



DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT
ECONOMIC AND SCIENTIFIC POLICY **A**

Economic and Monetary Affairs

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Internal Market and Consumer Protection

**ECB Quantitative Easing (QE):
What are the Side Effects?**

**Monetary Dialogue
June 2015**

COMPILATION OF NOTES



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POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

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Monetary Dialogue 15 June 2015

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Abstract

The notes in this compilation analyse the potential side effects of the ECB programme of Quantitative Easing (QE) by focusing on the channels through which the expanded asset purchase programme may affect the distribution of income and wealth. The notes also discuss the potential financial/fiscal risks related to QE through its effects on the allocation of consumption and savings, in the context of an aging population.

The notes by key monetary experts have been requested by the Committee on Economic and Monetary Affairs (ECON) of the European Parliament as an input for the June 2015 session of the Monetary Dialogue between the Members of the ECON Committee and the President of the ECB.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.

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INTRODUCTION

The European Central bank (ECB) announced on 22 January 2015 a comprehensive programme of Quantitative Easing (QE)¹. The QE programme, which includes the purchase of government bonds on the secondary market, is put into practice to combat low inflation, keeping interest rates low, thereby fostering risk taking and, ultimately, reinvigorating investment and growth.

However, the transmission channels through which monetary policy operates may lead to unwelcome side effects of QE². There are concerns that that ultra-expansionary monetary policy (QE) may favour financial income over labour income and/or rise profits more than wages, thereby potentially increasing income and wealth inequality. On the other hand, as low income groups generally experience large drops in income during business cycle contractions, implementing QE could actually reduce inequality. Similarly, low interest rates or higher inflation stemming from QE tend to benefit low net worth households (borrowers) over high net worth households (savers), again contributing to reduce inequality. But as very low interest rates affect the allocation of consumption and savings, they may also exacerbate financial and/or fiscal risks, particularly in the context of an aging population.

The notes in this compilation analyse the potential side effects of QE by focusing on the channels through which monetary policy may affect the distribution of income and wealth. The notes also discuss the potential financial/fiscal risks related to QE through its effects on the allocation of consumption and savings, in the context of an aging population. The main conclusions and the policy recommendations are summarised below

The notes by key monetary experts have been requested by the Committee on Economic and Monetary Affairs (ECON) of the European Parliament as an input for the June 2015 session of the Monetary Dialogue between the Members of the ECON Committee and the President of the ECB.

Grégory Claeys *et al.* (Bruegel). Low interest rates, asset purchases and other accommodative monetary policy measures tend to increase asset prices and thereby benefit the wealthier segments of society at least in the short-term, given that asset holdings are mainly concentrated among richest households. But such policies also support employment, economic activity, incomes and inflation, thereby helping the poor and middle-class, whose income is more dependent on employment and who tend to spend a large share of their income on debt service. Monetary policy should focus on its mandate, while fiscal and social policies should address widening inequalities by revising the national social redistribution systems for improved efficiency, intergenerational equity and fair burden sharing between the wealthy and poor.

Kerstin Bernoth *et al.* (DIW). The introduction of the ECB's most recent extended asset purchase program has raised concerns with respect to its effects on the income and wealth distribution in the euro area. The note reviews evidence about the effects of similar programs in the US, the UK and Japan on interest rates, asset prices, inflation and real economic outcomes against the background of stylized facts of the euro area income and wealth distributions. In the short-run the ECB's purchases are likely to exacerbate any

¹ https://www.ecb.europa.eu/press/pr/date/2015/html/pr150122_1.en.html

² <http://www.bruegel.org/nc/blog/detail/article/1467-the-distributional-effect-of-quantitative-easing/>
<http://blogs.wsj.com/economics/2014/10/19/low-for-long-a-qa-with-boston-feds-rosengren/>
<http://www.voxeu.org/article/monetary-policy-and-inequality-us>
<http://www.ecb.europa.eu/press/key/date/2013/html/sp131111.en.html>

existing income and wealth inequalities; in the long-run, however, if the program will be successful in bringing inflation back to target, promoting economic development and lowering unemployment, its effects on the income and wealth distribution in the euro area are ambiguous, thus justifying the 'benign neglect' of central bankers vis-à-vis distributional aspects of their policies.

