

Tilburg University

Bachelor Thesis

Income inequality and the 2008 crisis

What role has income inequality played in the 2008 crisis and what effects did the crisis have on income inequality in post-crisis years?

Economics and Business Economics

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Table of Contents

Chapter 1 Introduction	3
Chapter 2 Inequality in the United States	4
2.1 Income inequality	4
2.2 Wealth inequality	8
2.3 Consumption inequality	9
Chapter 3 Theoretical analysis	12
3.1 Effects of income inequality on economic crisis	12
3.2 Effects of economic crisis on income inequality	14
Chapter 4 Empirical analysis.....	15
4.1 Review of empirical literature	15
4.2 Inequality and the severity of a crisis	17
Chapter 5 Conclusion	21
References.....	22
Appendix correlations empirical analysis.....	24

Table of Figures

Figure 1 Top 1% income share United States.....	5
Figure 2 Top 5% income share United States.....	6
Figure 3 Top 10% income share United States.....	6
Figure 4 GINI coefficient United States	7
Figure 5 Bottom 90% wealth share	8
Figure 6 Top 1%, 0.1%, 0.01% wealth shares United States	8
Figure 7 Income inequality and Consumption inequality United States.....	9
Figure 8 Consumption inequality CE survey data United States	10
Figure 9 Consumption Inequality PSID data.....	11
Figure 10 GDP 2009/2007	18
Figure 11 GDP 2011/2007	18
Figure 12 Bottom 10% share	19
Figure 13 Top 10% income share	20

Chapter 1 Introduction

Income inequality is apart from a social issue, think of people protesting against Wall Street, also a topic that is discussed widely in recent academic research. Much of this research is about how to measure it and how income inequality changes over time. For example, Piketty (2014) argues that wealth or capital is being concentrated more and more to the richest part of the world population and therefore he argues for a global progressive tax rate on wealth. Other economists, however, argue that income inequality is not that big of a problem. These economists often focus on consumption inequality. For example, Krueger and Perri (2006) find that a rise in income inequality in the United States has not been accompanied by a corresponding rise in consumption inequality. However, Aguiar and Bils (2015) come to a different conclusion and argue that consumption inequality does mirror income inequality. Whether one views income inequality as a problem therefore depends on which measure you use and how one defines income inequality.

Not only in research is income inequality a hot topic. Income inequality has also become an issue in politics. One of the main priorities of Bernie Sanders' 2016 presidential campaign was reducing income inequality by for instance raising the minimum wage and a so-called Wall-Street tax. Sanders called income inequality the great moral, economic and political issue of our time. Also Pope Francis during his visit to the United States Congress called for a more even wealth distribution. This shows that income inequality is a widely discussed topic on which people have many different views.

In this paper we study the relationship between income inequality and economic crisis. A lot of causes and consequences of income inequality are being discussed in the literature (Dabla-Norris, Kochhar, Suphaphiphat, Ricka, & Tsounta, 2015). One cause and consequence of income inequality is however less present in literature. This paper tries to evaluate if income inequality can play a role in causing a crisis. Also the reversed effect, if a crisis plays a role in developing income inequality, will be studied. For this paper specifically the financial crisis of 2008 will be evaluated. The question being answered in this paper is therefore: What role has income inequality played in the 2008 crisis and what effects did the crisis have on income inequality in post-crisis years?

The paper proceeds as follows. In chapter two the data on income inequality will be evaluated. Did income inequality actually rise before the financial crisis or did it decrease? And, after the crisis, did income inequality increase or decrease? Data on income inequality, consumption inequality and wealth inequality will be evaluated for the United States. Since data on income inequality after the financial crisis are relatively scarce, we will also discuss the relationship between inequality and crisis before and after the Great Depression in 1929.

Chapter three goes deeper into the existing literature on the relationship between income inequality and crisis and how, from a theoretical point of view, income inequality can cause a crisis and how a crisis can spur income inequality. In this chapter the relationship is viewed as a causal relationship.

Chapter four gives an overview of empirical research into the relationship between income inequality and the crisis. This chapter will be split up into two parts. The first part will review whether the theory discussed in chapter 3 is also empirically confirmed. The second part presents a correlation analysis of income inequality and economic growth before and after 2008.

Chapter five will be the conclusion on the question what role income inequality has played in the 2008 financial crisis and what effects the crisis has had on income inequality in post-crisis years.

Chapter 2 Inequality in the United States

Before evaluating if there exists a causal relationship between both income inequality and the crisis and vice versa, it is useful to know if inequality was actually rising or decreasing before and after the crisis.

This chapter will look at the development of inequality over the last 100 years. The data will be from the United States because, as seen later in this paper, the effect that income inequality has on a crisis in the United States is representative for other countries and plenty of data are available for the United States. Three different measurements of inequality will be looked at: income inequality, wealth inequality and consumption inequality. This is important because it is arguable whether for instance only looking at income inequality gives the full picture of the inequality actually present.

For this paper we use data from The World Wealth and Income Database which provides data on top income shares. This is set up by Alvaredo, Atkinson, Piketty and Saez (2015). In this dataset, data till 2013 are available. From this follows that it is clear that the longer run effects (and even the medium run) of a crisis on income inequality for the 2008 financial crisis are not available and it is therefore difficult to establish the relation. That is why also data on the Great Depression in the 1930's are present in this paper although these data may not be representative for the 2008 financial crisis.

2.1 Income inequality

According to Piketty and Saez (2003) income exists of labour income and capital income. Labour income is the return people get from working: wages. Capital income is the return on wealth, this can be for example stock market returns. According to Piketty and Saez labour income is the major part of total income and accounts for around three quarters of total income. Capital income is then naturally the rest of this income. For measuring how much income people actually earn from work and thus see

how much inequality there is from working one could also look at wages but this paper does not do that. This paper looks at top income shares and GINI coefficients. Mainly because there is plenty of data available on these variables.

The following graphs are constructed using the data of The World Wealth and Income Database. This paper shows the top 1%, 5% and 10% income shares. The top 0.1% income share is not reviewed in this paper because this income share follows the same pattern as the top 1% share.

