

Monetary policy & wealth inequality

A case study of Quantitative Easing by the ECB and its impact on wealth inequality

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Abstract

This research aims to prove that Quantitative Easing has not been an effective monetary policy instrument of the European Central Bank, while increasing wealth inequality as a side effect in the Eurozone. It makes an assessment of the (historical) context in which the European Central Bank operates, together with a description of indirect and direct causes of Quantitative Easing policy. Furthermore, Quantitative Easing policy itself is described, followed by an assessment of economic theories and concepts of relevance for a better understanding of the consequences of Quantitative Easing policy. The relation between Quantitative Easing and (increasing) wealth inequality is also discussed within the context of theoretical and empirical literature. A collection of secondary data is presented and discussed in order to prove the central claim of the research. The research concludes by proving that Quantitative Easing has not been a very effective monetary policy instrument of the ECB, and that it has increased wealth inequality in the Eurozone.



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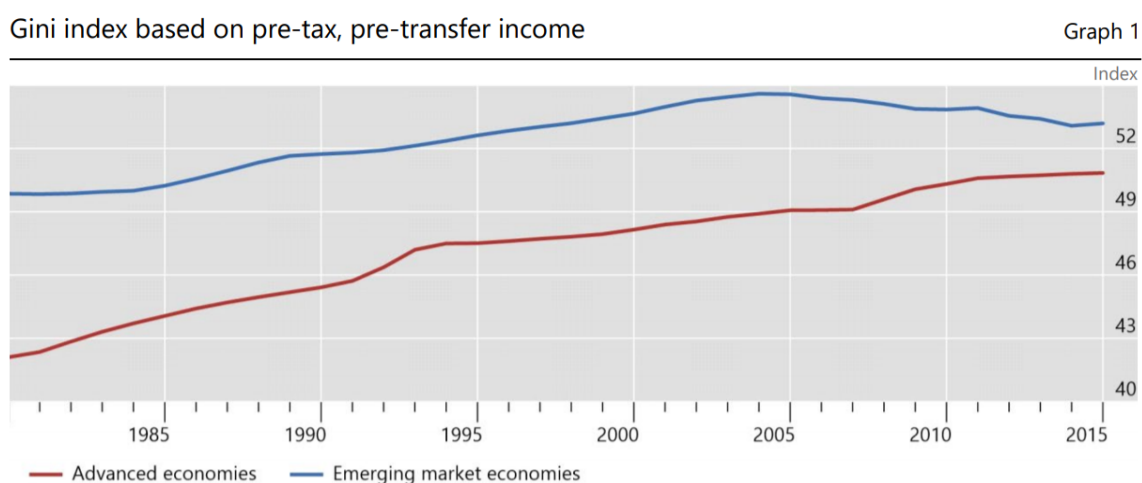
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Introduction

Rudolf von Havenstein was the president of the German central bank in the aftermath of the First World War. The former Weimar Republic was facing an enormous amount of public debt, when von Havenstein directed the Reichsbank to print large and exponentially growing amounts of money. He sincerely believed that the rate of inflation and the amount of money in the economy had no interaction. He could not have been more wrong. The massive growth of the money supply resulted in hyperinflation, economic struggle, weaker institutions and ultimately the destabilization of German society. Although von Havenstein and other German central bankers might not have had bad intentions when they implemented their policy, it certainly did not lead to the desired outcome. On the contrary, printing huge amounts of money has eroded its value, while the social unrest that resulted from it has eventually led to the rise of Adolf Hitler.

With this in mind, current monetary policies of major global central banks are, at the very least, somewhat controversial. Central banks of Japan, USA, UK and the Eurozone (among others) have all increased the supply of money in order to boost inflation. This is a result of a monetary policy instrument called Quantitative Easing (QE), used by central banks to stimulate economic growth. Opponents of QE policy sometimes refer to it as printing money digitally, while proponents consider QE as fundamentally different from printing money. Although hyperinflation is certainly not (yet) the case in the earlier mentioned countries, the growth of the money supply does not remain without consequences. Interest rates are negative or close to zero and public debt is increasing worldwide, with no signs of slowing down. At the same time, the distribution of wealth is increasingly becoming more unequal in both advanced economies and emerging market economies. In the last decade, (economic) inequality has been gaining widespread attention in public debate, with influential written contributions like 'Capital in the 21st Century' by Thomas Piketty (2013) and 'The Price of Inequality' by Joseph Stiglitz (2013). Although figure 1 clearly illustrates a trend of rising inequality (Gini index measures how equal wealth and income is distributed in society. A higher Gini coefficient means higher inequality), policy makers, scholars and other relevant experts can't seem to agree what causes this trend.

Figure 1



Source: BIS, 2021

On the one hand, there are central bankers who claim that monetary policy instruments like QE have no real impact on wealth inequality. This is exemplified by a claim of Jerome Powell, president of the United States' central bank, that "*Fed (US central bank) policies absolutely don't add to inequality*" (Condon & Saraiva, 2020). The idea of printing money to stimulate economic growth is shared by a fairly new economic school of thought called 'Modern Monetary Theory'. Stephanie Kelton, who wrote 'The Deficit Myth' (2020), is an outspoken advocate of this economic school of thought that sees no harm in printing money as long as inflation does not get out of control.

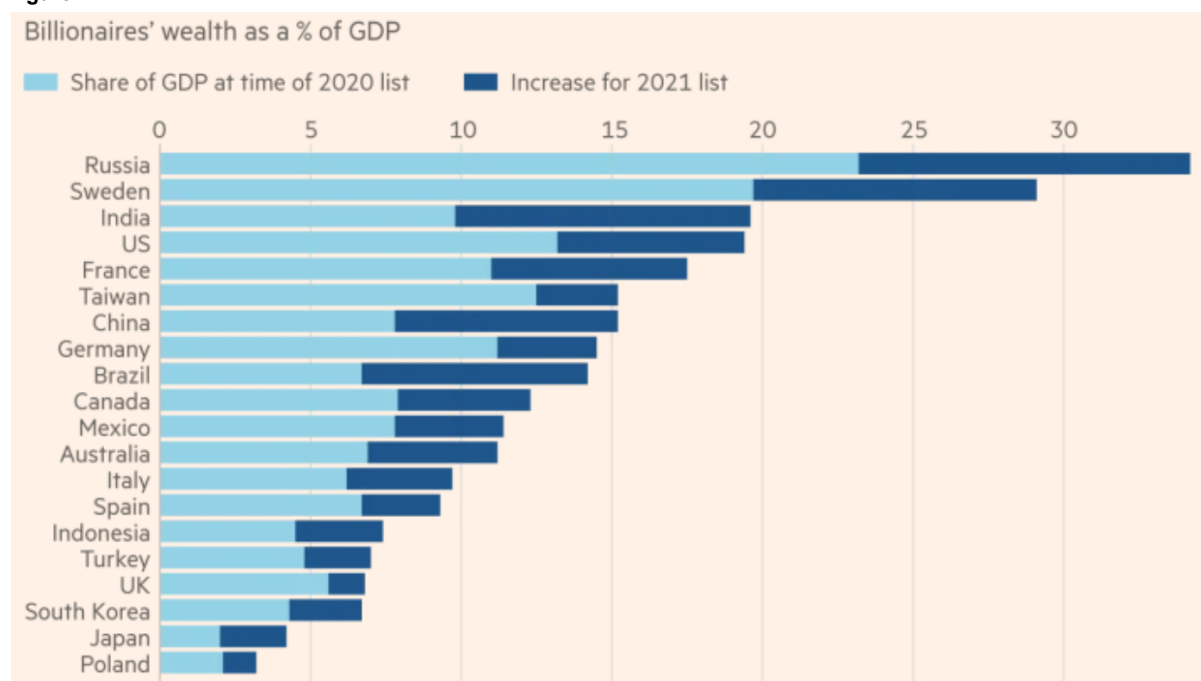
On the other hand, there are scholars, traders and also central bankers claiming that QE does increase wealth inequality. A wealthy billionaire and investor, Stanley Druckenmiller, has said: "*I don't think there has been a greater engine of inequality than the Federal Reserve Bank of the United States*" (YouTube, 2021, 38:40). Even though he greatly benefits from the Fed's policy, he still criticizes it. His assessment is shared by Karen Petrou, author of "*Engine of Inequality: The Fed and the Future of Wealth in America*". She argues in her book that the Fed's monetary policy has increased wealth inequality, by making the rich richer and by shrinking the middle class.

Even though most politicians, economists and other relevant experts will agree that high levels of inequality has a destabilizing impact on society, they can't seem to agree on what causes the widening inequality and how to decrease it. The IMF (Monteiro, 2021) even warns that inequalities may lead to polarisation, erosion of trust and ultimately social unrest. Clearly, there is a lot of discussion on monetary policy and rising wealth inequality in societies, with different actors having diverging points of view in this debate. Because of that, further research into this topic is necessary to describe how society is impacted by monetary policy instruments like QE.

Whereas most central banks represent one country with one single currency, there is one exception. The European Central Bank (ECB) is the central bank of all 19 countries that use the Euro as a currency. Since it is already difficult to set and implement effective monetary policy for a single country, one can only imagine how problematic it is to do the same for 19 countries together. There are many geographical, economic, political and societal differences between the 19 countries in the Eurozone, which makes it hard for the ECB to formulate monetary policy that fits every member state. On top of that, there are also large differences within countries in the Eurozone. The ECB adopted QE as part of its monetary policy relatively late in 2014 when compared to the central banks of Japan, US and the UK. Because of this, the long term effects of the so-called 'unconventional monetary policy' in the Eurozone aren't studied as much as in other countries. Moreover, because of the differences between and within countries of the Eurozone it is very difficult to implement monetary policy that benefits all member states equally. Hence, this research into the relation between monetary policy and increasing wealth inequality will focus on the Eurozone and the ECB. The variety between member states of the Eurozone, the inconclusiveness on how effective QE policy is and the relatively late implementation of QE by the ECB are justified reasons for this research.

While the ECB undoubtedly does not want another cycle of hyperinflation like Germany in the inter-war period, it should not be forgotten that the intentions of monetary policy don't always match the outcome. While increasing wealth inequality has been gaining more attention in public debate, reversing this trend seems difficult and far away. In the meantime, the Covid-19 pandemic has proven to be an accelerator of trends in society, widening wealth gaps even further (Goldin & Muggah, 2020). Billionaire wealth has exploded since the beginning of the pandemic (figure 2), while lower class households have been hit disproportionately hard.

Figure 2



Source: Financial Times (2021)

Public debt is exploding and the money supply keeps on growing as a result of QE and stimulus packages. The ECB implemented QE policy to stimulate economic growth and boost inflation, but as the debate continues it becomes more and more doubtful if QE ever served its purpose. The problems it needed to address haven't been solved, since economic growth has been low even before Covid-19. Furthermore, central bankers seem to ignore the side effects of QE policy, neglecting the possibility that it might affect increases in wealth inequality. When wealth inequality grows too big, it has a highly destabilizing impact on society. On top of that, as historical evidence from cases of hyperinflation has demonstrated, printing growing amounts of money can further exacerbate destabilizing trends in society. Because of that, it is highly relevant for European society to assess whether or not the ECB is conducting effective monetary policy. Within this context, this research aims to prove the claim that Quantitative Easing has not been an effective monetary policy instrument and has increased wealth inequality as a side effect.

This research is split in three parts: chapter 2 & 3 describe the historical context and discuss relevant theories and literature. In chapter 4, 5 & 6, the methodology is described and data will be presented and discussed. In chapter 7, 8 & 9, a conclusion will be drawn and suggestions for further research will be given, alongside a reflection.

Background

Before getting into the details of the main topic of this research, some important background information is necessary to understand the ECB's current monetary system. There are some major events in history that have had a lasting impact on the economic and monetary situation, which will be discussed in the following sections.

Because this research is focused on the monetary policy instrument of QE in the context of the Eurozone, it is of relevance to assess how this monetary policy became reality. This section will be split into two parts, the first part discusses the historical context and indirect causes of the current monetary policy of the ECB, and the second part discusses the events that directly led to the unconventional methods of the ECB.

Historical context & indirect causes

The Bretton Woods agreement established a new global monetary system in 1944, replacing the gold standard with the U.S. dollar as the global currency. Delegates of 44 countries, led by the United States, established rules for commercial and financial relations. These countries included Western Allied forces, but also countries like Japan and Australia. The agreement also created institutions such as the World Bank and the International Monetary Fund (IMF). Under the Bretton Woods agreement, the value of the U.S. dollar was pegged to a fixed price of gold. All other currencies of participating countries of the Bretton Woods System were pegged to the U.S. dollar. (Hetzel, 2013) Governments of participating countries in the system then could exchange their dollars for gold at any given time. The principal goals of establishing this new global monetary system were: creating an efficient foreign exchange system, preventing competitive devaluations of currencies and promoting international economic growth. (Chen, 2021)

Moreover, by pegging all currencies to the U.S. dollar, which was pegged to a fixed price of gold, participating countries in the Bretton Woods system were prevented from printing money as they pleased, since every currency was linked to the supply of gold.

During the First and Second World War, the gold standard was released because countries had to pay for their war efforts. Countries printed money in order to afford the war, which caused inflation because the supply of money overwhelmed the demand. (Amadeo, 2020) To create a more stable global monetary system with less volatility and to promote global trade, but also to give participating countries more monetary flexibility, the Bretton Woods System was established.

Under the Bretton Woods System, the Federal Reserve of the United States was the only institution that could increase the supply of dollars. The war in Vietnam during the 1960s increased the public debt of the United States significantly, which caused monetary inflation as the Federal Reserve increased the supply of dollars. This, among other factors, resulted in an overvaluation of the dollar and a decline of trust in the U.S. government. Many countries started to exchange their currencies for gold, which caused a run on the U.S. gold supply. To prevent the United States from losing their gold supply, President Nixon declared a 'temporary' ban on the exchange of dollars for gold in 1971. This event is often referred to as the Nixon Shock, which effectively ended the Bretton Woods System. Countries were free to choose exchange rate mechanisms for their currencies, whether by linking the value to another currency or by letting it float freely. (Kenton, 2021)

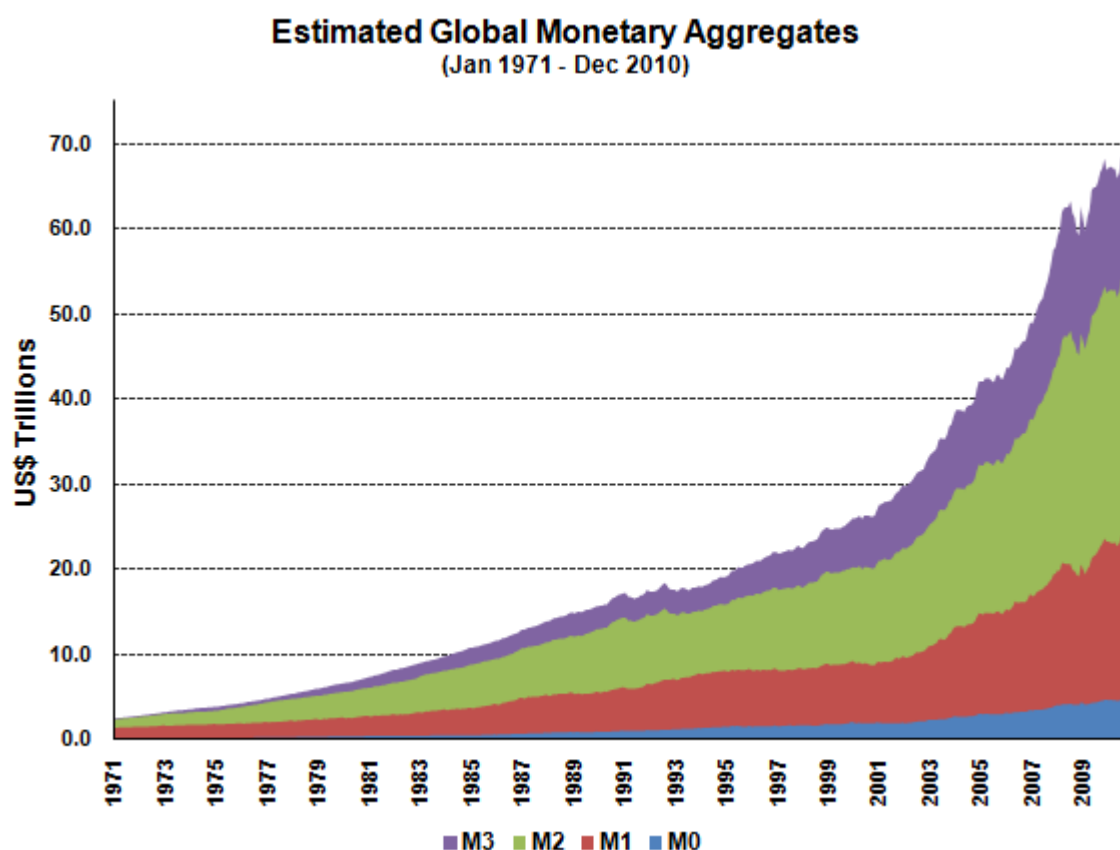
By abandoning the pegging of the U.S. dollar to gold, currencies weren't backed anymore by a physical commodity such as silver or gold. This situation resulted in a new monetary

system, the fiat money system. Fiat money is based on a government-issued currency, and only has value because the government maintains its value, or because parties engaging in exchange agree on its value. (Goldberg, 2005) The value of fiat money comes from the relationship between supply and demand of the currency and the stability of the government that issues their currency. (When the supply of a fiat currency increases faster than the demand for it, the currency will devalue, which in turn lowers the purchasing power of a currency unit.)

