Economic inequality and growth

The effects of economic inequality on growth

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Abstract:
The topic of this thesis is the effect of economic inequality on economic growth. The aim is to promote awareness and discussion on the issue, as growing high economic inequalities are a reality. More specifically the research questions focus on clarifying the effects of economic inequality and on means meant to decrease it without unduly hampering economic growth.

The primary source materials, Thomas Piketty's The Capital in the Twenty-First Century, Credit Suisse's Global Wealth Report, the OECD report by Federico Cingano and Does the Profile of Income Inequality Matter for Economic Growth by Sarah Voitchovsky are studied to draw conclusions on the research questions.

As a conclusion the author presents the inadequacy of the diffusion of knowledge and demographic growth to cancel out the growth of the economic inequality and sets the need for a tax on capital, as outlined by Piketty. This tax is then discussed on its effects on growth and on the measures needed to implement such a tax.

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Tiivistelmä:
Tämän opinnäytetyön aihe on taloudellinen epätasa-arvon vaikutus talouskasvuun. Tarkoituksena on lisätä tietoisuutta ja keskustelua asiasta, sillä alati kasvava taloudellinen epätasa-arvo on yhä selkeämmin nähtävissä. Tutkimusongelmina ovat taloudellisen epätasa-arvon vaikutusten selkeyttäminen, ja tavat joilla sitä voitaisiin vähentää haittaamatta talouskasvua kohtuuttomasti.

Päälähdeaineistona käytetään Thomas Pikettyn The Capital in the Twenty-First Century kirjaa, Credit Suissen maailman varallisuus raporttia, Federico Cinganon OECD:n raporttia sekä Sarah Voitchovskyn tutkimusta. Näiden pohjalta kirjoittaja vetää johtopäätöksensä tutkimusongelmiin.

Johtopäätöksenä kirjoittaja osoittaa osaamisen ja tiedon leviämisen, sekä väestönkasvun kykenemättömyyden estää epätasa-arvon kasvu, ja asettaa tarpeen Pikettyn hahmottelemalle pääomaverolle. Tämän jälkeen arvioidaan veron vaikutuksia kasvuun sekä sen käyttöönottoon tarvittavia vaiheita.

Avainsanat:	Taloudellinen epätasa-arvo, talouskasvu, Gini-kerroin
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1 INTRODUCTION

Following the 2007 Financial Crisis, economic growth has been stagnant in most of the world, but there is another phenomenon spreading worldwide: growing economic inequality. Starting from the 1920's economic inequality had actually been decreasing, but this trend has seemingly reversed itself during the 1970's. Now in 2014 economic inequality is approaching all time high values and the wealth of the world is owned by ever smaller groups of people. A recent report by the OECD, published in December 2014, now questions whether the stagnant growth is partially caused by increasing economic inequality.

This question is the topic of this thesis; economic inequality and its effect on economic growth. The causality between economic inequality and growth is not clear and can go both ways, but this thesis will focus on growth as the dependent variable to allow for a more focused viewpoint. Before focusing on the causality between growth and inequality we will first examine the measures used for them. The primary measures in this thesis are GDP per capita and the Gini coefficient for growth and inequality respectively. GDP can be divided into several factors that have different levels of importance for countries depending on the structure of their economy. Each of these factors will be analysed separately and connected to actual data from four Nordic countries: Denmark, Finland, Norway and Sweden. Inequality is similarly observed for these countries using the Gini coefficient.

After examining growth and inequality separately the thesis will focus on the regression model by the OECD researcher Federico Cingano to prove the link from inequality to growth. The results are then compared to a similar model by Sarah Voitchovsky, which also looks into the effect inequality has on growth in different income levels.

After this, the thesis will focus on the actual research questions by combining the findings from the regression analyses to the causes of economic growth and economic inequality and discuss the measures to decrease inequality in light of the findings.

1.1 Research aims and questions

This topic was chosen primarily because of its relevance to recent events, but also because of the author's interest in the interaction of economic and political issues in shaping both economic inequality and the successive financial crises. Understanding and clarifying the tangle of events that started from 2007 might allow for a clearer picture of where we are going.

This thesis has two research questions:

- what is the effect of economic inequality on economic growth and
- what measures could be used to decrease economic inequality without unduly hampering economic growth.

Through these questions this aims to generate more discussion and awareness of these issue and their relevance to the current events and the future.

1.2 Material and method

The method used in this thesis is literature review. Federico Cingano's findings by his regression analysis model are compared to Sarah Voitchovsky's findings. Their relevance and implications are discussed and compared. The results are then analysed based on Thomas Piketty's discussion and conclusions on inequality.

The primary sources used for this thesis are Thomas Piketty's book Capital in the Twenty-First Century, the Credit Suisse Global Wealth Report of 2014, the OECD Report by Federico Cingano and Does the Profile of Income Inequality Matter for Economic Growth study by Sarah Voitchovsky.

1.3 Theoretical framework

Economic inequality and its relationship to growth has been the focus of several studies during the past decades. One of the earliest studies was by Simon Kuznets (1955) and his inverted U-curve. His main conclusion is that the development between growth and

inequality will in the long term form an inverted U-curve, so that a country will experience an increase in inequality in the early stages of its economic development, and later as it matures see inequality fall. This theory marked an important starting point for many inequality studies that followed.

Persson and Tabellini's (1994) study presents that in unequal economies the governments would favour more redistributive policies. This in turn would affect incentives, and thus decrease growth. Inequality would thus hamper growth.

Barro's (1997) study presents a negative relationship between the growth of per capita income and initial per capita income level. In other words in high per capita countries growth speed will fall, and thus economic growth will converge inequality both within a country and between them.

Forbes's (2000) study, using panel data on countries, finds in contrast to Persson and Tabellini's a positive relationship in short term between inequality and growth.

Voitchovsky (2005) focused on the effect of different parts of income distribution on income inequality. She also focused on using more measures for inequality than just the general measures, such as the Gini index. Her approach is used in this thesis to validate the inadequacy of the Gini index in explaining the link to growth.

1.4 Limitations

Economic inequality research often suffers from a lack of long period data. This makes it difficult to make analysis on long term development of economic inequality, and so all conclusions are largely based on theoretical data and not empirical data.

Because of the time limits for the thesis, practical examples on growth and inequality are mostly limited to Denmark, Finland, Norway and Sweden. This will allow for a focus on the comparison of relatively similar countries, but in slightly different circumstances.

2 CAUSES OF ECONOMIC GROWTH

A nation's economy is often measured using gross domestic product (GDP). We do this because it's quick and simplifies all the data into one number. It can however be misleading as two nations with the same number can have a very different type of economy. It also does not account for the depreciation on the equipment used in the production of goods and services during the year.

The equation used to calculate GDP is as follows:

GDP = C + I + G + (X - M)

Where C is consumption, I is investments, G is government spending and X - M is net foreign trade.

To limit the effects the size of the population has on the data, this thesis will use GDP per capita as a measure of economic growth. GDP per capita is calculated by dividing the GDP of the country in question with its population:

GDP per capita = GDP / Total population

Economic growth for a nation means an increase in real GDP, as in adjusted for inflation. So true growth must factor in the effect of inflation, a nominal growth figure might mean a loss in purchasing power if the effect of inflation is stronger than the growth.

An increase in GDP means an increase in aggregate demand or supply. All causes that affect these two factors will also affect economic growth. (Pettinger 2012).

2.1 Demand side factors

A country's demand is the sum of consumer spending, gross private domestic investments, government spending and net export and import. How the demand is divided between these factors depends on the type of economy the nation has. (Pettinger 2012)

2.1.1 Consumer spending

Consumer spending is the sum of expenditure used for personal consumption, for goods and services, in a nation. Typically this is the largest portion of the aggregate demand.

Consumer spending can be influenced by various factors. Lowering taxes raises the amount of money households have for spending and saving, that is the income after taxes, the disposable income (Investopedia 2014). Disposable income can also be increased by increasing wages, but it's often quicker to change taxation. A larger disposable income can contribute to increased demand by expanding consumption, but it can also lead to increased savings. This is determined by consumer sentiment; the consumer's opinion on his/her financial status and short and long-term aspects of the economy. A person with little savings and property would much rather save the extra money in a depression. This is however a negative effect for the government if the taxes were cut in order to promote spending. A high consumer sentiment on the other hand promotes spending (Investopedia 2010a).

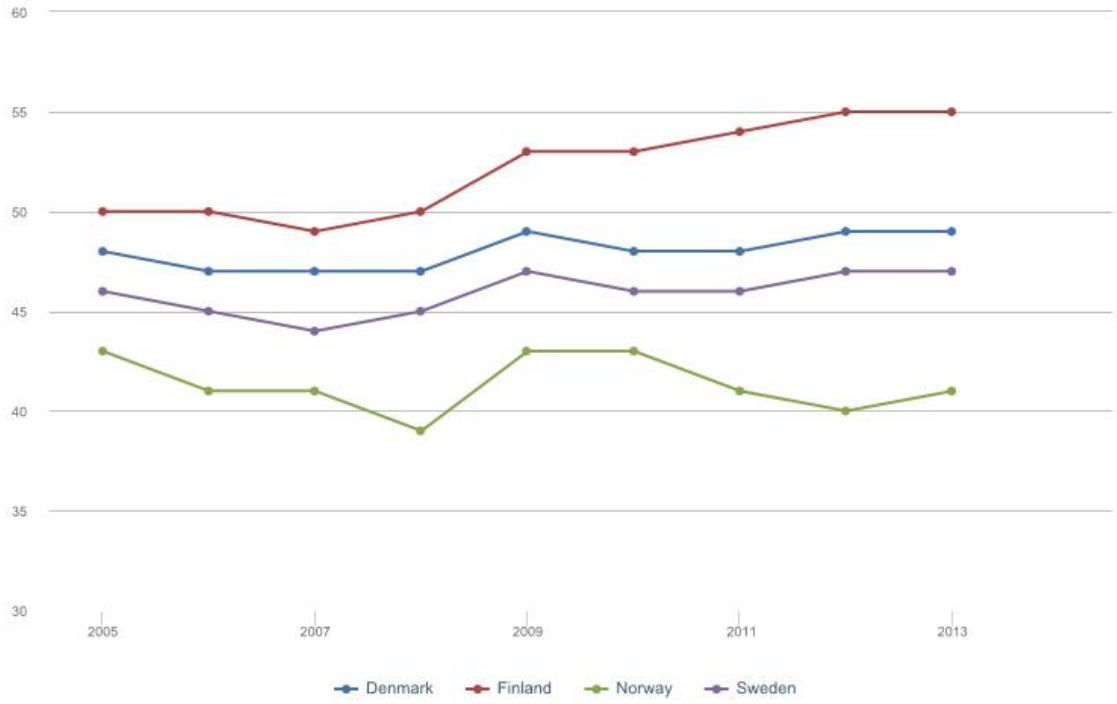


Figure 1: Consumption as a percentage of GDP

	Denmark	Finland	Norway	Sweden
2005	47.8	50.0	42.6	46.0
2006	47.4	50.4	40.9	44.8
2007	47.5	48.8	41.3	44.3
2008	47.5	49.6	39.2	44.6
2009	48.7	52.5	43.1	47.1
2010	47.9	53.2	42.8	46.4
2011	48.2	53.7	41.1	46.3
2012	48.8	54.5	40.4	46.5
2013	48.8	54.6	41.0	46.7

Table 1: Consumption as a percentage of GDP

The Nordic countries all show fairly similar figures, with Finland as the highest starting from 50 % and ending at 54,6 % and Norway as the lowest from 42,6 % to 41 %. The difference can be explained by Norway's natural resources and the role of investments in the economy. The increase from 2007 and 2008 thus reflect decreased investments because of the Financial Crisis and the increased role of consumption in the GDP. Norway and Finland show a more prominent increase and are thus somewhat more reliant on investments than Denmark and Sweden. Norway's recovery however has been faster.