Figure 1 Top 1% income share United States

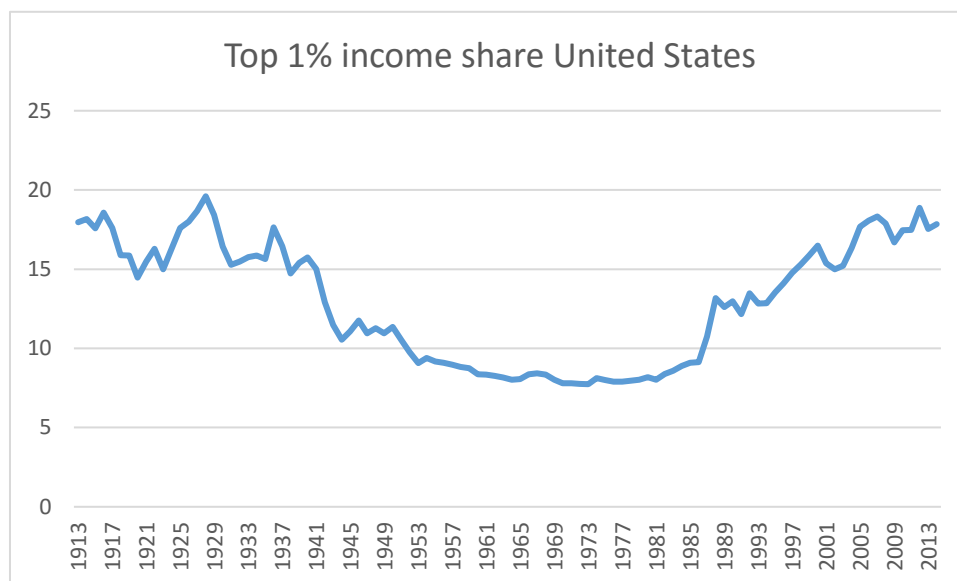


Figure 1: This figure is created by using data of the World Wealth and Income Database

For the top 1% share it can be seen that inequality was rapidly increasing in the period before the Great Depression. Then during and after 1929 the share of the top 1% decreased till it was around 10% in 1953 where it stayed for around 25 years. From 1978 onwards it showed the same pattern of increasing again until the share was around 18% at the start of the 2008 financial crisis. During the crisis the top 1% share decreased but then it increased again. The long term effects of the crisis on income inequality are therefore unclear.

Figure 2 Top 5% income share United States

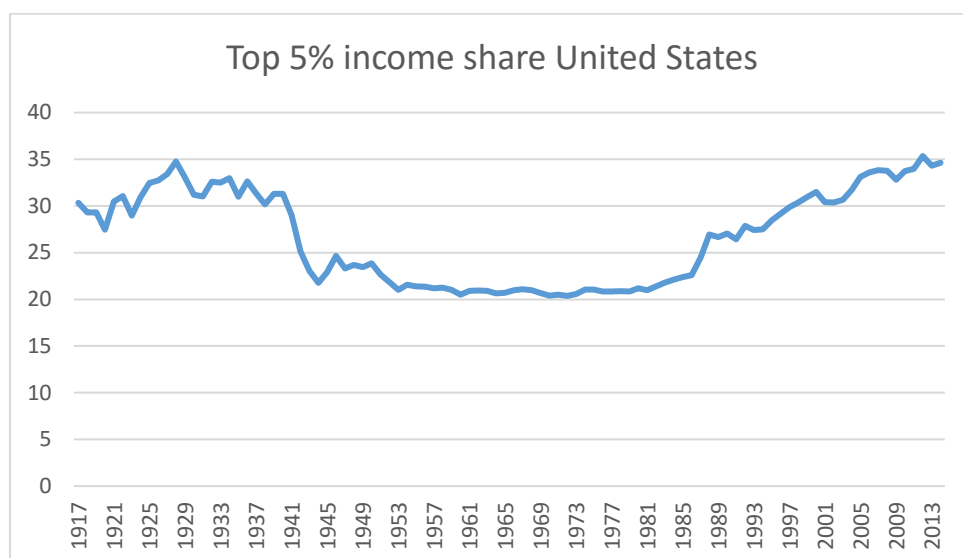


Figure 2: This figure is created by using data of the World Wealth and Income Database

The top 5% follows a similar pattern as the top 1% share. Again before the Great Depression the share increased with a decrease after the crisis. Leading up to the 2008 crisis the share increased at a relatively stable rate. The increases and decreases of the top 5% share are however much smaller than the top 1% share.

Figure 3 Top 10% income share United States

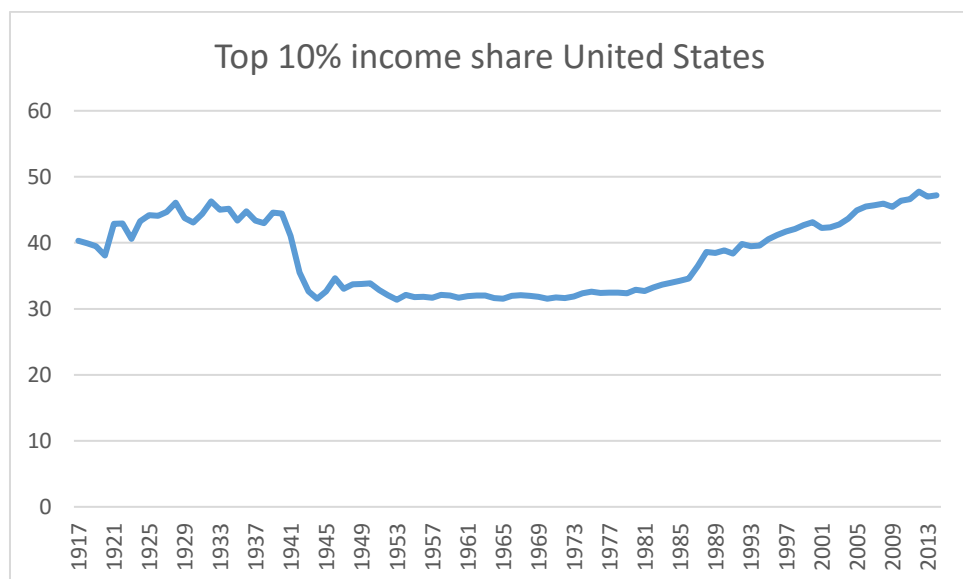


Figure 3: This figure is created by using data of the World Wealth and Income Database

Also for the top 10% income share the share follows a same pattern as the 5% and 1% income shares. Top income shares are however not the only measurement of income inequality. A more general

measurement which measures the inequality over the whole population and not only at the top is the GINI coefficient. Unfortunately the World Bank does not provide data on GINI coefficients before 1986. It is therefore not clear whether this coefficient was rising before the Great Depression but it can be seen for the 2008 crisis.

