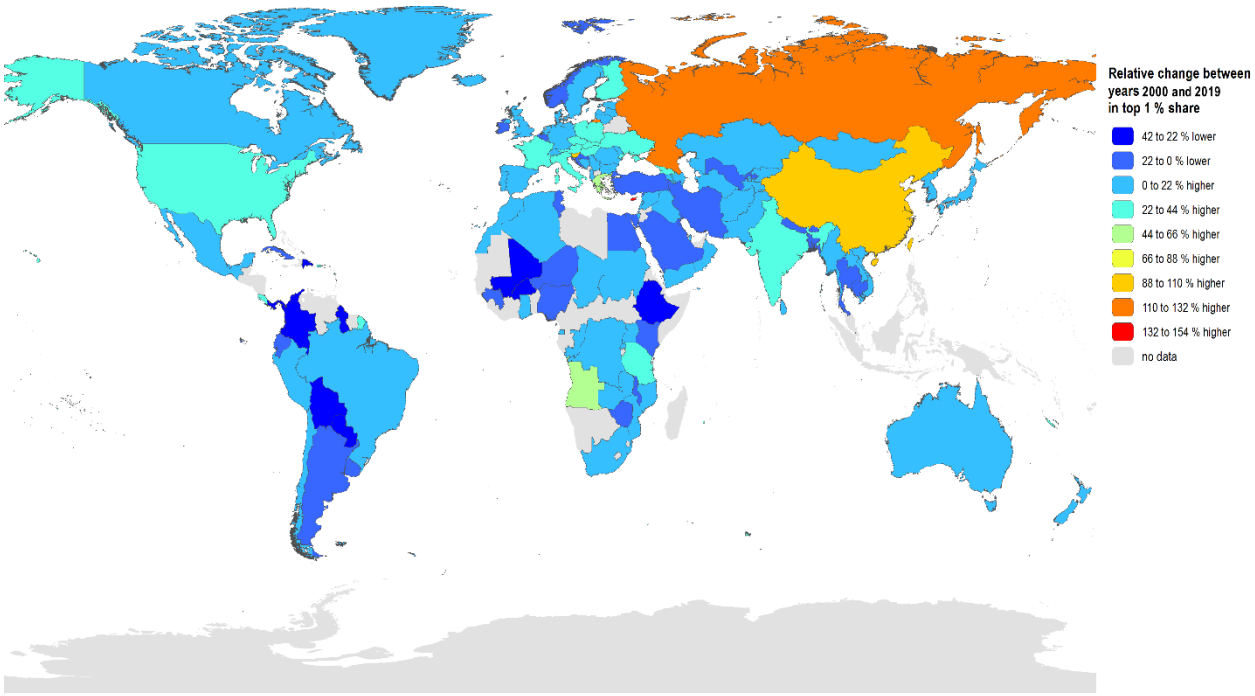


Notes: The figure reveals a histogram of the distribution of countries according to the group of values of the average of the top 10 % share between 2000 and 2019.

The following step is to calculate the mean for the top 10 % share for every country in the range of 2000 to 2019 and then create a histogram (see Figure 2). It is noticeable quite similar distribution with some differences between the top 1 % and the top 10 % of the countries. The interval is from 44.43 to 85.99. 49 countries are in the range of 57.95 to 64.71, which takes up 41 % of the total number of countries. The second group in the range of 51.19 to 57.95 decreases significantly with only 27 countries which is only 23 % of the total count of countries.

Looking at each group separately we can conclude that the average of the top 10 % share behaves the same way as the average of the top 1 % share, even the patterns of distributions for each group are very similar between these two variables (the plots can be seen in Figure A3 and Figure A4 in the appendix). The plots of the top 10 % share support our previous conclusions that wealth inequality is lower in developed countries and that developing countries have higher wealth inequality in contrast to developed countries.

Figure 3: Relative change between the years 2000 and 2019 in the top 1 % share



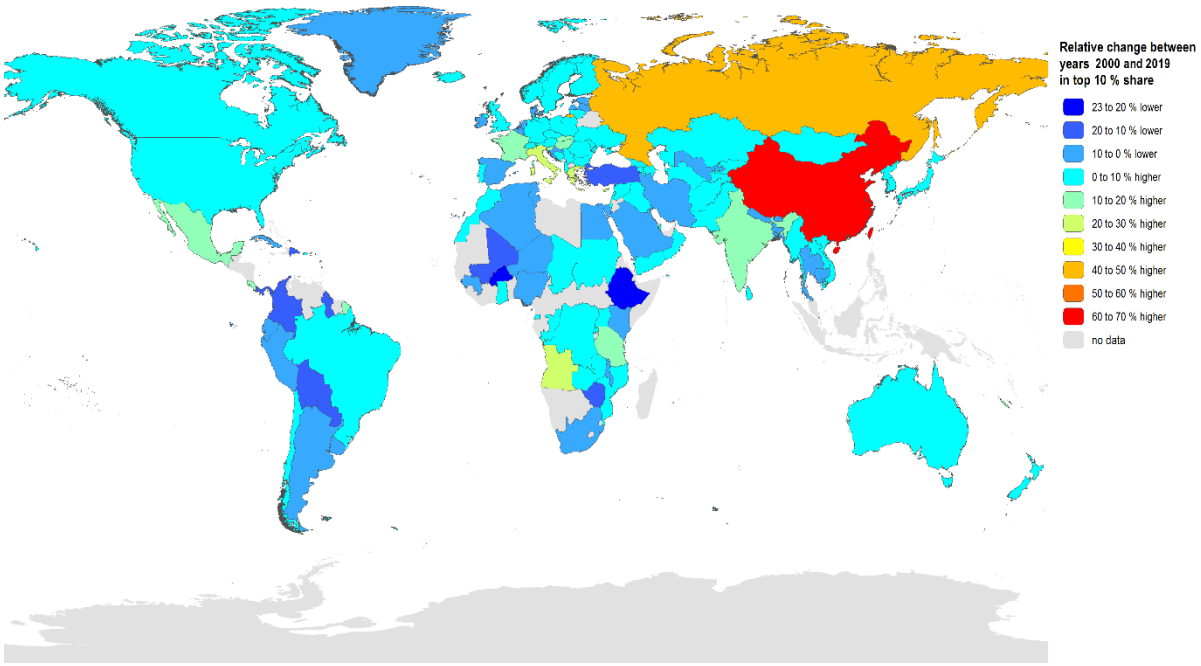
Notes: The figure reveals the relative change in the number of financial assets held by the top 1 % of countries' populations between 2000 and 2019, expressed as a percentage.

In most countries of the world, this indicator (see Figure 3) has experienced a slight increase or decrease between the measured years up to 22 % of the original value in 2000. Among European countries, decreases can be traced to Norway, Ireland, Belgium, and Croatia. A more significant decrease, i.e. more than 22 %, occurred in only nine countries in the world - Mali, Burkina Faso, Ethiopia, Panama, Colombia, Guyana, Dominican Republic, Bolivia, and Paraguay. At the same time, it is worth mentioning that despite the decrease in the values of the relative difference between these years, the absolute amount of held assets shared by both 1 % and 10 % of the population of the listed countries remains at least 60 % of all financial assets.

An increase in the number of financial assets held by 1 % of the population by more than 22 % from 2000 levels in the developed world can be seen in the United States, a number of Central European countries such as Ukraine, Finland, Italy, France, and Georgia. A more significant increase within Europe is seen in Greece, as well as in Slovenia, where the percentage of assets held has doubled since 2000. At the same time, in the Global South, only five countries - India, French Guyana, Costa Rica, Tanzania, and Angola - experienced such an increase. Of these countries, only Angola experienced an increase of between 44 and 66 percent.

The indicator reached record highs in three countries. In the People's Republic of China, it doubled, and in Russia, it was between 110 and 135 percent of the 2000 level. Simultaneously, in the Republic of Cyprus, this parameter in 2019 reached a value 2.5 times higher than at the end of the 90s.

Figure 4: Relative change between the years 2000 and 2019 in the top 10 % share



Notes: The figure reveals the relative change in the number of financial assets held by the top 10 % of countries' populations between 2000 and 2019, expressed as a percentage.

In the case of the top 10 % of the population (see Figure 4), most countries in the world have either increased or decreased by 10 percent or less between 2000 and 2019.

A larger decline in the number of assets compared to 2000 could be observed for some countries in South America and Africa - Colombia, Panama, Guyana, Bolivia, Paraguay, Mali, Zimbabwe, Burkina Faso, and Ethiopia. In the last two of these countries, the value for 2019 was more than 20 % lower than the value in 2000. Among the Eurasian countries, a similar decrease could only be observed for Turkey.

A moderate increase in the relative difference in the Global South was observed in Mexico, Costa Rica, French Guyana, India, Tanzania, and Angola. A similar increase up to 30 % of the 2000 level was also observed in the following European countries: Italy, France, Slovakia, Hungary, Greece, and Cyprus. We note that the absolute values of this indicator in all European countries, including

those with its relative increase over the period under research, remain among the lowest in the world.

Together with the increase in the number of assets owned by 1 % of the population, the number of assets in the hands of the richest 10 % of the population increased similarly in the Russian Federation and the People's Republic of China. China leads the world in the growth of this indicator and the value in 2019 was almost 1.7 times higher than in 2000.

3.3 Financial crises and wealth inequality

It is important to know if there is a relationship between wealth inequality which is represented by the top 1 % share and the top 10 % share and financial crises with three types of banking crises, currency crises, and debt crises, and the combination of banking and currency crises in the context of twin crises. That is why we conduct a correlation analysis.

Table 2: Correlation between the top 1 % share, the top 10 % share, and 4 types of crises

	Top 1 % share	**Top 10 % share**
Banking Crises	-0.135	-0.112
Currency Crises	0.132	0.125
Debt Crises	0.157	0.167
Twin Crises	0.014	0.009

Because crisis variables are binary, we cannot conduct the Pearson correlation coefficient and hence we need to use the point-biserial correlation coefficient.

The point-biserial correlation coefficient is used to assess the correlation between the measure of strength and the direction of the relationship between binary and continuous variables. It can be considered a special case of the Pearson correlation coefficient, with one of the variables being a binary. The point-biserial correlation coefficient ranges from -1 to 1, where 1 indicates an ideal positive relationship between two variables (binary and continuous), and -1 indicates an ideal negative relationship. A value of 0 indicates no relationship between the variables.

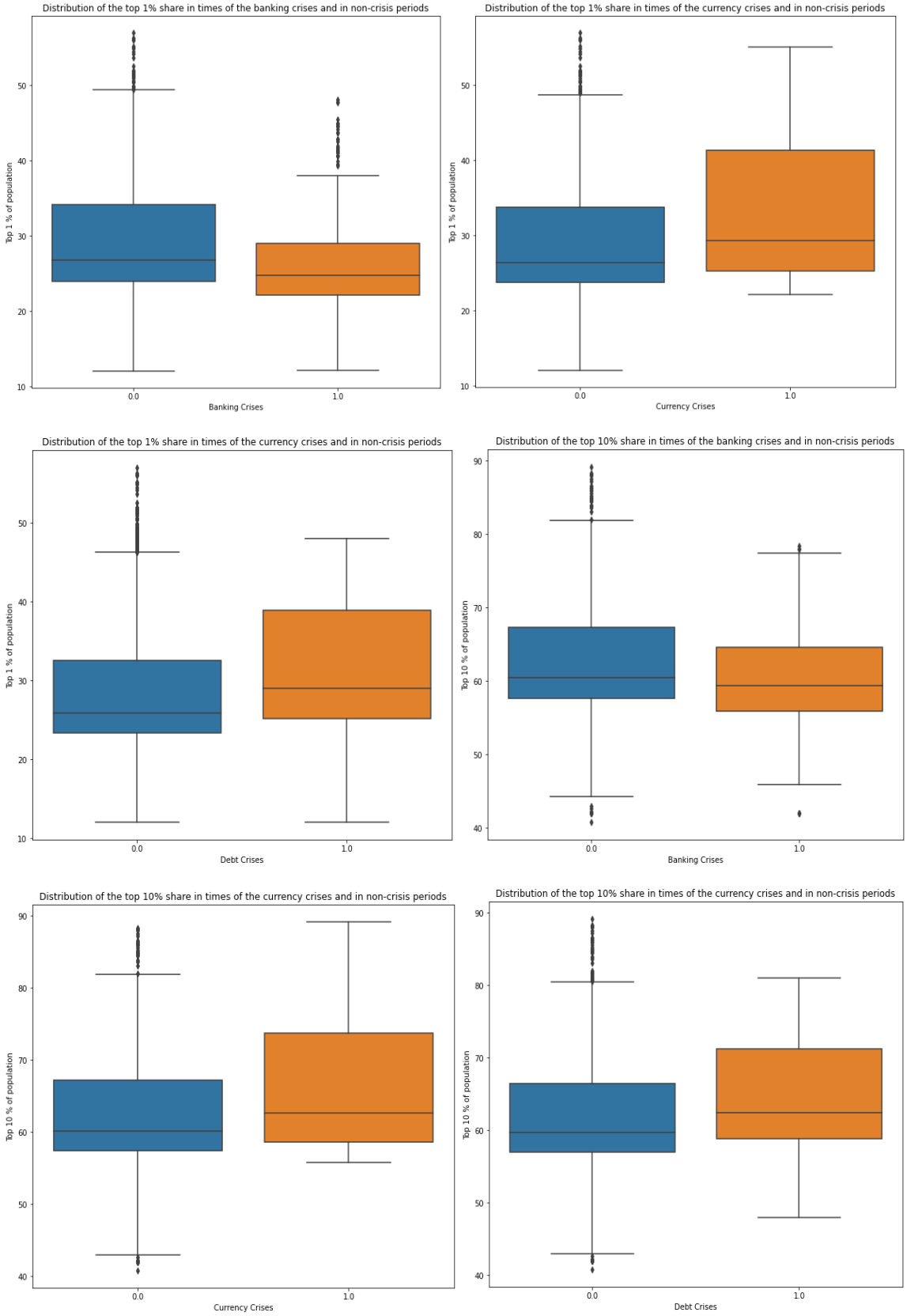
The negative point-biserial correlations (see Table 2) for both the top 1 % and top 10 % shares in the banking crises (-0.135 and -0.112) suggest a fragile negative association between higher wealth concentration and the likelihood of banking crises, meaning if we go from 0 which represent no crisis to 1 which represent a year with crisis asset concentration in top 1 % and top 10 % of the

population slightly drops. From the perspective of this thesis, the correlation for the currency crises (0.132 and 0.125) and the debt crises (0.157 and 0.167) is important. This is an indication of the increase in wealth inequality that is associated with the realization of currency and debt crises. The correlations for the twin crises are much lower, suggesting limited associations between wealth inequality and these specific types of crises.