2.1.2 Gross private domestic investment

Gross private domestic investment (GPDI) means the additions to the fixed assets of the nation and the net change of the inventory. Fixed assets mostly consist of construction of roads, railways, schools, hospitals, private residential buildings, commercial and industrial buildings. Inventory means the stock of goods held by firms. (The World Bank)

GPDI can be used as an indicator for future capacity for production. Investments are influenced by the cost of money, the interest rate. A lower interest rate will make more investments profitable and thus increase demand. Interest rates are set by the central banks, so not all nations are able to use loose monetary policy independently as a measure to bolster faltering economy (Investopedia 2003).

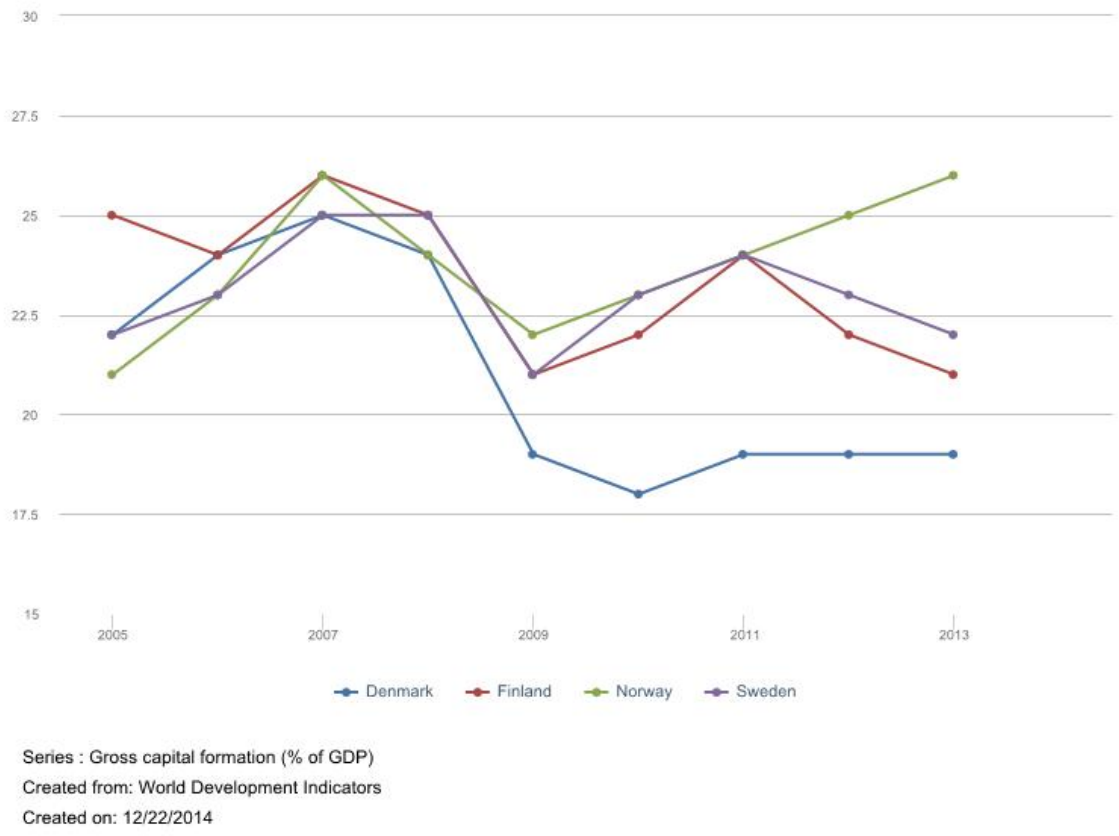


Figure 2: Investments as a percentage of GDP

	Denmark	Finland	Norway	Sweden
2005	22.2	24.6	21.5	22.0
2006	24.5	24.0	23.0	23.0
2007	25.4	25.5	25.8	24.6

2008	24.1	25.1	24.5	24.5
2009	18.9	21.2	22.3	20.9
2010	18.4	21.6	23.3	22.9
2011	19.5	23.5	23.8	23.8
2012	18.9	22.5	24.9	22.6
2013	18.8	21.4	26.4	22.2

Table 2: Investments as a percentage of GDP

In 2005 Denmark, Norway and Sweden were very close to each other with Finland a few percentages higher at 24,6%. Following the Financial Crisis the countries developments followed each other closely, but with differences in 2009 and 2011. In 2009 Denmark was unable to recover as quickly and in 2011 the start of the Euro Crisis pushed Finland and Sweden back down. Norway's investments were likely buffered by its oil fund and it did not suffer a similar drop. The development of the investment graph is a reversal of the consumption graph. The more investments drop as a percentage of GDP, the more important consumption becomes. However this does not explain all developments as Denmark, which suffered a heavier hit on investment than Finland, did not experience as a similar increase in consumption as Finland. The difference must be made up by government spending and net foreign trade effect.

2.1.3 Government spending

Government spending is less focused on increasing GDP and more on political values. Depending on what values the country deems important its spending can focus on very different matters. Government spending includes expenditures on goods and services, and most of the expenditures on national defence and security (The World Bank). European nations typically have a larger relative government budget than the rest of the world.

According to Keynesian economic theory, government spending can be used as a tool to bolster economic growth, however this is more popular in countries with socialist tendencies. The theory states that due to imperfect competition, wages and prices fail to adjust accordingly and thus result in unnecessary unemployment; the bust of the business cycle. The solution according to the theory is macroeconomic stabilization by the state and central bank using fiscal or monetary policies. (Radcliffe 2014)

Fiscal policy essentially means taxation and government spending, and can be used in an attempt to control unemployment rate and stabilize business cycles. Taxes, as previously, mentioned can influence consumer spending in order to promote growth. Government spending in fiscal policy often means large investments, such as building new highways or repairing old ones. The idea is that these new investments will create new jobs and thus lower unemployment rate. (Investopedia 2013)

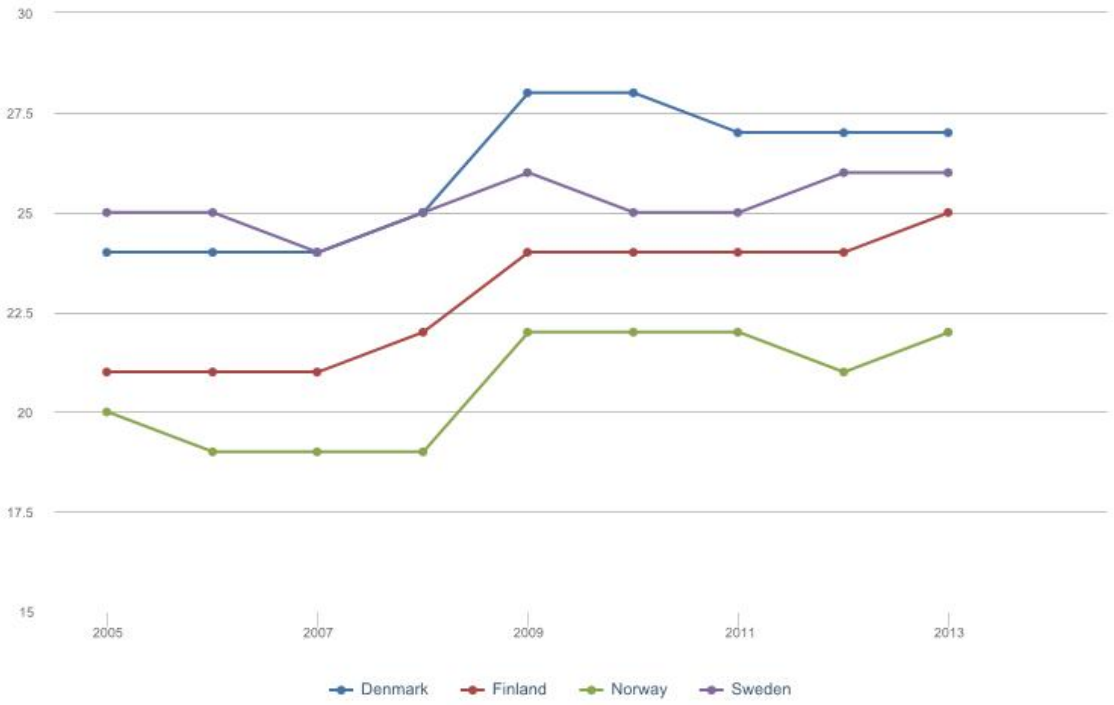
The problem in fiscal policy is that it is hard to use in a way that would be fair to all. A tax-cut might benefit a certain income level disproportionally and government investments will benefit the group receiving the investment more than the rest of the population. (Investopedia 2013)

Monetary policy means controlling the money supply, which in turn affects interest rates. The interest rate is set by the central bank of that currency, European Central Bank (ECB) for the Euro, Federal Reserve for the US dollar, Bank of Japan for the yen etc. For the Euro countries this raises a notable issue as they have relinquished their authority on monetary policy to a supranational organization and thus cannot influence it independently. The ECB must try to create a monetary policy that fits the needs of countries that have very different types of economies and needs. A very difficult task, if not impossible, as the Euro Crisis demonstrates. The lower the interest rate, the cheaper loans become. This influences both households and companies. With a low interest rate households that were considering large investments, such as new houses, cars etc., will go ahead with the transactions and increase consumption. For the companies the effect is compounded as large investments from companies not only create increased consumption but often new jobs as well. (Investopedia 2003)

The problem in using monetary policy is that by loosening interest rates too much will increase inflation and by too little will slow growth. This is further complicated by the fact that politicians can feel the temptation to loosen monetary policy in order to continue their debt funded policies and leave the aftermath for others to clean up. (Investopedia 2003)

An alternative point of view, often favoured by the US, the classical economic theory argues that the fiscal policy favoured by the Keynesians only serves to decrease resources available to individuals and companies that would spend them more efficiently elsewhere. (Vitez 2014)

Nordic countries currently favour extensive public sector services for their citizens, and therefore need heavier taxation than other countries. Americans on the other hand represent a different ideology and would rather place their trust on private sector services.