Figure 4 GINI coefficient United States

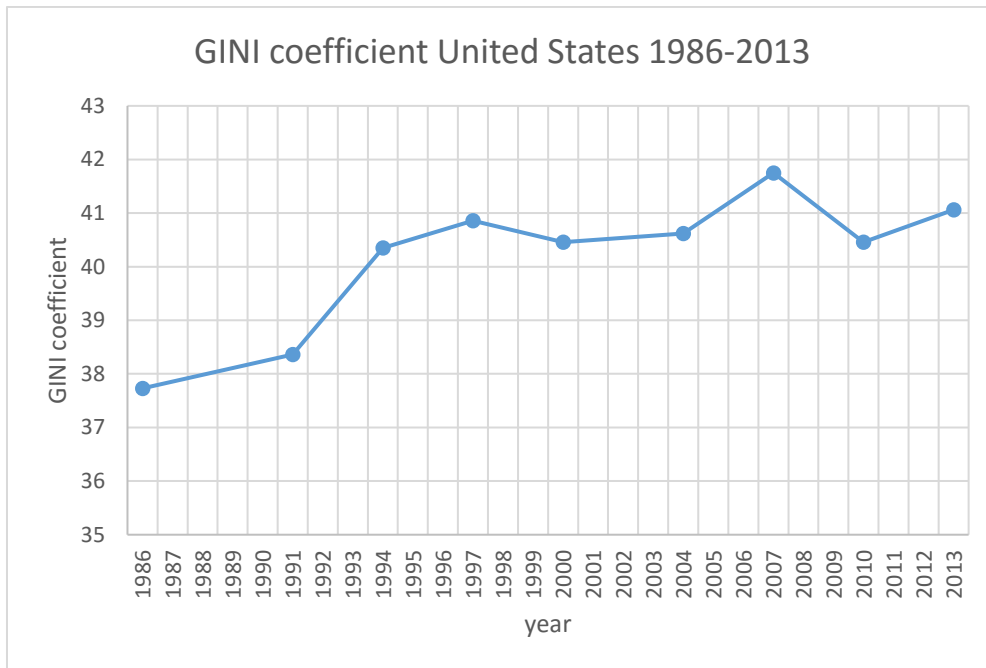


Figure 4: This figure is created by using data of the World Bank

From 1986 the GINI coefficient rises up and till the 2008 crisis. After the crisis it has decreased in 2010. These data are however not sufficient because not enough years are displayed.

The data indicate that increasing income inequality could lead to a financial crisis. For the reverse relationship the effect is unsure although data after the Great Depression suggest that after a crisis income inequality goes down.

It must however be said that the data which The Top Income Database use are pre-tax incomes. Also government welfare transfers are not included. This may suggest that the top % shares are not as big as seen in the graphs. Data on incomes after taxes are however more difficult to obtain. It is assumed, however, that the graphs are a good representation of how income inequality has evolved over the last 100 years, because especially in the United States taxation is not that progressive and benefits are relatively small.

2.2 Wealth inequality

For wealth inequality we use a different paper. Saez and Zucman (2016) provide data on wealth inequality in the United States from 1913 till 2012. Saez and Zucman use top 1% wealth shares and bottom 90% wealth shares. Again the same expected patterns are seen here.

Figure 5 Bottom 90% wealth share

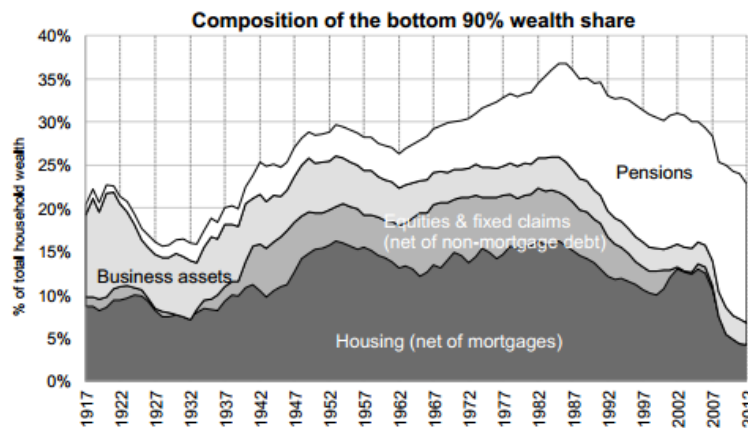


Figure 5: Source: Saez, E. & Zucman, G. (2016). *Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data*.

The bottom 90% wealth share decreases before the Great Depression hits in 1929. Then it increases for a long period until about 25 years before the crisis when it starts to decrease again. Also after the crisis the bottom wealth share decreases even further.

Figure 6 Top 1%, 0.1%, 0.01% wealth shares United States

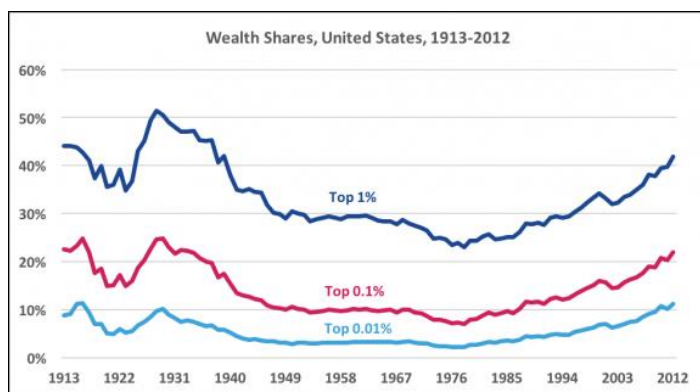


Figure 6: This figure is from the same paper as the previous figure: Saez, E. & Zucman, G. (2016). *Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data*. This paper however does not provide a graph in which all three income shares are displayed. Therefore a graph from www.inequality.org is used. This website is a project of the Institute for Policy Studies.

The top 1% wealth share shows a strong increase in the years prior and close to 1929 and also a stronger increase in the years close before the 2008 crisis.

2.3 Consumption inequality

As stated before, consumption inequality does not always mirror income inequality. For example, Krueger and Perri (2006) find an increase in income inequality but do not find an increase in consumption inequality. Aguiar and Bils (2015) find a different conclusion and show that consumption inequality does mirror income inequality. Piketty and Saez (2003) and Saez and Zucman (2016) do not provide data on consumption inequality. Consumption inequality is, however, important. How much a person can consume is a better measurement of that person's well-being than the amount of income he or she has. So what has actually happened? The problem of measuring consumption inequality is the lack of good data. Surveys have to be used like the Consumer Expenditure survey collected by the Bureau of Labor Statistics. The problem of this survey is according to Aguiar and Bils (2015) that high-income people underreport their actual consumption. If one then would use these data, this would mean that consumption inequality is lower than for example income inequality, this is also what Krueger and Perri (2006) find.