Andrew H. Hallett (University of St. Andrews). This note reviews the implications of Quantitative Easing (QE) for the distribution of income and wealth, and for the channels by which it affects the working of an economy. The note starts with a discussion of how QE stimulates an economy through low interest rates, increased liquidity and credit, higher asset prices and increased wealth effects. This raises the obvious concern that asset purchases and liquidity injections will favour the financial firms and owners of capital over labour income: thus high income groups over low income groups, borrowers over savers, current pensioners over future pensioners, non-taxpayers over taxpayers.

The note finds there are a large number of redistribution and inequality mechanisms in play. Income and wealth inequalities are the most obvious, and appear to have been unexpectedly strong. They reflect the principle side-effect of QE, which is the stabilisation of the financial markets (the result of large liquidity injections). There are also important intergenerational transfers by virtue of asset ownership and in the pensions sector. Redistribution of the burden of taxation is comparatively unimportant, but there are interesting bi-products in the form of lower costs of government and reduced trading costs. Spillovers on neighbouring economies are likewise probably benign; and a consideration of the risk of secular stagnation (QE being necessary, but not sufficient to kick start a recovery) brings transmission repair and regional inequalities to the fore with QE acting as a form of "monetary federalism".

Christophe Blot *et al.* (OFCE). The on-going debate about income and wealth inequality has recently hit the sphere of monetary policymaking: some analysts argue that the quantitative easing would benefit the rich at the expense of the poor, whereas some argue the contrary. The note reviews the arguments on both sides, while going back to the relationship between conventional monetary policy and income inequality. An empirical test on the euro area shows that monetary policy has an impact on the unemployment rate, hours worked and the inflation rate. This is interpreted as a positive, though relatively minor, effect of conventional and unconventional monetary policies on equality in the euro area.

Karl Whelan (University of Dublin). The ECB has finally introduced a QE programme. Predictably, the programme has faced many critics. Two criticisms are that the programme risks unleashing high inflation and that it worsens inequality. The paper argues that the perceived inflation threat from QE programmes largely relies on inaccurate macroeconomic theories about the relationship between the monetary base and inflation. In relation to inequality, criticisms of QE have generally ignored the various ways that lower interest rates benefit borrowers, reduces unemployment and boosts wages at the lower end of the income distribution. The available evidence actually suggests these channels dominates and QE reduces inequality. Claims that QE particularly helps banks or generates large commissions for traders are also false.

NOTES

DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

The effects of ultra-loose monetary policies on inequality

Grégory CLAEYS, Zsolt DARVAS,
Álvaro LEANDRO, Thomas WALSH

IN-DEPTH ANALYSIS

Abstract

Low interest rates, asset purchases and other accommodative monetary policy measures tend to increase asset prices and thereby benefit the wealthier segments of society at least in the short-term, given that asset holdings are mainly concentrated among richest households. But such policies also support employment, economic activity, incomes and inflation, thereby helping the poor and middle-class, whose income is more dependent on employment and who tend to spend a large share of their income on debt service. Monetary policy should focus on its mandate, while fiscal and social policies should address widening inequalities by revising the national social redistribution systems for improved efficiency, intergenerational equity and fair burden sharing between the wealthy and poor.