Series : General government final consumption expenditure (% of GDP)
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Figure 3: Government spending as a percentage of GDP

	Denmark	Finland	Norway	Sweden
2005	24.5	21.5	19.7	24.9
2006	24.2	21.4	18.9	24.6
2007	24.3	20.9	19.3	24.1
2008	25.2	21.7	19.1	24.6
2009	28.1	24.2	22.3	26.2
2010	27.6	23.9	22.0	25.2
2011	26.8	23.6	21.5	25.2
2012	26.9	24.5	21.3	25.9
2013	26.7	24.9	21.9	26.2

Table 3: Government spending as a percentage of GDP

In 2005 the countries were divided into two groups with Norway and Finland forming the lower group with 19,7 % and 21,5 %, and Denmark and Sweden forming the higher group 24,5 % and 24,9 %. As previously the change started from 2007, with all countries raising spending at least a few percentages from original levels. Finland is the exception with spending raising 3,4 % from 2005 to 2013. This is likely connected to problems with the Euro. It is notable that spending has not returned to original levels for any of the countries, even though at least Norway has regained its previous investment levels.

2.1.4 Imports and exports

Imports and exports are often compared in relation to each other. More imports means a current account deficit for the country and vice versa. Generally surplus is better for the economy as the deficit would have to be funded by borrowing more or increasing taxation. To decrease a deficit a country can try to affect the exchange rate of its currency, competitiveness of its industries or the quality of its products. (Pettinger 2013)

Export-based economies often take measures to keep their currencies from appreciating too much. Finland prior to joining the Euro used devaluation as a tool to bolster exports. The cheaper currency will then make exports more affordable to import countries and thus increase demand. At same it will make imports more expensive and further decrease trade deficit. However this method is not without its problems. A country that imports a great deal of its resources will instead increase expenses and undo any benefits in exports. Some resources could instead be produced domestically, such as food, but energy and other raw material based resources are more difficult. Devaluation also increases inflation which will also cut into the benefits. Uncontrolled deprecation of a currency runs the risk of hyperinflation. Overreliance on devaluation also makes exporting companies less willing to invest in long-term productivity.

The percentage of imports and exports of the GDP are often very close to each other. This relates to the size of the economy and how much of the economy is based on foreign trade.

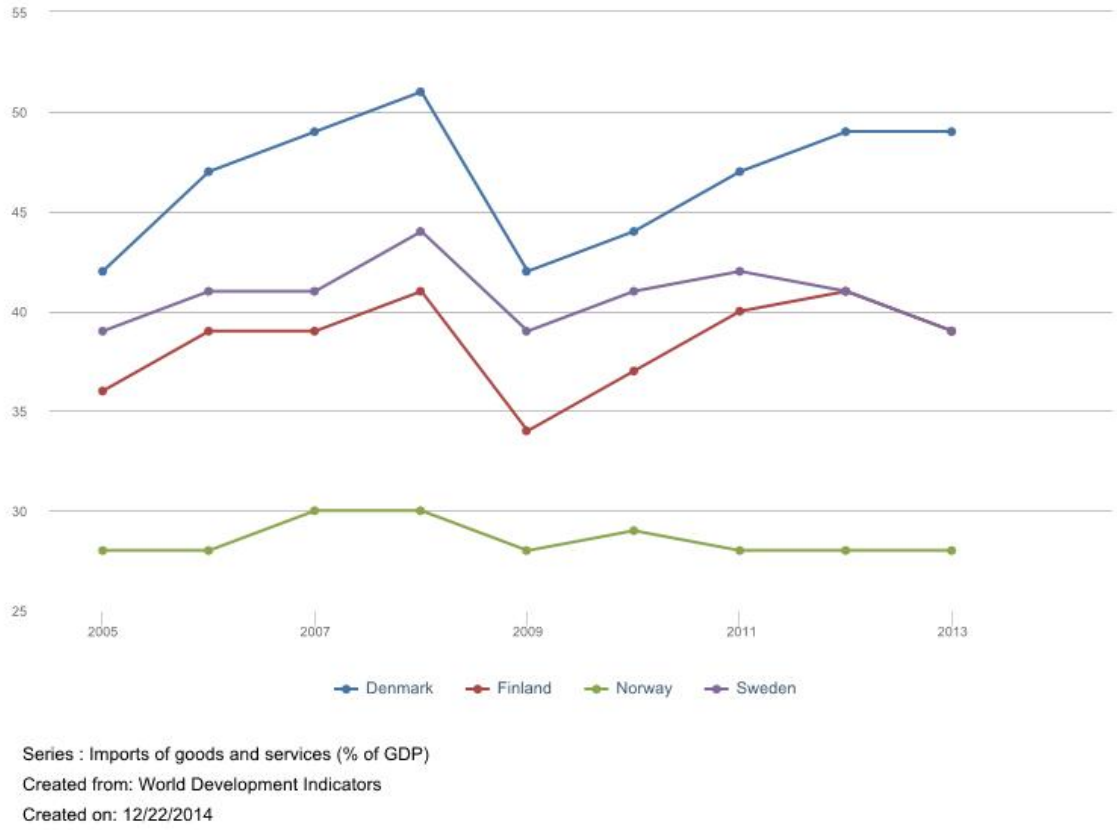


Figure 4: Imports as a percentage of GDP

	Denmark	Finland	Norway	Sweden
2005	41.8	36.4	27.8	38.7
2006	46.6	39.0	28.2	40.6
2007	48.5	39.2	30.5	41.3
2008	50.6	41.4	29.5	43.5
2009	42.4	34.3	27.7	38.7
2010	43.6	37.4	28.5	40.7
2011	47.4	40.0	28.3	42.0
2012	48.6	41.1	27.6	41.4
2013	48.5	39.1	28.2	38.9

Table 4: Imports as a percentage of GDP

In 2005 Norway is exception for the four Nordic countries with a markedly lower import percentage at 27,8 %. Denmark, Finland and Sweden closely mirror each others' development with a dip in demand in 2009. Only Norway maintained constant levels from 2005 to 2013. The more radical movements of the three other countries reflect a greater reliance on imports and also greater sensitivity to shocks, such as the Financial Crisis of 2007. The stability of Norway's imports show that Norway's demand was not affected by the Financial Crisis.

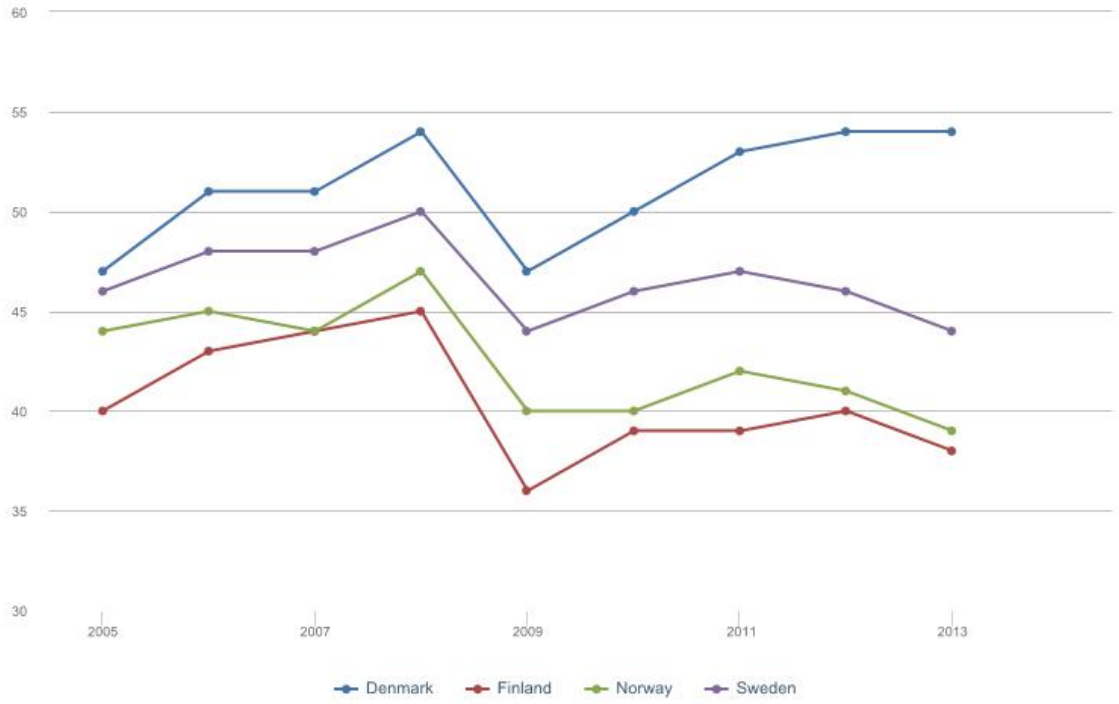


Figure 5: Exports as a percentage of GDP

	Denmark	Finland	Norway	Sweden
2005	47.4	40.3	44.1	45.9
2006	50.5	43.2	45.4	48.2
2007	51.3	44.0	44.1	48.3
2008	53.8	45.1	46.8	49.8
2009	46.7	36.3	40.0	44.5
2010	49.7	38.7	40.5	46.2
2011	52.9	39.2	41.9	46.7
2012	54.0	39.6	40.9	46.3
2013	54.3	38.2	38.9	43.8

Table 5: Exports as a percentage of GDP

The export chart mirrors the import chart closely: a dip in 2009 followed by slower recovery and again slow decline. By 2013 Denmark has seemingly managed to stabilize both its import and export levels. The imports at least can be explained by the type of products exported. Finland mainly exports investment goods and Denmark focuses more on food products. The necessity levels of these products in consumption show the difference in recovery rates. Another interesting difference is that while Norway showed no changes in import levels from 2005 to 2013, export levels clearly decreased. Even

Norway cannot affect decreased worldwide demand and suffers as a result of a global recession. Finland is similarly struggling in regaining competitivity in exports.