Figure 7 Income inequality and Consumption inequality United States

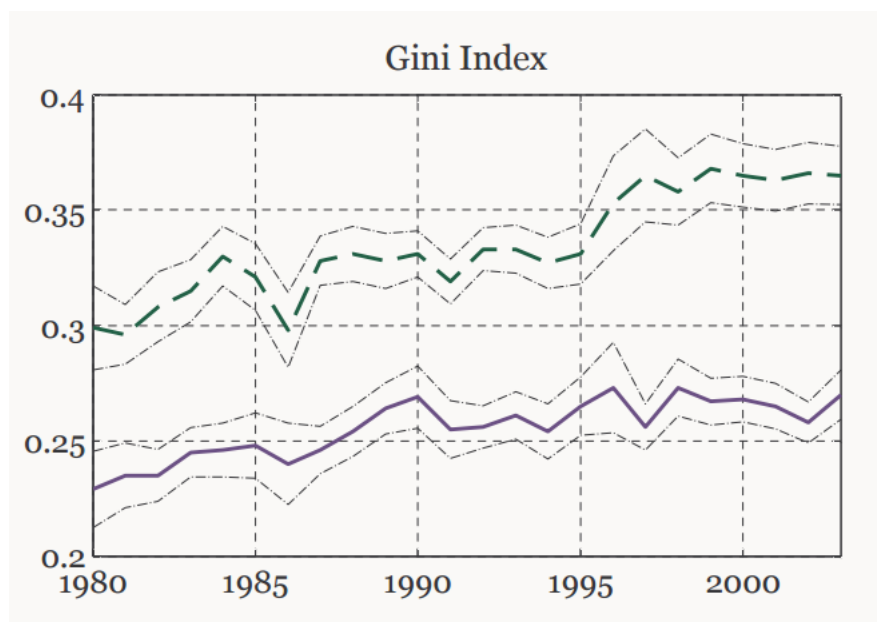


Figure 7: source: Krueger, D. & Perri, F. (2006). *Does Income Inequality Lead to Consumption Inequality? Evidence and Theory*. The top line is the GINI coefficient for income inequality and the bottom line is the GINI coefficient for consumption inequality.

In this graph the purple line is consumption inequality and the green line income inequality. Krueger and Perri do not find a substantial increase in consumption inequality in the decade before the 2008

crisis. They do however find an increase in income inequality. Unfortunately they do not have data from before the Great Depression so it is not possible to check this.

Attanasio, Hurst and Pistaferri (2012) try to mitigate the measurement error concerning consumption expenditure surveys in their paper. Attanasio, Hurst and Pistaferri (2012) try to do this in several ways. First they focus on Diary Data of the CE survey. These data are less prone to the measurement error because the consumption categories are more split up. Using these data Attanasio et al. find a strong increase in consumption inequality during the decade prior to the 2008 crisis. This line displays the standard deviation of log total consumption. A higher standard deviation means higher consumption inequality.

Figure 8 Consumption inequality CE survey data United States

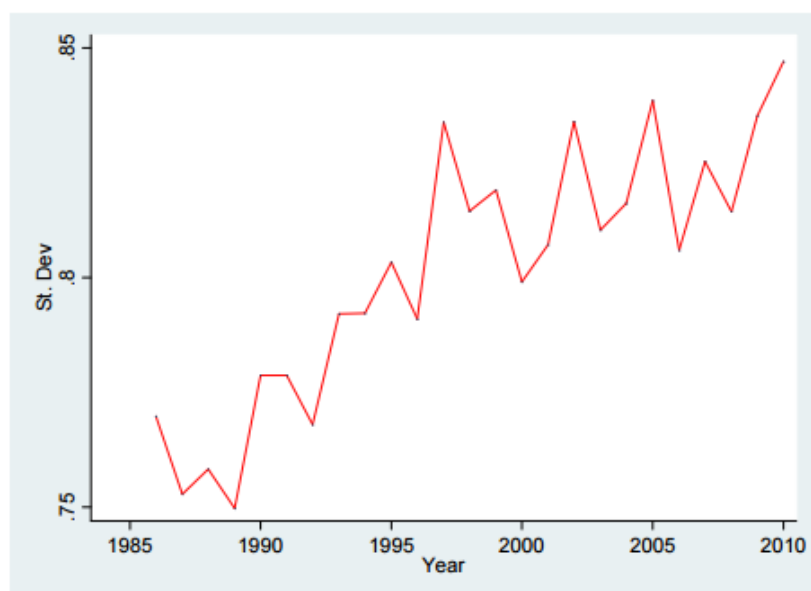


Figure 8: Source: Attanasio, O., Hurst, E. & Pistaferri, L. (2012). *The evolution of income, consumption, and leisure inequality in the US, 1980-2010*. This graph displays the standard deviation of log total consumption.

Furthermore, a different dataset is used in Attanasio, Hurst and Pistaferri (2012). Now data from the Panel Study of Income Dynamics (PSID) are used. They find again the same pattern.

Figure 9 Consumption Inequality PSID data

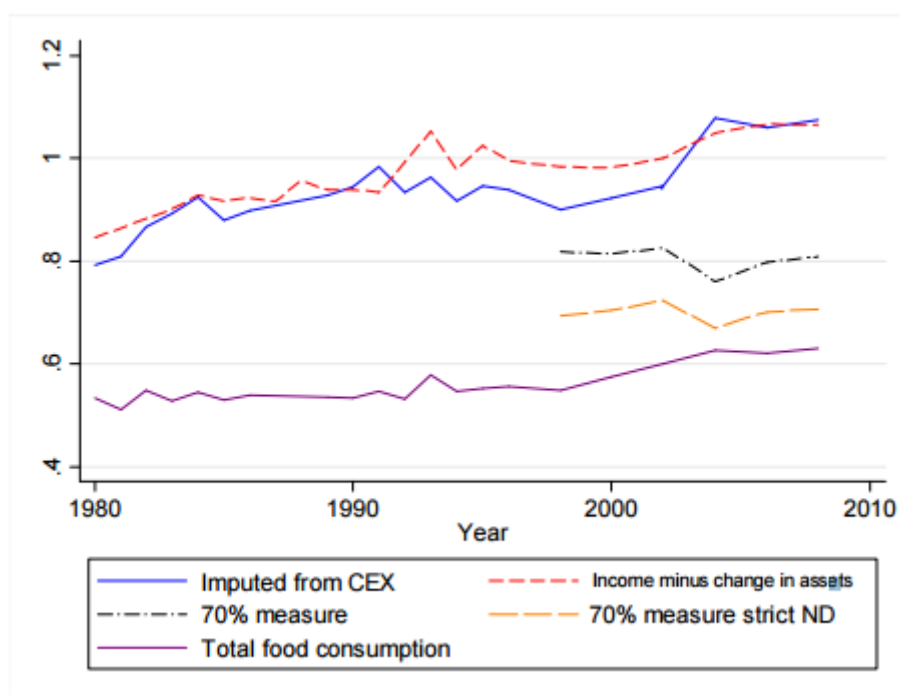


Figure 9: Source: Attanasio, O., Hurst, E. & Pistaferri, L. (2012). *The evolution of income, consumption, and leisure inequality in the US, 1980-2010*. This graph again displays the standard deviation of log consumption and income. The blue line is consumption inequality and the red line is income inequality. Inequality is measured by the standard deviation of the logs.