By comparing the t-statistics calculated for each correlation with the critical t-value for a significance level of 0.05 and the corresponding number of degrees of freedom for each correlation, we determine that all calculated correlations, except the twin crises, are statistically significant since the absolute values of t-statistics for banking, currency, and debt crises are greater than the critical t-values. For the twin crises, the result is the opposite, so the correlation with the twin crises is not statistically different from zero.

The next step is to look at the distribution of wealth by a specific percentage of the population in a period without a crisis and with a crisis. For this purpose, we need to create boxplots.

Figure 5: Distribution of the top 1 % and 10 % of the population in crisis and non-crisis periods



Notes: The figure reveals the distribution of the top 1 % and 10 % of the population in crisis and non-crisis periods. The order is from left to right side, the first row shows the top 1 % share split by the banking crisis, currency crisis, and debt crisis in the second row, then it is followed by the top 10 % share, and the same types of crises and order.

First, let's describe plots where we have the top 1 % of the population (see Figure 5). In the first plot, where this variable is split by banking crisis it is noticeable that the top 1% share of wealth is wider for a period without a crisis which covers practically the whole range with some outliers, for the crisis periods the richest have typically lower wealth in countries and years that have experienced a banking crisis. The unfolding of a banking crisis is typically accompanied by a decline in the value of financial assets, which disproportionately affects the richest 1 %. Since their financial assets are represented by stocks and bonds, the decline in their value leads to a reduction in the total wealth of the top 1 % richest (Pozo, 2021). Another reason can be considered the decline in real estate values that accompanies banking crises, which also, above all, reduces the wealth of the top 1 % of the richest.

The opposite situation is observed in countries experiencing currency crises. At this time, there is a sharp increase in the share of wealth belonging to the top 1 % of the wealthiest. This indicates that currency crises can lead to further stratification in society, concentrating more and more wealth in the hands of a few.

In the case of the debt crises, the accumulation of wealth in these populations is higher during the crises, which can be seen from the bigger interquartile range which seeks higher values, and from the bigger median with a value around 30, and even the upper whisker is a bit higher.

For the top 10 % of the population, we see similar behavior as it was for the 1 %. Specific populations that experience banking crises in given years have lower assets in comparison to the same populations in years without crises.

The top 10 % of the population experienced an increase in wealth during the currency crises, the interquartile range and median are bigger, and the upper whisker is much longer than the lower whisker meaning that a significant portion of higher values is in a period of crises and without any outliers.

For the debt crises, the top 10 % interquartile range is bigger, and the median is higher during crises than in years without crises, also lower whisker is shorter than in years without crises.

We do not describe the variable twin crises for the top 1 % and 10 % because it is a mix of the banking and currency crises, and they influence this variable tremendously leading practically to the same distribution patterns. Another reason is that we do not have a significant sample for this variable to accurately describe behavior during the twin crises, but we include it in Figure A5 in the appendix.

3.4 Control variables and wealth inequality

Additional variables, known as control variables, we include in statistical models to account for their possible effects on the dependent variable. In this master's thesis, control variables help isolate and estimate the exact effects of financial crises while keeping other relevant elements constant when studying how financial crises affect wealth inequality. Ideally, the control variables should be correlated with the dependent variables, i.e. in our case it is the top 1 % share and the top 10 % share.

Building on the analysis of the significance of certain control variables on wealth inequality in the study by Hasan et al. (2020), we use the set of 10 indicators shown in Table 3 as control variables. Let us look at the descriptive statistics of these control variables.

Table 3: Descriptive statistics of selected control variables

	Agriculture, forestry, and fishing, value added (% of GDP)	**School enrollment, tertiary (% gross)**	**Economic Freedom Summary Index**	**Tax including social contributions (% of GDP)**	**Globalization index**
Mean	11.139	42.001	6.819	21.099	62.839
Std	10.624	27.954	1.091	12.992	15.832
Min	0.030	0.318	2.900	0.355	23.684
25%	2.423	15.591	6.060	9.680	50.290
50%	6.935	42.807	6.890	19.211	63.094
75%	18.901	63.441	7.720	32.725	76.543
Max	57.140	142.388	8.920	49.592	91.141

	Financial Institutions Depth Index	Financial Institutions Access Index	Financial Institutions Efficiency Index	Financial Markets Depth Index	Financial Markets Access Index
Mean	0.276	0.371	0.554	0.263	0.271
Std	0.273	0.298	0.126	0.297	0.290
Min	0.000	0.000	0.073	0.000	0.000
25%	0.065	0.090	0.485	0.029	0.004
50%	0.164	0.337	0.567	0.108	0.178
75%	0.431	0.601	0.649	0.463	0.500
Max	1.000	1.000	0.830	0.998	1.000

Agriculture, forestry, and fishing, value added (% of GDP) is the first control variable to assess the possible effect on wealth distribution, since ownership of land used for agriculture and forestry may be concentrated in the hands of a few individuals or corporations, such concentration of land ownership may contribute to wealth inequality. The average value of the share of agriculture across countries is 11.139 % with a standard deviation of 10.624 %. The values range from 0.03 % to 57.14 % across countries.

School enrollment, tertiary (% gross) shows the degree of coverage of the population by the educational system and indirectly shows the level of education of the population. This indicator has a mean value of 42.001 % with a standard deviation of 27.954 %, has a minimum value of 0.318 % and a maximum value of 142.388 %, which indicates significant deviations of this indicator in different countries.

The next indicator is the Economic Freedom Summary Index, its purpose is to assess the level of economic freedom in different countries. With an average value of 6.819, this index has a standard deviation of 1.091 and a range of variation across countries from 2.900 to 8.920, which indicates that there is a significant difference in the level of economic freedom in different countries of the world.

Taxation is one of the most important instruments for the implementation of macroeconomic state policy and is measured by the indicator "Tax including social contributions (% of GDP)". The

average value of this indicator is 21.099 % with a minimum value of 0.355 %, a maximum of 49.592 %, and a standard deviation of 12.992 %, which indicates a significant difference in tax policy in different countries of the world.

The globalization index allows us to assess the degree and scale of integration of countries into the global world space. With an average value of 62.839, this index has a minimum value of 23.684, a maximum value of 91.141, and a standard deviation of 15.832, which indicates a significant difference in the level of openness of different countries to global processes.

In addition to the above indicators, we consider five other financial variables that are crucial from the results of Hasan et al. (2020). We include these indicators to reflect the assumptions made by the theory that financial market-dependent savings and financial development are the main drivers of wealth inequality.

The Financial Institutions Depth Index. The average value of this index is 0.276 with a standard deviation of 0.273, a minimum value of 0.000, and a maximum value of 1.000.

The Financial Institutions Access Index. The average value of this index is 0.371 with a standard deviation of 0.298, a minimum value of 0.000, and a maximum value of 1.000.

The Financial Institutions Efficiency Index. The average value of this index is 0.554 with a standard deviation of 0.126, minimum value of 0.073, and maximum value of 0.83.

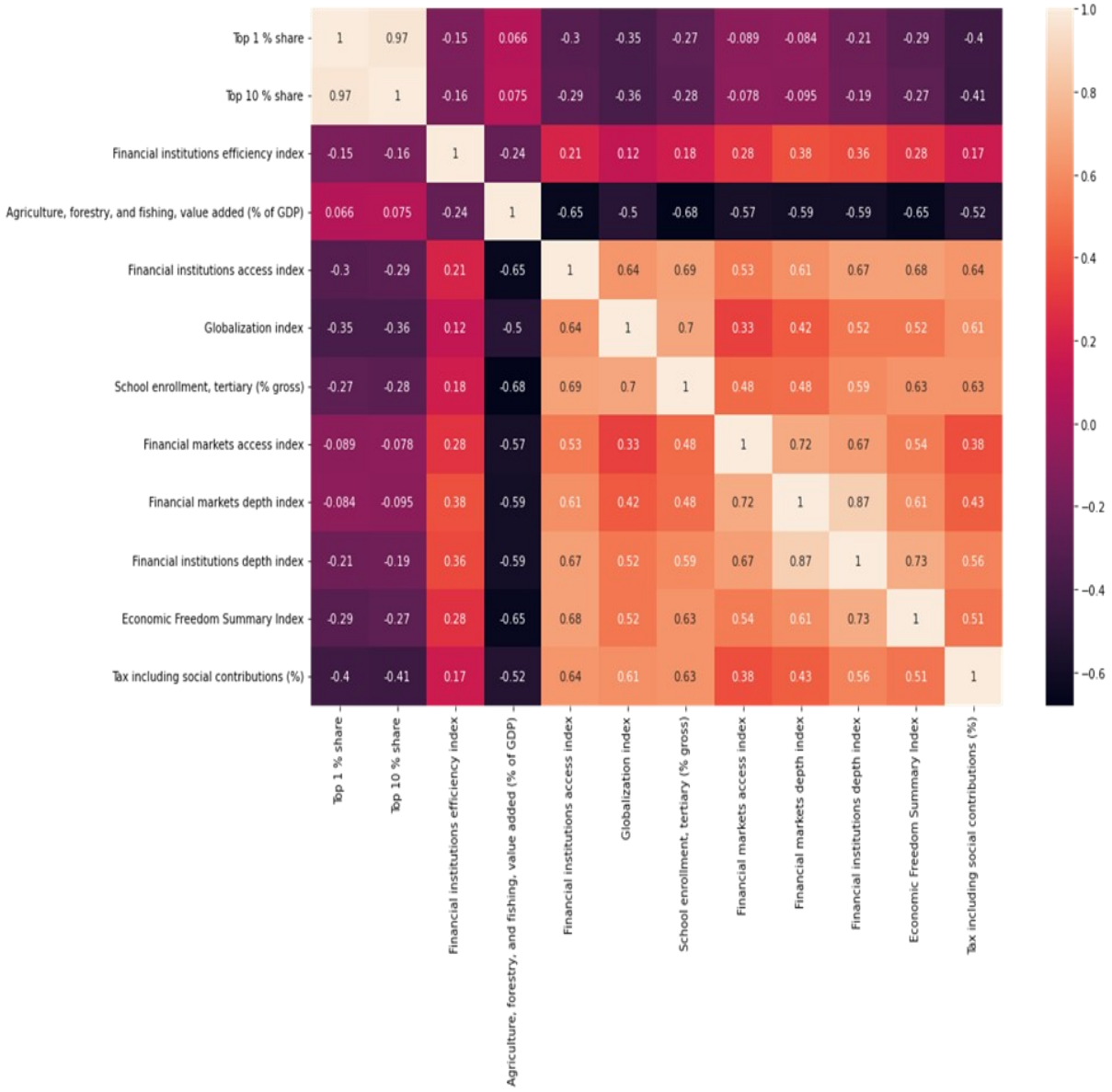
The Financial Markets Depth Index. The average value of this index is 0.263 with a standard deviation of 0.297, the minimum value is 0.000 and the maximum value is 0.998.

The Financial Markets Access Index. The average value of this index is 0.271 with a standard deviation of 0.290, a minimum value of 0.000, and a maximum value of 1.000.

As we can see, the above financial variables have a significant range of values (from 0.000 to 1.000), which indicates a significant difference in the level of development of financial institutions and markets, as well as in the degree of their integration into the economy of different countries.

The next step is to create a heatmap or correlation matrix plot and check if there is a relationship between the top 1 % and 10 % share, and the control variables and check for multicollinearity between our control variables.

Figure 6: Correlation between the top 1 % share, the top 10 % share, and selected control variables and their relationship with each other



Notes: The figure reveals the correlation between the top 1 % (10 %) share and the selected control variables. On the left side are the names of the variables starting from the top 1 % share, respectively the same variables are at the bottom. The color of each cell indicates the value to which the correlated value group the value belongs.

In the heatmap (see Figure 6), we use the Pearson correlation coefficient. 1 indicates a perfect positive correlation which can be seen on the diagonal line where the variables are equal to the same variables, the minimum value is -0.68 which reveals a moderate negative correlated value, and values very close to 0 indicate no linear correlation.

The biggest negative value for wealth distribution is taxation with values of -0.40 and -0.41 (for the top 1 % share and top 10 % share, respectively), implying a negative relationship. The article by Elinder et al. (2018) reaches the same conclusion, emphasizing that tax redistribution leads to a reduction in wealth inequality. The negative relationship with the globalization index with values of -0.35 and -0.36 creates a result opposite to the articles by Zucman (2019) and Karmakar and Jana (2022), which argue that globalization increases wealth inequality. The negative values shown by the Financial Institutions Access Index (-0.30 and -0.29), the Financial Institutions Depth Index (-0.21 and -0.19) and the Financial Institutions Efficiency Index (-0.15 and -0.16) support the findings of Hasan et al. (2020) that countries with more developed financial systems in terms of access and financial intermediaries face lower wealth inequality.

The negative relationship with the Economic Freedom Summary Index (-0.29 and -0.27 respectively) suggests that higher levels of economic freedom lead to lower levels of wealth inequality.