This fundamental change of the monetary system has had a major impact, up until today. Since there was no relationship anymore between the supply of money and the amount of gold that backed the amount of money, central banks could easily increase the broad money supply.

The increase of the money supply caused high levels of monetary inflation during the 1970s, not only in the United States, but in Europe as well. Ever since abandoning the Bretton Woods System, global money supplies have been growing.

Figure 3



Source: The Market Oracle (2011)

The change of the monetary system has undoubtedly created a situation that allowed central banks to print more and more money with lasting impact on monetary inflation. The collapse of the Bretton Woods System resulted in the fiat money system that remains the foundation of today's global monetary system. All major central banks in the world issue fiat currencies, including the ECB. However, the introduction of the fiat money system only partially explains why central banks are able and willing to print the amounts of money they do today. There are more recent events that have led to the current monetary policy of the ECB, which will be discussed in the next part.

European integration & direct causes

The ECB was established in June 1998 as a result of a complex multi-staged process. The introduction of a single currency and a central bank was one of many steps in the fuzzy process of European integration after the Second World War. A certain desire for peaceful convergence between European countries started to emerge after two World Wars had left Europe in shambles. By signing multiple Treaties and creating new institutions, Europe became more centrally organised. The ECB is one of those centralised institutions, and has been given the primary objective of maintaining price stability in the Eurozone. It also has the basic task of setting out and implementing monetary policy, while operating independently. In order to create and maintain a stable monetary union, four convergence criteria have been agreed upon in the Maastricht Treaty in 1991 which EU member states are required to meet. (ECB, 2017) These criteria focus on the following macroeconomic measures:

- Price stability, measured by levels of inflation
- Sound public finances, measured by government deficit and debt
- Exchange-rate stability
- Durability of convergence, measured by long-term interest rates

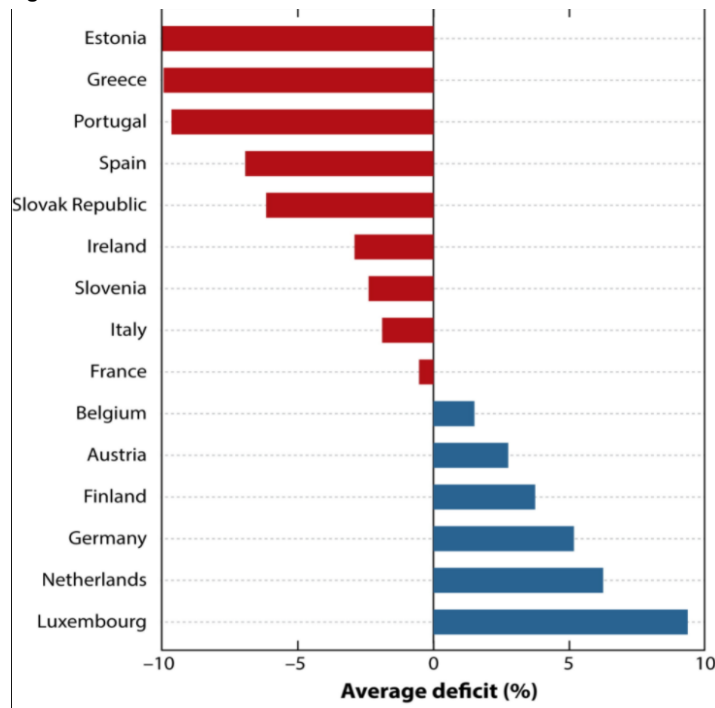
All participating countries of the Euro have agreed upon these criteria, as well as agreeing that no nation could be bailed-out by other member states and that the ECB was forbidden to directly monetize sovereign debt. (Gourinchas et. al. 2017) Despite the major economic divergences that existed at the time, the Eurozone was established.

What followed was a period in which the ECB focused on becoming a stable and independent institution that provided solid monetary policy to maintain price stability in the Eurozone, while they were also expanding geographically.

However, major threats towards the stability of the Eurozone were building up after establishing the monetary union. Both internal causes and external shocks have contributed to a major economic and financial crisis in the Eurozone that reached a climax in 2009 during the Greek sovereign debt crisis. The internal causes that led to the European debt crisis were driven by low interest rates that made borrowing very attractive in peripheral countries in combination with higher yielding investment opportunities. Low economic growth in combination with limited domestic investment opportunities pushed capital away from core countries in the north. (Frieden & Walter, 2017) This was based on the gravity principle, in which money flows from places with an abundance of capital and lower investment yields towards places with a capital shortage and higher investment yields. (Stiglitz, 2016) Under the “single-market principle”, the EU promoted its four freedoms: goods, capital, services (labour) and people. The free movement of capital and labour would theoretically lead to an efficient allocation of capital and labour to places with the highest returns. In theory, this would strengthen Europe as a whole, as income across the Eurozone would become more similar.

What emerged was a large flow of capital that reinforced itself, as an increasing amount of capital flowed into the peripheral countries. This process resulted in large differences between the trade balances of core and peripheral countries. Where core countries like Germany and the Netherlands ran a trade surplus and were able to invest that surplus, peripheral countries ran a trade deficit and increased their indebtedness. This is visualized in figure 3 below.

Figure 4



Source: Frieden & Walter (2017)

This process is described by Frieden & Walter (2017) as: *“The more capital flowed into countries like Spain and Ireland, the faster they grew; the more asset prices there rose, the more attractive they looked to lenders, drawing in still more capital. Borrowers and lenders fed an upward spiral, with capital flows driving expansion and expansion encouraging further capital flows. The result was first a boom, then a bubble, primarily in housing but in asset markets more generally.”*

This created a situation where peripheral, debtor countries were unable to service their debts after the bubble burst. They were also unable to compensate for the collapse of domestic demand by exporting, and borrowing more money to cover their continuing payment deficits had become impossible. Borrowing countries had been left with a massive debt to lending countries, which had become unlikely to be repaid.

While the idea has always been to create convergence through economic integration, divergence occurred as a consequence of the Eurozone’s structure. The European debt crisis highlighted the problems of a single monetary policy, by setting a single interest rate. Nobel prize winner Mundell (1961) has said: *“it can be economically and politically difficult when different regions, and different groups within regions, face different conditions.”*

Both before and after joining the Euro, countries like Spain, Italy but especially Greece have been facing different economic conditions compared to countries like Germany, the Netherlands or Austria. Besides differences within every country, there existed many economic discrepancies between countries, such as: levels of growth and inflation, institutional configurations and the amounts of public debt among other factors. This would create imbalances when setting and implementing a single monetary policy for such a disparate set of countries. (Stiglitz, 2016) Slow-growing countries in the core preferred a higher interest rate than a group of fast-growing countries in the periphery. Ultimately, a single interest rate proved to be a divergent force on top of the already existing differences.

The external shock of the Global Financial Crisis, triggered by the bankruptcy of Lehman Brothers in the United States, resulted in a severe recession and caused a collapse in housing prices and other assets throughout Eurozone countries. Financial markets stressed out and the crisis worsened in Europe. The Greek government was unable to finance their public debt, and there was fear that a Greek situation would spread around peripheral countries. Moreover, multiple private banks were facing bankruptcy and there were large macroeconomic imbalances between Eurozone member states. Without direct intervention, European finance was likely to collapse. (Frieden, Walter, 2017) The EU wanted to avoid this at all costs, but internal struggle between member states turned out to be problematic. Stronger, and financially more healthy member states were unwilling to support weaker member states and the currency union itself. Since Treaties prohibited member states to finance other member states and bail them out, a different response to the crisis was required.

The ECB ultimately played a crucial role in providing a response to the European debt crisis. From 2010 onwards, the ECB changed their approach by adopting a series of unconventional measures to prevent the Eurosystem from collapsing, while it was uncertain if the new approach was within the original mandate of the ECB. These measures were taken to reduce volatility in markets and to improve liquidity. (Eser & Schwaab, 2016) The ECB started buying government bonds and private debts through the Securities Market Programme (SMP), and it lowered interest rates to stimulate borrowing. The ECB later started Long-Term-Refinancing-Operations (LTRO), and Outright Monetary Transactions (OMT). In addition, a permanent rescue programme (European Stability Mechanism) was designed to replace the temporary rescue programme (European Financial Stability Facility). In 2012, as President of the ECB at that time, Mario Draghi spoke the famous words: "The ECB is ready to do whatever it takes", in order to guarantee financial markets that the ECB would literally do whatever it takes to save the Euro.

The immediate threat of the Euro collapsing seemed to be avoided by the bail-out programmes and stimulus packages of the ECB, but it came with serious consequences. Economic reforms and austerity measures came in return for the financial support, which lowered aggregate demand in the Eurozone as public and private spending decreased. Although the sovereign debt crisis had seemingly ended by the end of 2014, the economic struggle wasn't over. Facing slow economic growth and a declining inflation rate in the Eurozone, the ECB decided to implement QE policy as well, which will be further explained in chapter 3. By implementing QE policy, the ECB started buying bonds on a large scale.

The multiple interrelated financial and economic crises resulted in a staged implementation of unconventional monetary policy instruments by the ECB. These instruments included: large stimulus packages, bail-out and rescue programs, Quantitative Easing and extremely low interest rates. Even though it was specifically agreed not to implement such measures by member states of the Eurozone, the economic and political reality proved difficult to neglect. Because individual member states were unable to find a solution for the crisis, the ECB decided to intervene and attempted to solve the European debt crisis by creating more debt. An important indirect and historical cause of implementing unconventional monetary policy is the abandoning of the Bretton Woods System that resulted in the fiat money system. This laid the foundation for central banks to increase the money supply globally, and cannot be ignored as a major impact on the ECB's current monetary policy. The next part of this research will discuss economic theory that is fundamental to the current monetary policy, as well as theory on wealth inequality.

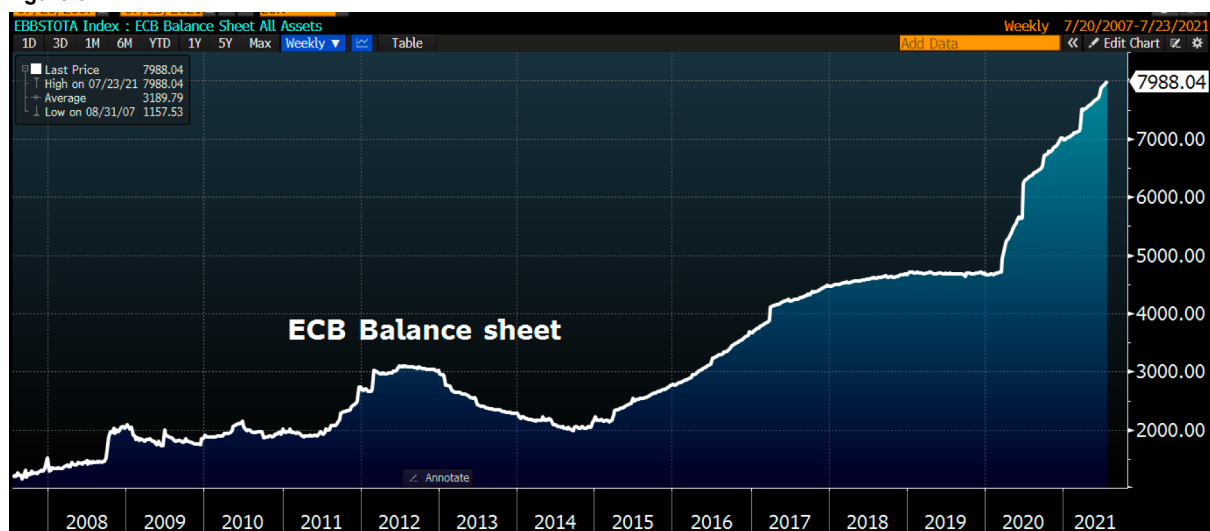
Theory

This chapter will present a theoretical framework to analyze the monetary policy of the ECB, after the policy itself is described in more depth. Further, the concept of inflation will be discussed in more depth. There will also be a review of the literature on wealth inequality in relation to monetary policy.

Quantitative Easing

Since the ECB implemented QE policy in 2015, after it had already lowered interest rates towards zero, it has taken a more stimulating approach towards generating economic growth and boosting inflation. There were no objectives to rapidly increase the balance sheet with unprecedented levels of debt to reach these objectives, as they were ready to do 'whatever it takes' to save the Euro. In the last 12 years, the ECB's balance sheet has increased by more than 5 trillion euro, as a result from QE and other asset purchase programmes. Figure 5 shows how the balance sheet of the ECB has grown from 2008 onwards. Noteworthy, from the end of 2014 (when QE was implemented) until now, the balance sheet has only increased, and is now roughly four times as large. In other words, the amount of debt held by the ECB is now almost 8 trillion euro, which is around 75% of the Eurozone's GDP.

Figure 5



Source: Bloomberg (2021).

Quantitative Easing is a process where central banks issue newly created reserves and use them to buy financial assets on the secondary market. The aim of QE is to increase spending and to maintain price stability. According to the ECB, the process goes as follows: the ECB buys bonds from banks, which increases the price of these bonds and creates money in the banking system. Consequently, interest rates fall and loans become cheaper, which stimulates businesses and people to borrow more at lower costs. This will create more consumption and investments, which will lead to economic growth and job creation. (ECB, 2021)

In other words, the ECB buys bonds and debt securities from governments and banks on the secondary market with digital credit they've created. Banks and governments are freed from debt obligations, as those obligations are transferred to the balance sheet of the central bank. In turn, banks and governments can loan more money to investors, since their balance

sheet has been freed from debt. Central banks thus 'create' money to buy debt securities from banks and governments, albeit indirectly.

Although it is implicitly forbidden for the ECB to monetize debt, they argue that QE is not a form of debt monetization. (Vanden Houte, 2020) Debt monetization is the process of a central bank printing money and directly handing it over to a government to reduce debt or increase spending, without ever having to pay it back. The ECB claims that QE is a temporary measure and that the debt obligations won't be on their balance sheet forever. Moreover, because the ECB purchases bonds on the secondary market from investors and not directly from member states, the ECB claims that they are conducting a legal practice. Buying bonds on the secondary market guarantees that a market price has been formed and the ECB doesn't distort the market pricing of risk. (Alexandra & Lastra, 2020) However, various opponents of QE policy have argued that it is a hidden form of debt monetization, and describe it as printing money digitally. (Dowd, 2018) Either way, QE massively increases the supply of money to stimulate economic growth while it lowers interest rates at the same time. The ECB's primary objective of maintaining price stability in the Eurozone has everything to do with keeping the level of inflation close to, but below 2%. Lowering the interest rate alone was not sufficient to bring inflation up towards 2%, therefore QE was implemented to boost inflation.

The ECB officially started its QE programme relatively late in september 2014, compared to other central banks around the world. While the ECB did purchase bonds under the targeted SMP programme and stimulated the economy with fresh liquidity during the years after the financial crisis of 2008, it did not openly admit it had implemented QE policy until 2015. The Bank of Japan was the first major global central bank that openly engaged in QE since the US Federal Reserve used similar policies during the Great Recession in the 1930s. At the end of the 1990s, the Japanese economy was suffering from low economic growth, low-interest rates and low levels of inflation. Several stimulus packages had already been used to spur economic growth, but it did not result in the desired outcome. Therefore, in 2001 the Bank of Japan officially started its QE programme. Central banks in the United Kingdom, Australia, Canada, and the United States have used QE policy as a response to the financial crisis in 2008, to stabilize markets during a recession and to stimulate economic growth afterwards. Other central banks of industrialized countries like Suisse have implemented these unconventional measures as well, all heavily increasing the money supply and lowering interest rates.