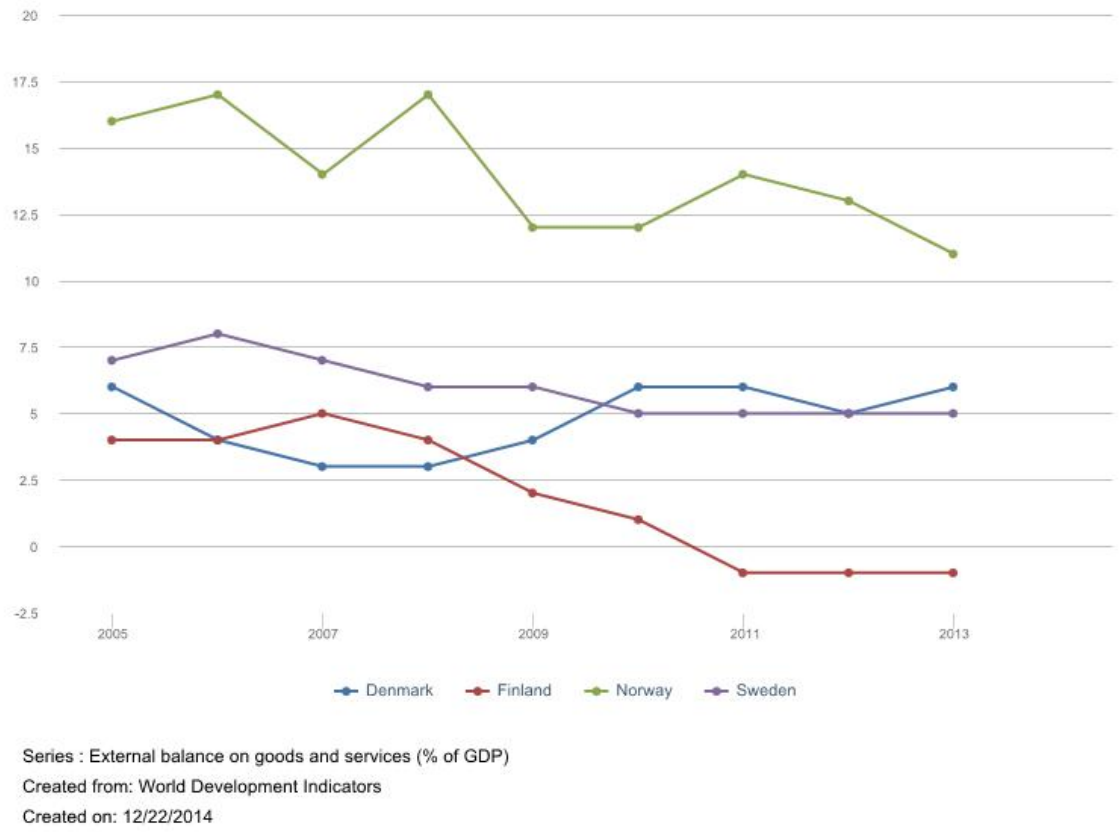


Figure 6: Net foreign trade as a percentage of GDP

	Denmark	Finland	Norway	Sweden
2005	5.6	3.9	16.2	7.2
2006	3.9	4.2	17.2	7.6
2007	2.8	4.8	13.7	7.0
2008	3.3	3.6	17.3	6.3
2009	4.4	2.0	12.3	5.8
2010	6.1	1.3	11.9	5.5
2011	5.5	−0.9	13.6	4.7
2012	5.4	−1.4	13.3	4.9
2013	5.7	−1.0	10.7	4.9

Table 6: Net foreign trade as a percentage of GDP

When exports surpass imports it results in surplus in the current account. A surplus current account means more jobs and increased aggregate demand, which in turn will increase GDP. Surplus is therefore the more desirable option. However every country obviously cannot have a surplus current account all the time, as the demand and supply must balance out. All the Nordic countries had a surplus in the current account starting

from 2005 and during the Financial Crisis 2007-2009, and only in 2011 did Finland show a deficit.

The Nordic countries can be divided into three trends. Norway and Finland showed a clear decrease in net foreign trade, Sweden a slight decrease and Denmark has in 2013 returned to the levels it had during 2005. The trend is not so worrying for Norway as they still have a very clear surplus, but each year Finland continues to have a negative net foreign trade will mean increased difficulties in balancing the government budget. Finland's deficit from 2011 onwards can at least partly be explained by the Euro Crisis. Decreased demand and competitivity both contribute to Finland's lowered exports and because of the Euro, devaluation is not an option.

2.2 Supply side factors

Supply-side often represents the long term measures to induce growth. These include increased capital, increased working population, increased labour productivity, discovering new raw materials and technological improvements. However the exact effects and causes are disputed as supply-side economists emphasize the importance of supply in economic growth and Keynesians focus on demand. The key issue is the difference in opinion regarding the belief that supply will create its own demand as dictated by Say's law (Investopedia 2010c).

- Increased capital means new investments in production or infrastructure. This results in increased aggregate supply but can also affect demand as discussed in government spending. (Harper 2013)

- Increased working population means higher production, increased tax revenue and greater household consumption. Altogether it means that population is a primary source of economic growth. Population can be increased through natural growth and immigration, which makes its development of great interest for economic considerations. Many modern countries face great challenges from decreasing and aging populations, Japan first among them.

- Labour productivity essentially means better education, training and improved technology. In developed countries better education and training no longer greatly increase productivity so the focus has shifted to technology. Robotics is a modern example of increasing productivity through technology.

- Raw materials are a important part of global economy. Currently oil is clearly the most important resource and its exporters benefit greatly from it. However as technological advances create new products and demands, it may also create the need for new raw materials. Countries with access to this new resource have the potential to reap comparable benefits to oil exporters if the resource has enough demand.

- Technological improvements affect capital and labour efficiency and serve to increase aggregate supply. Internet is a good example of past improvement that greatly increased efficiency. Robotics could be the next big leap.

Now that we have considered all the factors for GDP we can look at the total growth of the Nordic countries. To account for the difference in population we look at GDP per capita figures. The GDP per capita growth data is the sum of all the other figures and shows the overall development of the four Nordic countries during this period.

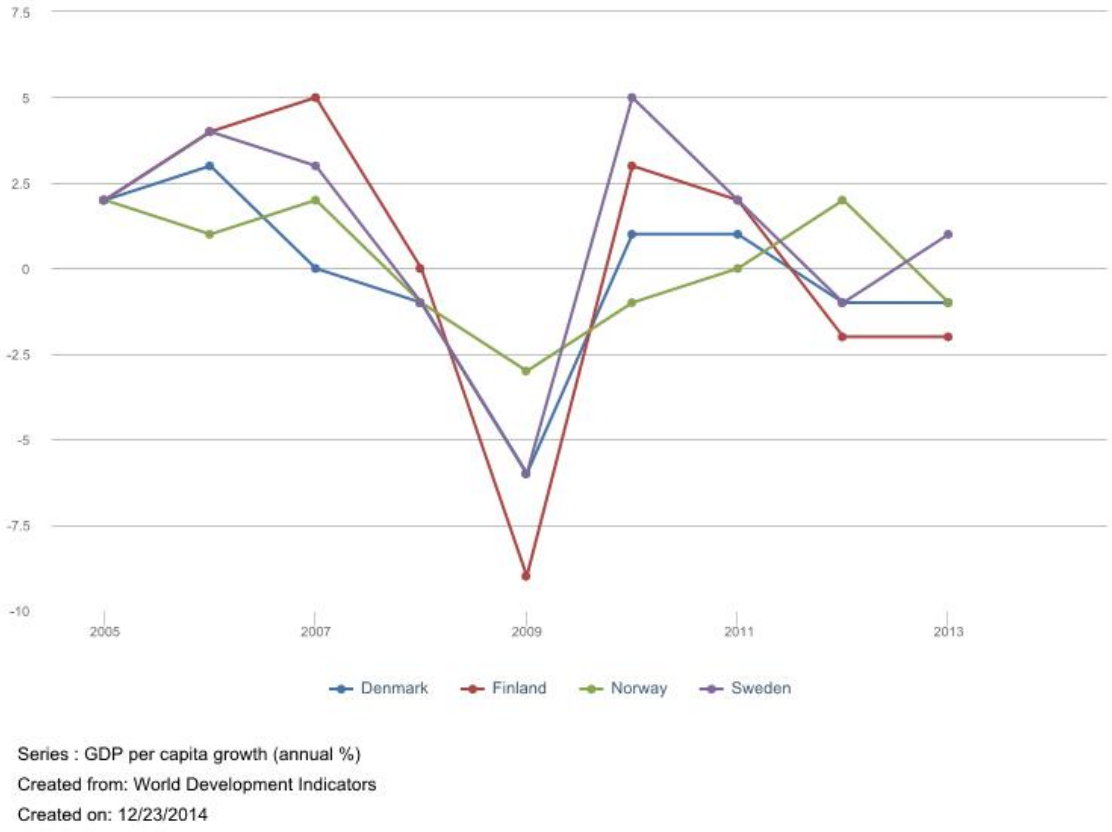


Figure 7: GDP per capita growth (%)

	Denmark	Finland	Norway	Sweden
2005	2.2	2.4	1.9	2.4
2006	3.5	3.7	1.5	4.1
2007	0.4	4.7	1.6	2.6
2008	−1.3	0.3	−1.2	−1.3
2009	−5.6	−8.7	−2.9	−6.0
2010	1.2	2.5	−0.8	5.1
2011	0.7	2.1	0.0	1.9
2012	−1.0	−1.9	1.6	−1.0
2013	−0.9	−1.7	−0.7	0.7

Table 7: GDP per capita growth (%)

In 2005 all the Nordic countries were experiencing growth, particularly Finland. This changed with the Financial Crisis, and since then none of the Nordic countries has managed constant growth. Even Norway's GDP per capita decreased 0,7 % in 2013. Finland clearly fared the worst, as it suffered the most during the Financial Crisis and is still struggling. Denmark is a moderate mirror of Finland's development: during growth pe-

riods it's growth didn't match Finland's rate, but neither did its economy shrink as much in 2009. Norway and Sweden fared much better, with Norway's dip in 2009 comparably much smaller than the others.

Now that we have finished considering each aspect of the GDP we can focus on economic inequality.

3 ECONOMIC INEQUALITY AND ITS EFFECTS

Economic inequality has the potential to cause social unrest, as does all inequality, The Arab Spring of December 2010 and the Occupy Wall Street movement in 2011 are a few of the events sparked by growing economic inequality. Highly chaotic social turmoil is in no-one's best interests, and therefore understanding the effects of economic inequality plays in our economy is important. In the world of the today, in which 1 % of populace owns almost half the wealth in the world. this is a critical issue (Davies *et al* 2014 p. 32).

Economic inequality is formed of two factors: wealth inequality and income inequality. Wealth of a person can be defined as the total market value of all the assets owned. Assets can, for example, be composed of houses, cars, businesses, savings and investments. (Investopedia 2007)

Income inequality as defined by Thomas Piketty in his book Capital in the Twenty-First Century is "the result of adding up these two components: inequality of income from labor and inequality of income from capital" (Piketty 2014 p. 242). In other words, the wages and the profit. Wealth and income inequality do overlap somewhat, but by examining them separately allows for a perspective into the actual causes of the disparity. Examining wealth is especially important for its relevance in inheritance, and the role it plays in accumulating wealth each generation. We will first examine income inequality.