Consumption inequality (the blue line) follows income inequality (the red line) and shows an increase in both consumption inequality and income inequality in the decade prior to the crisis in 2008.

It is therefore not quite sure what happened to consumption inequality prior to a crisis. If the measurement error is severe one could expect an increase prior to a crisis, but if this is not the case then consumption inequality might not mirror income inequality.

The Krueger and Perri (2006) approach is in accordance with our arguments in the following chapter. Because of increasing income inequality, relatively poor people started to borrow more to keep a standard of living, this keeps their relative consumption at a constant level. The fact that wealth inequality has especially increased a lot is also in line with our theory in the next section. Rich people cannot spend all their money on consumption and therefore have tried to find other ways in which they can invest their money by which their wealth increases.

Concluding from this analysis regarding the development of inequality of income, wealth and consumption, it is shown that generally inequality is rising prior to a crisis. What happens to inequality after a crisis is not decisive when looking at the data. After the Great Depression inequality clearly fell

but after the 2008 crisis this was not the case with especially wealth inequality rising. It should be noted, however, that long-term effects may show again decreasing inequality. This gives a good reason to look deeper into the theory of the relationship between income inequality and economic crisis and provides incentives for further empirical work.

Chapter 3 Theoretical analysis

In this chapter the possible theoretical models in the existing literature will be explored. This will be done first for the income inequality → crisis relation and secondly for the crisis → income inequality relationship.

3.1 Effects of income inequality on economic crisis

The general argument supporting the causal relationship between income inequality and a financial crisis is as follows. People in the lower part of the income distribution have a lower income. Therefore in order to keep the same standard of living, they start borrowing. This borrowing cannot be sustained and unexpected shocks will lead to defaults on loans to these people and then to defaults of financial institutions that provided these loans. This argument and other arguments will be discussed more in detail in this section.

Stiglitz (2012) is one of those economists that argue that income inequality was a cause of the financial crisis. Stiglitz argues that money has gone from people who need it for consumption i.e. poor people and therefore spend most of the income they have, to people who do not spend all of their income i.e. rich people because they have so much of it that they cannot spend it all. This according to Stiglitz will lead to insufficient aggregate demand and thus to a crisis. Fitoussi and Saraceno (2009) elaborate on Stiglitz' argument. They again state that income inequality led to decreased aggregate demand because the rich do not spend all of their extra income. This led to increased borrowing for low income people to maintain consumption. Fitoussi and Saraceno add that this increase in borrowing was further enhanced by monetary policy. Monetary policy kept interest rates low in order to increase spending (because people save less) but this has the effect that private debt increased even more because it is cheaper to borrow. Furthermore the ones who benefited from rising inequality i.e. rich people did not know what to do with their money. They were seeking places where they could invest their money for a higher return. This created asset bubbles like the housing bubble in the United States and to a lesser degree in the rest of the world.

Arbabzadeh (2012) provides a different theory for why income inequality can be a cause for the financial crisis of 2008. Arbabzadeh takes a more political view. She states that because of the rising income inequality the government felt that it had to prevent further increases. However, the

government has done this the wrong way. The government should have addressed income inequality by installing a more progressive tax or by addressing issues in the education system in which people with lower income have less access to education (Darling-Hammond, 1995). Instead, the government tried to combat the inequality by extending access to mortgage finance. The government did this through institutions like Fannie Mae and Freddie Mac whose goal was to allow low income people attain a mortgage. However, those low income people were not qualified for a prime mortgage and thus had to take a loan they actually could not afford and resort to subprime mortgages. This was a problem in the crisis when housing prices did not go up anymore and these mortgages therefore defaulted causing high losses of the financial institutions involved in subprime mortgages.

Another argument focuses on the liberalization of the financial markets. The argument is that income inequality leads to lobbying (Esteban and Ray, 2006). Rich people lobby for less regulated markets, because this can increase the return on their capital (this then has the effect of reinforcing income inequality as seen later in this paper). Less regulated markets, however, have the downside of being more vulnerable to financial crises (Kaminsky and Reinhart, 1999).

Few papers introduce a model which shows that higher inequality can lead to a crisis. One of these papers is Kumhof, Ranciere and Winant (2015). In this model there are two income groups, the top 5% and the bottom 95%. Kumhof et al. state that the top income group does not use all of its income for consumption but also use a share of this income to accumulate financial wealth in the form of loans to the bottom 95%. This is because in this model financial wealth (like consumption) gives direct utility to the top 5% group. The bottom 95% then borrow this money to keep up with consumption. This leads to an increase in the leverage (debt-to-income ratio) of this bottom income group which makes future crises more likely. This model assumes that consumption inequality does not increase as much as income inequality. This is because the bottom 95% become more leveraged to keep up consumption. In my paper however, it was shown that consumption inequality was probably much more in line with income inequality than assumed in the literature.

Another paper which introduces a model is Charpe and Kuhn (2012). This model states that the labour share of income has fallen up to the crisis. This is because workers (low income) have less bargaining power than rich people. This leads to lower consumption and income for the lower income group. This lower aggregate demand eventually leads to a crisis according to Charpe and Kuhn (2012). This model could be more relevant because it allows for an increase in consumption inequality as shown in the previous chapter. The Kumhof, Ranciere and Winant model does not allow for increased consumption inequality and thus may not be that relevant.

3.2 Effects of economic crisis on income inequality

This section will explore the theoretical models underlying the crisis → income inequality relationship. It would be easy to think that because rich people benefit the most leading up to a crisis it should automatically mean that they have the most to lose after the crisis and therefore inequality would go down. One could also argue that because poor people already have little it is worse for them to lose something as it is to rich people. These assumptions are however too simplistic. In this paper it is first evaluated what people can actually lose during a crisis. So what do poor people have to lose and what do rich people have to lose? Then it can be evaluated who lost more although this is likely to be ambiguous and it is difficult to verify because of a lack of data.