Not every QE programme of every central bank is the same, as there are differences in economic, political or societal realities between countries. However, in all cases where QE is used as a medicine, the disease it aims to cure is more or less the same. Economies suffer from periods with low growth and low levels of inflation, exacerbated by recessions and other shocks. Increasing the money supply to create more liquidity is considered a panacea by major global central banks in the last decade.

The intention of QE policy is clear: boosting economies and achieving desired levels of inflation. Central banks are increasingly becoming more influential institutions, as they are responsible for setting monetary policy. While most central banks have a certain degree of independence from politics, they ultimately serve their governments interests. Although the intention and functioning of QE might not provoke a heated discussion, the same thing can not be said about the side effects of this unconventional measure. For decades, there has been a debate between varying economic ideologies when it comes to the role of the government (indirectly central banks as well) as a driver of economic growth and job

creation. Moreover, different macroeconomic theories have opposing views on the relation between money creation and inflation. In the part below, some fundamental economic theories will be discussed that have been influential in the debates on government interference, as well as varying views on money creation.

Economic theories

Classical economic theory argues that a government shouldn't intervene in the economy and let free markets regulate themselves. Markets will reach maximum potential without the interference of governments. (Britannica, 2018) In classical economic theory, increasing public debt is discouraged and governments have to run a balanced budget. On the other side of the spectrum is Keynesianism. Keynesian economics is a school of thought that advocates countercyclical government spending, increasing deficits during periods of economic downturn. It considers the government to be a driver of economic growth and creator of jobs. By using active policy measures, aggregate demand has to increase in order to address or manage recessions. (Jahan et. al. 2014) Keynesianism argues that the best way out of a recession is a combination of monetary and fiscal policy. It advocates monetary policy that reduces interest rates to stimulate economic activity, while a government should also increase public spending during recessions. Proponents of Keynesian economics believe that an increase in the supply of money was a legitimate tool of a central bank to fight unemployment. More money would lead to more spending, creating higher economic demand. This would lower unemployment, while the possibility of inflation increased due to higher wages and prices. Keynesianism forced central banks in a difficult position, where lowering unemployment by increasing the money supply could result in accelerating inflation. Throughout the years, Keynes' original 'General Theory' has been redeveloped by many economists, resulting in several new theories like: Neo-Keynesian economics, New Keynesian economics or Post-Keynesian economics. In all theories, the government takes a stimulating, counter-cyclical approach towards generating economic growth and reaching full employment.

In recent years, especially in the United States, a 'new' economic theory has been receiving more attention. This theory is called 'Modern Monetary Theory' (MMT), with Stephanie Kelton and Randall Wray as outspoken advocates. The theory is based on post-keynesianism, and it has a specific view on public debt. According to MMT, *'public expenditures can be financed by public debt or even by printing more money without negative economic side effects such as inflation, crowding-out of investments or national insolvency'*. (Kelton, 2020) A state needs to have its own fiat currency in order for this kind of policy to be effective. Under MMT, a central bank can create money for the government with no expectation of being paid back. The supply of money is increased both with MMT based policies and QE when central banks purchase bonds. However, under QE it is expected that central banks will sell the bonds that they have bought before they mature, whereas MMT can be seen as an ongoing policy. Proponents of MMT acknowledge that inflation might occur as a consequence of printing money, but they argue that such inflation can be addressed by the government cutting back on deficit spending by raising taxes. MMT also argues that inflation only becomes problematic once an economy has reached its maximum capacity. According to Kelton (2020): 'Once the economy hits this full employment wall, any additional spending will be inflationary.'

An opposing view to the paradigm of Keynesianism (and related theories like MMT) is Monetarism. According to Milton Friedman, outspoken advocate of monetarism, 'inflation is always and everywhere a monetary phenomenon'. He argued that excessive growth in the

money supply would cause inflation to rise faster than paychecks, which would result in lower purchasing power. (Amadeo, 2021) Governments should have to keep the money supply fairly stable, expanding it slightly each year to allow natural growth of the economy. The excessive expansion of the money supply could lead to inflationary effects, which have to be targeted by monetary policy to maintain price stability.

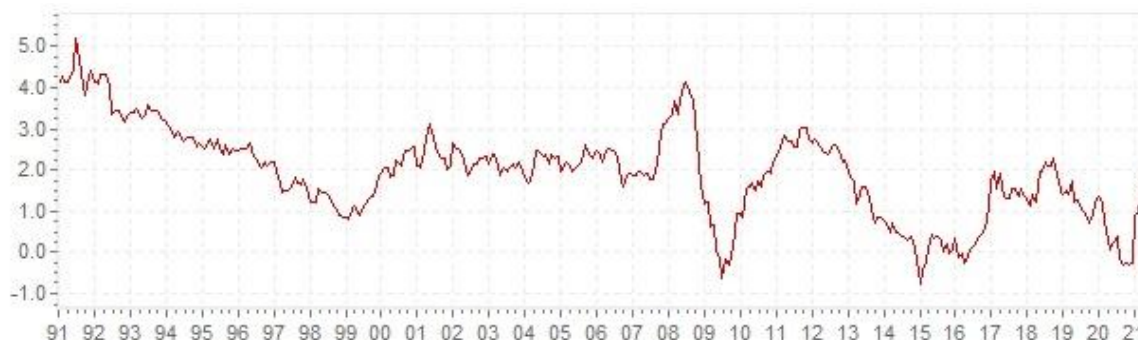
The Austrian School presents another way of looking at inflation and the creation of money. According to proponents of the Austrian School, any increase in the money supply that is not supported by an increase in the production of goods and services, will eventually lead to an increase in prices. However, prices of all goods do not increase simultaneously, as prices of some goods may increase faster than others. This results in a large disparity in the relative prices of goods. Ludwig von Mises, a prominent economist from the Austrian School, described the process of inflation in his book 'The Theory of Money and Credit' (2013) as: *"In theoretical investigation there is only one meaning that can rationally be attached to the expression Inflation: an increase in the quantity of money (in the broader sense of the term, so as to include fiduciary media as well), that is not offset by a corresponding increase in the need for money (again in the broader sense of the term), so that a fall in the objective exchange-value of money must occur."*

As discussed above, economists have diverging views on the role of the government as a driver of economic growth and creator of jobs. There is also no consensus on how increases in the supply of money affects inflation. The theories have been discussed very briefly, and lack a complete analysis of all elements of every theory. However, its purpose is to assess how QE relates to important economic theories, not to explain all theories extensively. While QE is not exactly the same as MMT, there are some important similarities. Both QE and MMT lead to significant increases of public debt, printing money to increase the supply of money. Also, QE policy might not be completely in line with all elements of Keynesianism, but on key issues it resembles Keynesian economics. Central banks use monetary policy to lower interest rates and increase the money supply, and governments have to stimulate the economy during recessions. However, QE was once implemented to trigger an increase in private sector spending in order to address the risks of a prolonged period of low inflation. According to the theories of the Austrian School and Monetarism, such increases in the supply of money will always affect levels of inflation, if the economy does not grow accordingly. The ECB has increased the amount of digital money massively ever since implementing QE, while the desired levels of inflation and economic growth have not been reached. At the same time, it seems like the ECB ignores harmful side effects of its policy. For a better understanding of QE policy and the side effects of increasing the money supply, the next part will take a closer look at the concepts of inflation.

Inflation

The primary objective of the ECB is to maintain price stability. This is achieved when levels of inflation are close to, but below 2%. In the period before the ECB started their QE programmes the inflation rate (HICP) was around 0%, shown in figure 5.

Figure 6



Source: inflation.eu

After cuts in private and public sector spending the aggregate demand dropped and threatened their mandate of price stability. QE was adopted to increase spending and to maintain price stability. When the ECB tries to boost inflation, it wants prices and wages to grow. However, inflation is a broad concept with a complex nature. There are numerous definitions of inflation that usually describe comparable situations in an economy. One definition of inflation is: *“a continuing rise in the general price level usually attributed to an increase in the volume of money and credit relative to available goods and services”* (Merriam Webster, n.d.) In this definition, it remains unclear which goods and services experience a continuing rise in the general price level, as well as how this rise is measured. As the various economic theories above described, economists have different views on the concept of inflation, and they don't always speak about the same thing.

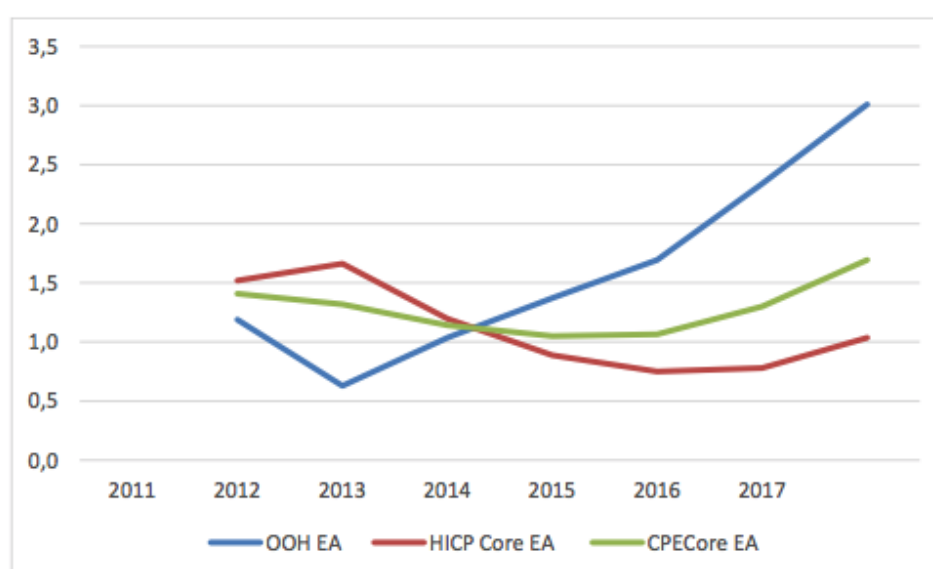
Regardless of economic theories, it is useful to make a distinction between three types of inflation: monetary inflation, consumer price inflation and asset price inflation. Monetary inflation refers to an increase in the broad money supply, which implies that the amount of money in the financial system is growing. The broad money supply of a financial system consists of all coins and banknotes in circulation, and it also includes all savings and checking accounts of individuals and businesses. (Liberto, 2020) The broad money supply goes up when banks make private loans, creating new deposits. It also goes up when central banks create new reserves to buy bonds and securities from governments that have been running large fiscal deficits. Monetary inflation means that the amount of 'money' in a system increases, and does not directly mean that prices of goods and services are increasing.

When the nominal price of a wide range of goods and services increases, consumer price inflation occurs. Consumer price inflation measures the weighted average of prices in a basket of goods and services that consumers primarily need. In the Eurozone, this is measured by the Harmonised Index of Consumer Prices (HICP), which is calculated by taking price changes for every item in the basket, weighing their relative weight in the basket and then taking the average. (ECB, 2021) Since not all goods and services experience the same development of prices, a wide range of products is included in the basket to see if there is a rise in general levels of prices. So when prices rise for the majority of goods and

services, this lowers the purchasing power of a currency. The ECB's objective of price stability is defined as annual HICP inflation rate of below 2%.

However, the HICP measure does lead to some controversy. It is contested what goods and services have to be included in the basket to measure HICP. If certain goods or services are intentionally left out of the basket, HICP can be made higher or lower. This is the case for houses. The cost of housing is measured by the HICP only by including the cost of actual rents (with a low weighing of 6,5%), without including the housing costs of homeowners. The fact that homeowners don't pay rent, doesn't mean that they don't have housing costs (25% of households in the Eurozone have a mortgage loan to pay (Jourdan, 2020)). Moreover, the weighing of rent expenditures is heavily underestimated by the HICP measure. The measure estimates housing costs at 6,5%, while estimates show this is closer to 25%. By not reflecting housing costs correctly in the HICP measure, the ECB is likely to report lower levels of inflation than it is in reality. Gros (2018) estimated that HICP inflation would be 0.3% higher if owner occupied housing would be included in the HICP measure.

Figure 7



Source: Gros (2018)

It is also contested how prices are being weighted. Not every household has the same income, and not every household spends the same proportion of their income on specific goods and services. By using a universal measure, differences between households are overlooked, as consumption patterns may vary between lower, middle and high income households.

Another type of inflation is asset price inflation. This occurs when prices and valuations of financial assets increase over time, even though they are already above their intrinsic or underlying value. (Alden, 2021) Financial assets can be held for a long period, and tend to appreciate in price over time. Examples of assets are: stocks, bonds, real estate, gold and silver. It can also be argued that in the last decade, cryptocurrencies have emerged as a new type of asset.

The inflation of asset prices is quite different from consumer price inflation, as financial assets are products that most people don't buy everyday. Asset price inflation usually occurs when interest rates are very low and when wealth is highly concentrated. During periods of

low interest rates and money creation, the newly created credit has to go somewhere. Central banks and governments argue that this credit will eventually 'trickle down' into the economy and reach households. Former chairman of the Federal Reserve Board, Ben Bernanke, has stated that the objectives of QE are a wealth effect on consumption from higher asset prices, and that lower interest rates are intended to spur investment, indirectly increasing employment. (Bernanke, 2010) According to New Keynesian theory, the increase in financial asset prices can increase demand via wealth effects, stimulating the wealthy to spend more. However, a case study shows that the wealthiest 10% in the Eurozone, only spent 6 cents of every euro of wealth they've gained. (van Lerven, 2016) If the wealthiest people would receive extra money, they are unlikely to change their consumption behaviour, because they are already able to eat, drink, buy or do what they want anyway. It is more likely that wealthy people would use their extra money to buy more financial assets, which further increases the price of assets as demand rises.

If the middle class would receive extra money, they are more likely to spend that money, as they change their consumption pattern. They might go to a restaurant, or buy new shoes with the extra money, thus stimulating the economy. When the broad money supply increases but stays concentrated with a low circulation, this can intensify the link between broad money growth and asset price growth. (Alden, 2021) This also weakens the link between broad money growth and consumer price inflation.

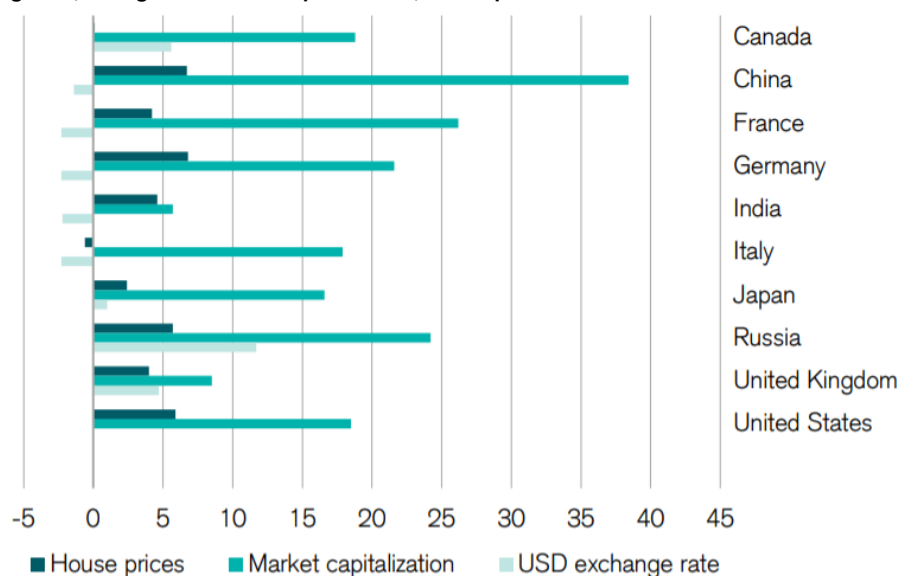
Inflationary trends have specific implications for households, usually experienced differently throughout society. Only cases of very high levels (hyperinflation) or unpredictable levels of inflation will hurt everyone in society. But in other cases, there are usually winners and losers of inflationary cycles. An argument could be made that lower classes would be harmed more by inflation, as they mostly have cash savings. Those savings erode through inflation when the value of money decreases. Wealthy people usually have a more diversified savings portfolio, including financial assets. But, lower classes usually have more debt, and since inflation often occurs after rising wages, this needs to be taken into account as well.

Basically, inflation will benefit those who have large debts. As prices and wages rise, it becomes easier to pay back the original debt. Debt partially gets inflated away, favouring debtors. The lower class in society usually has more debt (liabilities) than assets, while the middle class generally has moderately more assets than liabilities.

On the other hand, inflation hurts savers and creditors. When real interest rates are lower than the level of inflation, savings of people will erode. If prices rise and the value of money decreases, the real value of savings will decline. People with a fixed income, or pensioners with a pension that is not indexed to the price level are hurt the most during high levels of inflation. They experience rising prices, while their income does not rise accordingly. But more in general, when levels of price inflation exceed the real wage growth, it negatively impacts the working class.