3.1 Income inequality

The income inequality in society could result from many variations: High equality wages and low equality profit, low equality wages and high equality profit or even low equality wages and low equality profit. This depends on legislation, labour market solutions and the local concept of fairness in regards to wages and capital income, but societies tend to leans towards more equal wages and unequal capital income (Piketty 2014 p. 244). Income inequality can also be influenced by the size of the investments. Higher sum investments make it easier to leverage the profit and thus create a higher return on investment. Wealthy people also do not need to have the same level of expertise and time to manage their investments as they can hire professionals to do it for them. (Piketty 2014 p.243)

To compare income inequality Piketty studied the financial records of the world and identified certain countries during certain time periods to serve as comparison points for low, medium and high labour and capital income inequality. This was not meant for direct comparison, but to provide perspective for the values. Rather than put idealistic values to what values a highly equal society should have for income division, he used historical values from real countries to give a more realistic measure of how a high equal society divided income. For low inequality measure he used the Scandinavian countries during the 1970-1980's, for middle inequality he used France and Germany in 2010, and for high inequality he used the US in 2010. First let's look at the labour income division from these countries.

Piketty's research shows that the wages for the top 10 % earners in low wage income inequality countries account for 20 % of total wages, in the moderate wage inequality countries for 25 %, and in high wage inequality countries for 35 %. The wage income share for the lower 50 % of population are 35 %, 30 % and 25 % respectively. (Piketty 2014 p. 247)

Inequality in regards to labour income is generally smaller than in capital income, but this does not mean it is not significant since wages greatly affect consumption, a large part of the GDP. The rich do not consume much more as their income increases as their

basic needs are already met, they either save it or invest it themselves. New investments are good for the economy, but consumption is often even more important. Cutting the wages of poor and middle income to bolster high income would mean cutting consumption in favour of investments, but investments often need a steady consumption to be profitable. Forcing the poor to borrow more and more to meet their basic needs, such as housing, is not sustainable and can lead to a financial crisis like what happened in subprime crisis in the US. Only in the US the lower 50 % earn less than the top 10 %, but for the richest people, total income is based more on capital income than labour. It is notable that the shares of high income top 10 % and low income 50 % are almost reversed between high and low inequality countries. National policy clearly has a role in the development, but to get total income we also need to consider capital income. (Piketty 2014 p. 255-256)

Capital income is much less equal, but this is hardly surprising. Investments come from savings and borrowing, those with a lot of savings or other property can more easily borrow more without suffering crippling interest payments. Poor and even average income households must carefully plan their investments and cannot borrow as big amounts as high income households. The rich can therefore invest more often and in bigger amounts, creating the leverage effect on profit mentioned previously. (Piketty 2014 p. 257)

Piketty's observations regarding capital income division for the richest 10 % in the same countries during the same time periods as in the wage income observation for low, medium and high inequality are 50 %, 60 % and 70 % respectively. The lower 50 % capital income have shares of 10 %, 5 % and 5 % respectively (Piketty 2014 p. 248)

The contrast to the labour income division is clear. The poorer population generally have very little, if any at all, capital income. The importance of capital income in wealth inequality is obvious, as capital is often much more protected from the effects of inflation and recession. Stock prices may fall in recession, but alternative investments are readily available to the attentive investor. Gold and currencies can also serve as alternative investments options to help mitigate the effects of inflation and recession. Low income households on other hand often cannot move their minimal savings to these op-

tions as easily, since they need them to fund their daily needs. Housing is the favourite investment of the middle-class and the well-to-do, but in the very top financial and business assets dominate. In the top 9 % for capital income, real estate accounts for nearly 50 % of total capital income, but in the top 1 % real estate has been nearly totally replaced by financial and business assets. Shares of stocks and partnerships make up almost of all the very largest fortunes. (Piketty 2014 p. 260)

Total income shares added up to are thus 25 %, 35 % and 50 % for the highest 10 % and 30 %, 25 % and 20 % for the lower 50 %. (Piketty 2014 p. 249) Thus in the comparison only in the Scandinavian countries the higher 10 % earned less than the lower 50 % in total, and even this number represents the Scandinavian countries in 1970-1980's. Since then inequality has increased.

Let's change perspective and examine the issue from a purely wealth inequality perspective. The Credit Suisse has released their Global Wealth Report of 2014 in October, which focused on wealth inequality in its special topic. Their researched covered the development of wealth inequality from 2000 to 2014. This time period is interesting as it allows for an insight on the effect that the Financial Crisis had. (Davies *et al* 2014 p. 28)

3.2 Wealth inequality

The Credit Suisse report notes that through much of the 20th century the wealth inequality had been decreasing in high income countries, but that recently the decreasing trend has stalled and possibly reversed itself. (Davies *et al* 2014 p. 28)

To find the cause, let's examine its development in the nations covered by the report. Data for the financial records is often lacking and long-term trend following thus impossible, but the Credit Suisse managed to gather sufficient data for ten countries: Australia, the United Kingdom, the United States, Denmark, Finland, Norway, Sweden France, the Netherlands and Switzerland. For these countries the trend showed decreasing in the share of the top 1 % from 1920's to 1970's, followed by an evening out and then slow increase to 2014. The total effect for the whole period 1914-2010 showed de-

creasing for all the countries expect Switzerland, which showed no particular trend. The wealth share of the next 4 % had remained the same in 2010 as it had been in 1914. (Davies *et al* 2014 p. 30)

For the developments in the 21st century there is more data available, allowing for a global comparison. The short-term development for the whole world, except China and India, was much the same as it had been for the ten long-term countries, slow decreasing of wealth inequality. This trend was however changed by the breaking of the Financial Crisis. Following 2007, wealth inequality first dropped sharply, but has since then been steadily increasing in every region, expect the US. In most countries the decrease in wealth inequality has already been surpassed by 2014. (Davies *et al* 2014 p. 33)

For an actual figure reference, the share of wealth for the top 10 % in the US was 74,6 % in 2000, increased slightly to 74,8 % in 2007 and finally dropped back to 74,6 % in 2014. France had much bigger changes from 56,4 % to 51,1 % and finally to 53,1 %. Germany went from 63,9 % to 61,7 % and stayed the same in 2014. Italy had 52,6 % and changed to 47,9 % and finally 51,5 %. For the Nordic countries, Sweden had 69,7 %, dropped to 68,6 and stayed there all the way to 2014. Finland had 55,0 %, and dropped to 54,5 % and stayed there in 2014. For Asian countries, China had 48,6, increased to 56,1 % and further increased to 64,0 %, a very rapid increasing trend and also very different from the US and the European countries. Japan had 51,0 %, dropped to 49,4 % and further dropped to 48,5 %, a slower reversal of the China's trend. Russia started in 77,1 %,. dropped to 75,4 % and then shot to 84,8, a very quick reversal of the plummet in 2007. (Davies *et al* 2014 p. 33)

So what do these figures actually tell us? We know that there are bound to be differences in emerging countries, such as Russia and China, in comparison to more developed countries, such as the US and the UK. However since the emerging and developed countries have experienced different types of trends within their own group, it cannot be the only factor affecting the trend. Notably many major countries closer to the heart of the Financial Crisis have not experienced an increase in the wealth inequality in the years following the crisis, with the exception of the UK. This can be explained, in part

at least, by the fact that the wealthy in those countries lost proportionally more and have not yet recovered from their losses. (Davies *et al* 2014 p. 33)

3.2.1 Causes for wealth inequality

Credit Suisse in its report divides the factors affecting wealth inequality by time period into long-term and short-term.

Long-terms factors, as listed by Credit Suisse, include the growth of the economy, demographic trends, savings rate, inheritance arrangements, general macroeconomic trends (such as globalization) and government policies, such as taxation and pension provision.

Short-term factors include changes in asset prices, because the wealth portfolio of households vary by income this affects income levels differently, and the exchange rates of currencies. (Davies *et al* 2014 p. 33-34)

The Financial Crisis of 2007 was heavily affected by the sudden drop of asset prices. However it is not only the fall of asset prices that affects wealth inequality, but also the rising of them. The Credit Suisse report lists a theory that suggested rising asset prices are not only a consequence of the wealth inequality but also a cause of it.

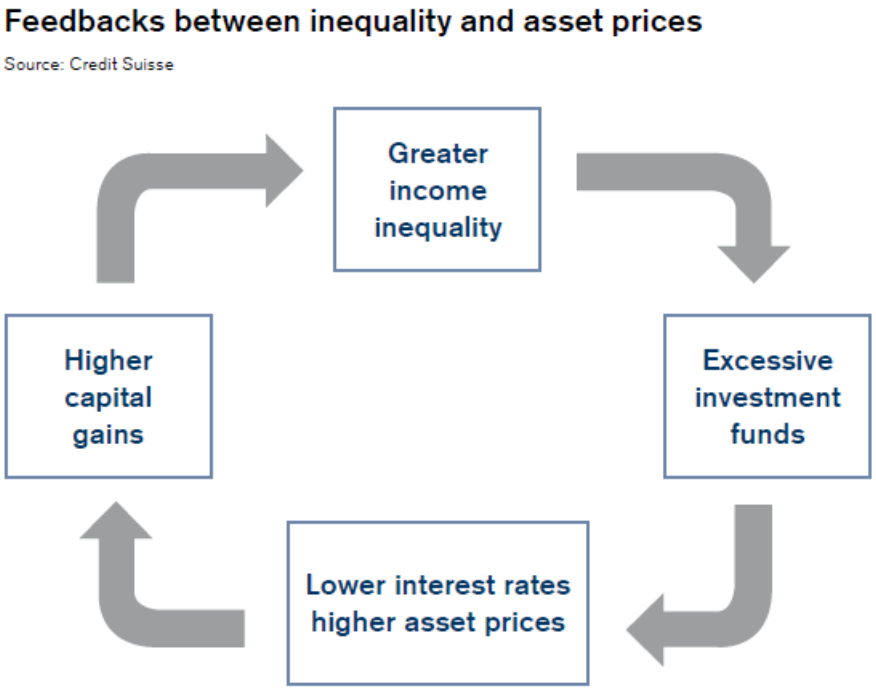


Figure 8: Feedback between inequality and asset prices

Higher wealth inequality would allow for a greater disposable income for high income households, that typically save a larger portion of their income than lower income groups. Increased savings would create demand for more investment funds, as shown in figure 8. The increased number of funds would drive down interest rates and raise stock prices, thus further increasing profit for high income group in the form of capital gains. Increased capital gains further widen wealth inequality and the circle repeats itself. The low interest rate partly caused by this cycle also fuelled the development of the Financial Crisis of 2007. (Davies *et al* 2014 p. 34)

Fast growth of economy, typically associated with successful entrepreneurs and new companies, is a cause of wealth inequality for emerging economies. As the new companies get listed they create wealth that is concentrated in the hands of the few, thus increasing wealth inequality. Broader shareholdings and change of generations can dissipate the effect, but it can still last for years. Part of the fast growth in wealth inequality in China and other emerging countries can be explained by this.