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EXECUTIVE SUMMARY

- Since 2008, most major central banks have implemented various monetary easing measures. Given the macroeconomic situation in advanced economies and in the euro area in particular, these measures were justified and in fact the European Central Bank should have acted earlier. However, some of these measures and the unusual length of the monetary accommodation could have side effects on income and wealth distribution.
- The widening of inequality observed in many advanced countries in recent decades is a long-term trend and primarily the result of deep structural changes. Nevertheless, current monetary policies could amplify that trend, at least in the short-term.
- Monetary policy can increase inequality by increasing asset prices, because assets are mainly held by the richest households. Yet it is difficult to estimate the extent and duration of asset price increases and their direct impact on inequality, and over the long-term, any initial effect could be reversed when monetary policy is tightened.
- Monetary policy can reduce inequality through its positive impacts on the general macroeconomic environment: boosting GDP, raising inflation back to target and supporting employment. Too-low inflation and deep recessions have stronger negative effects on the poorest segment of the population. Adverse economic developments make the repayment of debts more difficult and the debt service/income ratio tend to be higher in the middle and at the lowest end of the income and wealth scales. Low-skilled workers are also much more affected by increased unemployment during recessions.
- Ultimately, the effects of monetary policy on inequality are ambiguous. Irrespective of whether monetary policy increases or reduces inequality and in the short- and long-run, we believe the ECB should focus on its price stability mandate and thereby support the fragile recovery now taking place in the euro area. This is the best way for monetary policy to contribute to the avoidance of an increase in inequality in times of recession.
- Nevertheless, we recommend the ECB to monitor the side effects of its monetary policy measures, including the potential distributional effects.
- It is the job of fiscal and social policies to correct widening inequality, whatever the reason behind it. Revising national tax/benefit systems for improved efficiency, intergenerational equity and fair burden-sharing between the wealthy and poor is the right way to fight inequality.

1. INTRODUCTION

Since 2008, all major central banks have engaged in monetary easing through conventional interest rate cuts, and through unconventional measures, such as asset purchases, long-maturity lending and forward guidance about intended future monetary policy actions. We call these unconventional measures 'ultra-loose monetary policies' (ULMP). Such measures have increased significantly the size, and changed the composition of, the central banks' balance sheets¹. The main reason for these various unconventional policies and low interest rates is that central banks try to set interest rates at, or around the so-called 'natural rate' of interest, a level consistent with low and stable inflation and with an economy near its potential. In the last few years, the too-low and below-target inflation, low inflation expectations, the low level of capital utilisation and the high level of unemployment suggest that the natural rate of interest has been well below the policy rate, which has been constrained by the zero lower bound.

While these various monetary easing measures are justified from a macroeconomic perspective, and in fact the European Central Bank should have adopted expansionary measures much earlier (Claeys et al, 2014), they may create various side effects.

One possible concern is the impact on financial stability. By analysing various theoretical considerations and the current situation of the euro area, we (Claeys and Darvas, 2015) concluded that the risks to financial stability of ultra-loose monetary policy in the euro area could be low. We argued that monetary policy should focus on its primary mandate of area-wide price stability, and other policies should be deployed whenever the financial cycle deviates from the economic cycle or when heterogeneous financial developments in the euro area require financial tightening in some but not all countries. These policies include micro-prudential supervision, macro-prudential oversight, fiscal policy and regulation of sectors that pose risks to financial stability, such as construction.

Another potential concern is the impact of ultra-loose monetary policy on income and wealth distribution. Several observers, such as Cohen (2014), Stiglitz (2015) and Acemoglu and Johnson (2012), have accused central banks of favouring the rich and fuelling the increase in income and wealth inequality. Inequality is a concern from both social and economic perspectives (Piketty, 2014). The long-held view of economists that there exists an inherent trade-off between efficiency and equality (Okun, 1975) has recently come into question, with inequality itself being put forward as the potential cause of the crisis. High level of inequality might urge households to rely on debt financing to maintain living standards, which might have been an important driver of the housing boom in the pre-crisis period in the US, and thereby the consequent bust (Rajan, 2012; Van Treeck, 2014). Ostry et al (2014) claim that greater inequality could reduce the level and duration of periods of growth, while greater inequality can also be linked with greater financial instability (Skott, 2013; Vandemoortele, 2009). For the euro area, Darvas and Wolff (2014) showed that countries with greater inequality tended to have higher household borrowing prior to the crisis, resulting in more subdued consumption growth during the crisis. The resulting high private debt, high unemployment, poverty and more limited access to education undermine long-term growth and social and political stability.