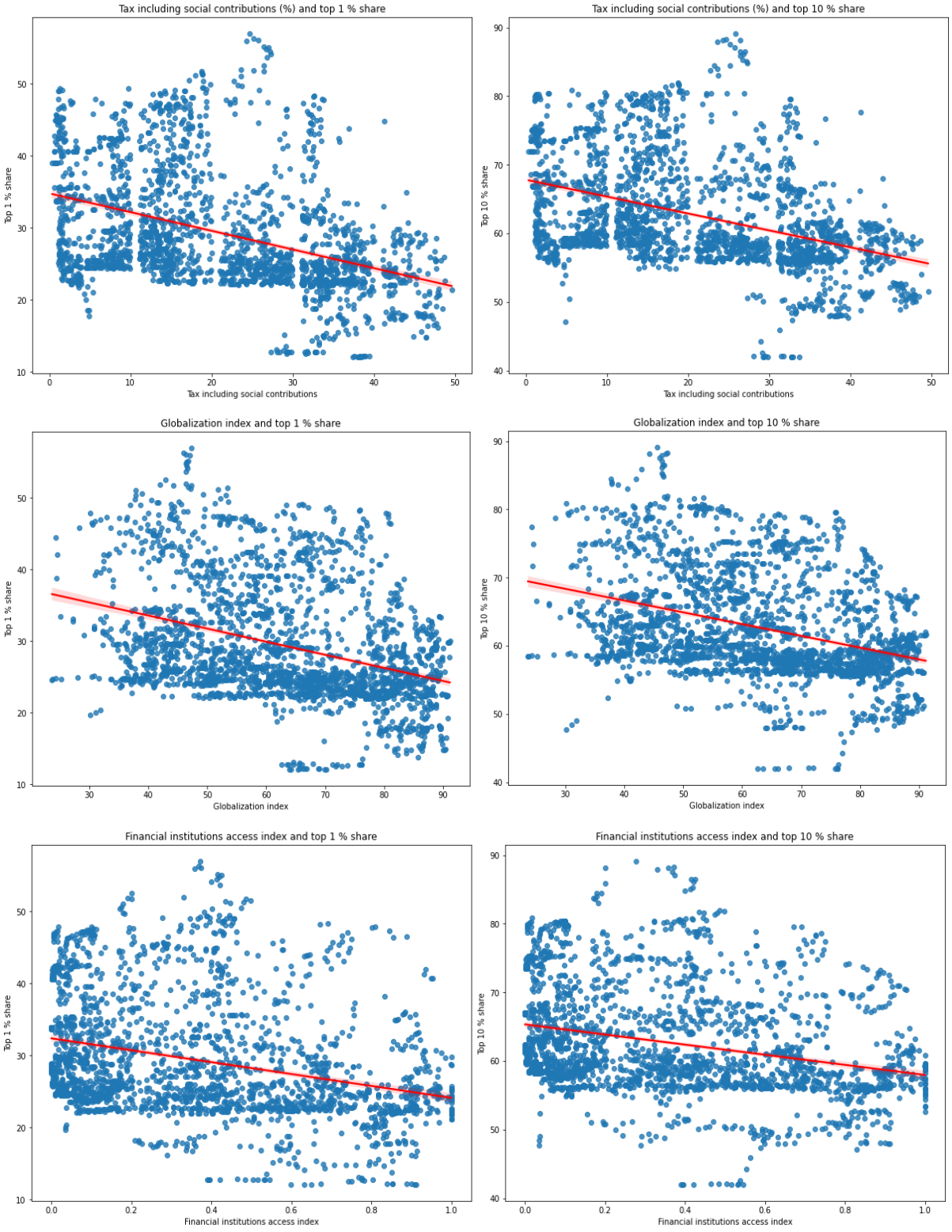
Additionally, the correlation values of -0.27 and -0.28 for tertiary enrollment support the study by Keister and Moller (2000), which states that if the population has access to quality tertiary education, wealth inequality eventually decreases.

Negative values less than 0.1 represent a very weak relationship and we do not include them in the heatmap description.

Of the control variables we select, the positive correlation values are less than 0.1, i.e., they show a very weak positive relationship. Therefore, we do not include them in the description of the heatmap.

Looking at other variables and their relationships with each other, strong positive (more than 0.5) and negative values (less than - 0.5) can be observed between some variables. This can lead to multicollinearity in a regression model where independent variables are highly correlated with each other. In addition to the heatmap, we provide several scatter plots to visualize the relationship between the dependent and control variables.

Figure 7: Scatter plots of the top 1 % share, the top 10 % share, and some control variables



Notes: The figure reveals scatter plots for the richest 1 % (left column) and the richest 10 % (right column). The first row contains tax variables including social contributions, the second row contains the globalization index, and the third row contains the Financial Institutions Access Index.

Figure 7 provides a visual representation of the relationship between tax, the globalization index, the Financial Institutions Access Index, and wealth inequality. The scatter plots display the expected pattern. We see that these indicators are negatively correlated with inequality for both the top 1 % and the top 10 %. On the other hand, figure 7 shows that wealth inequality is higher in countries with lower levels of taxation, while higher values of the Financial Institutions Access Index are inherent in countries with lower levels of inequality. The scatter plots for the globalization index have an uneven distribution of data points indicating variability in the data, and although the trend lines indicate a negative relationship, this emphasis is not strongly pronounced. Overall, the scatter plots suggest that there is a relationship between our selected indicators and wealth inequality.

4. Basic Regressions

4.1 Methodology

Below we briefly discuss the main method we use in our thesis, namely the fixed effects model. Our estimated model has the following form:

$$\text{Wealth share of the top 1\%(10\%)}\ _{it} = X'_{it}\beta + \alpha_i + \varepsilon_{it} \quad (1)$$

The dependent variable wealth share of the top 1 % (10 %) $_{it}$ represents wealth inequality measured as the share of the richest 1 % (10 %) in year t for country i. In addition, α_i corresponds to an unobserved, time-independent individual effect specific to country i, and ε_{it} is the error term. X'_{it} is a vector of independent variables for object i at time t, contains one binary independent variable (banking crisis, currency crisis, debt crisis, or twin crises) and ten independent variables, which we use in our main regression: agriculture, forestry and fishing, value added (% of GDP); school enrollment, tertiary (% gross); the Economic Freedom Summary Index; tax including social contributions (% of GDP); globalization index; 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. This specification of independent variables is based on significant regressors of wealth inequality identified by Hasan et al. (2020)

as most relevant to the study of the effect of the level of financial development of countries on wealth inequality.

The coefficient β in the model we apply indicates that a change over time of the independent variable X by one unit, other things being equal, leads to a change in the dependent variable by β units.

4.2. Selection of a regression model

We apply three types of tests to determine the main method in our thesis:

- F-test for individual effects to compare the pooled OLS (ordinary least squares) model with the fixed effects model.

- Lagrange multiplier test (also known as Honda test) to select the pooled OLS model against the random effects model.

- Hausman test for comparing fixed and random effects models.

In all three cases, the null hypotheses are rejected at the highest level, which clearly indicates the need to use the fixed effects method as the most effective estimator for our dataset.

Thus, we estimate baseline fixed-effects regressions using robust standard errors to remove the influence of heteroskedasticity and autocorrelation.

4.3 Preliminary evaluation of the effect of crises, independent variables on wealth inequality

When we conduct regressions, we can notice that the sample of countries is not completely full. In our regressions, we observe that developing countries are lees in regressions because if any independent variable has missing values for the whole period, this country is not included in a regression. Hence, we miss approximately 10 countries, and it depends on which exact independent variables we use in a regression.

Before proceeding to the estimation of the basic regression models, let us consider the results of the regression with the dependent variable wealth share of the top 1 % (10 %) and the independent binary variable "crisis" by crisis type (see Table A2 in the appendix) and the regression with the dependent variable wealth share of the top 1 % (10 %) and the control variables specified in subchapter 3.4. From the data in Table A2, we see that for the full sample of 119 countries, the banking and currency crises are not significant, while the debt and twin crises have a significant

positive relationship with changes in wealth inequality. At the same time, we see that the estimation of fixed effects for the country samples depending on the level of economic development has a number of differences. Thus, for developed countries the banking and currency crises are significant (the banking crisis is negatively related, and the currency crisis is positively related to wealth inequality), while for developing countries the banking, debt, and, to a lesser extent, twin crises are significantly positively related to wealth inequality.

Let us consider for the same samples the fixed-effects regression results for the dependent variable wealth share of the top 1 % (10 %) and 10 control variables (see Table A3 in the appendix). The fixed effects show that depending on the type of countries in the sample, between 7 (for developing countries) and 9 (for developed countries) independent variables are significant. However, for the full sample of 119 countries, eight out of ten independent variables are significant, the globalization index and the Financial Markets Depth Index are insignificant for both the top 1 % and the top 10 % rich, in addition, tax including social contributions is insignificant for top 1 % rich, while the Financial Institutions Depth Index is insignificant for the top 10 % rich. Therefore, we observe that of the five financial independent variables, the important ones are 4 variables for the top 1 % rich and 3 variables for the top 10 % rich. Also, significant independent variables are agriculture, forestry, and fishing, value added (% of GDP), the Economic Freedom Summary Index, and school enrollment, tertiary.

The fixed effects for developed countries indicate the significance of 9 independent variables, with 4 out of 5 financial independent variables being significant to some extent (except for the Financial Institutions Depth Index). Agriculture, forestry, and fishing, value added (% of GDP), globalization index, school enrollment, tertiary (% gross), tax including social contributions (% of GDP), and the Economic Freedom Summary Index are also significant to varying degrees and show a positive relationship with wealth inequality.

For developing countries, 4 out of 5 financial independent variables are significant (the exception is the Financial Institutions Access Index), as well as the globalization index, school enrollment, tertiary (% gross), and the Economic Freedom Summary Index.

As we can see, the fixed effects results for the independent variables in our thesis are largely consistent with the study of Hasan et al. (2020). Next, we turn to reviewing the basic regression results.

4.4 Basic regression results

4.4.1 Banking crises

The results of the basic regression for banking crises are presented in Table 4. As we can see, the banking crisis has a significant negative relationship with wealth inequality for developed countries at the 0.1 % significance level, for developing countries the effect of the banking crisis is positive, but the relationship is significantly lower (for the top 1 % at the 10 % significance level, for the top 10 % at the 5 % significance level). The relationship between the banking crisis and wealth inequality is not significant for the full sample of 119 countries. Of the 10 independent variables, 8 variables are significant for the sample of 119 countries, 9 variables for developed countries, and 6 variables for developing countries. For the sample of 119 countries, globalization, depth of financial markets, taxes (for the top 1 %), and depth of financial institutions (for the top 10 %) are not significant. For developed countries, the non-significant factors are the depth of financial institutions, agriculture (for the top 1 %), taxes (for the top 1 %), and access to financial institutions (for the top 10 %). In the regression for developing countries, the efficiency and accessibility of financial institutions, agriculture, taxes, and education (for the top 10 %) are insignificant.

The financial accessibility and efficiency indices reveal a negative relationship with wealth inequality, but in the regression for developing countries, the financial market accessibility index shows a positive correlation with wealth inequality. Financial depth indices show a positive relationship with wealth inequality for the regression for all countries and developing countries. In contrast, the same indices for developed countries show a negative relationship with wealth inequality. Education shows a negative relationship with wealth inequality only for developing countries, while the regressions for all countries and developed countries display an increase in wealth inequality with an increase in the education index. The globalization index (positive for developed countries) also shows a differential effect depending on the country sample. Agriculture and the index of economic freedom reveal a positive correlation with wealth inequality.

Table 4: Main regressions with banking crises

	Dependent variable:					
	All countries:		Developed countries		Developing countries	
	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share
Banking crises	-0.332 (0.282)	-0.100 (0.261)	-1.202*** (0.262)	-0.864*** (0.232)	1.314 . (0.750)	1.462* (0.722)
Financial Institutions Efficiency Index	-2.579** (0.991)	-3.139*** (0.918)	-3.426** (1.313)	-3.523** (1.162)	-1.099 (1.308)	-1.928 (1.258)
Financial Markets Access Index	-2.785** (0.948)	-1.566 . (0.878)	-5.762*** (0.903)	-3.647*** (0.799)	5.360** (1.918)	4.481* (1.845)
Agriculture, forestry, and fishing, value added (% of GDP)	0.091** (0.035)	0.092** (0.032)	0.072 (0.081)	0.130 . (0.072)	0.034 (0.039)	0.027 (0.037)
Financial Institutions Access Index	-3.617*** (0.785)	-2.227** (0.726)	-2.652** (0.847)	-0.734 (0.749)	-0.175 (1.514)	-0.431 (1.457)
Globalization index	-0.020 (0.023)	-0.034 (0.021)	0.145*** (0.025)	0.122*** (0.022)	-0.207*** (0.035)	-0.198*** (0.034)
School enrollment, tertiary (% gross)	0.044*** (0.008)	0.039*** (0.008)	0.085*** (0.009)	0.073*** (0.008)	-0.030* (0.014)	-0.018 (0.013)
Tax including social contributions (% of GDP)	0.004 (0.011)	0.018 . (0.010)	0.009 (0.011)	0.025** (0.009)	-0.019 (0.020)	-0.001 (0.019)
Financial Markets Depth Index	0.957 (1.219)	1.409 (1.129)	-2.171 . (1.284)	-2.864* (1.136)	4.692* (2.055)	7.568*** (1.977)
Financial Institutions Depth Index	2.969 . (1.626)	0.996 (1.506)	-1.726 (1.525)	-2.079 (1.349)	12.126*** (3.603)	6.035 . (3.466)
Economic Freedom Summary Index	1.393*** (0.278)	1.119*** (0.257)	0.683 . (0.375)	0.414 . (0.331)	1.105** (0.387)	0.880* (0.373)
Observations	1473	1473	728	728	745	745
Adj. R-Squared	0.059	0.048	0.256	0.226	0.128	0.126
F Statistic	7.777*** (df = 11;105)	6.241*** (df = 11;105)	27.524*** (df = 11;42)	24.075*** (df = 11;42)	8.92763*** (df = 11;62)	8.823*** (df = 11;62)
Note	*** p< 0.001, ** p< 0.01, * p< 0.05, . p< 0.1					

4.4.2 Currency crises

The basic regression results for currency crises are presented in Table 5. The currency crisis shows a positive relationship with wealth inequality for the full sample of 119 countries at a 5 % significance level (for the top 1 %) and a 10 % significance level (for the top 10 %), for developed countries at 5 % significance level, and for developing countries the effect of the currency crisis is insignificant. Of the 10 independent variables, 9 variables are significant for the sample of 119 countries, 8 variables are significant for developed countries, and 7 variables are significant for developing countries. For the sample of 119 countries, not significant are the depth of financial markets, efficiency of financial institutions (for the top 1 %), accessibility of financial institutions (for the top 10 %), taxes (for the top 1 %), and depth of financial institutions (for the top 10 %). For developed countries, the insignificant factors are depth of financial institutions, economic freedom index, efficiency of financial institutions (for the top 10 %), agriculture (for the top 1 %), accessibility of financial institutions (for the top 10 %), and taxes (for the top 1 %). In the regression for developing countries, agriculture, accessibility of financial institutions, taxes, efficiency of financial institutions (for the top 1 %), and education (for the top 10 %) are insignificant.