Demographic trends, such as increased longevity and aging populace, will increase the effect of savings on wealth. With a population that lives longer than before, pensions

will need to be larger and the importance of the capability to save increases. This means that those who can save more of their income while working are relatively wealthier in the future. The effect is that high income groups who do not need to spend much of their income to cover basic needs will benefit more. This will mainly affect developed economies with advanced healthcare and aging populace, but also China because of the effect its one-child policy has had on the populace. Other notable demographic trends are increased gender-equality and smaller households. It is hard to see what effect smaller households will have on wealth inequality, but at least higher gender-equality could possible decrease wealth inequality in the current non-gender-equalitarian countries, as women would get a larger income due to better education, jobs and generally better opportunities to advance. (Davies *et al* 2014 p. 34-35)

Inheritance is a primary effect in wealth inequality, as wealth created by the first generation can be accumulated more easily due to existing capital. Poor and middle-income households obviously cannot leave similar inheritances to their children as the high income households can, and as the generations continue to accumulate wealth this effect will only increase. In countries where education and opportunity to advance are hard to come by, inheritance can dictate opportunity and mean everything. (Davies *et al* 2014 p. 35-36) Inheritance is especially important in countries with low economic growth, as in low growth economies capital income will be relatively more profitable compared to labour income. (Piketty 2014 p.571-572)

The last long-term factor affecting wealth inequality is government policy. Loose monetary policy and strong economic growth both cause inflation. While not perhaps the intended consequence by policymakers, inflation can have a large negative effect on savings, and since savings are a large part of the poor income household wealth portfolio it widens wealth inequality. (Davies *et al* 2014 p. 34) Credit Suisse also ironically list strong social welfare policies as source of wealth inequality. The logic is this, with many basic needs covered, such as education, good public pensions, unemployment and health insurances, there is no incentive to save for the low and middle income groups and spend all their earnings on consumption. The rich who have reached a saturation point with consumption and thus will not consume more, will save the larger share of their income for investments and thus accumulate even larger capital gains. This accord-

ing to the report is the reason for the large wealth inequalities in Sweden, Norway and Denmark, although they generally are more equalitarian than many other countries. Government actions can also decrease wealth inequality. A large public sector decreases opportunities for the private sector and thus affects capital income and decreases high income. A more intentional way is through taxation: progressive income or estate taxes, wealth or capital income taxes, can all reduce wealth inequality. The primary reason for the decreasing wealth inequality levels through the 20th century is high levels of taxation. Of course taxes can also increase wealth inequality, if progressive taxes are replaced by flatter rates. Taxation has an important role in the economy and too heavy taxation can stifle the economic growth, but too loose or too flat taxation can cause massive wealth inequality. (Davies *et al* 2014 p. 36)

3.3 Measures of economic inequality

Now that we understand the structure of the economic inequality and the causes of it, we can focus on the measures used to evaluate it. To effectively study economic inequality we will need ways to measure it between countries.

3.3.1 The Lorenz Curve and the Gini Index

One of the measures created for this purpose in 1905 by Max O. Lorenz is the Lorenz Curve. It depicts the share of total income by the share of population. In true economic equality the line would be linear and the further the depicted line of a country gets from it the more unequal it is. It also allows to graphically measure how much of the income goes to which income level. (G. Clarke 1992)

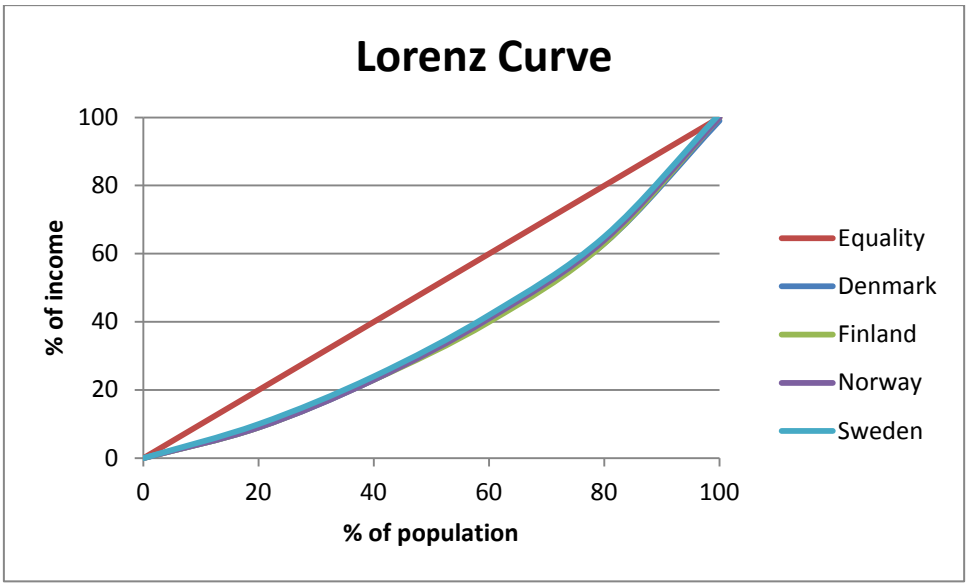


Figure 9: Lorenz Curve for the Nordic countries

It's weakness, as highlighted by the comparison of Nordic countries, is that the differences are not readily visible if the countries are not very different from each other. This Lorenz curve is based on World Bank income share data.

So in the Nordic countries, the lower 20 % of population hold 10 % of total income, the lower 40 % hold little more than 20 % of income, 60 % of the population hold 40 % of income, and finally 80 % hold 60 %. This would lead to the conclusion that the top 20 % would hold close to 40 % total income. This result is in line with Piketty's findings.

Due to the weaknesses of the Lorenz curve most researchers use the Gini coefficient instead. The Gini coefficient quantifies economic inequality into one figure between 0 and 1. The closer to 0 the country's Gini coefficient is the more economically equal the society is.

However this tool either is not without its faults, but like with the GDP we use it because it is simple. The compression of the data into just one number means that we lose the ability to analyze the effect of various income levels on the total inequality. Another problem with it, as Piketty outlines, is that we lose the ability to differentiate between labour and capital income and thus cannot see the exact causes of the inequality (Piketty 2014 p. 266-267). The structure of inequality between two countries with the same Gini

coefficient could be widely different. Additionally long-term studying of the Gini Index is difficult because of lacking data for many countries and years.

This lack of data is shown in the observed linear development for Norway and Sweden in figure 10. In order to see the trend graphically the missing years were filled with average values between the two years with existing data. The movements of the Gini coefficients tend to be small so missing data from a few years does not dispute the validity of the trend observed.

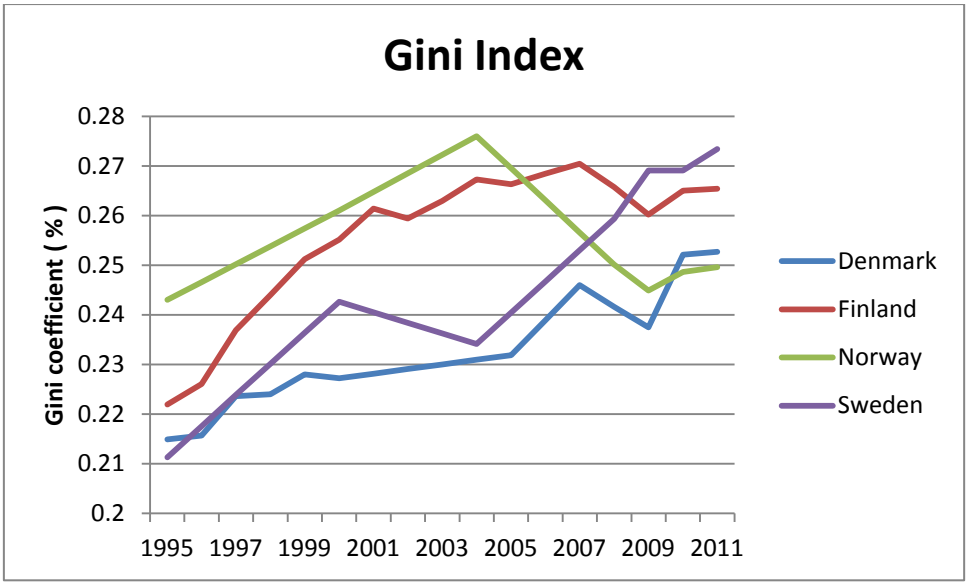


Figure 10: Gini index for the Nordic countries

	Denmark	Finland	Norway	Sweden
1995	0.21	0.22	0.24	0.21
1996	0.22	0.23	0.25	0.22
1997	0.22	0.24	0.25	0.22
1998	0.22	0.24	0.25	0.23
1999	0.23	0.25	0.26	0.24
2000	0.23	0.26	0.26	0.24
2001	0.23	0.26	0.26	0.24
2002	0.23	0.26	0.27	0.24
2003	0.23	0.26	0.27	0.24
2004	0.23	0.27	0.28	0.23
2005	0.23	0.27	0.27	0.24
2006	0.24	0.27	0.26	0.25
2007	0.25	0.27	0.26	0.25
2008	0.24	0.27	0.25	0.26
2009	0.24	0.26	0.24	0.27
2010	0.25	0.26	0.25	0.27

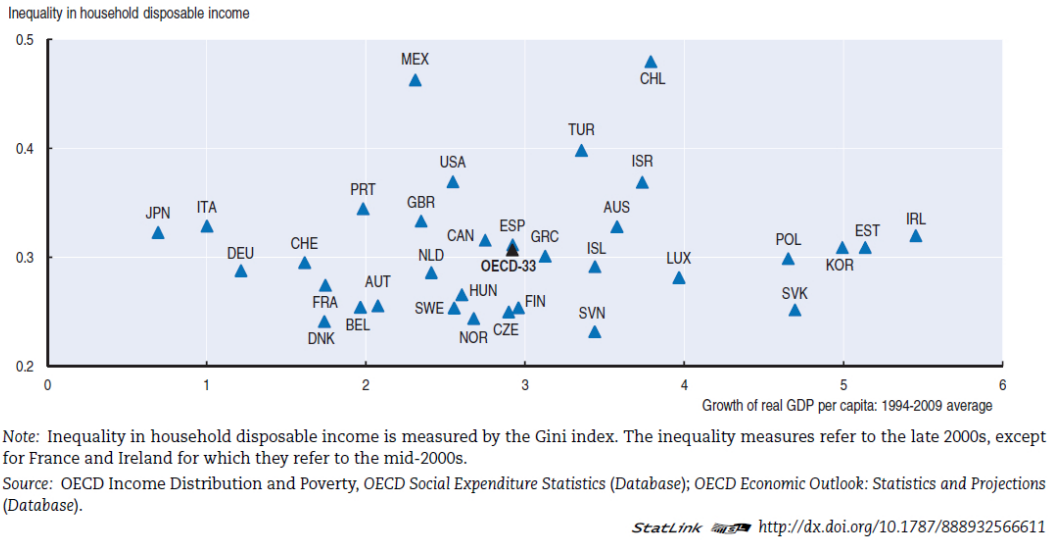
2011	0.25	0.27	0.25	0.27

Table 8: Gini index for the Nordic countries

The Gini Index, with data from the OECD, clearly confirms the Credit Suisse findings on rising economic inequality as all depicted countries show a overall increasing trend (OECD). Norway shows an interesting drop from 2003 to 2009, but it too shows signs of increasing inequality. Sweden's development is especially alarming since in 1995 it started at a level lower than any of the others and is now leading with a seemingly still widening gap.