When asset prices rise, people who own assets will benefit from this as the valuation of their assets will increase. Subsequently, they are able to buy more assets, reinforcing the process. People that want to acquire assets during a period of rising asset prices are affected negatively, as they will have to pay more money for the same product. While trickling down of wealth is not particularly proven, it is clear that the wealthy class greatly benefits from rising asset prices. This is not the case for the lower class who generally don't own any assets, while the middle class usually has one source of wealth in the form of home equity. In recent years, the value of stock prices has grown more than the value of house prices (shown in figure 8), which benefits the wealthiest who own more stocks than the lower and middle class households.

Figure 8, changes in market capitalization, house prices



Source: Credit Suisse (2020)

Figure 9 illustrates the composition of households' balance by selected net wealth quintiles (as a percentage of total assets), in 6 different countries. Although the composition of households' balance sheet varies between countries, there are some important similarities. Q5 implies the highest net wealth quintile, and Q2 is the second net wealth quintile (the class that has 20-40% of a country's net wealth). In all cases, the highest quintile has a more diversified asset portfolio, owning more stocks and bonds proportionally.

Figure 9, composition of households net wealth

		Assets					Liabilities		Memo: Leverage
		Deposits	Stocks	Bonds	Mutual funds	Real estate	Mortgage debt	Other debt	
France	Q5	11.9	7.3	0.9	3.4	76.5	73.0	27.0	1.1
	Q2	34.5	1.2	0.0	0.8	63.5	78.4	21.6	1.6
	Δ	-22.6	6.1	0.9	2.6	13.0	-5.4	5.4	-0.6
Germany	Q5	16.2	3.8	3.4	5.0	71.7	91.8	8.2	1.1
	Q2	57.1	0.9	0.0	1.8	40.2	66.7	33.3	1.4
	Δ	-40.9	2.9	3.4	3.2	31.5	25.1	-25.1	-0.3
Italy	Q5	8.5	1.3	5.1	2.8	82.2	69.9	30.1	1.0
	Q2	13.7	0.3	2.2	0.6	83.1	80.4	19.6	1.2
	Δ	-5.2	1.0	2.9	2.2	-0.9	-10.5	10.5	-0.2
Spain	Q5	12.5	3.3	0.5	2.7	80.9	84.3	15.7	1.1
	Q2	5.1	0.2	0.1	0.3	94.4	89.7	10.3	1.3
	Δ	7.4	3.1	0.4	2.4	-13.5	-5.4	5.4	-0.2
United Kingdom	Q5	15.8	6.2	4.6	2.5	70.9	92.5	7.5	1.0
	Q2	17.9	1.6	1.1	0.1	79.3	87.8	12.2	1.7
	Δ	-2.1	4.6	3.5	2.4	-8.4	4.7	-4.7	-0.6
United States	Q5	12.4	15.1	3.4	14.6	54.5	90.9	9.1	1.1
	Q2	7.5	0.6	0.2	0.6	91.1	76.1	23.9	3.4
	Δ	4.9	14.5	3.2	14.0	-36.6	14.8	-14.8	-2.4

Source: Domanski et. al. (2016)

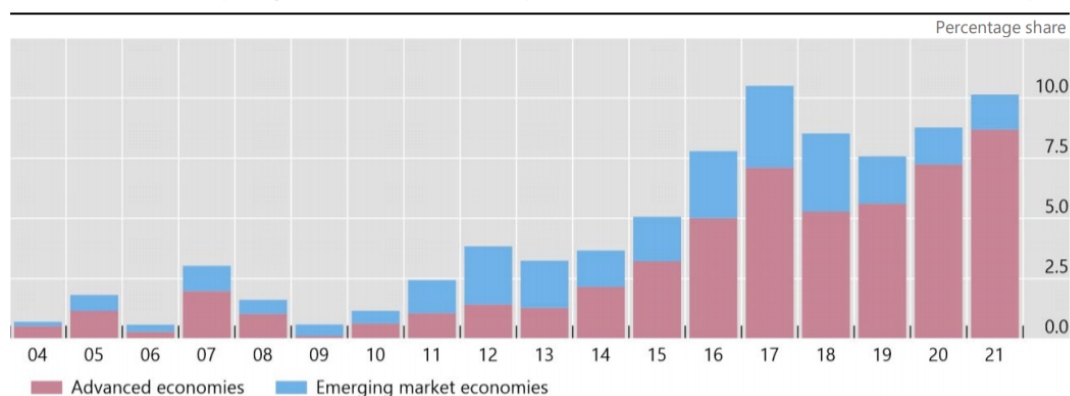
Wealth inequality and QE

Economic (income & wealth) inequality has received an increasing amount of attention by economists and policy makers after the Global Financial Crisis. Within this wider, global debate on economic inequalities in society, the role of central banks and monetary policy is also being discussed. More specifically, the unconventional policy measures (such as QE) used by central banks in advanced economies fuel the debate on how monetary policy affects the unequal distribution of wealth in societies. Central bankers around the world have been acknowledging that inequality is part of the environment in which monetary policy is being set, and that they have to reflect that in their decisions. (Carstens, 2021) This has not always been the case, as Olivier Blanchard (former chief economist of IMF) highlighted by saying that central bankers used to think that: “we didn’t have to worry about inequality when we did monetary policy”. (Sloan & Podkul, 2021) Figure 10 shows how often central bankers have mentioned inequality in their speeches, and it clearly highlights that it has become a topic of interest.

Figure 10

References to “inequality” in central bankers’ speeches

Graph 2



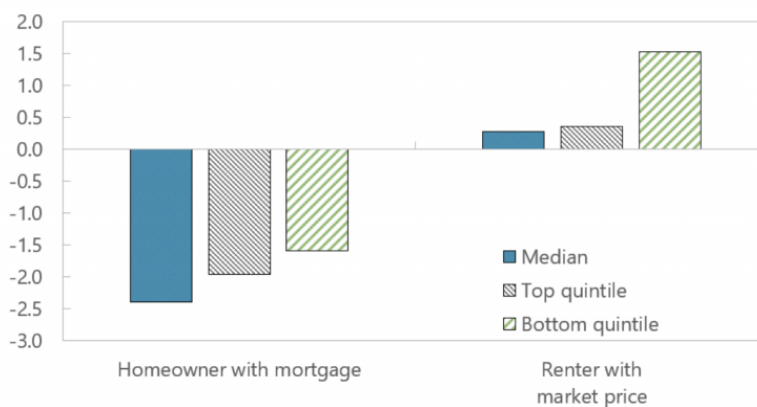
Source: BIS

Moreover, a wide range of literature and empirical research has emerged in an attempt to illustrate and investigate how economic inequality is affected by monetary policy. However, there is no consensus on how these subjects relate to each other. First, a distinction should be made between income and wealth inequality. Since this research is focused on the latter, the distributional effects of monetary policy on wealth inequality will be discussed. Various studies have shown that wealth inequality tends to increase when equity prices rise, and decrease when house prices rise. Domanski et.al. (2016) have analyzed the relative importance of the channels through which monetary policy actions may have affected wealth inequality since the crisis. Their findings suggest that “rising equity prices have been a key driver of wealth inequality”. Colciago et.al. (2019) reviewed recent research on the relationship between central bank policies and inequality. They found that “*results for the impact of unconventional monetary policies on wealth inequality are rather mixed. Again, this may be caused by offsetting influences: whereas higher financial asset prices lead to higher inequality, higher house prices reduce wealth inequality.*” Adam & Tzamourani (2016) also find this relation: “*a 10% increase in the value of housing decreases the euro-area Gini coefficient for net wealth by 0.4 Gini points, as housing tends to be held by middle-decile households. In contrast, a 10% rise in stock prices increases the coefficient by 0.3 Gini*

points...” Higher equity prices thus seem to increase wealth inequality, while rising housing prices decrease wealth inequality.

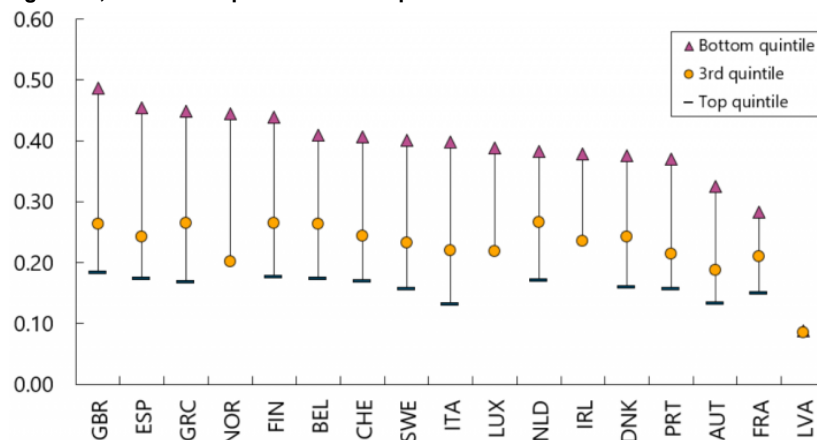
However, Zucman (2019) contests this by claiming that higher housing prices have an ambiguous effect on wealth inequality: *“although higher housing prices tend to increase the wealth share of the middle class, they also make it harder for the poor to become property owners, thus exacerbating inequality between the poor (the bottom 50%) and the middle class (the next 40%).”* Not all households own a home, and usually the lowest income groups in society tend to rent instead of being a homeowner. Where housing costs for homeowners with a mortgage have dropped in the Eurozone since 2014, the same can’t be said about renting costs. Figure 10 shows the change in housing costs across income groups, as a percentage of disposable income (changes between 2011-2013 and 2016-2018). Where homeowners with a mortgage benefited from low interest rates as they had to pay less interest, renters saw their costs rise during the same period. At the same time, low income households usually spend more than 40% of their disposable income on rent, which is way more proportionally when compared to other income groups. This is illustrated in figure 11.

Figure 11, change in housing costs



Source: Kammer et.al (2021)

Figure 12, share of disposable income paid on rent



Source: Kammer et.al. (2021)

Greenwald et.al. (2021) also conclude that low interest rates are least beneficiary for lower wealth households: "A persistent decline in real interest rates, like the one experienced in much of the world between the 1980s and the 2010s, naturally leads to a rise in financial wealth inequality." They add: "While most households have been made worse off by the decline in interest rates, ..., the costs have fallen disproportionately on young and low-wealth households." Karen Petrou describes low interest rates as a 'double edged sword' for lower-income families in her book 'Engine of Inequality: The Fed and the Future of Wealth in America' (2021). Because these families can't accumulate any real savings and they also can't receive low-cost loans, they are affected twice by the same measure.

Rising housing prices can be favourable for middle class income groups, but it certainly doesn't benefit the lowest income groups who don't own a house. In combination with low interest rates, the lowest income groups and younger people in general don't benefit from rising housing prices as a consequence of QE. It can be argued that Gini coefficients are lowered because of rising housing prices, thereby decreasing wealth inequality, but it actually widens the gap between the lowest income groups and the middle and wealthy groups.

Central bankers argue that it is largely due to structural forces and fiscal policy that inequalities exist in society. They argue that monetary policy doesn't significantly increase economic inequalities. This is highlighted by a quote from Ben Bernanke, former Chair of the Federal Reserve Board and the one who designed and implemented QE policy in the United States in 2008. In 2015 he said: "*The degree of inequality we see today is primarily the result of deep structural changes in our economy that have taken place over many years, including globalization, technological progress, demographic trends, and institutional change in the labor market and elsewhere... The effects of monetary policy on inequality are almost certainly modest and transient.*" (Petrou, 2021)

The General Manager of the Bank for International Settlements (BIS, the central bank that oversees all other central banks) concludes more or less the same in a lecture he gave in may 2021. Although he recognizes that central bankers are fully aware of the short-term consequences of their actions on income and wealth distribution, he argues that monetary policy does not lead to inequality in the long run. (Carstens, 2021) The ECB holds the same view, and expresses this in multiple publications. Dossche et.al. (2021) state that: "*The main factors driving increases in inequality include globalisation, technological progress and changes in taxation.*" They conclude by saying: "*In many advanced economies, inequality has been on the rise for several decades, mainly as a result of factors other than monetary policy*". They go even further by saying that "... *the easing of monetary policy clearly has an inequality-reducing impact via its indirect effects, resulting in increased employment for lower-income households in particular*".

Another ECB publication by Lenza & Slacalek (2018) also suggests that QE policy has reduced income inequality: "... *monetary policy is not a key driver of inequality in the long run (for which other factors, such as globalization or progressivity of the tax system are more important), also due to the likely temporary nature of its effects, quantitative easing substantially contributed to support vulnerable households*". They also argue that rising housing prices are the 'equalizer' when asset price inflation leads to increasing wealth inequality. As stocks and other assets are mostly in possession of the wealthiest households, they profit the most from an increase in their valuation. But since 60% of the Eurozone households own a house, they profit from an increase in house prices. According to the Dossche et.al. (2021), these factors offset each other, as it benefits the middle class.

Furthermore, middle class households see their net interest income rise when interest rates decline. Since they relatively have high levels of mortgage debt, they benefit the most from low interest rates.

To summarize the statements from above, central bankers argue that rising inequality is mainly driven by structural forces and can only be addressed by governments through fiscal policy instruments. They reject the option that monetary policy negatively affects inequality, where the ECB even claims that monetary policy reduces inequality. However, merely accepting these claims without contesting them would be problematic. After all, when central bankers are left to judge their own policy, they are butchers inspecting their own meat. To contest these claims, it is useful to understand how central bankers argue that QE and low interest rates have been effective monetary policy instruments. When QE was implemented, first in the United States and later in the Eurozone, it provided liquidity to financial markets. Ultimately, QE had to stabilize financial markets by stimulating economic growth and by creating jobs. In an assessment of the ECB's Asset Purchase Programmes (APP), the authors summarize: *"Available studies strongly suggest that the ECB's APP and its previous unconventional monetary policy programmes had a stabilising effect on financial markets, offsetting large financial turbulences..."* (Andrade et.al. 2016) This implies that the initial problem that QE had to solve was addressed effectively. Moreover, multiple central banks argue that if they had not implemented QE and did not interfere in financial markets, they would have collapsed. This would have led to an increase in unemployment and a deeper recession. The ECB, among other central banks, generally argue that the economic situation would be a lot worse if it weren't for QE.

This way of reasoning is problematic because it is impossible to prove (or disprove) that the economy in the Eurozone would be worse off without QE. Additionally, long-term effects of QE are uncertain, as the amount of money being printed is unprecedented with no signs of slowing down. While most economists and policy makers might agree that QE initially stabilized financial markets, it turns out that the economic impact of QE tends to fade away after a while. Researchers of the BIS have analyzed the macroeconomic effects of asset purchase programmes launched by the Federal Reserve and the Bank of England from 2008, and concluded: *"... early asset purchase programmes had significant positive macroeconomic effects, while those of the subsequent ones were weaker and in part not significantly different from zero"*. Another important finding of their analysis is: *"there is a significant and persistent positive impact of asset purchase shocks on stock prices. This suggests that central bank asset purchases may have been a driving factor of rising stock market valuations in recent years"*. (Hesse et.al., 2017) The 'success' of QE is based on the assumption that it created jobs and prevented the economy from collapsing, but it came at great costs. The ECB massively increased their balance sheet with debt to 'save the euro', while drawing in multiple unintended side effects. These side effects are discussed by Horvath (2017), who concludes that the unconventional monetary policy of the ECB has *"likely contributed to greater wealth inequality in the euro area."*

As the literature is inconclusive on the effects of QE on wealth inequality, with multiple studies coming to varying conclusions, it remains unclear how injecting trillions of euros in the financial markets has affected economic growth and the distribution of wealth in the Eurozone. For a better understanding of the effectiveness of QE and its impact on wealth inequality in the Eurozone, it is necessary to present and compare more empirical findings of the ECB's monetary policy. In the next section, the strategy of this research will be presented in order to be able to assess the claim of this research.

Research strategy

The aim of this research is to prove the claim that QE has not been an effective monetary policy instrument of the ECB and that it has increased wealth inequality as a side effect in the Eurozone. In order to prove this claim, secondary data will be gathered, presented and discussed. Every data source will be discussed briefly and what can be observed from the source. After all data has been presented, a synthesised discussion is given.

Macro-economic measures such as GDP growth can be used to describe whether or not economic growth has been realized. Data on the growth of the money supply will also be presented, just as the development of the balance sheet of the ECB in order to establish a connection between QE and the growth of the money supply. Furthermore, to show how wealth inequality has been impacted by QE policy, the distribution of wealth will be illustrated by Gini coefficients, and how it has developed over time. Additionally, data of the development of housing and stock prices will be presented, for a better understanding of the relation between asset prices and money supply growth. Other data like the development of interest rates, inflation rates or money velocity will be used to further explain the current economic situation in the Eurozone and the impact of monetary policy instruments like QE policy.