The financial accessibility and efficiency indices for 119 and developed countries (except the efficiency of financial institutions for developed countries) reveal a negative relationship with wealth inequality, but in the regression for developing countries, the financial market accessibility index indicates a positive correlation with wealth inequality. Financial depth indices display a positive relationship with wealth inequality for the regression for all countries and developing countries, while the same Financial Market Depth Index for developed countries displays a negative relationship with wealth inequality. Education reveals a negative relationship with wealth inequality only for developing countries, while the regressions for all countries and developed countries show an increase in wealth inequality with an increase in the education index. The globalization index (positive relationship for developed countries) also presents a differential effect depending on the sample of countries. Agriculture and the index of economic freedom display a positive correlation with wealth inequality.

Table 5: Main regressions with currency crises

	Dependent variable:					
	All countries:		Developed countries		Developing countries	
	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share
Currency crises	0.851*	0.686 .	1.682*	1.198*	0.548	0.466
	(0.382)	(0.360)	(0.662)	(0.601)	(0.463)	(0.446)
Financial Institutions Efficiency Index	-0.294	-1.483 .	2.434*	0.809	-1.422	-2.299 .
	(0.939)	(0.884)	(1.217)	(1.105)	(1.293)	(1.245)
Financial Markets Access Index	-3.292***	-2.135*	-6.238***	-4.204***	5.309**	4.371*
	(0.919)	(0.865)	(0.835)	(0.758)	(1.922)	(1.851)
Agriculture, forestry, and fishing, value added (% of GDP)	0.090**	0.092**	0.066	0.121 .	0.034	0.0262
	(0.033)	(0.031)	(0.073)	(0.066)	(0.039)	(0.037)
Financial Institutions Access Index	-2.262**	-1.131	-2.002**	-0.209	-0.368	-0.638
	(0.752)	(0.708)	(0.759)	(0.689)	(1.514)	(1.458)
Globalization index	-0.039 .	-0.045*	0.109***	0.101***	-0.211***	-0.202***
	(0.022)	(0.020)	(0.023)	(0.021)	(0.035)	(0.034)
School enrollment, tertiary (% gross)	0.020*	0.019*	0.053***	0.047***	-0.032*	-0.020
	(0.008)	(0.008)	(0.009)	(0.008)	(0.014)	(0.013)
Tax including social contributions (% of GDP)	0.004	0.018 .	0.012	0.028**	-0.023	-0.005
	(0.010)	(0.010)	(0.009)	(0.009)	(0.020)	(0.019)
Financial Markets Depth Index	1.018	1.564	-2.669*	-3.159***	4.655*	7.520***
	(1.156)	(1.089)	(1.155)	(1.049)	(2.058)	(1.981)
Financial Institutions Depth Index	4.553**	2.180	1.094	-0.025	12.385***	6.431 .
	(1.557)	(1.466)	(1.395)	(1.266)	(3.604)	(3.471)
Economic Freedom Summary Index	1.198***	0.946***	0.346	0.142	1.151**	0.917*
	(0.264)	(0.249)	(0.336)	(0.305)	(0.390)	(0.376)
Observations	1461	1461	716	716	745	745
Adj. R-Squared	0.043	0.033	0.177	0.152	0.030	0.027
F Statistic	5.444***	4.179***	18.822 ***	16.431 ***	8.755 ***	8.512 ***
	(df = 11;105)	(df = 11;105)	(df = 11;42)	(df = 11;42)	(df = 11;62)	(df = 11;62)
Note	*** p< 0.001, ** p< 0.01, * p< 0.05, . p< 0.1					

4.4.3 Debt crises

The results of the basic regression for debt crises are presented in Table 6. The debt crisis displays a positive relationship with wealth inequality for the full sample of 119 countries at the 0.1 % significance level, for developing countries at the 5 % significance level, and for developed countries the effect of the debt crisis is insignificant. Of the 10 independent variables, 8 variables are significant for the sample of 119 countries, 9 variables are significant for developed countries, and 7 variables are significant for developing countries. For the sample of 119 countries, the depth of financial markets, globalization index, taxes (for the top 1 %), and the depth of financial institutions (for the top 10 %) are not significant. For developed countries, the non-significant factors are the depth of financial institutions, agriculture (for the top 1 %), and taxes (for the top 1 %). In the regression for developing countries, agriculture, accessibility of financial institutions, taxes, and efficiency of financial institutions (for the top 1 %) are insignificant.

Financial accessibility and efficiency indices show a negative relationship with wealth inequality, but in the regression for developing countries, the financial market accessibility index reveals a positive relationship with wealth inequality. The financial depth indices demonstrate that developed countries have negative relationship with wealth inequality, while for the regression for all countries and for developing countries, depth indices increase wealth inequality. For developing countries, education exhibits a negative relationship with wealth inequality, while for all countries and developed countries the index indicates an increase in wealth inequality. The globalization index (which leads to a decrease in inequality only for developing countries) shows a different directional effect depending on the sample of countries. Agriculture and the index of economic freedom have a positive effect on wealth inequality.

Table 6: Main regressions with debt crises

	Dependent variable:					
	All countries:		Developed countries		Developing countries	
	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share
Debt crises	1.359***	1.293***	0.466	0.095	0.830*	0.898*
	(0.318)	(0.295)	(0.519)	(0.458)	(0.393)	(0.379)
Financial Institutions Efficiency Index	-2.381*	-3.072***	-2.297 .	-2.664*	-1.225	-2.086 .
	(0.972)	(0.899)	(1.311)	(1.156)	(1.297)	(1.251)
Financial Markets Access Index	-2.602**	-1.482 .	-5.087***	-3.183***	4.816*	3.898*
	(0.932)	(0.863)	(0.906)	(0.799)	(1.902)	(1.834)
Agriculture, forestry, and fishing, value added (% of GDP)	0.074*	0.076*	0.079	0.141 .	0.027	0.019
	(0.035)	(0.033)	(0.083)	(0.073)	(0.040)	(0.038)
Financial Institutions Access Index	-3.630***	-2.138**	-3.610***	-1.437 .	-0.461	-0.610
	(0.775)	(0.718)	(0.835)	(0.736)	(1.528)	(1.473)
Globalization index	0.006	0.009	0.138***	0.116***	-0.174***	-0.166***
	(0.023)	(0.021)	(0.026)	(0.023)	(0.037)	(0.036)
School enrollment, tertiary (% gross)	0.038***	0.033***	0.084***	0.072***	-0.040**	-0.027*
	(0.008)	(0.008)	(0.010)	(0.008)	(0.014)	(0.014)
Tax including social contributions (% of GDP)	0.008	0.021*	0.011	0.026**	-0.025	-0.007
	(0.011)	(0.010)	(0.011)	(0.009)	(0.020)	(0.019)
Financial Markets Depth Index	0.500	1.054	-3.000*	-3.450**	4.305*	7.114***
	(1.205)	(1.115)	(1.29)	(1.138)	(2.057)	(1.983)
Financial Institutions Depth Index	2.732 .	0.775	-1.479	-1.897	12.795***	6.656 .
	(1.616)	(1.496)	(1.548)	(1.364)	(3.607)	(3.478)
Economic Freedom Summary Index	1.662***	1.345***	1.121***	0.700*	1.218**	1.005**
	(0.279)	(0.259)	(0.377)	(0.332)	(0.396)	(0.382)
Observations	1459	1459	727	727	732	732
Adj. R-Squared	0.072	0.061	0.234	0.210	0.131	0.128
F Statistic	9.439 ***	7.927***	25.007***	22.389***	9.013 ***	8.760 ***
	(df = 11;105)	(df = 11;105)	(df = 11;42)	(df = 11;42)	(df = 11;62)	(df = 11;62)
Note	*** p< 0.001, ** p< 0.01, * p< 0.05, . p< 0.1					

4.4.4 Twin crises

The basic regression results for the twin crises are presented in Table 7. Twin crises indicate a positive relationship with wealth inequality for the full sample of 119 countries at the 1 % significance level, for developing countries at the 5 % (top 1 %) and 10 % (top 10 %) levels, and for developed countries the effect of twin crises is insignificant. Of the 10 independent variables, 8 variables are significant for the sample of 119 countries, 9 variables are significant for developed countries, and 7 variables are significant for developing countries. For the sample of 119 countries, the depth of financial markets, globalization index, taxes (for the top 1 %), and depth of financial institutions (for the top 10 %) are not significant. The regression for developed countries reveals that the non-significant factors are the depth of financial institutions, agriculture (for the top 1 %), and taxes (for the top 1 %). For developing countries, agriculture, accessibility of financial institutions, taxes, and efficiency of financial institutions (for the top 1 %) are insignificant.

The financial accessibility and efficiency indices exhibit a negative relationship with wealth inequality, but in the regression for developing countries, the financial market accessibility index indicates a positive relationship with wealth inequality. The financial depth indices demonstrate for developed countries a negative relationship with wealth inequality, while for the regression for all countries and for developing countries the depth indices reveal a positive relationship with changes in wealth inequality. For developing countries, education displays a negative relationship with wealth inequality, while for all countries and for developed countries the index is associated with an increase in wealth inequality. The globalization index (which leads to an increase in inequality only for developed countries) exhibits a multidirectional effect depending on the sample of countries. Agriculture and the index of economic freedom have a positive effect on the increase in wealth inequality.

Table 7: Main regressions with twin crises

	Dependent variable:					
	All countries:		Developed countries		Developing countries	
	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share
Twin crises	2.594**	1.983**	1.247	0.522	2.583*	2.343 .
	(0.827)	(0.766)	(0.910)	(0.802)	(1.293)	(1.245)
Financial Institutions Efficiency Index	-2.432*	-3.129***	-2.225 .	-2.662*	-1.601	-2.459*
	(0.970)	(0.899)	(1.306)	(1.151)	(1.292)	(1.244)
Financial Markets Access Index	-2.652**	-1.527 .	-5.117***	-3.185***	5.046**	4.144*
	(0.938)	(0.869)	(0.904)	(0.797)	(1.911)	(1.841)
Agriculture, forestry, and fishing, value added (% of GDP)	0.100**	0.099**	0.102	0.150*	0.041	0.033
	(0.035)	(0.032)	(0.082)	(0.073)	(0.039)	(0.038)
Financial Institutions Access Index	-3.809***	-2.321**	-3.638***	-1.431 .	-0.407	-0.675
	(0.776)	(0.719)	(0.833)	(0.734)	(1.511)	(1.455)
Globalization index	-0.017	-0.031	0.137***	0.116***	-0.206***	-0.197***
	(0.023)	(0.021)	(0.026)	(0.023)	(0.035)	(0.034)
School enrollment, tertiary (% gross)	0.043***	0.039***	0.084***	0.072***	-0.032*	-0.020
	(0.008)	(0.008)	(0.010)	(0.008)	(0.014)	(0.013)
Tax including social contributions (% of GDP)	0.005	0.019 .	0.011	0.026**	-0.023	-0.005
	(0.011)	(0.010)	(0.011)	(0.009)	(0.020)	(0.019)
Financial Markets Depth Index	0.793	1.346	-3.008*	-3.459**	4.590*	7.462***
	(1.210)	(1.121)	(1.290)	(1.137)	(2.054)	(1.978)
Financial Institutions Depth Index	2.900 .	0.934	-1.399	-1.843	12.602***	6.605 .
	(1.621)	(1.502)	(1.544)	(1.361)	(3.582)	(3.449)
Economic Freedom Summary Index	1.529***	1.204***	1.087**	0.695*	1.228**	0.990**
	(0.277)	(0.256)	(0.372)	(0.328)	(0.392)	(0.378)
Observations	1473	1473	728	728	745	745
Adj. R-Squared	0.065	0.053	0.235	0.210	0.129	0.126
F Statistic	8.593 ***	6.866 ***	25.067***	22.401 ***	9.024 ***	8.765 ***
	(df = 11;105)	(df = 11;105)	(df = 11;42)	(df = 11;42)	(df = 11;62)	(df = 11;62)
Note	*** p< 0.001, ** p< 0.01, * p< 0.05, . p< 0.1					

4.5 Possible sources of errors

The results of our study could be distorted by several possible problems, which could call into question the validity of the conclusions of the study and, in fact, could invalidate them. The likely potential problems to which our findings may be subjected, as well as approaches to reducing or eliminating their impact on our findings, we discuss in the next section.

4.5.1 Multicollinearity

One possible problem is multicollinearity, which occurs when several independent variables of a regression model have a strong correlation relationship. In this case, the coefficients and statistical significance of the respective independent variables are distorted. For some regressors of our baseline regressions, the correlation coefficients were quite high, which may indicate the possible presence of multicollinearity for these regressors. However, we can say that no high collinearity is observed after the fixed effects transformation and multicollinearity should not be a problem for our regression model.

4.5.2 Endogeneity

Endogeneity is a major problem in econometric models that can affect the validity of regression estimation results. Endogeneity occurs when one or more independent variables of a regression are correlated with an error term. This can lead to errors in determining the relationship between the variables under study, which in turn can lead to erroneous and inconsistent estimates. Factors contributing to endogeneity in econometric models are primarily measurement errors and bias, omitted variables, simultaneity, and selection bias. The assumption of the presence or absence of endogeneity is based on prior research and intuition. Due to the fact that there are practically no empirical studies examining the determinants of wealth inequality to the extent that are investigated in this thesis, we do not have recommendations and conclusions regarding the determinants of wealth inequality that may be subject to endogeneity.