Unemployment:

Low income people are generally working in labour intensive industries and their main income is labour. Therefore one cost of the crisis is unemployment. It is expected that unemployment is hitting the low income part of the population. According to the OECD (2013), incomes from work and capital fell in the period immediately after the crisis. This was because of higher unemployment and lower wages. This would mean that inequality would have been higher after the crisis. However, this effect was partly mitigated by people claiming more unemployment or other safety net benefits according to the OECD. This was helped by policies of boosting demand by lower taxes.

Furthermore, as Verick (2009) states, it is young people who are hit the hardest during a crisis. This can be seen for example in Spain where around 50% of young people were unemployed. Young people are part of the low income part of the population so this is again evidence of higher income inequality after a financial crisis.

There is however also evidence that unemployment in the financial sector, in which the high income part of the population often works, is higher than in other sectors.

Stock market losses:

Mankiw and Zeldes (1991) argue that the fraction of households owning stock increases with average labour income. They also find that if these households have had more education, stock ownership increases as well. During and after the economic crisis, stock markets lost 50% of their value. Meaning that stock owners had to endure a big loss on the stock market. If high income people are more likely to invest in the stock market this would automatically mean that rich people were the one who were hit the hardest by the stock market crash during the financial crisis and inequality may have gone down. But a few years after the crisis the stock market recovered so that would mean that inequality should have gone up again since then.

Bucher-Koenen and Ziegelmeyer (2011) have a similar view but take a slightly different approach and state that households with lower financial literacy and cognitive abilities are less likely to participate in stock markets and thus have lower losses due to the crisis. This is in line with our previous argument that lower income people are less hit by losses in the stock market. Lower financial literacy indicates that a person has had less education and therefore a lower income, although this is not always the case of course. Bucher-Koenen and Ziegelmeyer add to this that those people with lower financial literacy were more likely to sell their assets in which they made a loss. This would again mean that income inequality would have gone down because the effects the losses on the stock market had on private households was limited. Bucher-Koenen and Ziegelmeyer, however, expect that inequality increases once the stock market is recovering, because low literate people remove their assets from the stock market during the crisis. This would mean that these people will miss the higher long-term returns of the stock market when the economy is booming again. If the economy starts to recover, income inequality would then be likely to increase again because more literate people will reap the benefits of this on the stock market.

It is therefore not theoretically clear what happens to inequality after a crisis. Many factors play a role in this. One could however state that if a crisis hits hardest in for example the lower part of the job market that it is likely that income inequality will increase. If the stock market is hit hardest it is expected that rich people will lose from this and inequality will decrease.

Chapter 4 Empirical analysis

4.1 Review of empirical literature

In chapter 3 the theory behind the causal relationships between income inequality and an economic crisis have been discussed. Although it is useful to know these theories to understand the potential mechanisms that cause these relationships, it is also necessary to find empirical evidence to establish if the causality truly exists. Exactly this is the goal of this chapter. The empirical work will be discussed in more detail and the methodology of this work will be investigated.

Atkinson and Morelli (2011) provide empirical evidence on the relation between income inequality and the crisis. This papers studies data of 25 countries over the last 100 years. The paper looks at different measurements of inequality: poverty rate, top income shares and GINI coefficients. The GINI coefficient has priority and will be looked at first, if there are no data on GINI coefficients, the other measurements are looked at. Then, it is evaluated if a crisis has been preceded by an increase in these measurements. Atkinson and Morelli find that banking crises were preceded by a decrease in inequality the same amount of times as an increase in inequality. Only in one third of the cases

inequality was clearly rising before the crisis. Therefore one could conclude that the hypothesis that higher income inequality leads to an economic crisis is not true.

Morelli and Atkinson (2015) have updated this analysis by including recent data and including more countries. They find the same conclusion as in the 2011 analysis but also state that in the United States and the United Kingdom inequality was rising before the recent 2008 economic crisis. The US and the UK are two main and important economies of which many countries are dependent. Bellettini and Delbono (2013) therefore state that if there is a crisis in one of these countries, it is likely that a crisis occurs in other countries in the world too. This can also be seen in the 2008 crisis which started in the United States and because of globalization and interconnectedness between firms and banks spread to Europe and the rest of the world. So if these other countries may not have experienced rising income inequality but the US and the UK have, income inequality may not be excluded as a cause of the crisis in these countries.

Perugini, Holscher and Collie (2013), looking at 18 OECD countries in the period of 1970-2007, find a statistically significant positive relationship between income concentration and private sector indebtedness. This in turn results in higher financial fragility and eventually a crisis. This analysis is, however, for only one period before a crisis and thus may be coincidental.

Bordo and Meissner (2012) furthermore look at a longer period and not only look at crises but also at other boom-bust cycles. Bordo and Meissner find little evidence linking credit booms and financial crises to rising inequality. They argue that credit booms do lead to a higher probability of a crisis but that inequality is not a major determinant of these credit booms. According to Bordo and Meissner low interest rates and increasing real income are important determinants. I, however, discuss in chapter 3.1 that these low interest rates could have been an outcome of monetary policy. To increase consumption for low income people the government used monetary policy to keep interest rates low. The low interest rates are then a response to the consumption loss following higher inequality.

Kumhof, Ranciere and Winant (2015) provide evidence that household leverage has increased leading up to both the Great Depression and the 2008 crisis. This is showed by an increase in the debt to income ratio of the low income group.

It is thus not quite clear whether inequality does lead to a higher probability of crises. What is, however, clear is that leverage of households has increased and that this increase leads to a higher probability of a crisis occurring. More research should be done in order to establish whether income inequality was a determinant of this higher leverage.

In the same paper Atkinson and Morelli (2011) also provide an analysis for the effect of economic crisis on income inequality. They however do not find a decisive conclusion. A crisis does affect inequality but this effect can be increasing and decreasing inequality.

As stated before, both the causal relationship between income inequality and crisis and between crisis and income inequality may be self-reinforcing. Inequality leads to lobbying which leads to less regulation and perhaps to a financial crisis. The lobbying also leads to more earnings for the rich which in turn increases income inequality again. However, if a crisis has redistributive consequences this effect may not be present as lobbying is decreased during and after the crisis.

4.2 Inequality and the severity of a crisis

In this section I will perform explorative research into the relationship between income inequality and economic crisis by correlation analysis. The hypothesis is that a country with a higher level of income inequality will have a severer crisis. It is therefore not evaluated whether a high level of income inequality leads to a higher probability of a crisis occurring but rather to a severer crisis. Income inequality is measured by the GINI coefficient in 2007, a year before the crisis and the severity of the crisis is measured by the GDP at market prices drop during the crisis compared to a GDP level before the crisis i.e. the GDP of 2007. For this analysis a sample of 21 European countries and the United States will be used including countries with different values of income inequalities. For example countries with historically lower GINI coefficients like Sweden and The Netherlands and countries with higher GINI coefficients like Greece and Spain. The data are from the database of the World Bank.