With this wide range of secondary data, it becomes possible to assess the claim related to the aim of this research. Secondary data will be used, because it takes too much time to gather relevant data on wealth inequality in the Eurozone by myself. It is also problematic to gather such data as an individual, unrelated to a company or an institute such as the ECB. The data used for this research will not be limited to the Eurozone only, as there are other cases where QE policy has been implemented for a longer period. This can help to identify the (long-term) effects of the policy in general. By using these publicly available macroeconomic measures, the reliability of this research will be strengthened as it can be repeated in a different context or at another time. Furthermore, collecting data from other regions where QE has been part of the monetary policy, can build a circumstantial argument to prove the claim of this research.

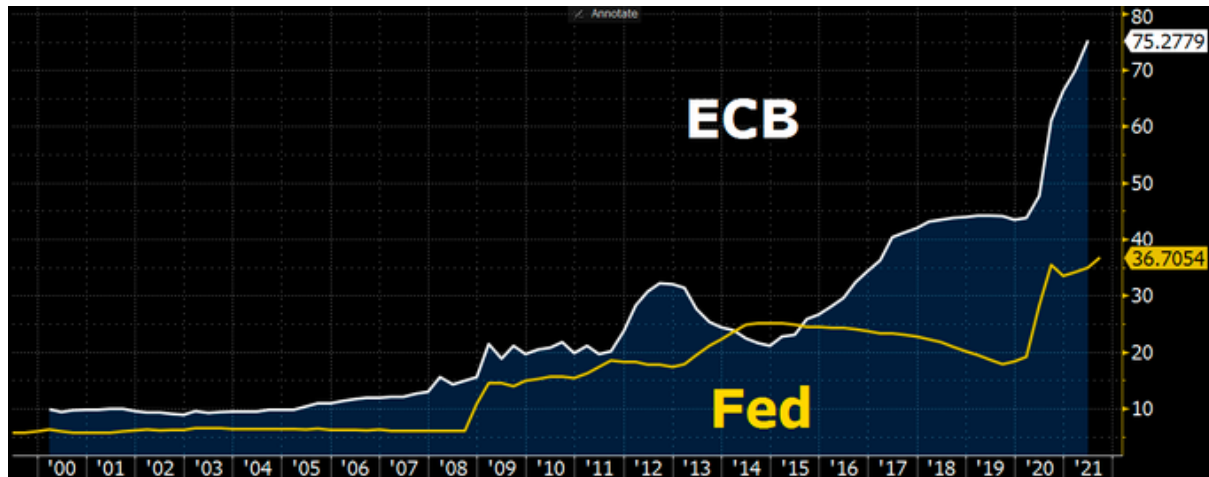
The use of Gini coefficients for measuring inequality can be somewhat misleading, as Piketty explains in his book 'Capital in the 21st Century' (2013). He says: *"These coefficients— and there are others, such as the Theil index— are sometimes useful, but they raise many problems. They claim to summarize in a single numerical index all that a distribution can tell us about inequality— the inequality between the bottom and the middle of the hierarchy as well as between the middle and the top or between the top and the very top. This is very simple and appealing at first glance but inevitably somewhat misleading. Indeed, it is impossible to summarize a multidimensional reality with a unidimensional index without unduly simplifying matters and mixing up things that should not be treated together."*

Therefore, Gini coefficients of wealth inequality will not be the only measure of this research, other measures will be used as well. Piketty prefers to analyze inequalities by measuring the distribution of wealth in percentiles and deciles, saying that he wants to *"analyze inequalities in terms of distribution tables indicating the shares of various deciles and centiles in total income and total wealth rather than using synthetic indices such as the Gini coefficient."* Because of this, such distributions of wealth in deciles and percentiles will also be used to measure inequality of wealth.

Evidence

In this section, the data is presented. First, it will be illustrated how QE has affected certain macroeconomic developments, not only in the Eurozone but also globally. Second, data is shown that relates to how QE and low interest rates

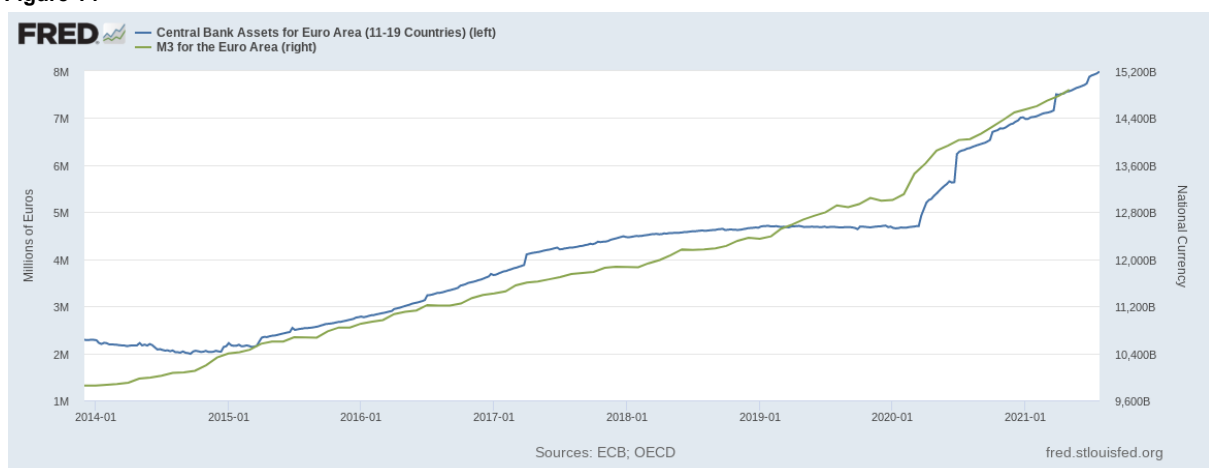
Figure 13



Source: Bloomberg (2021)

In the image above, the development of the ECB's balance sheet as a percentage of the Eurozone's GDP is shown, as well as the balance sheet of the Federal Reserve of the U.S. A significant increase in the ECB's balance sheet can be noted from 2014 onwards. Where the balance sheet of the ECB was roughly 20% of the Eurozone's GDP in 2014, after the implementation of QE it rose sharply to more than 75%. This implies a serious increase in debt for the ECB as a percentage of the economic output. In comparison, the Fed's balance sheet as a percentage of the United States' GDP is almost half the size relative to the ECB's balance sheet at 36,7%.

Figure 14

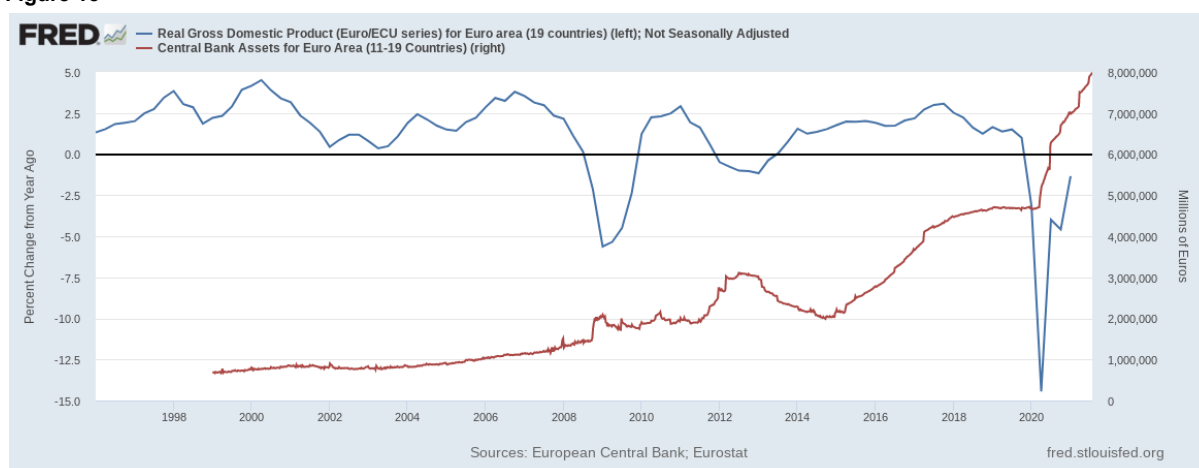


Source: FRED (2021)

In the image above, the development of the balance sheet of the ECB is shown on the left axis together with the development of the broad money supply in the Eurozone on the right

axis. From the beginning of 2015, when QE policy officially started, the increase in the broad money supply correlates with the increase of the ECB's balance sheet.

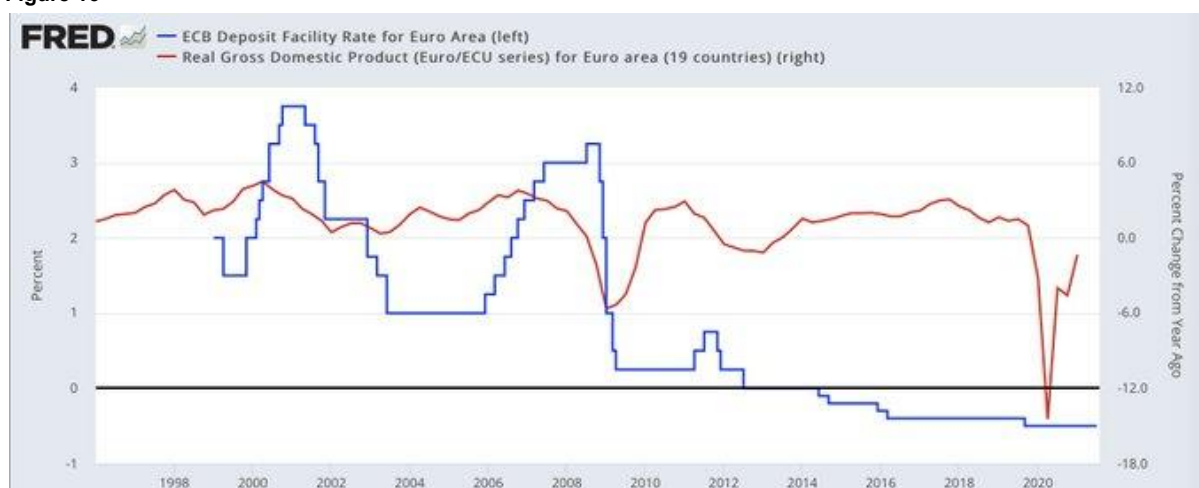
Figure 15



Source: FRED (2021)

In the image above, the annual change (in percent) of GDP of the Eurozone is shown on the left axis, and the annual development of the balance sheet of the ECB is shown on the right axis. It can be noted that both growth and decline has occurred in the Eurozone, before the start of QE policy. It can also be noted that no significant GDP growth has occurred from 2014 onwards when QE has been implemented, without considering the shock and recovery from the Covid-19 pandemic in 2020.

Figure 16

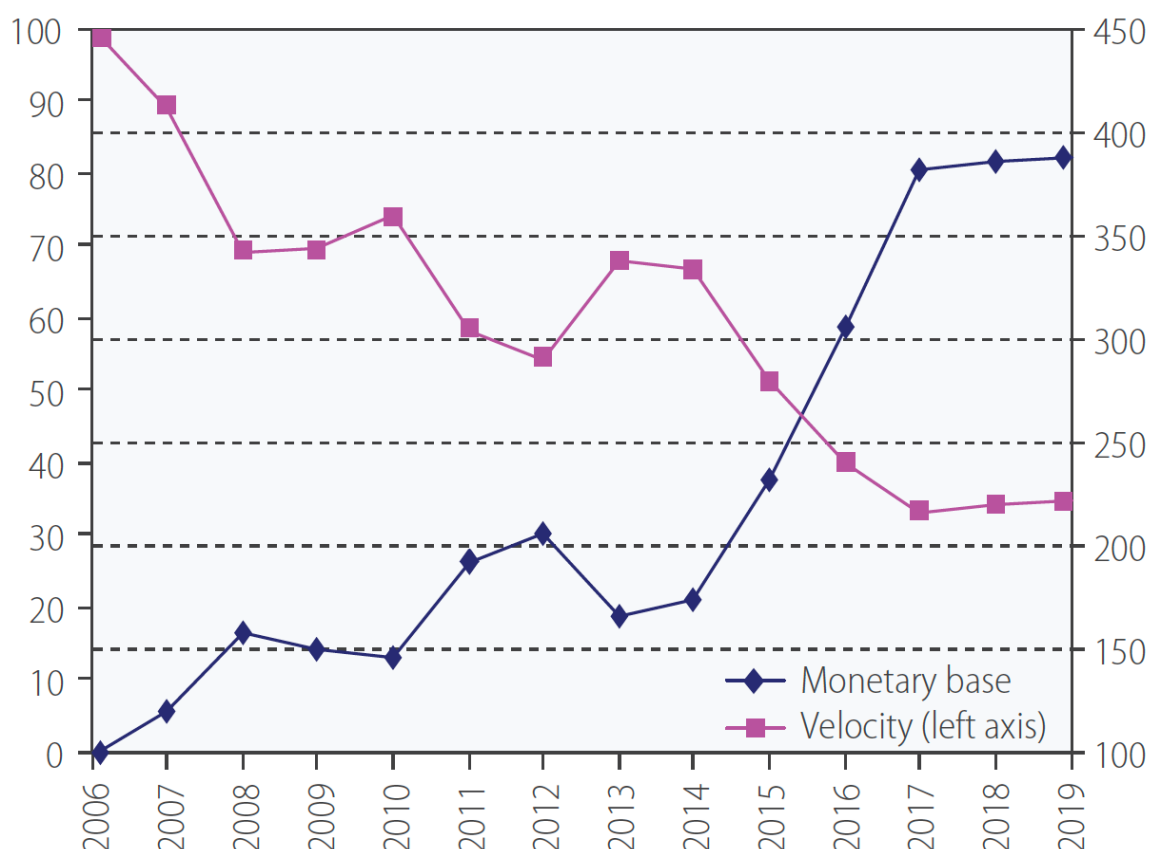


Source: FRED (2021)

In the image above, the annual change (in percent) of the ECB's interest rate is shown on the left axis, and the annual change of the Eurozone's GDP (in percent) is shown on the right axis. Interest rates have been lowered towards zero in 2009, and are negative today. While immediately after lowering the interest rates an effect is noticeable in the change in economic growth, this effect seems to fade away in the years afterwards.

The image below shows the growth of the monetary base in the Eurozone (money supply) on the right axis, and the velocity of that monetary base on the left axis (indexed at 100 in 2006). It can be noted that the money supply has been increasing sharply from 2014 onwards (start QE), while the velocity of the monetary base has been decreasing in the years after the implementation of QE. A general trend of decline in the velocity of the monetary base is also notable, as well as a general trend of an increasing monetary base. Furthermore, it seems that if the monetary base increases the velocity of it decreases accordingly, indicating a negative correlation.

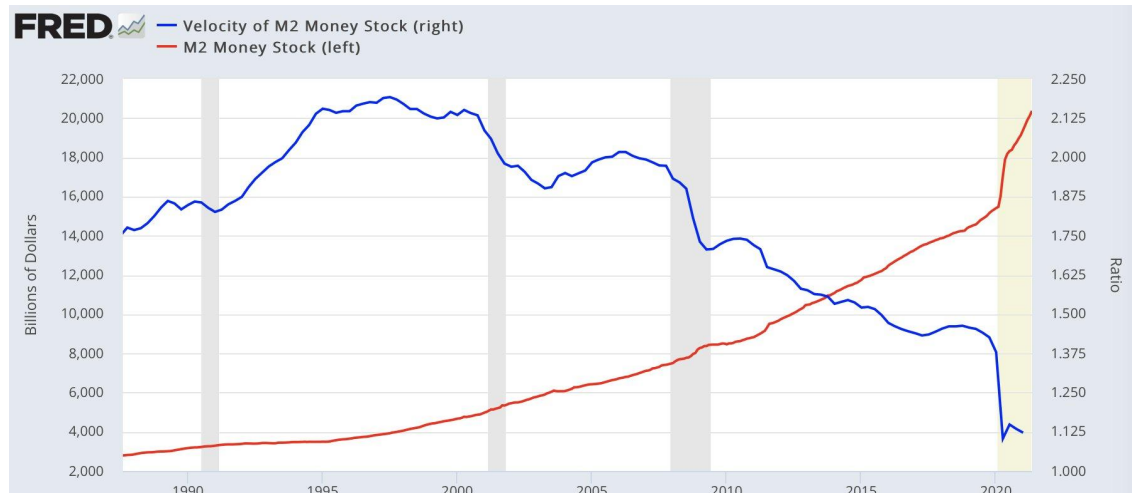
Figure 17



Source: UN (2020)

In the image below, the growth of the money supply in the United States is shown on the left axis while the velocity of that money supply is shown on the right axis. Just like the image above illustrated the relation between the growth and the velocity of the money supply in the Eurozone, the same trend appears in the United States. When the money supply grows, the velocity of the money supply decreases. In periods of big increases in the money supply, like during the covid pandemic in 2020, the velocity of the money supply decreases even faster.