Although the data we use in this master's thesis are from reliable sources, the presence of possible bias and errors in the calculation of certain data cannot be ruled out. It is possible that measurements for some countries and periods are subject to data collection errors and therefore there may be differences in the comparability of the data used across countries. Simultaneity, in which the dependent variable and its determinant are mutually influenced, may also pose a significant problem. For example, a country's level of financial development may affect changes in wealth inequality, but at the same time, high wealth inequality due to the concentration of

significant resources in a small percentage of the population may affect the level of financial development. However, we assume that wealth inequality does not have a significant effect on the independent variables in our regressions since these variables are relative rather than absolute. The omitted variable effect occurs when an important determinant of the dependent variable is not included in the model, which may lead to bias in the estimation of the coefficients of the included regressors.

One of the main methods to solve the problem of endogeneity in linear regression is the use of instrumental variables correlated with a possible endogenous variable and at the same time independent of the error term. In doing so, the instrumental variable should fulfill the main conditions such as relevance and exogeneity. Relevance implies that such a variable is correlated with the endogenous variable, i.e., it affects the regression result. Exogeneity of a variable implies that the instrumental variable is not correlated with the error term. However, the selection and identification of such variables is a rather time-consuming and complex process, in addition, there is currently little understanding of the determinants of wealth inequality. This master's thesis attempts to gain an initial understanding of the effect of financial crises on wealth inequality and the dependence of unequal wealth distribution on the level of financial development of the countries under study. Therefore, it is beyond the scope of this thesis to verify the results of the basic regressions in the amounts necessary to provide confidence about possible endogeneity by identifying the appropriate instrument.

One source of endogeneity is the effect of omitted variables. In our thesis, we use a fixed effects model. This model effectively mitigates the influence of time-invariant omitted variables that may be correlated with the control variables used. This is achieved by accounting for individual effects, which allows us to obtain unbiased estimates of the model parameters despite the presence of time-invariant omitted variables. Therefore, we can say that the results of our basic regressions are robust to the bias of invariant omitted variables.

Also, simultaneity may pose another problem for our independent variables in terms of endogeneity. The Arellano-Bond model, or dynamic panel data system, is widely used to deal with endogeneity problems. The model is based on applying the first differences method to the original data to eliminate individual effects that may be correlated with the independent variables and using lags of the dependent variable and control variables as instruments. However, this model requires significant costs for instrument selection, time-consuming data analysis, and appropriate tests to ensure the accuracy and reliability of the estimates. The purpose of this thesis is to gain an initial

understanding of the effect of crises on wealth inequality and the dependence of unequal wealth distribution on the level of financial development, discussing the simultaneity problem to the extent implied by the Arellano-Bond model is beyond the scope of this thesis and would require a lot of research in the future. Therefore, we refuse to use this model in this master's thesis.

In addition, one way to check the results for possible inaccuracies and measurement errors in the data is to use a smaller subsample of data whose quality is not in doubt. Such a subsample could be, for example, data for developed countries only. Note that such a sample of developed countries is also investigated in our basic regressions, and the corresponding robustness checks will be discussed in the next section (see subchapter 4.6).

4.6 Robustness checks

This part of the thesis describes the results of the basic regression robustness checks. More detailed attention is paid to comparing and estimating the fixed effects results for the banking crisis and control variables using the sample for all countries and the sample for developed countries only.

The robustness check that we analyze in more detail is a fixed effects estimation based on a sample of developed countries for the banking crisis and 10 control variables. Of the 119 countries in the baseline sample, only 43 are classified as developed economies on the United Nations's data (United Nations, 2022). The data for these countries seem to us to be more reliable in terms of possible errors and bias. Using only this data reduces the potential endogeneity associated with measurement errors. The results of fixed effects for developed countries with robust standard errors are summarized in Table 8.

Table 8: Regression results with banking crises for developed countries

	Dependent variable:	
	Top 1 % share	Top 10 % share
Banking crises	-1.202***	-0.864***
	(0.262)	(0.232)
Financial Institutions Efficiency Index	-3.426**	-3.523**
	(1.313)	(1.162)
Financial Markets Access Index	-5.762***	-3.647***
	(0.903)	(0.799)
Agriculture, forestry, and fishing, value added (% of GDP)	0.072	0.130 .
	(0.081)	(0.072)
Financial Institutions Access Index	-2.652**	-0.734
	(0.847)	(0.749)
Globalization index	0.145***	0.122***
	(0.025)	(0.022)
School enrollment, tertiary (% gross)	0.085***	0.073***
	(0.009)	(0.008)
Tax including social contributions (% of GDP)	0.009	0.025**
	(0.011)	(0.009)
Financial Markets Depth Index	-2.171 .	-2.864*
	(1.284)	(1.136)
Financial Institutions Depth Index	-1.726	-2.079
	(1.525)	(1.349)
Economic Freedom Summary Index	0.683 .	0.414 .
	(0.375)	(0.331)
Observations	728	728
Adj. R-Squared	0.256	0.226
F Statistic	27.524***	24.075***
	(df = 11;42)	(df = 11;42)
Note	*** p< 0.001, ** p< 0.01, * p< 0.05, . p< 0.1	

In contrast to the 119-country sample, for developed countries, the banking crisis is significant (at the 0.1 % significance level) for both the top 1 % of the rich and the top 10 %, with a negative relationship with wealth inequality (the same as for the 119-country sample). In addition, 9 out of 10 control variables are significant; for the 119 countries, 8 out of 10 variables are significant. The Financial Markets Access Index, the globalization index, and school enrollment, tertiary reveal a significance level of 0.1 %, the Financial Institutions Efficiency Index, the Financial Institutions Access Index (for the top 1 %), tax including social contributions (for the top 10 % rich) are significant at 1 % significance level. The Financial Markets Depth Index is significant at the 5 % level (for the top 10 % of the rich) and 10 % level (for the top 1 % of the rich). Agriculture, forestry, and fishing, value added (% of GDP) (for the top 10 %), and the Economic Freedom Summary Index demonstrate minimal significance at the 10 % significance level.

The Financial Institutions Depth Index is insignificant. As we can see, the regression results for developed countries slightly differ from the regression results for the sample of 119 countries, however, 7 significant variables show the same direction of influence as in the regression for 119 countries. Moreover, all 5 financial development ratios exhibit a negative correlation with wealth inequality, while the other 5 show a positive relationship with wealth inequality. We observe that the effects of independent variables for developed countries are slightly different from the regression results for the full sample of 119 countries, however, the significance and direction of the coefficients' effects are basically the same. Consequently, the regression results for developed countries confirm, for the most part, the regression results for 119 countries.

5. Discussion

5.1 General discussion of my results

In this master's thesis, we attempt to investigate the effect of financial crises on wealth inequality and to assess the effect of crises depending on the level of economic development of countries. In addition, one of the aspects of the thesis is to examine the effect of the level of financial development on wealth inequality, namely how wealth inequality changes depending on the level of development of the financial system of countries.

Identification of the determinants of wealth inequality is not part of the problematic of this thesis, so as independent variables of wealth inequality, in addition to binary variables in the form of four types of financial crises, we use 10 control variables identified in the work by Hasan et al. (2020), including five variables characterizing the development of financial institutions and financial markets. The first aspect of the thesis focuses on the effects of financial crises on wealth inequality. We consider three groups of countries - a full sample of 119 countries without economic development, a sample of developed countries, and a sample of developing countries separately. The results of the basic regressions suggest that there is a mixed and multidirectional relationship depending on the type of financial crisis and the level of economic development of the countries.

For both the sample of 119 countries and developed countries, the banking crisis indicates the effect of reducing wealth inequality, while the other types of financial crises are associated with an increase in wealth inequality. Meanwhile, for the 119 countries, the debt crisis is significant at the 0.1 % significance level, the twin crises at the 1 % significance level, and the currency crisis at the 5 % (for the top 1 % of rich people) and 10 % (for the top 10 % of rich people) significance levels, the banking crisis is insignificant.

For developed countries, the banking crisis has a negative relationship at the significance level of 0.1 %, the currency crisis has a positive effect at the significance level of 5 %, and the debt and twin crises are insignificant. We should note that for developed countries, the twin crises are not significant for wealth inequality, as the components of the twin crises - banking and currency crises - have multidirectional effects on wealth inequality in these countries and their effects seem to tend to cancel each other out.

For developing countries, the currency crisis is insignificant, the other types of crises indicate an effect of increasing wealth inequality at the 5 % and 10 % significance levels. Therefore, debt, currency, and twin crises contribute to inequality by increasing the income gap between different segments of society. This finding is supported by Bodea et al. (2021) and Nguyen (2022). The finding that banking crises lead to a reduction in wealth inequality correlates with the study of Agnello and Sousa (2012) and the findings of the International Monetary Fund (2002).

The next aspect of the thesis is related to the effect of financial crises on two groups of the richest people, namely the top 1 % and the top 10 % of the richest, depending on the level of economic development. There is virtually no literature in the academic literature that considers the top 1 % and the top 10 % of the richest people as wealth inequality. Therefore, at this point, the attempt to investigate this aspect is quite novel and can serve as a basis for further research. We find that the direction of the effect of crises is the same for the top 1 % and top 10 % of the richest people in both developed and developing countries.

However, the impact effect in developed countries is larger for the top 1 % than for the top 10 %, while in developing countries, on the contrary, the effect is practically the same for the top 1 %, and the top 10 % of the rich. For example, in developed countries, a significant portion of the assets of the top 1 % of the wealthy are often in high-risk and high-return financial investments (stocks of financial institutions, derivatives, and other more complex financial instruments), as opposed to the top 10 %. During banking crises, such assets are vulnerable to sharp depreciation due to reduced confidence in financial institutions and market liquidity problems. This can lead to larger losses for the top 1 % than for the top 10 %, as the top 1 % hold such assets in larger volumes. In addition, this effect may be amplified by the greater financial leverage available to the richer layer. At the same time, currency crises may lead to a greater increase in wealth for the top 1 % than for the top 10 %, due to greater opportunities to hedge currency risks, diversification of international investments, and greater opportunities to acquire assets in local currency at low prices.

In developing countries, most of the assets of the top 1 % and top 10 % of the rich are linked to investments in real assets in the form of local financial institutions, large and medium-sized businesses, and real estate. Such assets are less susceptible to depreciation during crises. In addition, during crises, governments of developing countries pursue a policy of supporting medium-sized businesses to stabilize the local economy and financial sector, the beneficiaries of which are large and medium-sized investors belonging to the top 10 % of rich people. Additionally, we should note that there is an informal (shadow) economy in developing countries, so some of the assets of the richest people may not be accounted for in official statistics, and are less exposed to the effects of financial crises. As a rule, representatives of the top 10 % of rich people are more involved in the shadow economy.

Another aspect of research in this master's thesis is devoted to the relationship between wealth inequality and the level of financial development. The results of regression analysis show that the indicators of financial development have a complex influence on wealth inequality, and the direction of such influence depends on both the specific aspect of financial development and the level of economic development of the country.

Hence, for the sample of all countries, of the 5 financial independent variables, only the Financial Markets Depth Index is insignificant (indicating an increase in inequality), while the Financial Institutions Depth Index (for the top 1 %) is associated with an increase in inequality; the financial institutions efficiency, access of financial institutions, and markets access measures indicate a decrease in wealth inequality.

For developed countries only the Financial Institutions Depth Index is not significant, the Financial Institutions Efficiency Index, the Financial Markets Access Index, the Financial Institutions Access Index, and Financial Markets Depth Index (for the top 10 %) have a negative effect on wealth inequality.

For developing countries, the Financial Institutions Efficiency Index (for the top 10 %) is associated with reduced wealth inequality. The Financial Markets Access Index, the Financial Markets Depth Index, and the Financial Institutions Depth Index indicate an increase in wealth inequality. The Financial Institutions Access Index is not significant (indicating a decrease in inequality). When combined with the banking, currency, and twin crises, the significance and direction of the financial development indicators on wealth inequality remain the same.

We find that for developed countries, the Financial Institutions Efficiency Index combined with a currency crisis increases wealth for the top 1 % of the wealthy. We believe that with broad access to financial services for households and businesses, during currency crises the richest layer can significantly increase its wealth due to greater opportunities for arbitrage operations, hedging currency risks, and diversification of international investments.

In the context of the effect of the level of financial development on wealth inequality, our results highlight the importance and complexity of financial development. At the same time, depending on the level of economic development of countries, different aspects of financial development may affect wealth inequality in different ways. Thus, for developing countries, financial development is mainly associated with an increase in inequality.

According to Greenwood and Jovanovic (1990) in the early stages of financial development and as financial infrastructure develops, the richest layers of the population receive more preferential treatment from new financial opportunities, which eventually leads to an increase in their income and assets faster than for less wealthy groups. When financial infrastructure reaches a certain level of development, it generates a more stable distribution of income.

Meanwhile, we discover that for developed countries, unlike developing countries, financial development contributes to the decline in the share of the richest segments of the population. This finding is consistent with Hasan et al. (2020), which indicates that countries with more efficient financial institutions and better access to financial markets and services tend to show lower wealth inequality. It also concludes that countries with high levels of financial development are associated with lower levels of inequality.

Regarding aspects of the effect of non-financial variables on wealth inequality, we discover that higher levels of the Economic Freedom Summary Index are associated with higher wealth inequality, with this relationship holding for both developed and developing countries.

Globalization is an important factor of inequality, and the effect is multidirectional depending on the level of economic development of countries. For developed countries, globalization increases wealth inequality, while for developing countries it decreases it. Thereby, it can be assumed that globalization leads to cross-country redistribution of wealth among the richest segments of the population in favor of representatives of developed countries.