4 THE EFFECT OF ECONOMIC INEQUALITY ON GROWTH

In order to fully examine the effects of economic inequality on growth we will need to first validate the link between them. The first option to do this is to perform a simple scatter analysis with data based on economic growth and inequality. The OECD has analyzed all the OECD countries on based on these factors. Their scatter chart variables for economic growth is based on real GDP per capita and the inequality variable on the Gini coefficient.



Note: Inequality in household disposable income is measured by the Gini index. The inequality measures refer to the late 2000s, except for France and Ireland for which they refer to the mid-2000s.

Source: OECD Income Distribution and Poverty, *OECD Social Expenditure Statistics (Database)*; *OECD Economic Outlook: Statistics and Projections (Database)*.

StatLink http://dx.doi.org/10.1787/888932566611

Figure 11: OECD Scatter chart on inequality in OECD countries

No obvious trend is apparent from the scatter chart, which shows we need more variables and use regression analysis to prove the connection. The OECD report by Federi-

co Cingano published on December 2014 has an interesting model with a theory proving the connection.

Variable	**Measure**
Economic growth	Real GDP per capita
Inequality	Gini Index
Physical capital (investments)	Fixed capital formation to real GDP
Human capital	Average years of schooling of the working age (15 - 64) population

The empirical model estimates growth as a linear function of initial inequality, income, human and physical capital; the model is similar to that used in most empirical analyses of growth determinants and can be derived from an augmented Solow growth model. (Cingano 2014 p. 14)

Written out the model takes the form:

$$lnyi,t - lnyi,t-1 = \alpha lnyi,t-1 + Xi,t-1\beta + \gamma Ineqi,t-1 + \mu i + \mu t + \epsilon i,t$$

Countries are indicated by a i and $(t,\ t-1)$ is a time interval of 5 years. The output variable on the left hand side $lnyi,t - lnyi,t-1$ measures the 5-year growth of per capita GDP. $Ineq$ is a measure of inequality, in this case the Gini index, per capita GDP (yt-1) is used as the standard control for convergence, and the vector X contains a minimum set of controls for human and physical capital. This means that the baseline model does not account for cumulating population growth, capital depreciation and technological progress. The reason for these controls is to prevent sample size from decreasing further from already small sizes due to the limited availability of inequality data. Additionally within country variation of population growth is assumed to change very little. Cingano also uses panel data to allow accounting for country fixed effects (μi and μt). The country dummies are included to control for time-invariant omitted-variable bias, and the period dummies are included to control for global shocks, which might affect aggregate growth in any period but are not otherwise captured by the explanatory variables. (Cingano 2014 p. 45-46)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Net inequality (t-1)	-0.774**	-0.800**	-0.809***	-1.003**		-1.257**	-1.207**	
	(0.319)	(0.306)	(0.282)	(0.376)		(0.517)	(0.473)	
Gross inequality (t-1)					-0.640	0.138		
					(1.092)	(0.595)		
(Gross–Net) ineq. (t-1)							0.064	-0.365
							(0.706)	(1.476)
y (t-1)	-0.136**	-0.080	-0.054	-0.079	0.038	-0.070	-0.079	0.133
	(0.054)	(0.051)	(0.057)	(0.106)	(0.178)	(0.121)	(0.131)	(0.231)
Human Capital (t-1)		-0.005	-0.007	-0.000	0.006	-0.009	-0.010	0.013
		(0.011)	(0.007)	(0.015)	(0.021)	(0.011)	(0.012)	(0.021)
Investment (t-1)		0.197	0.428	0.045	1.545	-0.245	-0.243	2.484
		(0.318)	(0.544)	(1.311)	(1.304)	(1.310)	(1.477)	(2.138)
M2 (p-val)	0.722	0.558	0.623	0.723	0.860	0.606	0.665	0.916
Hansen Statistics (p-val)	0.847	0.614	0.377	0.129	0.471	0.129	0.174	0.535
Observations	127	127	127	127	124	124	124	124
Number of countries	31	31	31	31	30	30	30	30
Number of instruments	27	31	26	16	16	18	18	16

Note: The dependent variable is $\Delta \ln y_t$ where y_t is per capita GDP, and [t-(t-1)] is a 5-year period. Inequality is measured by Gini indexes. Robust, 2-step System GMM estimator with Windmeijer-corrected standard errors. All regressions include country and period dummies. M2 are the p-values of the tests for second order serial correlation in the differenced error terms; Hansen denotes the p-value on the Hansen test of over identifying restrictions. ***, **, * denote significance at the 1, 5, 10% levels, respectively

Cingano uses panel data to add more variables to the equation, but for our purpose of linking economic inequality to growth the first two columns are sufficient. The empiric results show that inequality has a negative effect on growth. In the first column the model shows growth as a dependent of initial income and inequality (Gini coefficient), but the second column adds the variants human and physical capital without affecting the effect of inequality on growth significantly. However the estimated coefficients on human capital and investment are not statistically significant. Additionally the p-values show that we are unable to dismiss the null hypothesis. This may be linked to the inadequacy of the measure for inequality, as show in the later regression model by Voitchovsky. This is examined in more detail later. Cingano's model would suggest that lowering Gini coefficient by one point would cause growth of 8 % in five years. (Cingano 2014 p. 17)

Cingano's model shows a link to economic growth, but the p-values show that this model is not sufficient to fully explain the connection. We can therefore compare it to other models. Sarah Voitchovsky uses a fairly similar panel data growth model. Her variables include several of the same variables used by Cingano.

Variable	**Measure**
Economic growth	Real GDP per capita
Inequality	Gini coefficient, Luxembourg Income Study and also several ratios of income percentiles
Physical capital (investments)	Average share of gross fixed capital formation in GDP over the five years
Human capital	Average years of schooling in the population aged 25 and over

The difference lies with the used inequality measure. However as both models put growth as the dependent variable this difference does not reduce comparability, but should instead highlight validation for the same matter from a slightly different perspective.

Written out the model takes the form:

$$yi,t - yi,t-1 = (\alpha - 1)\, yi,t-1 + \beta\, Xi,t + \mu i,t$$

To keep the formula as close to the form Voitchovsky used, we will not write ln in the formula like Cingano did even though the growth measure $yi,t - yi,t$ on the left hand side measures the same 5-year growth of per capita GDP like Cingano's model. Also similarly i denotes a country, $\mu i,t$ includes unobserved country specific effect and the vector Xi,t contains current or lagged values of several explanatory variables. These include the inequality measures, and the physical and human capital measures. (Voitchovsky 2005 p. 281-282)

No	Gini only 1	Top Only 2	Bottom only 3	Gini and top 4	Gini and bottom 5	Top and bottom 6	Gini, top and bottom 7
y_{t-1}	−0.2635***	−0.2432***	−0.2820***	−0.2366***	−0.2656***	−0.2475***	−0.2516***
	(0.0681)	(0.0658)	(0.0701)	(0.0623)	(0.0588)	(0.0572)	(0.0605)
Invest_t	0.0164***	0.0147**	0.0173***	0.0137*	0.0161***	0.0143**	0.0146**
	(0.0077)	(0.0080)	(0.0078)	(0.0086)	(0.0079)	(0.0085)	(0.0080)
AvgYrsSch_{t-1}	0.0414**	0.0408**	0.0484***	0.0456***	0.0580***	0.0559***	0.0572***
	(0.0213)	(0.0219)	(0.0205)	(0.0211)	(0.0271)	(0.0235)	(0.0268)
Gini_{t-1}	−0.0451			−1.2053***	1.3363		0.5349
	(0.6151)			(0.5154)	(1.4167)		(1.5998)
$90/75_{t-1}$		0.2031		0.8933***		0.6464	0.4438*
		(0.4138)		(0.4207)		(0.5241)	(0.3014)
$50/10_{t-1}$			−0.0736		−0.2319	−0.1574***	−0.1940
			(0.0551)		(0.1671)	(0.0742)	(0.1764)
p-value[1]	0.941	0.623	0.181	0.018	0.183	0.104	0.029
m1	−2.220	−2.296	−2.144	−2.079	−2.157	−2.100	−2.127
m2	−0.782	−0.826	−0.749	−0.818	−0.738	−0.794	−0.761

21 countries, 81 observations, first-step estimates reported, time dummies included, robust standard errors in parenthesis. The dependent variable is Δy_t where $t-(t-1)$ is a 5-year period.
[1]Wald (joint) test on the inequality variable coefficient(s) in the regression.
***, **, * indicates that the coefficient is significantly different from 0 at the 5, 10 and 15% significance levels, respectively.

The results from the inequality measures do not appear significantly related to economic growth when used separately, but a joint measure in column 7 and the Gini and top measure used in column 4 are indicated as highly significant with p-values of 0,029 and 0,018 respectively. (Voitchovsky 2005 p. 287) This is a interesting difference in comparison to Cingano's model. The major difference between this model and Cingano's lies in the used inequality measure, so clearly the Gini index is inadequate to explain the connection between inequality and growth by itself. Additionally Voitchovsky notes a interesting detail in columns 2 and 3. In column 2 with the top only inequality measure of 90/75 the correlation is positive, so increased inequality will positively affect growth. While in column 3 for the bottom only inequality measure of 50/10 the correlation is negative, decreased growth for increased inequality. (Voitchovsky 2005 p. 288) This highlights an interesting perspective into the different roles of income levels in inequality and the inadequacy of one inequality measure in fully explaining the correlation.