Figure 18



Source: FRED (2021)

Figure 19

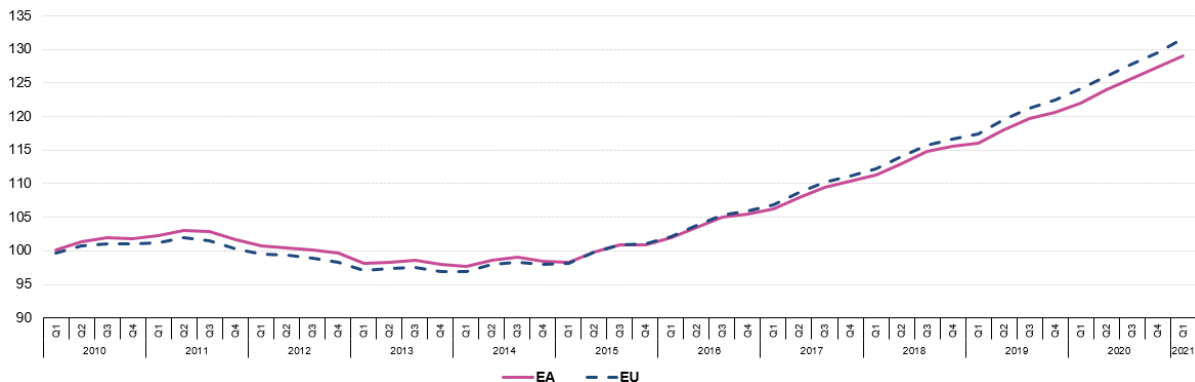


Source: Lohman Econometrics

The image above shows the global stock market capitalization as a percentage of GDP on the left axis, and the combined balance sheets of major global central banks as a percentage of GDP (Fed, ECB, Bank of England, Bank of Japan and the Swiss National Bank). Global stock market capitalization basically is the total amount of value in stocks, expressed in dollars. During the period between 2009 and 2019, the increases in major central bank balance sheets as percentage of GDP correlates with the growth of global market capitalization as percentage of GDP.

Figure 20

**House Prices – Euro area and EU – Index levels (2015 = 100),
2010Q1-2021Q1**



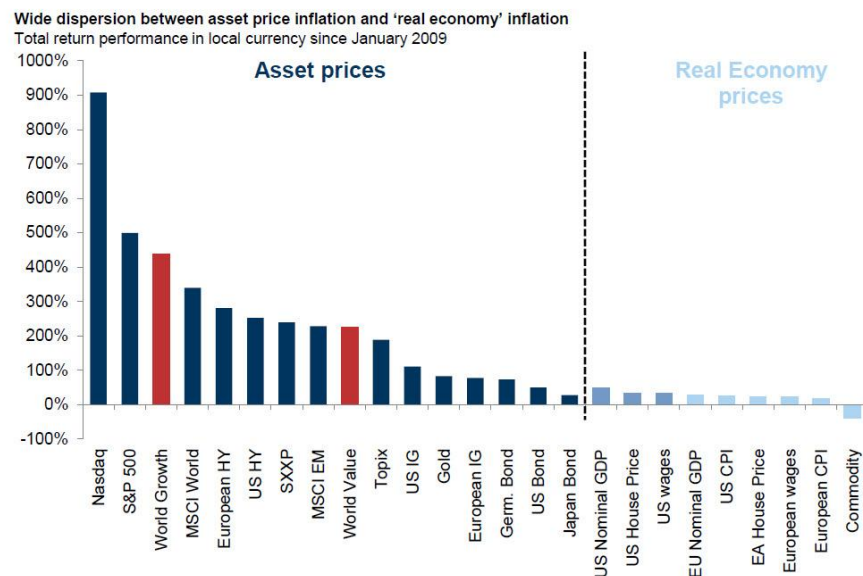
Source: Eurostat (online data code: prc_hpi_q)

eurostat

Source: Eurostat

In figure 20 the quarterly growth of housing prices is shown (indexed at 100 in 2015), for both the Eurozone as the European Union. At the end of 2014, a steady increase in housing prices can be noted, while housing prices were fairly stable in the years before 2014.

Figure 21

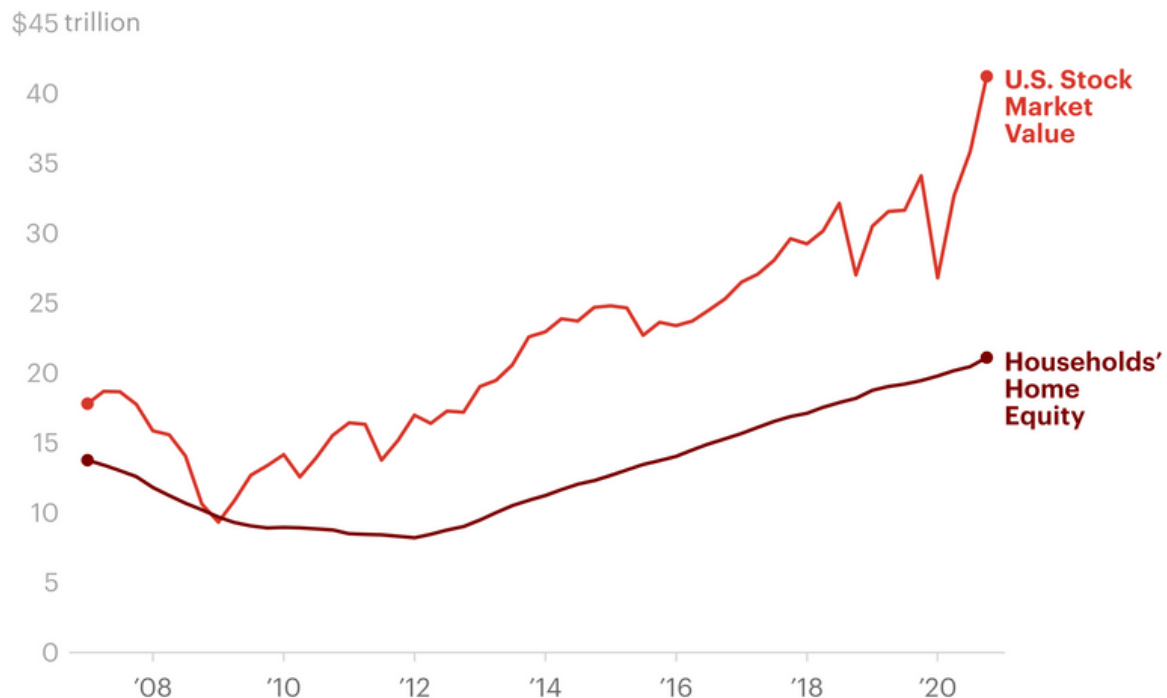


Source: Goldman Sachs (2020)

In the image above, the total return performance of assets and 'real economic' measures since 2009 are shown. It shows high levels of asset price inflation versus lower levels of inflation of real economic prices. The asset prices displayed in the figure are varying from U.S. based stock markets, to European or Japanese markets. What stands out is the general trend of rising asset prices, that exceeds the rise in real economy prices.

Figure X shows how stock market equity has outperformed home equity in the United States, again demonstrating that stock market equity grows faster than home equity during periods of asset price inflation.

Figure 22



Source: Sloan & Podkul (2021)

Figure 23

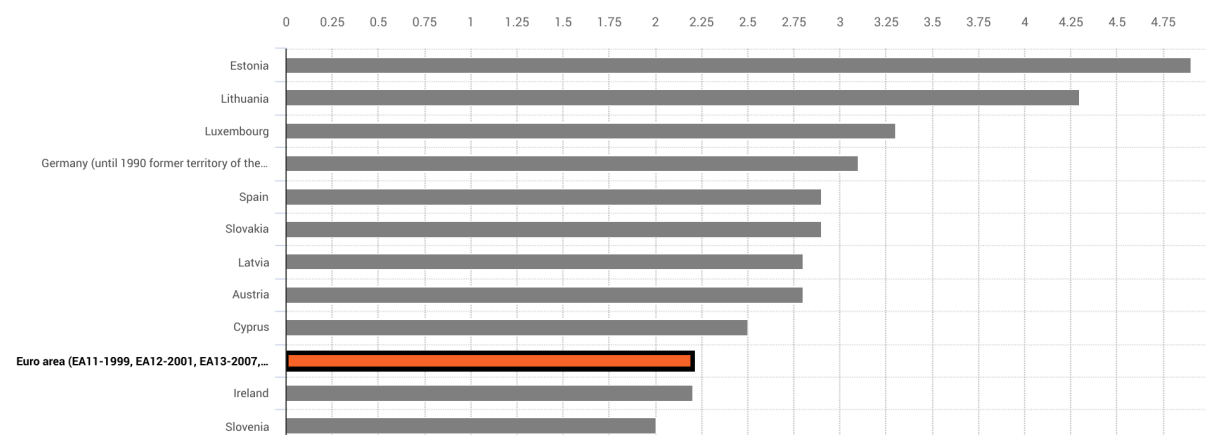


Source: Tradingeconomics.com (2021)

The image above shows the consumer price inflation rate during the last decade in the United States. With the inflation rate currently approaching 6%, prices are rising quickly and money is becoming less valuable. In the image below, the monthly data of annual inflation rates for the Eurozone is shown, together with inflation rates of all member states of the Eurozone that currently exceed the mandate of the ECB. In more than half of all countries in the Eurozone, the 'close, but below 2%' is not being met, and for the Eurozone as a whole

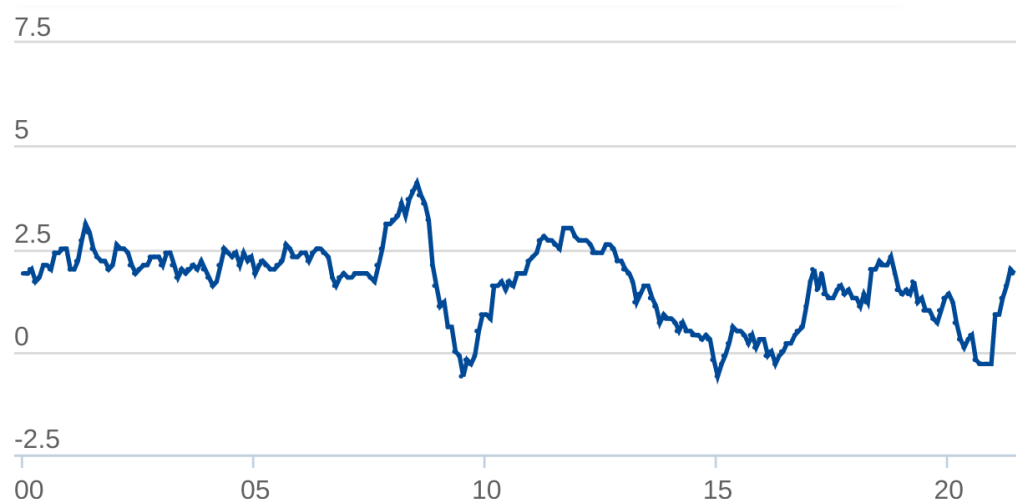
the inflation rate is exceeding 2%. Moreover, when looking at image X, the trend is recently going upward for the Eurozone as a whole.

Figure 24



Source: Eurostat (2021)

Figure 25



Source: Eurostat (2021)

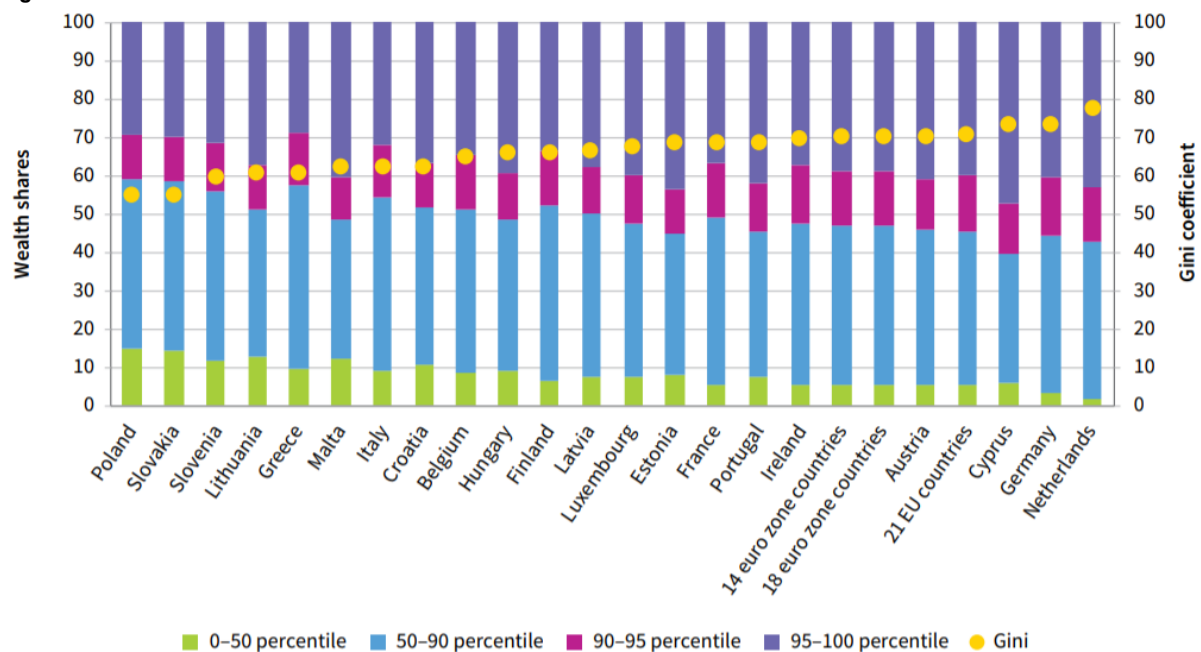
In table 1, the change between 2014 and 2017 in the share of total assets held per wealth quintile is shown. The least wealthy quintile didn't see their total share of assets rise, and the second and third quintile saw a decrease in their total share of assets. The wealthiest quintile saw an increase in their total share of assets.

Table 1: Shares of total assets held across the total assets distribution in Eurozone, in percent

	2014	2017	Change
0-20%	0,3	0,3	0,00%
20-40%	3	2,8	-6,67%
40-60%	10,7	10,2	-4,67%
60-80%	20,4	20,4	0,00%
80-100%	65,6	66,2	0,91%

Source: HFCS ECB

Figure 26

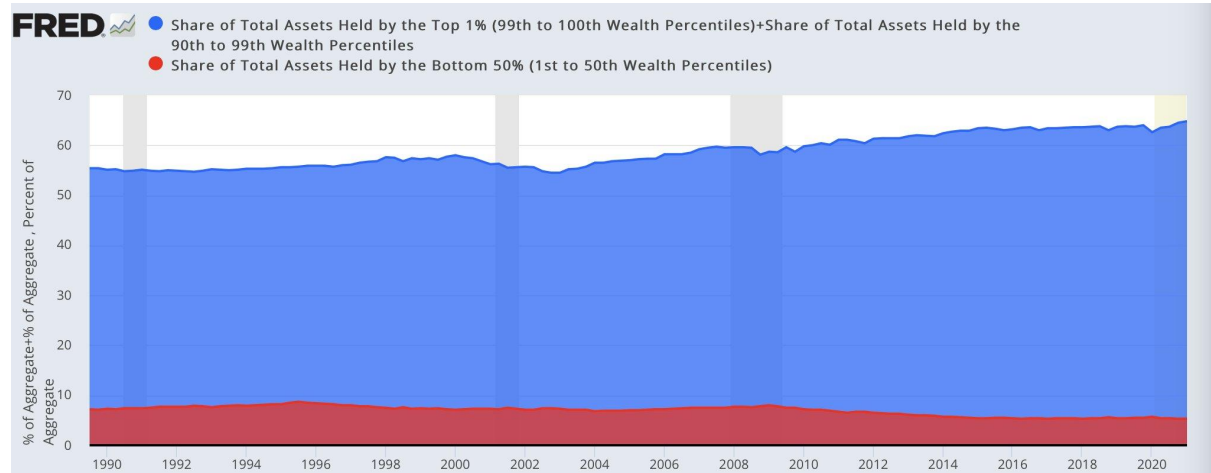


Source: Eurofound (2021)

This image illustrates how wealth is distributed in European countries and in the Eurozone. The Gini coefficient for net wealth inequality is also given, which was around 0.7 in 2017 for the Eurozone. Besides differences between individual countries, some notable observations can be made. Roughly speaking, in all countries the 0-50 percentile and 50-90 percentile combined own around 50 % of the financial wealth in a country. The 90-95 percentile and the 95-100 percentile combined usually own the other 50% of net wealth in the Eurozone. This demonstrates that financial wealth is unequally distributed across European countries, but also in the Eurozone as a whole.