In the existing academic literature, there is no unambiguous point of view on the relationship between globalization and wealth inequality. The book by Stiglitz (2002) indicates an increase in

both cross-country and within-country wealth inequality. More recent studies suggest that there are two trends: a decrease in cross-country inequality and a simultaneous increase in within-country inequality, with the main beneficiaries of globalization being the middle class of developing countries in Asia and the global segment of the richest (Milanovic, 2016).

We also find that tax including social contributions is significant only for the top 10 % of rich people in developed countries, showing a positive relationship with wealth inequality. For developing countries, the effect of this indicator is insignificant. This result is somewhat dissonant with the existing views on the taxation aspect. However, we note that the academic literature studies the effect of taxes on income inequality, while we consider the indicators of the top 1 % and top 10 % of rich people. The result reveals that in developing countries tax increases do not affect wealth inequality, while for the top 10 % in developed countries, they even increase wealth. Nevertheless, the effect we discover is fully consistent with the work of Zucman (2015), in which the author explores the problem of tax evasion and hidden wealth. According to the author, representatives of the rich layer of the population have many more opportunities to use all kinds of complex tax evasion schemes than the rest of the population. Therefore, the real tax rates for the richest are significantly lower than for the rest of the population, which leads to an increase in wealth inequality.

Although it is beyond the scope of our master's thesis to examine non-financial determinants and their effects on wealth inequality, we have nevertheless highlighted the effects found, which may serve as a starting point for further research.

5.2 Consequences of wealth inequality

Wealth inequality is one of the significant and debated problems of the modern world and its consequences are manifested at both individual and social levels. The consequences of unequal distribution of wealth can affect economic, political, social, and cultural aspects of life.

According to Piketty (2014), long-term trends of inequality growth can threaten economic and social stability, and Stiglitz (2012) analyzes how wealth inequality threatens economic growth, democracy, and social cohesion. However, the effects of wealth inequality are currently under-researched and the existing studies in the academic literature do not pay adequate attention to the factors affecting changes in wealth inequality. Therefore, we do not make any recommendations based on the findings of our thesis.

The second reason we do not do this is that we only examine the effects of factors on the wealth distribution of a small part of the population. We do not know how these same factors affect the wealth of the rest of the population. We might assume that our regressors affect both the wealthiest and the rest of the population segments of countries equally. However, this would only be an assumption, and with possible disproportionate changes in the wealth of different segments, overall inequality may increase or decrease to a greater extent. A comprehensive understanding of the effects of the determinants of wealth inequality on all segments of the population is necessary for recommending and formulating policies to reduce wealth inequality. Additional research on various aspects of wealth inequality is needed to obtain full and reliable knowledge, without which the picture of the effects of wealth inequality is incomplete.

5.3 Limitations and perspectives

This master's thesis attempts to provide an initial insight into the effect of financial crises and the level of financial development on wealth inequality. We do not aim to identify the determinants of wealth inequality and to answer questions about different aspects of inequality.

Nevertheless, this thesis may be of interest and opportunities for further research. Studies of wealth inequality face several limitations, such as lack of data, methodological difficulties in estimating inequality, and the dynamic nature of inequality In our thesis, the relationship between wealth inequality and regressors was modeled as short-run. Given that wealth inequality changes rather slowly, in addition to the short-run effects of the independent variables, inequality may also be subject to the long-run effects of the independent variables. Using variables at different time lags can help to identify long-run effects, and thus obtain a more complete knowledge of wealth inequality.

Another problem of wealth inequality research is the multiplicity of factors affecting wealth inequality. Wealth inequality is caused by many factors (economic, political, socio-cultural) and it is very problematic to study their influence in one study, so the inclusion of only a small part of influencing factors in the model may lead to incomplete analysis.

One more aspect of studying wealth inequality is that independent variables can interact and have combined effects on the distribution of wealth. Such interactions are often complex and multifaceted, which requires the use of appropriate methodological approaches to analyze them. The inclusion of interacting terms in regression models will allow us to determine the effect of the combination of regressors on wealth inequality.

Hence, overcoming the existing limitations and using a broader set of different determinant specifications, methods, and models of analysis will contribute to a more complete understanding of the problem of wealth inequality and possibly enable the development of effective strategies to reduce it.

5.4 Summary of the discussion

There are very few empirical studies in the existing academic literature examining the effect of financial crises on wealth inequality. This thesis extends and deepens the existing academic findings on the ambiguous effect of financial crises on inequality, revealing the existing differences in the change in wealth of the top 1 % and top 10 % of the richest members of the population depending on the level of economic development of countries.

Also, the results of the thesis state the significance of the level of financial development for changes in the unequal distribution of wealth and support the view that countries with higher levels of financial development are associated with lower levels of wealth inequality. Thus, the results of this study add to the knowledge base on wealth inequality and can serve as a basis for further research on the functional relationships of financial determinants of wealth inequality at both global and regional levels.

6. Conclusion

Currently, there is virtually no research on the effect of financial crises on wealth inequality in the academic literature. This thesis makes a practical contribution to the empirical knowledge base on wealth inequality and allows for a new assessment of the effect of financial crises and the level of financial development of countries since the thesis uses a grouping of countries according to the level of economic development (developed and developing countries). An important distinction of the thesis is also the use of a large dataset of 119 countries over 20 years.

We cannot confirm a clear effect of financial crises on increasing wealth inequality, but we find that banking crises reduce inequality in developed countries, while in developing countries they increase the wealth of the richest layer of the population. The currency crises increase wealth inequality only in developed countries, and the debt and twin crises raise wealth inequality only in developing countries. We discover that depending on the level of economic development of countries, not all crises have the same significant effect on wealth inequality.

The value and innovation of the thesis also lie in considering the top 1 % and top 10 % of the richest segments of the population as wealth inequality and analyzing changes in these indicators depending on the level of economic development of countries and the type of financial crisis. We reveal that for developed countries, financial crises have a greater effect on the top 1 % of the richest people than on the top 10 %; in developing countries, the effect is generally the same for the top 1 %, and the top 10 % of the richest.

Another value of the thesis is also confirmed by the results of the analysis of the effect of the level of financial development on wealth inequality depending on the economic development of countries. At the same time, the results of the thesis indicate a decrease in inequality in developed countries and an increase in inequality in developing countries. The cross-country difference we detect is confirmed by Hasan et al. (2020), which point to the importance of the role of finance and lower wealth inequality in countries with a high level of financial development.

We deal with only a small part of the aspects of wealth inequality. Further research is needed to gain a fuller understanding of both the causes and consequences of wealth inequality. Based on the findings of this thesis, further promising research on wealth inequality might include studies of broader segments of the population, such as the bottom 50 % share.

This master's thesis can also be continued by researching wealth inequality at regional levels and by the type of economic development of countries. Such studies allow for a more focused assessment of existing wealth inequality and, accordingly, the development of recommendations and possible policies aimed at reducing existing wealth inequality.

References

Acharya, V. V., & Pedersen, L. H. (2005). "Asset Pricing with Liquidity Risk." Journal of Financial Economics, 77(2), 375-410. ISSN 0304-405X. https://doi.org/10.1016/j.jfineco.2004.06.007.

Agnello, L., & Sousa, R. M. (2012). "How do banking crises impact on income inequality?" Applied Economics Letters, 19(15), 1425-1429. https://doi.org/10.1080/13504851.2011.631885.

Atkinson, A. B., & Morelli, S. (2011). "Economic Crises and Inequality." UNDP-HDRO Occasional Papers No. 2011/6. Available at SSRN: https://ssrn.com/abstract=2351471.

Babecký, J., Havránek, T., Matějů, J., Rusnák, M., Šmídková, K., & Vašíček, B. (2014). "Banking, debt, and currency crises in developed countries: Stylized facts and early warning indicators." Journal of Financial Stability, 15, 1-17. ISSN 1572-3089. https://doi.org/10.1016/j.jfs.2014.07.001.

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. ISSN 0147-5967. https://doi.org/10.1016/j.jce.2015.04.002.

Baltagi, A. H., Demetriades, P. O., & Law, S. H. (2009). "Financial development and openness: Evidence from panel data." Journal of Development Economics, 89(2), 285-296. ISSN 0304-3878. https://doi.org/10.1016/j.jdeveco.2008.06.006.

Bazillier, R., & Héricourt, J. (2014). "The Circular Relationship between Inequality, Leverage, and Financial Crises: Intertwined Mechanisms and Competing Evidence." CEPII research center Working Papers 2014-22.

Beirne, J., & Fratzscher, M. (2013). "The Pricing of Sovereign Risk and Contagion during the European Sovereign Debt Crisis." Journal of International Money and Finance, 34, 60-82. ISSN 0261-5606. https://doi.org/10.1016/j.jimonfin.2012.11.004.

Berisha, E., Meszaros, J., & Olson, E. (2018). "Income Inequality, Equities, Household Debt, and Interest Rates: Evidence from a Century of Data." Journal of International Money and Finance, 80, 1-14. ISSN 0261-5606. https://doi.org/10.1016/j.jimonfin.2017.09.012.

Bittencourt, M., Chang, S., Gupta, R., & Miller, S. M. (2019). "Does financial development affect income inequality in the U.S. States?" Journal of Policy Modeling, Volume 41, Issue 6, 1043-1056. ISSN 0161-8938. https://doi.org/10.1016/j.jpolmod.2019.07.008.

Bodea, C., Houle, C., & Kim, H. (2021). "Do financial crises increase income inequality?" World Development, Volume 147, 105635. ISSN 0305-750X. https://doi.org/10.1016/j.worlddev.2021.105635.

Bogliacino, F., & Maestri, V. (2016). "Wealth Inequality and the Great Recession." Intereconomics, 51, 61–66. https://doi.org/10.1007/s10272-016-0578-y.

Borensztein, E., & Panizza, U. (2009). "The Costs of Sovereign Default." IMF Economic Review, 56, 683–741. https://doi.org/10.1057/imfsp.2009.21.

Borgerhoff Mulder, M., Bowles, S., Hertz, T., Bell, A., Beise, J., Clark, G., Fazzio, I., Gurven, M., Hill, K., Hooper, P.L., Irons, W., Kaplan, H., Leonetti, D., Low, B., Marlowe, F., McElreath, R., Naidu, S., Nolin, D., Piraino, P., Quinlan, R., Schniter, E., Sear, R., Shenk, M., Smith, E.A., von Rueden, C., & Wiessner, P. (2009). "Intergenerational Wealth Transmission and the Dynamics of Inequality in Small-Scale Societies." In: Science, 326, 682-688. https://doi.org/10.1126/science.1178336.

Brunnermeier, M. K. (2009). "Deciphering the Liquidity and Credit Crunch 2007-2008." Journal of Economic Perspectives, 23(1), 77-100. DOI: 10.1257/jep.23.1.77.

Brunnermeier, M. K., & Pedersen, L. H. (2005). "Predatory Trading." Journal of Finance, 60, 1825-1863. http://dx.doi.org/10.1111/j.1540-6261.2005.00781.

Chesters, J. (2019). "Economic Growth, Wealth, and Wealth Inequality in Asia before, during and after the Global Financial Crisis." Asian Journal of Social Science, 47(4-5), 459-483. https://doi.org/10.1163/15685314-04704003.

Cingano, F. (2014). "Trends in Income Inequality and its Impact on Economic Growth." OECD Social, Employment and Migration Working Papers, No. 163, OECD Publishing. http://dx.doi.org/10.1787/5jxrjncwxv6j-en.

Claessens, S., Dornbusch, R., & Park, Y.C. (2001). "Contagion: Why Crises Spread and How This Can Be Stopped." In: Claessens, S., Forbes, K.J. (eds) International Financial Contagion. Springer, Boston, MA. https://doi.org/10.1007/978-1-4757-3314-3_2.

Cortes, G. S., Taylor, B., & Weidenmier, M. D. (2022). "Financial Factors and the Propagation of the Great Depression." Journal of Financial Economics, Volume 145, Issue 2, Part B, 577-594. ISSN 0304-405X. https://doi.org/10.1016/j.jfineco.2021.08.018.

Crafts, N., & Fearon, P. (2010). "Lessons from the 1930s Great Depression." Oxford Review of Economic Policy, 26(3), 285–317. http://www.jstor.org/stable/43664566.

Davis, M., Laden, F., Hart, J., Garshick, E., & Smith, T. (2010). "Economic Activity and Trends in Ambient Air Pollution." Environmental Health Perspectives, 118, 614-619. DOI: 10.1289/ehp.0901145.

De Nardi, M., & Fella, G. (2017). "Saving and wealth inequality." Review of Economic Dynamics, Volume 26, 280-300. ISSN 1094-2025. https://doi.org/10.1016/j.red.2017.06.002.

Demyanyk, Y., & Van Hemert, O. (2011). "Understanding the Subprime Mortgage Crisis." The Review of Financial Studies, Volume 24, Issue 6, June, 1848–1880. https://doi.org/10.1093/rfs/hhp033.

Elinder, M., Erixson, O., & Waldenström, D. (2018). "Inheritance and wealth inequality: Evidence from population registers." Journal of Public Economics, 165, 17-30. ISSN 0047-2727. https://doi.org/10.1016/j.jpubeco.2018.06.012.

Forbes, K. J. (2000). "A Reassessment of the Relationship between Inequality and Growth." American Economic Review, 90(4), 869-887. https://doi.org/10.1257/aer.90.4.869.

Fraser Institute. (2022). Economic Freedom Summary Index: Economic Freedom of the World: 2022 Annual Report [Online]. Retrieved from https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2022-annual-report (Accessed 17 November 2023).

Goda, T., Onaran, O., & Stockhammer, E. (2017). "Income Inequality and Wealth Concentration in the Recent Crisis." Development and Change, 48(1), 3–27. https://doi.org/10.1111/dech.12280.

Grabka, M. M. (2015). "Income and wealth inequality after the financial crisis: the case of Germany." Empirica, 42, 371–390. https://doi.org/10.1007/s10663-015-9280-8.

Granados, J. A. T., & Ionides, E. L. (2017). "Population health and the economy: Mortality and the Great Recession in Europe." Health Economics, 26(12), e219-e235. DOI: 10.1002/hec.3495.