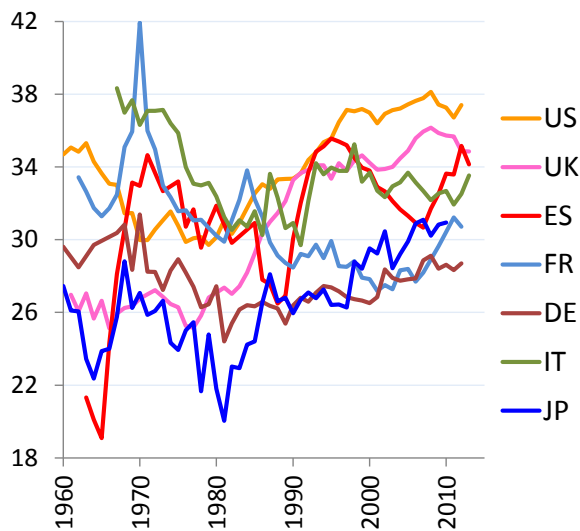
The rise of inequality is mainly seen as a long-term trend resulting from deep structural changes that could be attributed to skill-biased technological change, globalisation, demography, institutional and political changes and in particular changes in fiscal, educational and labour institutions (Piketty, 2014). Using the Gini coefficient and the share of income going to the top 1%, Figure 1 shows that income inequality in major advanced

¹ See Claeys (2014) for an overview of such policies.

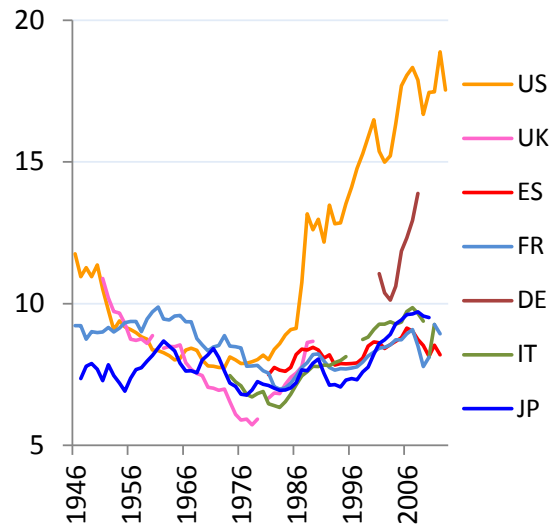
countries declined somewhat after the World War 2 till about the 1970s, when it started to increase in most countries. The figure also shows that there are major differences between countries. For example, Germany is more equal than the United States and the United Kingdom.

Figure 1: Measures of inequality

A: Gini coefficient of income inequality (after taxes and transfers), 1960-2013



B: Share of income going to the 1% (before taxes and transfers), 1946-2012



Source: Standardised World Income Inequality Database

Note: The Gini coefficient ranges from 0 to 100, with 100 indicating complete inequality. It is a function of the surface between the Lorenz curve (which is the cumulative distribution function of the probability distribution of income) and the line of equality.

Source: Top World Incomes Database (<http://topincomes.parisschoolofeconomics.eu/>)

The purpose of this Briefing Paper is to assess the impact of ultra-loose monetary policies on income and wealth distribution in the euro area. Section 2 assesses the potential impacts through financial markets, while section 3 considers the impacts through changes in the macroeconomic situation. Section 4 concludes.

2. THE IMPACT OF ULTRA-LOOSE MONETARY POLICIES ON INEQUALITY THROUGH FINANCIAL MARKETS

2.1 The impact through asset prices

One of the main channels through which ultra-loose monetary policies affect income and wealth distribution is changes in asset prices. First, lower central bank interest rates reduce the interest rates on other securities (such as government and corporate bonds) and increase their prices. Second, asset purchases result in a further fall in yields and an increase in their prices. Third, sellers of the assets purchased by the central bank might purchase other securities and thereby the prices of all kinds of assets can increase (portfolio rebalancing effect). Fourth, asset purchases by central banks can also improve market functioning and liquidity, thereby reducing liquidity premia, which can further raise asset prices. And finally, ultra-loose monetary policies can convince investors that interest rates will remain low for a long period, which can affect future corporate earnings and raise asset prices.