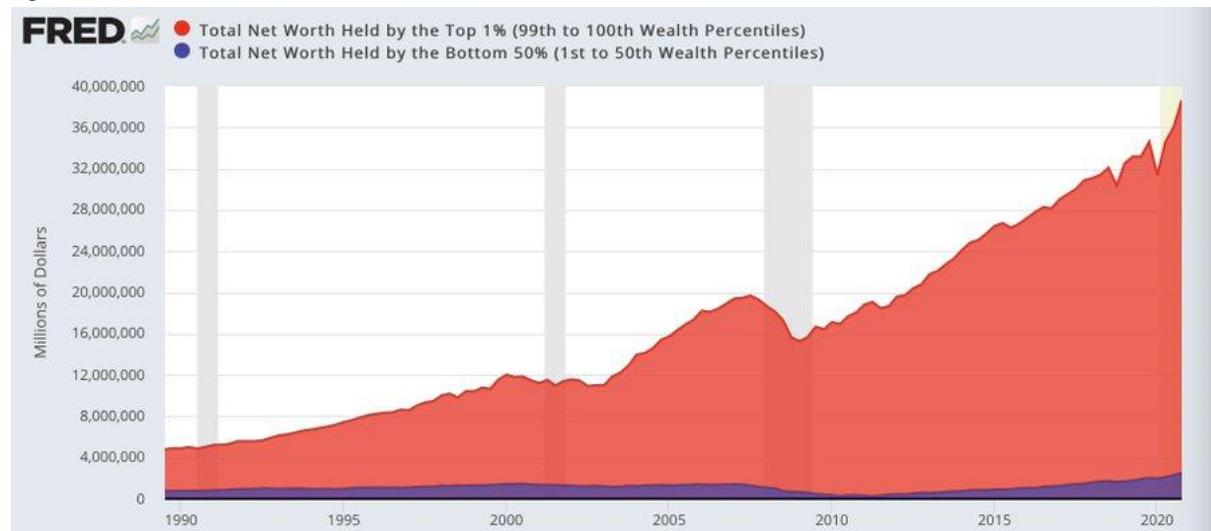
In the images below, the distribution of wealth is shown for the United States. In figure 27, the share of total assets held by the top 10% is shown in blue, and the share of total assets held by the bottom 50% is shown in red. The bottom 50% never own more than 10% of assets, while the share of total assets held by the top 10% has grown over 60%. Figure 28 shows the development of total net worth by the top 1% against the development of total net worth held by the bottom 50%. After a short decline in total net worth during the Great Financial Crisis in 2008, total net worth by the top 1% has increased significantly as it more than doubled. During this period, the Federal Reserve has implemented QE policy.

Figure 27



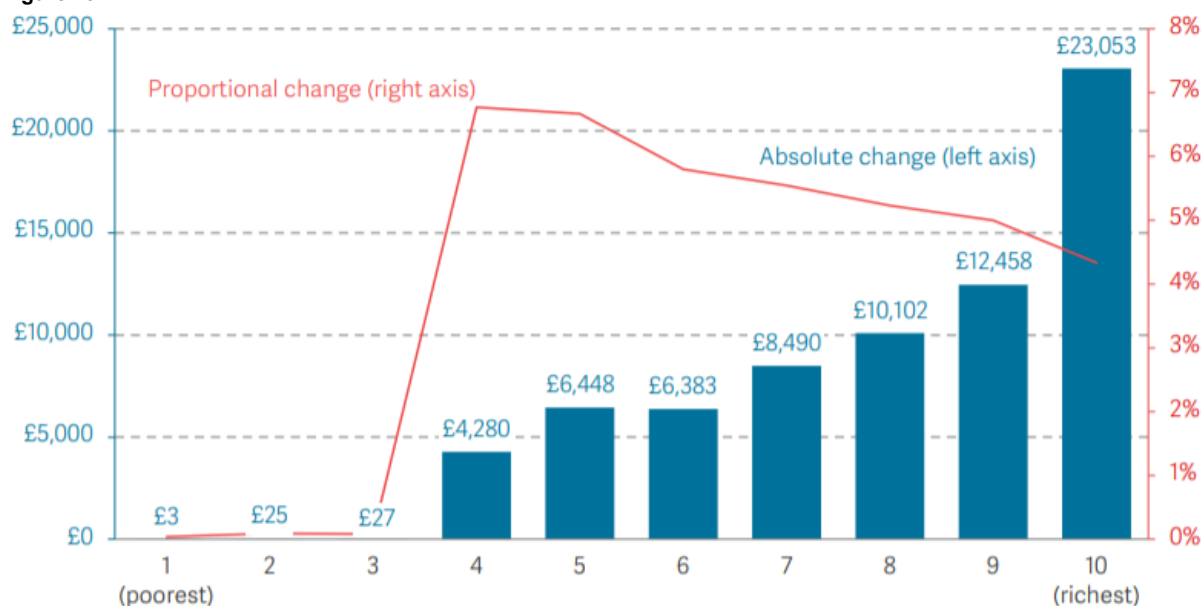
Source: FRED (2021)

Figure 28



Source: FRED (2021)

Figure 29

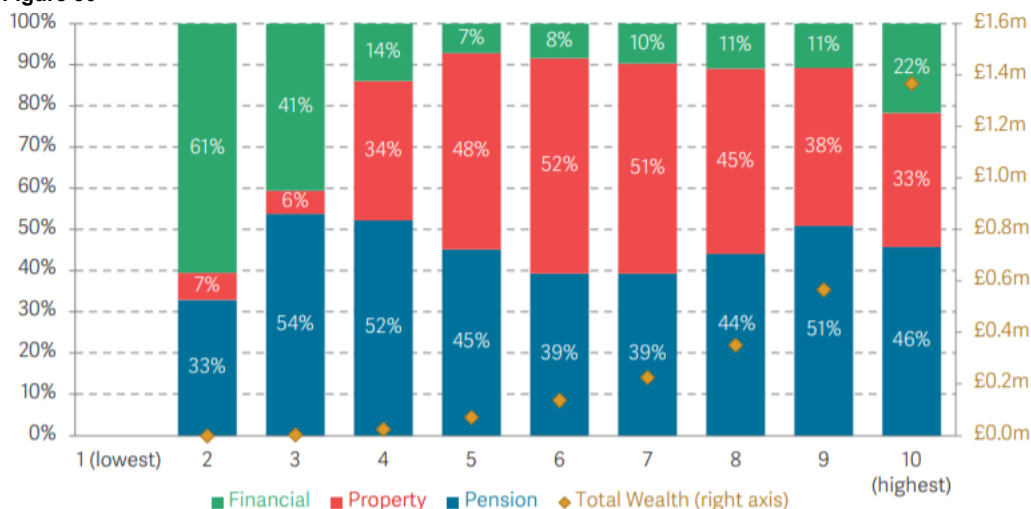


Source: Leslie & Shah (2021)

In this image, the median change in family wealth per adult as a result of asset price changes since the beginning of the covid pandemic is shown, by income decile in Great Britain. What stands out, is that the highest income decile (richest class), has benefited greatly in terms of changes in wealth. Middle class families have seen their wealth increase as well, although much less than the richest decile. The poorest families in Great Britain have barely benefited during this period. This shows that only the richest greatly profit from rising asset prices, while the lowest income deciles reap no benefits from inflation of asset prices. The gap only continues to grow.

In image X below, the composition asset portfolios of households in Great Britain can be seen. Property wealth is the most valuable asset for middle-wealth households. For the least wealthiest deciles, households don't own property and mostly own financial assets (deposits) and pension allowances. Just as in the Eurozone and the United States, the bottom 50% don't own more than 10% of total wealth.

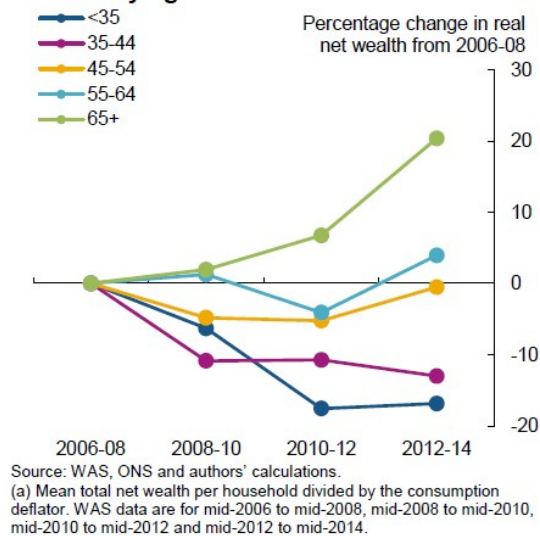
Figure 30



Source: Leslie & Shah (2021)

Figure 31

Chart 10: Change in real net wealth from 2006-08 by age

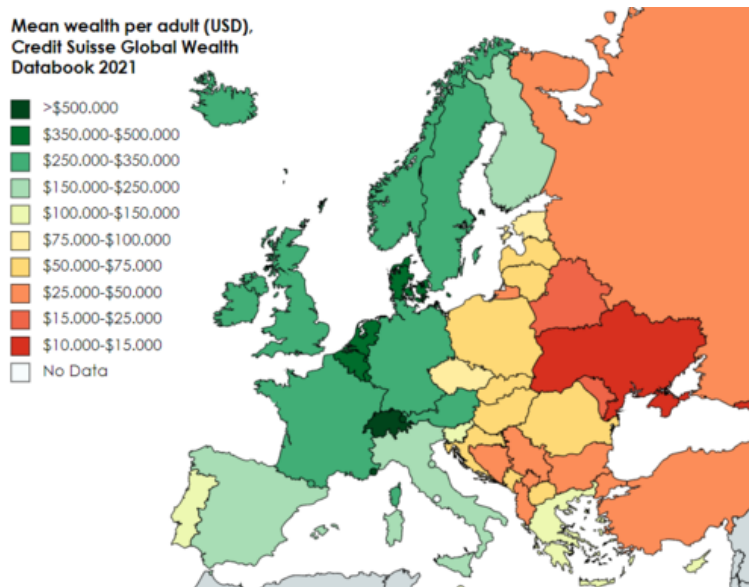


Source: Bikas (n.d.)

This image shows the change in real net wealth from 2006 to 2014 in Great Britain. This was the period when the Bank of England adopted QE policy. It can be seen that only the age groups of 55-64 and 65+ have seen their net wealth increase during this period. The younger the age group, the more they have seen their net wealth decrease.

The map below shows the mean wealth per adult in 2021 (in US dollars). There is a clear distinction between eastern and western European countries in terms of mean wealth per adult. The mean wealth of adults in Eastern European countries is much less than in the west of Europe.

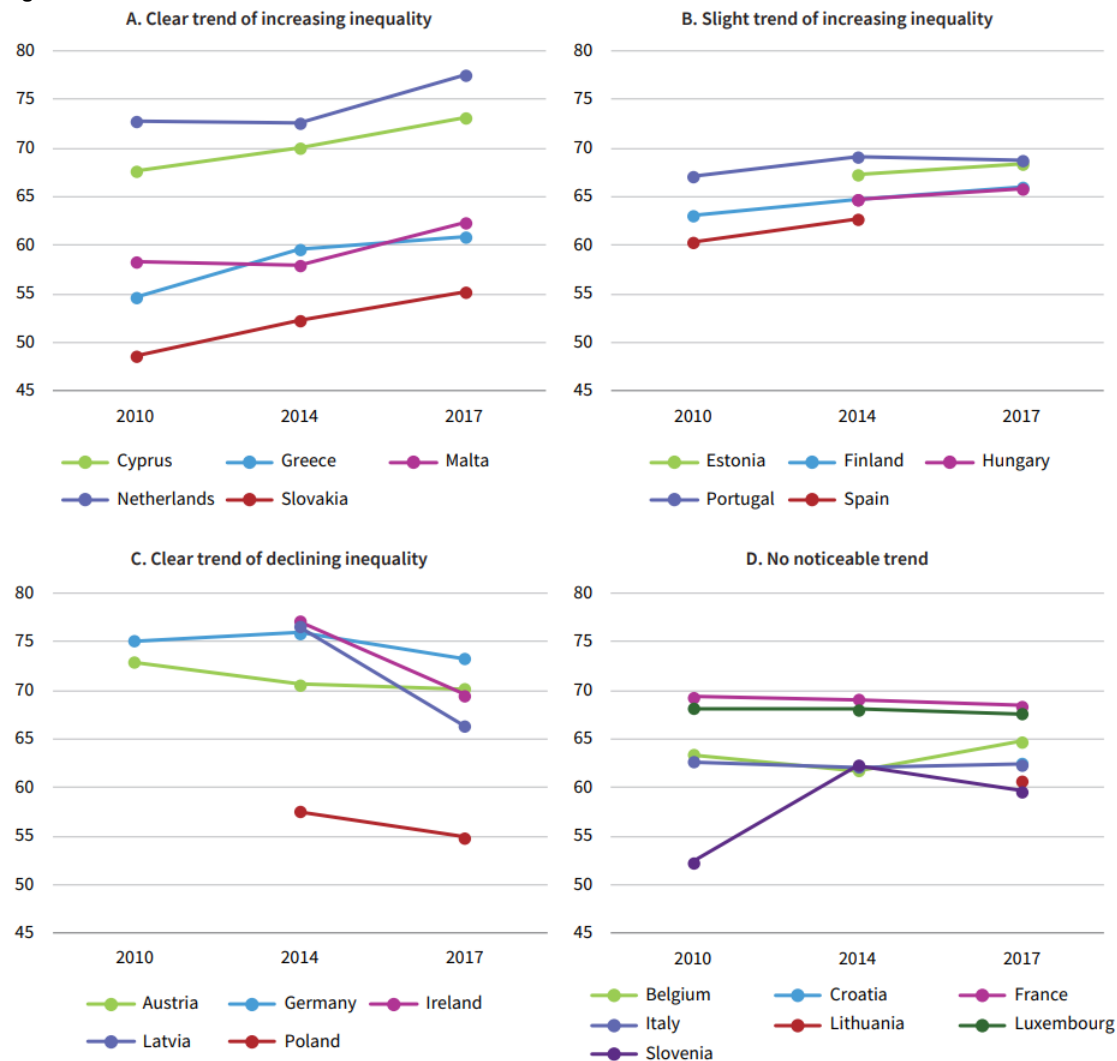
Figure 32



Source: Credit Suisse (2021)

In the image below, changes in net wealth inequality for a selection of European countries are shown. Measured by changes in the Gini coefficient, several trends can be noted. In some countries a clear trend of increasing wealth inequality is noticeable, and in some countries there is a clear trend of decreasing wealth inequality. In other cases no significant increases or decreases can be noticed. The different trends across different countries in the Eurozone demonstrate the variance between member states.

Figure 33



Source: Eurofound (2021)

The trend of increasing wealth inequality has started again from 1970, as figure X demonstrates. In both the United States as in Europe, the top 1% and top 10% of wealthiest percentiles have been gaining more wealth.

Discussion

Since the lowering of interest rates and the implementation of QE policy by the ECB, their balance sheet has massively increased. The increase of its balance sheet, currently at 75% of the Eurozone's GDP, has led to a corresponding rise in the broad money supply. The principal aim of QE policy has been to boost inflation to levels near 2% and to stimulate economic growth, based on the principle of trickle down economics. When analyzing the annual changes in real GDP growth in the Eurozone, no significant impact of QE policy can be noted. Real GDP growth seems unaffected by the large stimulating efforts of the ECB. Lowering interest rates has shown a limited effect, with a brief response in economic growth immediately after lowering those rates. After a while, the impact seems to fade away. This corresponds with findings of BIS researchers, who concluded that *'early asset purchase programmes had significant positive macroeconomic effects, while those of the subsequent ones were weaker and in part not significantly different from zero'*.

Moreover, the increase in the broad money supply does not result in a higher velocity of the money supply. On the contrary, when the monetary base increases the velocity of that monetary base declines, both in the Eurozone as in the United States. This implies that money is circulating less in the economy, pointing towards low economic growth and declining investments. Also, when the velocity of the money supply is decreasing while the supply is growing, more money remains in the hands of fewer businesses and individuals which further increases the (already existent) unequal distribution of wealth. This opposes the view of the former president of the Fed Ben Bernanke, and New Keynesian Theorists, who claim that QE and lower interest rates indirectly spur investments that will trickle down into the economy. According to them, the increase in financial asset prices can increase demand via wealth effects, stimulating the wealthy to spend more. But as the data suggests, added with a case study that shows that the wealthiest 10% in the Eurozone have only spent 6 cents of every euro of wealth they've gained, this theory is not grounded in reality.