Greenwood, J., & Jovanovic, B. (1990). "Financial Development, Growth, and the Distribution of Income." Journal of Political Economy, 98(5), 1076-1107. http://www.jstor.org/stable/2937625.

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

Hasan, F., Horvath, R., & Mares, J. (2020). "Finance and wealth inequality." Journal of International Money and Finance, 108, 102161. ISSN 0261-5606. https://doi.org/10.1016/j.jimonfin.2020.102161.

Hauner, T. (2020). "Aggregate wealth and its distribution as determinants of financial crises." Journal of Economic Inequality, 18, 319–338. https://doi.org/10.1007/s10888-020-09444-9.

Hogan, T. L., & White, L. H. (2021). "Hayek, Cassel, and the Origins of the Great Depression." Journal of Economic Behavior & Organization, Volume 181, 241-251. ISSN 0167-2681. https://doi.org/10.1016/j.jebo.2020.12.005.

Hsu, S.-L. (2015). "The Rise and Rise of the One Percent: Considering Legal Causes of Wealth Inequality." Emory Law Journal Online, 64, 2043.

International Monetary Fund. (2002). "Financial Crises, Poverty, and Income Distribution." IMF Working Papers 2002/004.

International Monetary Fund. (2023). Financial Development Index [Online]. Retrieved from https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B&sId=1472846904452 (Accessed 18 November 2023).

Jauch, S., & Watzka, S. (2016). "Financial development and income inequality: a panel data approach." Empir Econ, 51, 291–314. https://doi.org/10.1007/s00181-015-1008-x.

Kaminsky, G.L., & Reinhart, C.M. (1999). "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems." American Economic Review, 89(3), 473-500.

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

Karmakar, A., & Jana, S. (2022). "Globalization, Income Inequality, and Wealth Disparity: Issues and Evidence." DOI: 10.1108/978-1-80117-870-920221004.

Keister, L. A., & Moller, S. (2000). "Wealth Inequality in the United States." Annual Review of Sociology, 26, 63-81. https://doi.org/10.1146/annurev.soc.26.1.63

Kirschenmann, K., Malinen, T., & Nyberg, H. (2016). "The risk of financial crises: Is there a role for income inequality?" Journal of International Money and Finance, Volume 68, 161-180. ISSN 0261-5606. https://doi.org/10.1016/j.jimonfin.2016.07.010.

Kiyotaki, N., & Moore, J. (2002). "Evil Is the Root of All Money." The American Economic Review, 92(2), 62–66. http://www.jstor.org/stable/3083378.

Kodres, Laura E., & Pritsker, Matthew G. (1998). "A Rational Expectations Model of Financial Contagion." Board of Governors of the Federal Reserve Finance and Economics Discussion Series 98-48. http://dx.doi.org/10.2139/ssrn.148769.

Kumhof, M. M., Ranciere, R., & Winant, P. (2013). "Inequality, leverage and crises: the case of endogenous default" (No. 13-249). International Monetary Fund.

Leitner, S. (2018). "Factors Driving Wealth Inequality in European Countries." wiiw Working Papers 155, The Vienna Institute for International Economic Studies, wiiw.

Longstaff, F. A. (2010). "The Subprime Credit Crisis and Contagion in Financial Markets." Journal of Financial Economics, 97(3), 436-450. ISSN 0304-405X. https://doi.org/10.1016/j.jfineco.2010.01.002.

Maddaloni, A., & Peydró, J-L. (2011). "Bank Risk-taking, Securitization, Supervision, and Low Interest Rates: Evidence from the Euro-area and the U.S. Lending Standards." The Review of Financial Studies, Volume 24, Issue 6, June, 2121–2165. https://doi.org/10.1093/rfs/hhr015.

Mian, A., & Sufi, A. (2015). "How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again." University of Chicago Press.

Milanovic, B. (2016). "Global Inequality: A New Approach for the Age of Globalization." Harvard University Press. https://doi.org/10.2307/j.ctvjghwk4.

Mills, M. (2009). "Globalization and Inequality." European Sociological Review, Volume 25, Issue 1, 1–8. https://doi.org/10.1093/esr/jcn046.

Nguyen, T. C. (2022). "The effects of financial crisis on income inequality." Development Policy Review, 40(6), November. https://doi.org/10.1111/dpr.12600.

Nguyen, T. C., Castro, V., & Wood, J. (2021). "Financial Crises and Human Development." http://dx.doi.org/10.2139/ssrn.3802418.

Nguyen, T. C., Castro, V., & Wood, J. (2022). "A new comprehensive database of financial crises: Identification, frequency, and duration." Economic Modelling, Volume 108, 105770. ISSN 0264-9993. https://doi.org/10.1016/j.econmod.2022.105770.

Piketty, T. (2014). "Capital in the Twenty-First Century." In: The Belknap Press of Harvard University Press, Cambridge, MA.

Piketty, T., & Saez, E. (2003). "Income Inequality in the United States, 1913–1998." The Quarterly Journal of Economics, Volume 118(1), February, Pages 1–41. https://doi.org/10.1162/00335530360535135.

Pozo, J. (2021). "The Impact of the Financial Crisis on Wealth and Income Inequality." Available at SSRN: http://dx.doi.org/10.2139/ssrn.3886325.

Rajan, R. G., & Zingales, L. (2003). "The great reversals: the politics of financial development in the twentieth century." Journal of Financial Economics, 69(1), 5-50. ISSN 0304-405X. https://doi.org/10.1016/S0304-405X(03)00125-9.

Ravallion, M. (2014). "Income inequality in the developing world." Science, 344, 851-855. DOI: 10.1126/science.1251875.

Shchepeleva, M., Stolbov, M., & Weill, L. (2022). "Has the Global Financial Crisis increased wealth inequality?" International Economics, 169, 148-160. ISSN 2110-7017. https://doi.org/10.1016/j.inteco.2021.12.004.

Stiglitz, J. (2002). "Globalization and Its Discontents." New York: Norton.

Stiglitz, J. (2012). "The Price of Inequality: How Today's Divided Society Endangers Our Future." (2nd ed.). In: W.W. Norton & Company, New York.

Stiglitz, J. (2016). "The Measurement of Wealth: Recessions, Sustainability and Inequality." In Contemporary Issues in Macroeconomics: Lessons from the Crisis and Beyond, 63-76. London: Palgrave Macmillan UK.

United Nations. (2022). Classification of Developed and Developing Regions [Online]. Retrieved from https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD?year=2023 (Accessed 14 November 2023).

United Nations Development Programme. (2019). "Human Development Report 2019: Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century." New York.

UNU-WIDER. (2023). Government Revenue Dataset [Online]. Retrieved from https://doi.org/10.35188/UNU-WIDER/GRD-2023 (Accessed 25 November 2023).

White, E. N. (1990). "The Stock Market Boom and Crash of 1929 Revisited." The Journal of Economic Perspectives, 4(2), 67–83. http://www.jstor.org/stable/1942891.

Wolff, E. N. (2002). "Inheritances and Wealth Inequality, 1989-1998." American Economic Review, 92(2), 260-264. DOI: 10.1257/000282802320189366.

World Bank. (2023a). Agriculture, Forestry, and Fishing, Value Added (% of GDP): World Development Indicators [Online]. Retrieved from https://databank.worldbank.org/source/world-development-indicators/Series/NV.AGR.TOTL.ZS (Accessed 15 November 2023).

World Bank. (2023b). School enrollment, tertiary (% gross): World Development Indicators [Online]. Retrieved from https://databank.worldbank.org/source/world-development-indicators/Series/SL.UEM.TOTL.ZS (Accessed 15 November 2023).

World Inequality Database. (2023a). Wealth Inequality (Top 1 % Share) [Online]. Retrieved from https://wid.world/data/ (Accessed 14 November 2023).

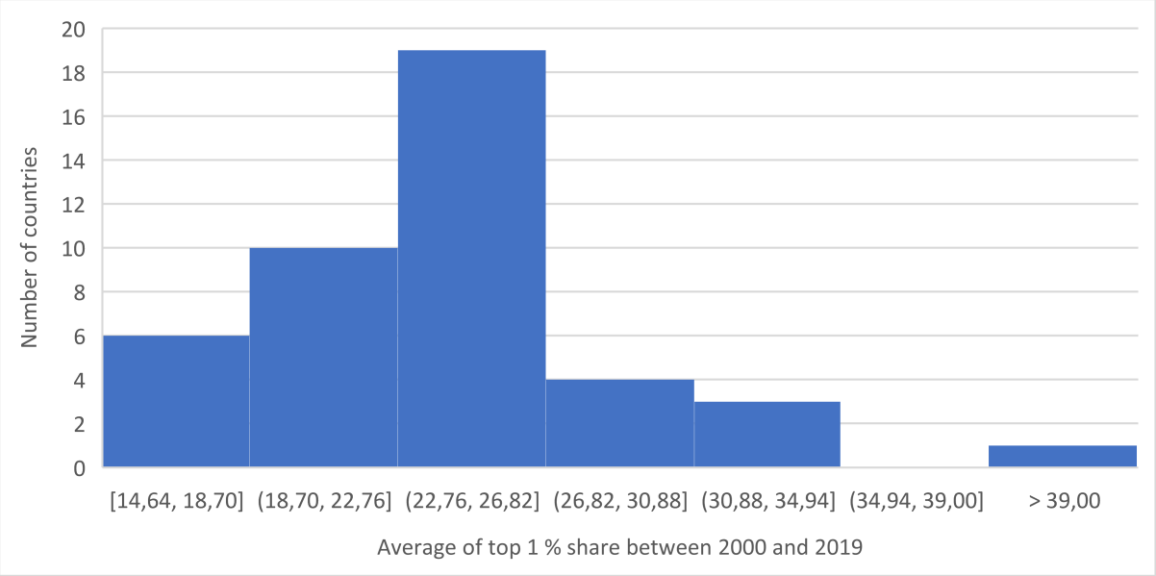
World Inequality Database. (2023b). Wealth Inequality (Top 10 % Share) [Online]. Retrieved from https://wid.world/data/ (Accessed 14 November 2023).

Zucman, G. (2015). "The Hidden Wealth of Nations: The Scourge of Tax Havens." The University of Chicago Press.

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

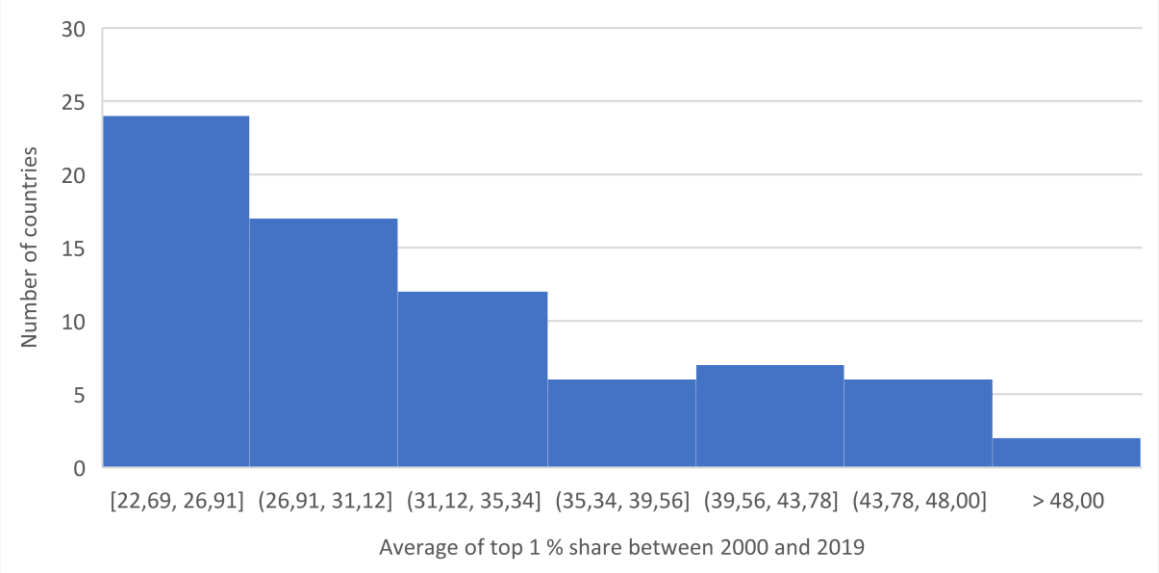
Appendix

Figure A1: Average of the top 1 % share of developed countries between 2000 and 2019



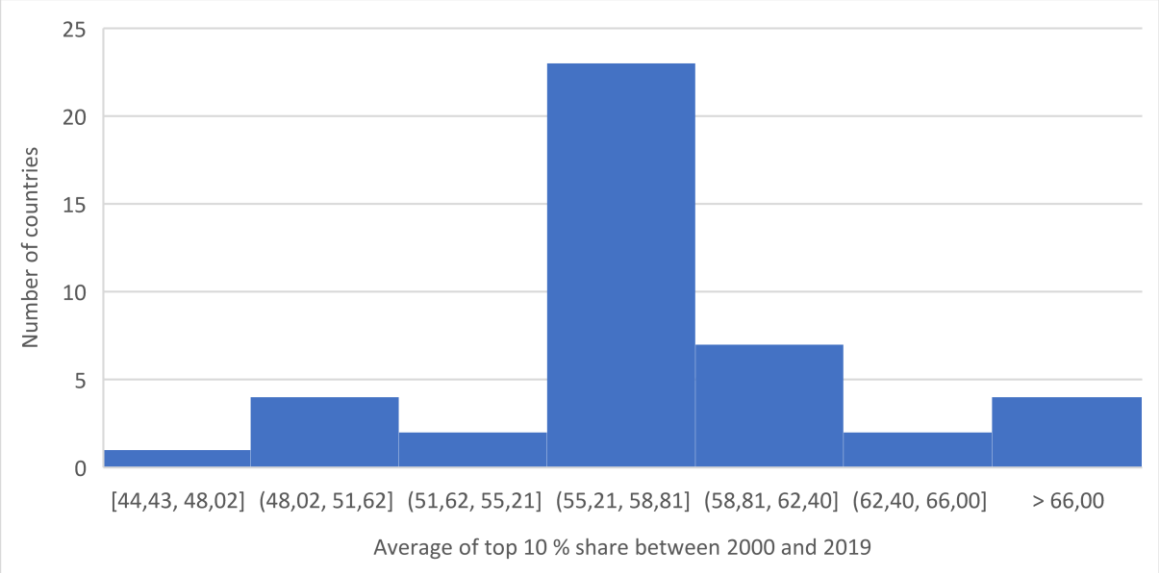
Notes: The figure reveals a histogram of the distribution of developed countries according to the group of values of the average of the top 1 % share between 2000 and 2019.