First, the GDP level in the worst crisis year 2009 will be compared with the pre-crisis GDP level in 2007. The drop in income is the highest during these years and thus this will give information about how the level of income inequality is related to the severity of the crisis in the different countries.

Figure 10 GDP 2009/2007

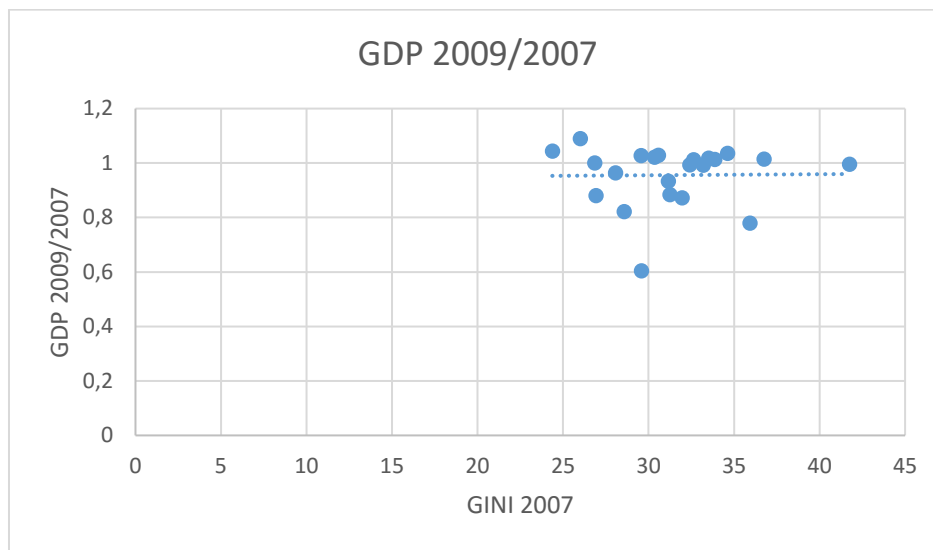


Figure 10: This figure is created by using data of the World Bank

As shown in this graph a higher GINI coefficient in 2007 does not go together with a bigger income drop during the years 2007-2009. The correlation coefficient is small: 0,01356. This correlation is also not significant and thus can be ignored. One could stop the analysis and conclude that income inequality has no relationship with the severity of the crisis. But the severity of a crisis is not only measured by how much GDP has dropped in certain years but also by how long the crisis was present in a particular country and how fast that country was able to recover from the crisis. The GDP drop or recovery should therefore be evaluated for a longer period. This is analysed in the next graph. Again the GINI of 2007 will be used but it is now compared with the income drop or increase between 2011 and 2007.

Figure 11 GDP 2011/2007

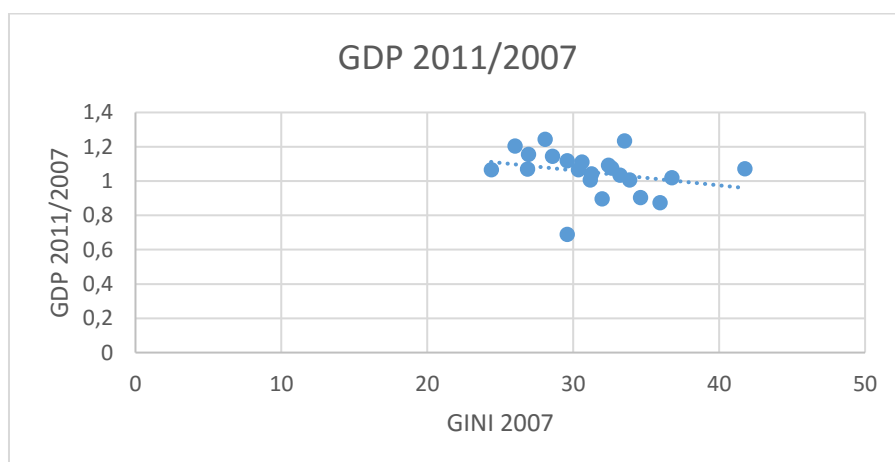


Figure 11: This figure is created by using data of the World Bank

This graph shows that countries with a higher level of income inequality measured by the GINI coefficient in 2007 have a higher GDP drop during the years between 2007 and 2011 or have recovered slower displayed as a lower GDP increase in the same period. For example, Sweden a country with lower income inequality has recovered much more from the crisis than countries with higher income inequality like the United Kingdom and Greece. The correlation coefficient is -0,27369 which is larger than the coefficient for the shorter period but still not significant. Using SPSS and doing a two-tailed test the p-level is 0,218.

This analysis can be extended by looking at different income inequality measures. This paper chooses to look at income shares as already done before in a previous chapter. First, the bottom 10% income share will be evaluated. There should be a positive correlation now. If the bottom 10% hold more income, income inequality is lower.

Figure 12 Bottom 10% share

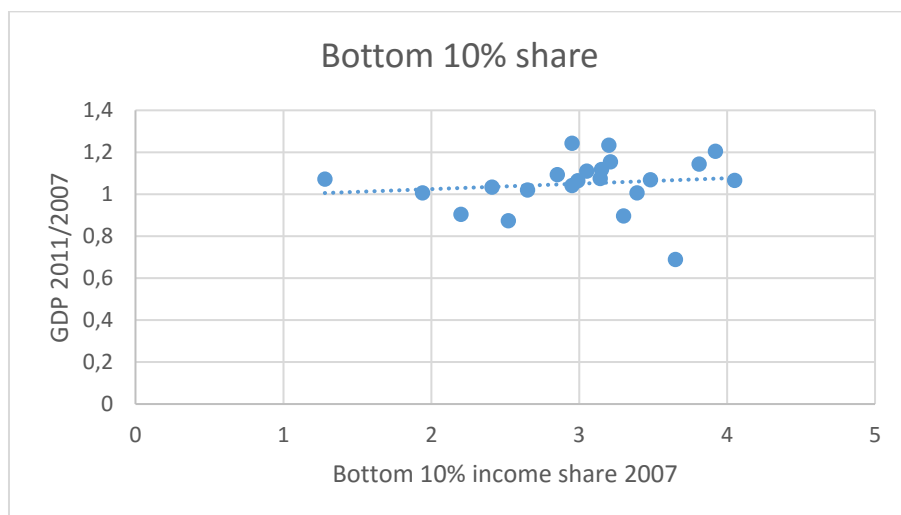


Figure 12: This figure is created by using data of the World Bank

The pattern is again the same. Countries with higher bottom 10% income shares have a higher GDP growth between 2007 and 2011 with the exception of Iceland. The correlation coefficient 0,1345 is positive but again not significant with a p-value of 0,551.