Furthermore, the data clearly shows asset price inflation in the form of rising housing prices and rising stock market prices. As figure 19 suggests, the prices of stocks have been rising accordingly with the increase of balance sheets of major global central banks. Furthermore, figure 20 and 21 also suggest the inflation of asset prices. This can be attributed to the increase in the broad money supply, fueled by QE programmes of central banks around the world. As table 1 has illustrated for the Eurozone, and figure 27 for the United States, the wealthiest groups in society own the biggest share of all assets. When asset prices are increasing, it is no surprise that the wealthiest groups in society benefit the most from this. It also becomes more difficult for lower classes to buy financial assets when prices are rising. In the earlier mentioned study of researchers of the BIS, an important conclusion is drawn that supports this finding: *there is a significant and persistent positive impact of asset purchase shocks on stock prices. This suggests that central bank asset purchases may have been a driving factor of rising stock market valuations in recent years.*

Inflation of asset prices is clearly illustrated, and described as a consequence of QE programmes. However, the objective of the ECB is to maintain price stability measured by the HICP inflation rate, and not to inflate asset prices. The HICP inflation rate has not been reaching the target of 'close, but below 2%' for years. More recently, consumer price inflation in the United States is increasing significantly to almost 6%, and in many Eurozone countries levels of inflation of above 2% are being measured. If this trend is continuing, the ECB is failing to achieve its objective. It seems very difficult for the ECB to achieve the desired,

stable levels of inflation. And with such heavy measures like QE and lowering interest rates, it can be seriously questioned whether the ECB's monetary policy is proportional and successful.

Domanski et.al and Adam & Tzamourai have concluded in their studies that rising equity prices are a driving force of increasing wealth inequality. Adam & Tzamourai added that rising house prices have a decreasing impact on wealth inequality. This is in line with the ECB's argumentation, claiming that rising house prices as a consequence of QE have lowered wealth inequality in the Eurozone. However, Zucman has contested this by saying that *"higher housing prices tend to increase the wealth share of the middle class, they also make it harder for the poor to become property owners, thus exacerbating inequality between the poor (the bottom 50%) and the middle class (the next 40%)"*. As figure 30 also shows, property wealth is usually the biggest share of the middle class' wealth. But for the least wealthiest class, owning a house is not very common. So when housing prices are rising, it becomes increasingly difficult for the least wealthy in society to become a homeowner, and accumulate wealth for themselves. On top of that, the least wealthiest households tend to be renters, who are affected more by low interest rates (or they don't benefit as much as homeowners). Furthermore, demonstrated by figure 22, the value of financial assets has grown more than the value of house prices. This indicates that there is a bigger benefit for those who own financial assets, compared to households who only have one source of equity in the form of an owned house.

Greenwald et al. add to this by concluding that *"most households have been made worse off by the decline in interest rates, ..., the costs have fallen disproportionately on young and low-wealth households"*. Figure 31 also shows how younger people are affected differently from older people, which is largely due to differences in homeownership. Karen Petrou also describes that low interest rates negatively affect low income households, as they can't accumulate savings and they also can't receive low interest loans (which are more accessible for more wealthy households). Thus, low interest rates and rising house prices are beneficial for the middle class and wealthiest in society, while it becomes more and more difficult for the least wealthy in society to become a homeowner and accumulate wealth themselves. This increases the wealth gap. Figure 29 corroborates this finding, illustrating that the wealthiest class have benefitted the most from rising asset prices in Great Britain. Middle class households have also benefited from this, while the least wealthy households have seen no wealth gains in this period.

Finally, within the Eurozone there are large differences in wealth, not only within countries but also between countries. The differences in mean wealth per country can be seen in figure 32, showing the unequal distribution of wealth between countries. And while in some countries wealth inequality is decreasing, in many countries there is still increasing wealth inequality, as figure 33 demonstrates. The single monetary policy of the ECB is not helpful for such a variety of countries, as the problems of the sovereign debt crisis have already highlighted. On the contrary, the different developments in varying Eurozone countries can further exacerbate problems that are already existent in Europe.

Conclusion

The aim of this research has been to prove the claim that Quantitative Easing has not been an effective monetary policy instrument of the ECB and that it has increased wealth inequality as a side effect in the Eurozone.

In order to prove this claim, first an assessment of the (historical) context in which the ECB operates has been made, together with a description of indirect and direct causes of QE policy. Second, QE policy itself has been described, followed by an assessment of economic theories and concepts of relevance for a better understanding of the consequences of QE policy. After that, the relation between QE and (increasing) wealth inequality has been discussed within the context of theoretical and empirical literature.

Thereafter, a collection of secondary data has been presented and discussed to prove that QE policy has not been an effective tool and that it increases wealth inequality. As the data suggests, no significant increases have been made in the economic output measured by real GDP growth. Also, the ECB has not been reaching its objective of maintaining price stability for years, as levels of inflation have been too low, or at risk of becoming too high. Moreover, before QE was part of the ECB's monetary policy, periods of economic growth were also realized. This shows that QE is not the only way to achieve economic growth or stable levels of inflation.

On top of that, the data has shown that the principle of trickle down economics is highly doubtful. The velocity of the massively increased money supply is slowing down, which indicates declining investments and less circulation of money. This money lands and remains increasingly in the hands of the wealthiest individuals and businesses in society, not only in the Eurozone but also in the United States.

As a result of QE, both house prices and financial asset prices have grown significantly. The inflation of asset prices is most beneficial for the wealthiest in society, and again, not only in the Eurozone but elsewhere too. QE leads to asset price inflation and creates bubbles on the housing market and financial markets. These bubbles create a new risk, because when the bubble bursts this will have a destabilizing impact on everyone in society.

The rich get richer while doing nothing. As the wealthiest households in the Eurozone see their share of assets increase, they also see their wealth grow. Meanwhile, young people are struggling to buy houses, finding themselves unable to pay the high prices for a home. At the same time, they can't accumulate wealth in the form of home equity. The least wealthy households in society barely benefit from QE policy in combination with negative or low interest rates. They can't accumulate savings with negative interest rates, and when consumer price inflation becomes too high they have a bigger problem to pay for their daily needs. All of this further exacerbates already existent trends of rising wealth inequality in the Eurozone. The negative side effects are evident, although it is difficult to find one clear measure that immediately proves this.

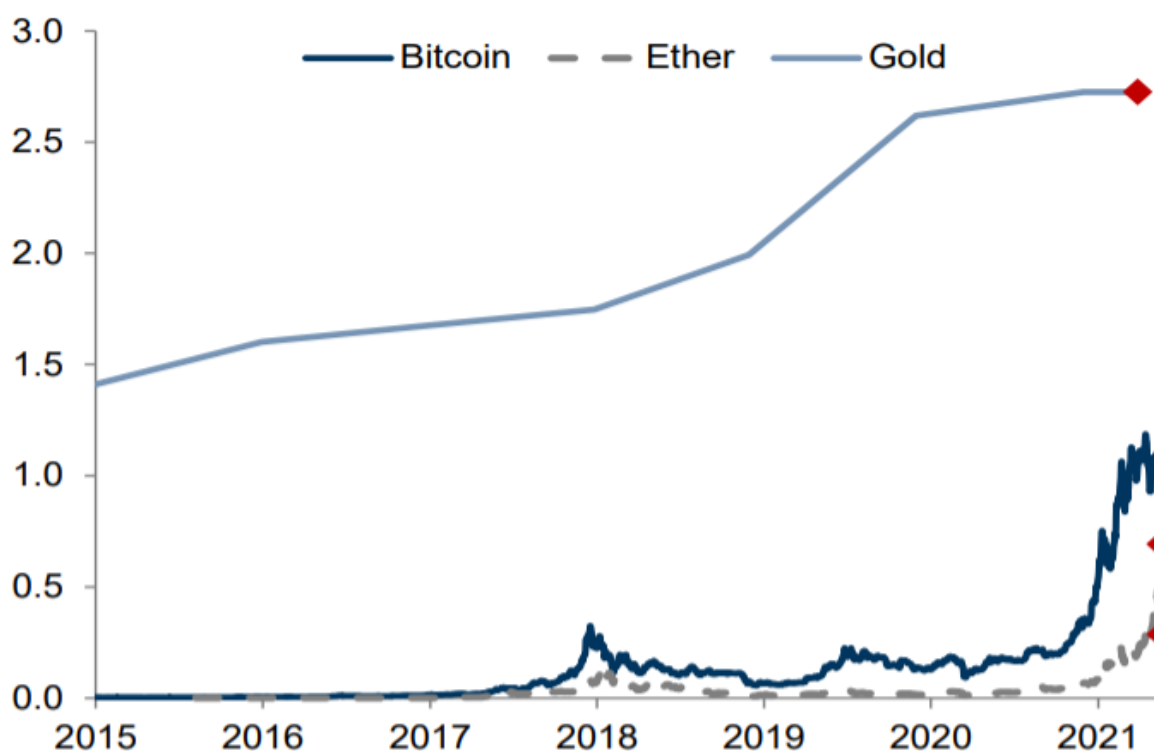
Although hyperinflation is certainly not the case yet in Europe, the ECB needs to seriously consider the possibility of it happening. As this research has proven, the effectiveness of QE policy is highly doubtful while it further increases wealth inequality which has a destabilizing impact on society. Too much wealth inequality in combination with high and unsustainable levels of inflation can lead to serious social unrest, just like the case of hyperinflation in the Weimar Republic. Printing money is not without consequences, especially in a one-size-fits-all system like the Eurozone.

Suggestions for further research

There are many suggestions to make for further research that relate to the main subject of this research. Without describing every possible option for future studies, I would like to highlight one. It has been mentioned very briefly in an earlier part of this research, but Bitcoin and other cryptocurrencies have been emerging as a new kind of financial asset class. Bitcoin is fundamentally different from other financial assets like stocks, bonds or gold. In the aftermath of the Global Financial Crisis in 2008, Bitcoin was 'created' by Satoshi Nakamoto, someone who is unidentified up until this day. One of the main reasons why Bitcoin was created, was to create a decentralized form of finance without influences of central banks. In the early years of Bitcoin, not much value was generated and it took a while before that would actually happen. But as the image below demonstrates, the global market capitalization of Bitcoin has exceeded 1 trillion for the first time in december 2020. The image also shows how the market capitalization of Ethereum, another cryptocurrency, has developed over time compared to private investment in gold.

Figure 34

Crypto market cap. vs private investment gold stock, \$tn

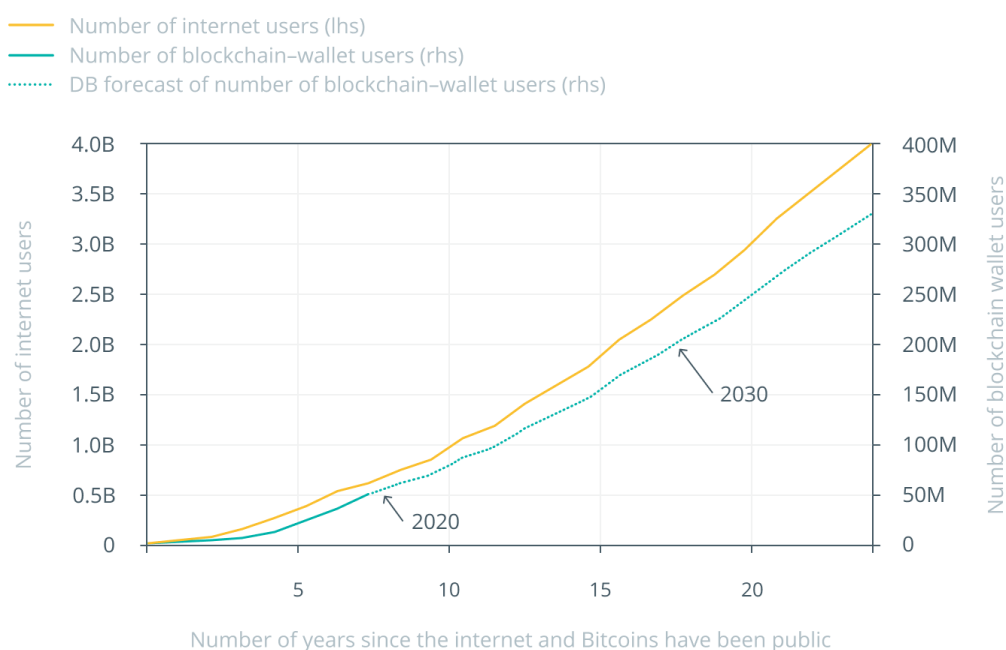


Source: Goldman Sachs (2021)

Bitcoin is becoming a serious asset class, as major global financial institutions have been acknowledging it as such. Goldman Sachs has published a report in which it discusses the role of Bitcoin as an asset class. Zach Pandl argues that institutional investors should treat bitcoin as a macro asset, akin to gold, going through a social adoption phase. In the image below, the adoption rate of Bitcoin can be seen, as compared to the adoption rate of the internet in the years after implementation. A comparable trend of growth can be observed,

although in absolute terms there haven't been as many blockchain-wallet (necessary precondition for using Bitcoin) users compared to internet users.

Figure 35



Source: Klumov (2020)

However, there are many recent developments surrounding Bitcoin that deserve attention. For instance, El Salvador has been the first country in the world to make Bitcoin a legal tender. This means that El Salvador is no longer only relying on the Fed (previously the U.S. dollar was the only legal tender in El Salvador) for its monetary policy. There are other countries that discover the possibilities of adopting Bitcoin as a legal tender as well. So Bitcoin is not only a new financial asset class, used by individuals and businesses as a store of value during times of inflation and recessions, but can also be adopted as a decentralized system of payment (the initial goal of Bitcoin).

As this research has proven, asset price inflation occurs as a consequence of QE. Since Bitcoin can be considered as an asset class, wealthier people have more possibilities to invest in Bitcoin as an asset. People who are struggling to make their ends meet, have fewer possibilities to invest in Bitcoin. This could create an unequal distribution of Bitcoin among different wealth classes globally. However, the adoption of Bitcoin as a legal tender in El Salvador has proven that Bitcoin offers an alternative for the centralized financial domination of the United States, ECB, IMF, World Bank and other prominent institutions. El Salvadorians working abroad can now send home remittances without paying transfer fees, which is a huge part of their income. This could result in more independence for small nations such as El Salvador. Furthermore, they don't have to adhere to the monetary policy of the Fed alone anymore. All in all, Bitcoin has the potential to have both an increasing and decreasing impact on economic inequality worldwide.

These developments alone are more than enough reason to further explore the role of Bitcoin in relation to monetary policy and wealth inequality. Especially in a time where central banks are investigating the possibilities of Central Bank Digital Currencies, it is highly relevant to have a lively debate about these subjects. This debate should not limit itself to academia, but has to take place in the media and politics as well.

Reflection & epilogue

This research has made an attempt to prove a certain claim. A range of relevant literature and a collection of secondary data sources have been reviewed and discussed, in order to prove this claim. However, wealth inequality and monetary policy are very broad topics with a lot of different measures and data sources to describe them. This research hasn't used its own data sources or didn't create an economic model for actual empirical findings. This lowers the reliability of the research. Furthermore, the variety between countries in the Eurozone made it difficult to collect a coherent set of data. It is hard to find data sources on different topics that only cover the Eurozone. Collecting data for a longer time, or through different sources could also improve the reliability of this research. On the other hand, due to the limited amount of time and resources, choices had to be made to conduct this research. Therefore, it has been chosen to use secondary data sources.

As for the process of this research, I can say this has been quite the experience. At the start of this research, I only had knowledge of this subject from what I had read in newspapers and online. Writing a thesis on such a subject can be pretty overwhelming from time to time, and I have had to learn a lot of new things. I have read hundreds of articles, watched multiple movies and listened to numerous podcasts in an attempt to get a good understanding of this subject. As time passed by, I became more and more enthusiastic about the main subject of the thesis. However, since it is such a widespread topic, it gets really hard to maintain a clear focus and research strategy. My parents and my girlfriend have helped me enormously by trying to steer me in the right direction, by narrowing down my focus. This has helped me a lot, especially in times of a pandemic where visiting the University was not very common. The lack of discussion with fellow students and the absence of lectures and working groups have made more impact than I would have thought beforehand. Being at home every day and seeing the same room has made the process of writing quite difficult for me. Ultimately, I hope that the final result is not disappointing and reflects the effort that I have put in.

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