Figure A2: Average of the top 1 % share of developing countries between 2000 and 2019



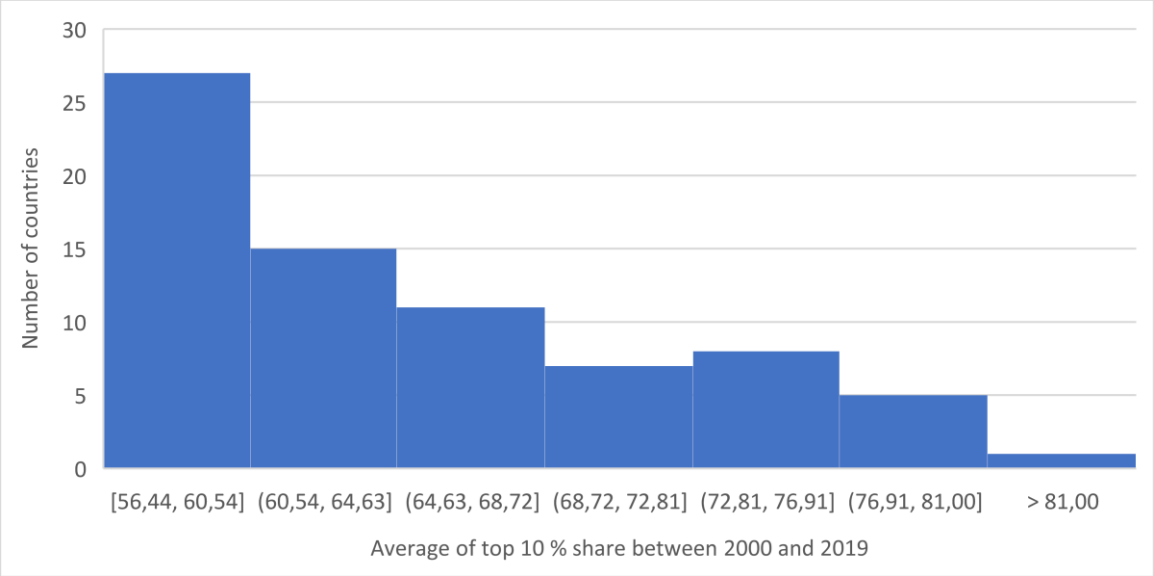
Notes: The figure reveals a histogram of the distribution of developing countries according to the group of values of the average of the top 1 % share between 2000 and 2019.

Figure A3: Average of the top 10 % share of developed countries between 2000 and 2019



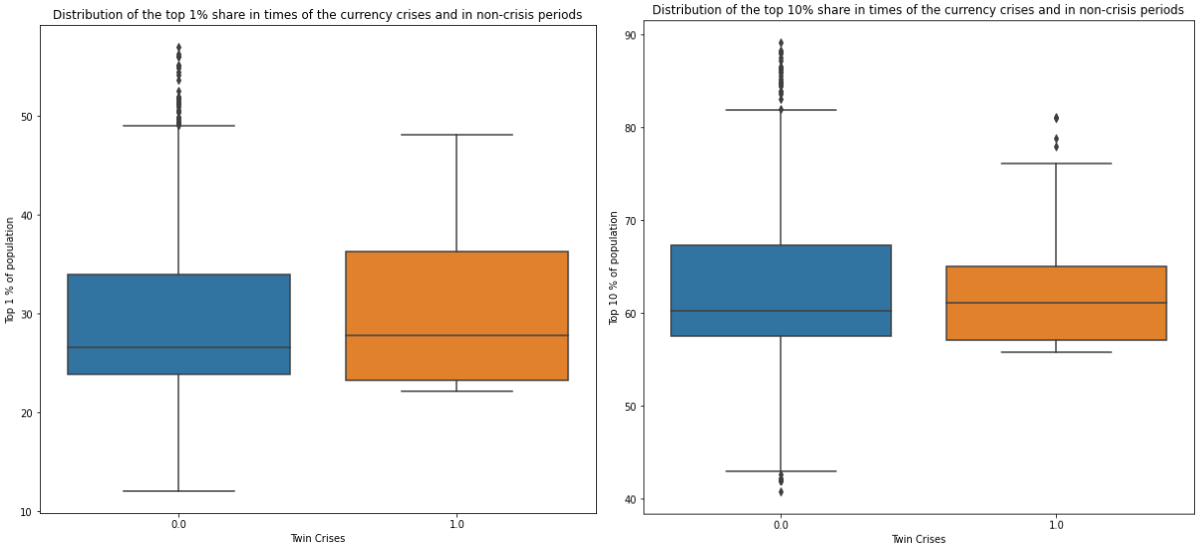
Notes: The figure reveals a histogram of the distribution of developed countries according to the group of values of the average of the top 10 % share between 2000 and 2019.

Figure A4: Average of the top 10 % share of developing countries between 2000 and 2019



Notes: The figure reveals a histogram of the distribution of developing countries according to the group of values of the average of the top 10 % share between 2000 and 2019.

Figure A5: Distribution of the top 1 % and 10 % of the population in crisis and non-crisis periods



Notes: The figure reveals the distribution of the top 1 % and 10 % of the population in crisis and non-crisis periods. It reveals the top 1 % share split by the twin crises, then it is followed by the top 10 % share split by the twin crises.

Table A1: Countries split by the development statuses and continents

Africa	Angola	Developing
	Burkina Faso	Developing
	Chad	Developing
	Equatorial Guinea	Developing
	Ethiopia	Developing
	Ghana	Developing
	Malawi	Developing
	Mozambique	Developing
	Nigeria	Developing
	Rwanda	Developing
	Tanzania	Developing
	Uganda	Developing
	Zambia	Developing
	Algeria	Developing
	Congo	Developing
	Democratic Republic of the Congo	Developing
	Egypt	Developing
	Guinea	Developing
	Kenya	Developing

	Mali	Developing
	Morocco	Developing
	Niger	Developing
	South Africa	Developing
	Sudan	Developing
	Tunisia	Developing
	Zimbabwe	Developing
Asia	Israel	Developed
	Japan	Developed
	Republic of Korea	Developed
	Armenia	Developing
	Azerbaijan	Developing
	Bangladesh	Developing
	Bhutan	Developing
	Cambodia	Developing
	China	Developing
	Georgia	Developing
	India	Developing
	Iraq	Developing
	Kazakhstan	Developing
	Lao P.D.R.	Developing
	Mongolia	Developing
	Myanmar	Developing
	Qatar	Developing
	Singapore	Developing
	Sri Lanka	Developing
	Tajikistan	Developing
	Turkmenistan	Developing
	Uzbekistan	Developing
	Vietnam	Developing
	Afghanistan	Developing
	Bahrain	Developing
	Democratic People's Republic of Korea	Developing
	Iran (Islamic Republic of)	Developing
	Kuwait	Developing
	Kyrgyzstan	Developing
	Lebanon	Developing
	Nepal	Developing
	Oman	Developing
	Pakistan	Developing
	Saudi Arabia	Developing

	Syrian Arab Republic	Developing
	Thailand	Developing
	Yemen	Developing
Asia/Europe	Turkey	Developing
	Russian Federation	Developed
Europe	Albania	Developed
	Austria	Developed
	Belgium	Developed
	Bosnia and Herzegovina	Developed
	Bulgaria	Developed
	Croatia	Developed
	Cyprus	Developed
	Czechia	Developed
	Denmark	Developed
	Estonia	Developed
	Finland	Developed
	France	Developed
	Germany	Developed
	Greece	Developed
	Hungary	Developed
	Iceland	Developed
	Ireland	Developed
	Italy	Developed
	Latvia	Developed
	Lithuania	Developed
	Luxembourg	Developed
	Netherlands	Developed
	Norway	Developed
	Poland	Developed
	Portugal	Developed
	Republic of Moldova	Developed
	Romania	Developed
	Serbia	Developed
	Slovakia	Developed
	Slovenia	Developed
	Spain	Developed
	Sweden	Developed
	Switzerland	Developed
	Ukraine	Developed
	United Kingdom	Developed
North America	Canada	Developed
	United States of America	Developed

	Dominican Republic	Developing
	Panama	Developing
	Costa Rica	Developing
	Cuba	Developing
	Mexico	Developing
Oceania	Australia	Developed
	New Zealand	Developed
South America	Guyana	Developing
	Argentina	Developing
	Bolivia (Plurinational State of)	Developing
	Brazil	Developing
	Chile	Developing
	Colombia	Developing
	Ecuador	Developing
	Paraguay	Developing
	Peru	Developing
	Uruguay	Developing

Table A2: Regression results for crises

	Dependent variable:					
	All countries:		Developed countries		Developing countries	
	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share
Banking crises	-0.077 (0.237)	0.035 (0.224)	-0.718** (0.238)	-0.545** (0.209)	2.543*** (0.559)	2.409*** (0.542)
Observations	2360	2360	860	860	1500	1500
Adj. R-Squared	4.7243e-05	1.1019e-05	0.011	0.008	0.014	0.014
F Statistic	0.106 (df = 1;117)	0.025 (df = 1;117)	9.108 ** (df = 1;42)	6.828 ** (df = 1;42)	20.668 *** (df = 1;74)	19.779 *** (df =11;74)
Currency crises	0.397 (0.294)	0.353 (0.280)	1.607* (0.627)	1.304* (0.566)	0.195 (0.348)	0.195 (0.337)
Observations	2283	2283	848	848	1435	1435
Adj. R-Squared	0.001	0.001	0.008	0.007	0.0002	0.0002
F Statistic	1.825 (df = 1;116)	1.592 (df = 1;116)	6.570* (df = 1;42)	5.300* (df = 1;42)	0.313 (df = 1;74)	0.333 (df = 1;74)
Debt crises	0.825*** (0.206)	0.853*** (0.194)	-0.215 (0.460)	-0.470 (0.403)	1.030*** (0.236)	1.110*** (0.228)
Observations	2327	*2327*	859	859	1468	1468
Adj. R-Squared	0.007	0.009	0.0002	0.002	0.0135	0.017
F Statistic	16.108*** (df = 1;117)	19.287*** (df = 1;117)	0.219 (df = 1;42)	1.364 (df = 1;42)	19.040*** (df = 1;74)	23.614 *** (df = 1;74)
Twin crises	2.257 ** (0.753)	1.788 * (0.709)	1.571 (1.006)	0.854 (0.883)	2.835 ** (1.075)	2.575* (1.041)
Observations	2360	2360	860	860	1500	1500
Adj. R-Squared	0.004	0.003	0.003	0.001	0.005	0.004
F Statistic	8.982 ** (df = 1;117)	6.348 * (df = 1;117)	2.436 (df = 1;42)	0.935 (df = 1;42)	6.960 ** (df = 1;74)	6.122 * (df = 1;74)
Note	*** p< 0.001, ** p< 0.01, * p< 0.05, . p< 0.1					

Table A3: Regression results for independent variables

	Dependent variable:					
	All countries:		Developed countries		Developing countries	
	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share	Top 1 % share	Top 10 % share
Financial Institutions Efficiency Index	-2.358*	-3.073***	-2.540 .	-2.664*	-1.465	-2.33 .
	(0.973)	(0.901)	(1.313)	(1.150)	(1.293)	(1.245)
Financial Markets Access Index	-2.649**	-1.525 .	-5.464***	-3.188***	5.106**	4.198*
	(0.941)	(0.871)	(0.913)	(0.797)	(1.915)	(1.844)
Agriculture, forestry, and fishing, value added (% of GDP)	0.092**	0.093**	0.070	0.147*	0.032	0.025
	(0.035)	(0.032)	(0.082)	(0.072)	(0.039)	(0.037)
Financial Institutions Access Index	-3.732***	-2.261**	-3.205***	-1.414 .	-0.335	-0.610
	(0.779)	(0.721)	(0.842)	(0.734)	(1.514)	(1.457)
Globalization index	-0.021	-0.034	0.086***	0.115***	-0.210***	-0.201***
	(0.023)	(0.021)	(0.019)	(0.023)	(0.035)	(0.034)
School enrollment, tertiary (% gross)	0.044***	0.039***	0.091***	0.073***	-0.032*	-0.020
	(0.008)	(0.008)	(0.009)	(0.008)	(0.014)	(0.013)
Tax including social contributions (% of GDP)	0.005	0.018 .	0.006	0.026**	-0.024	-0.007
	(0.011)	(0.010)	(0.011)	(0.009)	(0.020)	(0.019)
Financial Markets Depth Index	0.822	1.368	-1.501	-3.449**	4.626*	7.495***
	(1.214)	(1.123)	(1.299)	(1.136)	(2.058)	(1.981)
Financial Institutions Depth Index	2.990 .	1.002	0.032	-1.842	12.798***	6.783 .
	(1.626)	(1.505)	(1.499)	(1.360)	(3.588)	(3.455)
Economic Freedom Summary Index	1.434***	1.132***	0.746 .	0.680*	1.098**	0.872*
	(0.276)	(0.255)	(0.381)	(0.327)	(0.388)	(0.373)
Observations	1473	1473	728	728	745	745
Adj. R-Squared	0.058	0.048	0.226	0.211	0.124	0.121
F Statistic	8.414***	6.855***	26.408***	24.620***	9.485***	9.253 ***
	(df = 10;105)	(df = 10;105)	(df = 10;42)	(df = 10;42)	(df = 10;62)	(df = 10;62)
Note	*** p< 0.001, ** p< 0.01, * p< 0.05, . p< 0.1					