Nevertheless Voitchovsky's findings confirm Cingano's by linking inequality to growth. By putting the findings of both together the ideal approach to inequality regarding growth would be to discourage it on the lower income levels and encourage it on higher income levels.

To consider the effects of economic inequality on economy, it is important to understand the wealth portfolios and consumption of each income level, since higher economic inequality will lower consumption and investments of poor and possibly middle income households, and increase the consumption and investments of high income households.

At lower income wealth is mostly compromised of savings and thus vulnerable to inflation, since interest on savings is rarely high enough to cover it. Debts are also more prominent, because of the often typically longer payback periods and higher interest demanded by banks for loans. Capital income is nearly non-existent for most poor income households. Thus their the primary contribution to economic growth is through consumption, most of what they earn through wages will go directly to consumption and very little is saved. (Davies *et al* 2014 p. 34)

Middle income households are more varied. Their primary form of wealth is often their family home, but the more affluent can also hold stocks and other financial assets. A higher percentage of their income is saved rather than consumed compared to the lower income households, but consumption is still larger than savings. (Davies *et al* 2014 p. 34)

For high income households, the wealth portfolio consists of financial and business assets, but also significant real estate assets. The higher we climb the income levels the more prominently financial and business assets replace housing assets (Piketty 2014 p. 260). This is why rising financial and business asset prices tend to increase economic inequality. Rising housing prices, as noted by the report by Credit Suisse, tend to decrease the share of wealth by the top percentile (Davies *et al* 2014 p. 34). This confirms Piketty's findings. So high income households either save or invest large parts of their income, and this naturally decreases the portion going to consumption.

The logic for decreasing consumption by income level is this. The higher the income for a household rises the easier it is to meet the needs for products and services. After a while all the needs will become saturated and there is no need to purchase more. The

left over income will then be saved or invested. Of course there are luxury product specifically meant for high income households, but there is a definite limit to demand for even those. This saturation process is clearly depicted by Engel's coefficient. Engel's law states that the percentage of income spent on food decreases as income rises and while food cannot represent all products and definitely not services, the principle remains the same. (Investopedia 2010b)

Thus higher economic inequality means lower consumption from poor and middle income households, and more investments and savings from the high income households. The additional investments will then create more capital, but since lower income consumption has decreased and cannot be permanently financed by loans, the economy will face a crisis. The very situation depicted in the Marxist theory of overproduction/underconsumption. However couldn't the high income households cover the decreased consumption of lower income households with their own? In the short run it is certainly feasible, after all luxury products cost much more and at least partly compensate for the higher number of poorer households. In the long run it is hard to imagine a rich person consuming the same amount as 1000 poor people. The exact number would depend on the population of the country and the local economic inequality.

In high economic inequality countries, growth would then have to come from increased investments, but since domestic consumption is simultaneously curbed these investment would most likely focus abroad. This would then generate capital income from these countries, but would not bolster domestic employment or generate as much tax revenue for the government. The effect of decreased consumption in favour of more investments, would thus unlikely be profitable for the country in question.

The conclusion is then that extremely high forms of economic growth would at least slow economic growth. Not to mention the possibility to cause significant social unrest. We should then focus on decreasing inequality to more sustainable levels. But who determines the right level of inequality? Especially since Voitchovsky's findings indicated inequality on the higher levels of income might be useful for economic growth. This is a matter of discussion for the population of each country in question. Piketty sought to put the matter in perspective by quoting the US Declaration of Independence, which states

that "men are born free and remain free and equal in rights." Further clarified by "social distinctions can be based only on common utility." But what is common utility? Piketty's interpretation is that "social inequalities are acceptable only if they are in the interest of all and in particular of the most disadvantaged social groups." (cp. Piketty 2014 p. 479-480) Achieving equality on the level dictated by the Declaration sounds fairly utopian, but at least we can strive for it.

4.1 Measures to decrease economic inequality

One of the measures that decreases economic inequality is strong demographic growth, this is because it decreases the significance of inherited wealth. Inherited wealth, as mentioned earlier makes it much easier to accumulate further wealth due to capital income. It might also dictate opportunity in countries with lower education and social inequality.(Piketty 2014 p. 83)

Which takes us to an another measure for decreased inequality, the diffusion of knowledge and investments in training and skills. This force operates not only within a country, but also between them. This is evident with countries like China, that adopt production modes and skills of the rich countries and gain a huge jump in productivity, boosting their growth. (Piketty 2014 p. 22)

Demographic growth and the diffusion of knowledge may occur more or less naturally as the economy matures, but since economic inequality is not just an emerging market country problems it is evident that the forces of divergence can be stronger than convergence in even mature economies. Piketty's suggested solution to this is a progressive global annual tax on capital. He himself admits that it is an utopian idea, and actually implementing would require unrealistic levels of international cooperation (Piketty 2014 p. 515). The difference between his idea and existing forms of capital taxation is that this tax would be progressive and would be applied to all forms of assets: real estate, financial assets and business assets (Piketty 2014 p. 517). The point he underlines is that the purpose of this tax would not be to replace other forms of taxation as a source of revenue, but to stop the divergent effect of capital income on economic inequality. The tax would also serve to regulate the financial and banking system in order to protect

against financial crises. Additionally significant gain of this would be increased transparency for the financial system, by requiring everyone to report their ownership of capital assets. This in turn would require increased sharing of international banking data between authorities, with the effect of eliminating tax evasion through tax havens. (Piketty 2014 p. 519-521). Instant global introduction of the progressive annual capital tax is hardly realistic, so Piketty outlined a theoretical case of Europe adopting the tax. The rate would be 0 % for fortunes below 1 million Euros, 1 % between 1 and 5 million Euros, and 2 % for above. This he estimates, if applied to the European Union countries, would generate revenues equivalent to 2 % of Europe's GDP (Piketty 2014 p. 528). Not an insignificant number.

Now that we considered measures to decrease economic inequality, let's focus on the second research question of this thesis and consider them in conjunction with economic growth.

4.2 Measures to stimulate growth

The source of economic growth is aggregate demand and supply. The economy can also be boosted by an increase in productivity, but since this is mainly done through improving training, equipment and technology it can be said to be a component of supply. As mentioned earlier, consumption cannot be decreased too far without also hurting investments, but the same is also true in reverse. Too much consumption, will lower funds available for invest. Investments, as mentioned, play a crucial role in maintaining competitivity. This in turn affects the employment rate and wages, which feed consumption.

The issue is thus to pursue measures that don't unduly burden consumption or investments. Let's us examine each of the measures used in decreasing economic inequality.

Strong demographic growth can be achieved through either a natural increase of population, more births, or immigration. High immigration can cause social unrest, but if the social policies succeed in easing assimilation to local population it can be a great source of economic growth as outlined in the chapter about economic growth. So as a measure

to decrease economic inequality, not only does this measure not harm consumption or investment, it actually increases them.

Diffusion of knowledge too is highly beneficial to economic activity. However this measure is of less use in already developed economies as education already plays a significant role and efficient production is widespread. It however outlines the importance of maintaining high quality education available to all. If higher education becomes too expensive for the lower income households it will lower social mobility and increase inequality. Inheritance would play a larger role in determining opportunity.

The last measure, the proposed progressive global annual tax on capital, is less clear on its effect on economic activity. A very high rate would obviously kill of investments altogether and constitute an economic suicide. However in many developed economies, the combined effect of the previously mentioned measures is not enough to combat the widening economic inequality. One of the only remaining tools left is taxation, and Piketty's suggestion contains many interesting ideas, such as the decreased effect of tax havens, more transparent financial and banking system and finally a regulative effect against reckless speculation by the investors. The concern is of course that the tax would lower investment, but to this Piketty suggests that the tax would act as an incentive to invest more efficiently. The logic goes like this, in order to cover the tax rate of 1 or 2 %, the investor would have to seek out investments with higher yields. Those incapable of this would lose their assets and the assets would pass to more dynamic investors. (Piketty 2014 p. 526). According to Piketty, the average real rate of return on capital is 4-5 %, so it should not be impossible to manage finding higher yield investments than 1 or 2 % (Piketty 2014 p. 572). The real problem with this suggestion is not effect on investment, but rather that it requires unforeseen levels of international cooperation to implement globally. The solution would be strive for it incrementally, as suggested by Piketty, first on a regional level such as Europe (Piketty 2014 p. 515).

5 CONCLUSION

To start our discussion on the effect of economic inequality on economic growth, we first needed to examined the various reasons for which a country can experience eco-

nomic growth. Growth we will take as an increase in the real GDP per capita, that is GDP adjusted for the affects of population and inflation. The effects that affect GDP can be divided into demand and supply side effects. This is because of the theory that economy is based on aggregate demand and supply. Keynesians will place more importance on aggregate demand. This is because they believe demand will create supply, a preference to focus on consumption over investment. The classical economists on the other hand have faith in Say's law which is a reverse of what the Keynesians believe. Regardless of which to focus on, both can be said to be important for economic growth.

After growth we focused on economic inequality and its causes. We found the causes of economic inequality to be divided into short and long run effects. The short run effects are the changes in asset prices and exchange rates. The long run effects are the rapid growth of the economy, demographic trends, savings rate, inheritance arrangements, general macroeconomic trends and possibly government policies. We then examined two measures for economic inequality, the Lorenz curve and the Gini coefficient, their merits and faults. After covering both growth and economic inequality we needed to find significant evidence of a link between them. The regression analyses and models by Cingano and Voitchovsky showed a correlation between inequality and growth, with growth as the dependent variable. Cingano's regression model did not fully explain the connection, as indicated by the p-values, but as Voitchovsky's model shows this can at least partly be explained by the inadequacy of the Gini index as a inequality variable.

With both growth and economic inequality covered we could finally focus on the research questions. Economic inequality was found to cause imbalances between consumption and investments, the two primary causes of economic growth. These imbalances could then potentially lead to recession, or even a financial crisis. The resulting crisis, would then have a disastrous effect on accumulated capital. The loss in capital would affect capital income, and thus lower economic inequality. With the first research question covered we focused on the measures to reduce economic inequality without unduly hampering economic growth. The findings indicated that many of the possible measures were tied to the maturation of the economy, but were insufficient to stop the increase of inequality in developed economies. This is particularly the case for economies with a high level of financialization, like the US (Investopedia 2004). No naturally

existing balancing mechanisms were thus proven to exist, leaving government policies as the only option of decreasing economic inequality. Thomas Piketty suggested the creation of a progressive global annual tax on capital. The benefits of that tax would include the decreased effect of tax havens, more transparent financial and banking system and finally a regulative effect against reckless speculation by the investors. The problem is that it requires currently unreasonable levels of international cooperation. The first step could be a banking union in the EU.

Further research on this topic could therefore focus on the potential advantages and disadvantages of this banking union and how it would affect the taxation needed to tackle the economic inequality.

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