For the top 10% income share the correlation is larger. For the top 10% two different datasets are being used. The graph below is based on the data of the World Bank. The other dataset is from the earlier mentioned The World Wealth and Income Database. This database gives an even larger correlation coefficient of -0,47335 but because of this dataset only consisting of a sample of 10 countries versus the 22 country World Bank dataset, the latter is chosen with a correlation of -0,32955. This correlation is again not significant with a p-value of 0,134.

Figure 13 Top 10% income share

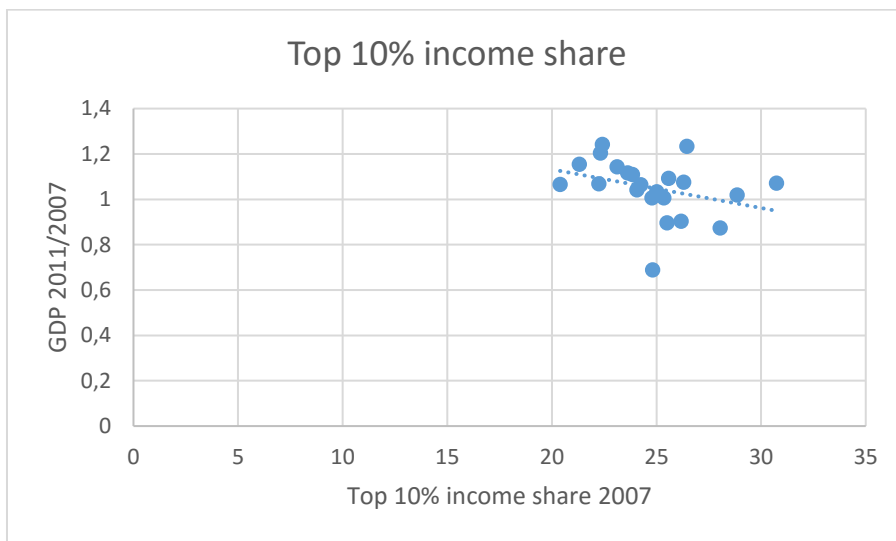


Figure 13: This figure is created by using data of the World Bank

For the top 5% and 1% income shares the same pattern as in the top 10% income share appears. The higher the top income share the less GDP growth there is between 2007 and 2011. However because the same dataset with only 10 countries is used it is decided not to include those graphs.

Looking at the data one can clearly see that Iceland is an outlier. Iceland has had a much severer crisis than the other European countries and the United States while not having a particularly high income inequality. Omitting Iceland in our analysis would lead to a significant p-value of 0,046 for the correlation between GINI 2007 and GDP growth for the years 2007-2011. Also for the top 10% analysis the p-value would become 0,055 which is at least significant at the 10% significance level. The correlations would then respectively become -0,440 and -0,425. These correlations are absolutely higher. However one cannot just leave an observation out of the analysis. If one does decide to do this, this should be done before the analysis. Otherwise a bias is created to leave the observation out to get a more significant result. In this paper Iceland is left out after the initial analysis. This is done because the financial sector is large compared to the GDP of the country and banks had such large amounts of debt that a financial crisis had much more severe consequences in Iceland than the rest of Europe. Therefore the correlations without including Iceland cannot be taken into consideration when drawing conclusions.

Based on our correlation analysis, we conclude that there are some weak indications that countries with higher income inequality (whether that is measured by GINI coefficients or top/bottom income shares) take longer to recover their GDP to the original level. This correlation is however not significant

for all income inequality measurements. It is therefore still questionable whether a higher level of income inequality leads to a severer crisis.

Furthermore, even if our correlation analysis would have shown that a high level of income inequality is significantly related to a more severe crisis, this does not mean that there also exists a causal relationship between income inequality and a crisis. There are many other factors that influence GDP in an even more direct way than income inequality does. These factors should be included in the analysis but that is beyond the scope of this paper. Furthermore, this is only one crisis which is being looked at. To get a better picture more crises should be evaluated but this is difficult because crises are relatively rare and for the crises that have been there in the past the data are not widely available.

Chapter 5 Conclusion

In this thesis it is evaluated what role income inequality played in the 2008 crisis and what effect the crisis had on inequality. This relationship is not often reviewed in the literature but could have serious implications for preventing future crises. It could also make inequality an even more important subject than it is now. In the second chapter it is shown that income and wealth inequality were rising before both big crises in the United States. For consumption inequality this pattern is not that clear. The reverse relationship from the crisis on inequality is ambiguous. A longer period after the crisis should be empirically researched to find out what role a crisis plays in inequality.

The theory states that because of inequality leverage will increase and therefore the fragility of the financial system. This is enhanced by government policies and lobbying which are responses to inequality. The fact that inequality was rising before both crises and the theoretical arguments provide reason to review this empirically and suggest that the relationship may be viable.

In the next chapter the empirical literature is reviewed and this is much more sceptical about the relationship. Few papers find evidence but this should not be the end of the research. Arguments given in this paper like the fact that crises can originate in countries with high inequality should be researched further empirically. Furthermore, an explorative analysis between inequality and the severity of the crisis is done and from this it is suspected that higher inequality leads to severer crises. This analysis however has many limitations.

More research should therefore be done to establish whether inequality can cause a crisis or make a crisis more severe. The focus of this research should not be to just look at whether inequality rises before future crisis but more on whether inequality has an effect on other causes of a crisis like higher leverage or less consumption for low income people.

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Appendix correlations empirical analysis

This appendix includes all the correlations and p-values of the analysis done in chapter 4.2.

Variable 1	Variable 2	Pearson Correlation	Significance
GINI 2007	GDP 2009/2007	0.014	0.952
GINI 2007	GDP 2011/2007	-0.274	0.218
Bottom 10% income share 2007	GDP 2011/2007	0.135	0.551
Top 10% income share 2007	GDP 2011/2007	-0.330	0.134
GINI 2007**	GDP 2011/2007**	-0.440*	0.046
Bottom 10% income share 2007**	GDP 2011/2007**	0.365	0.104
Top 10% income share 2007**	GDP 2011/2007**	-0.425	0.055

** For these variables Iceland is omitted in the sample.

* Correlation is significant at the 0.05 level (2-tailed).