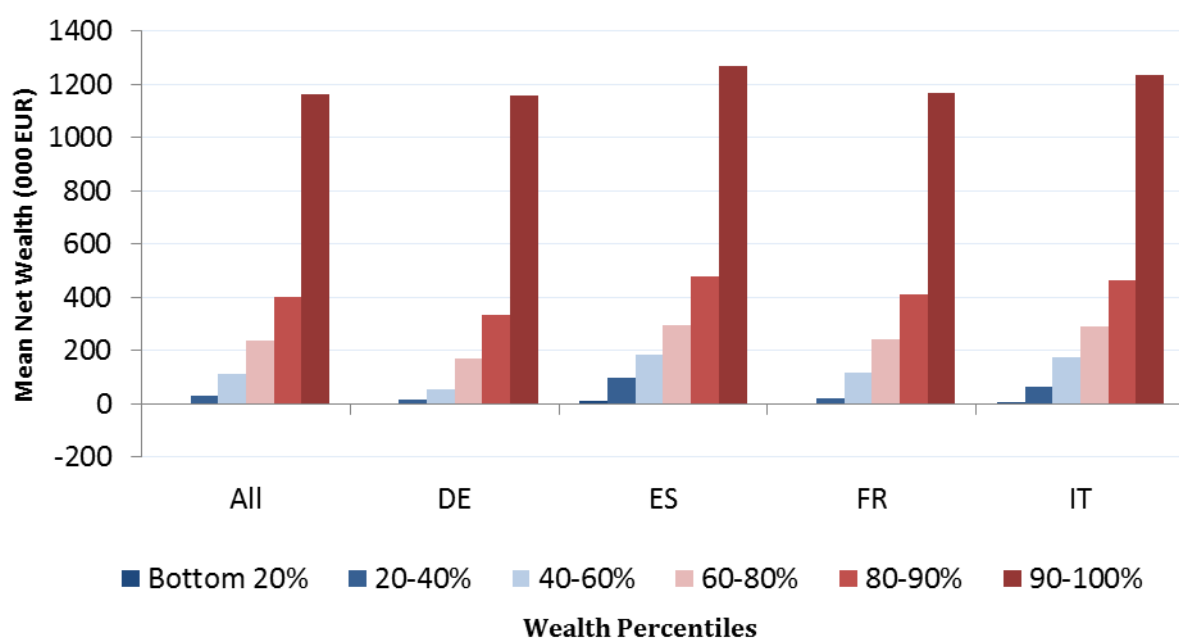
Empirical estimates for the United Kingdom and United States by Joyce et al (2011), Meier (2009), Gagnon et al (2011) and Baumeister and Benati (2010) found significant effects of asset purchases on the prices of the assets purchased, and also on other securities not included in the purchase programmes, including equity prices. However, as argued by Dobbs, Koller and Lund (2014), the effect of asset purchases on equity prices might not be as strong as is often reported, for both theoretical and empirical reasons. First, a rational investor should regard the current ultra-low interest rate environment as temporary, and thus should not reduce the discount rate to value future cash flows. As Figure 5 of Claey's and Darvas (2015) shows, P/E ratios have remained close to their long-term average in the US, UK and euro area, suggesting that share prices might not have been boosted extraordinarily, but might have primarily rebounded from extremely low levels. Second, according to calculations in Dobbs et al (2014), the implied real cost of equity, which represents the compensation investors require for investing in equities instead of risk-free securities such as Treasuries, has not fallen to a level that would be expected in the context of a big boost in equity prices. Finally, in order for the portfolio-rebalancing channel to work, equity must be seen by investors as a close substitute for fixed-income assets. The authors give some reasons why this might not be the case: the high level of volatility in the equity market, which should deter investment in equity, or the retreat by US retail investors from equity mutual funds and exchange-traded funds. Overall, Dobbs et al estimate that, if interest rates rise to their long-term historical average levels in five years, low rates will have resulted in an increase in equity prices of only about 1 percent.

More generally, the effects of monetary policy on asset prices should average out over the long term. First, the exit from quantitative easing and the tightening of monetary policy through interest rate rises should have the opposite downward effect on asset prices. Second, equity prices are ultimately a function of the profitability of firms and even though they can diverge from their fundamental values in the short-term, they should not diverge permanently from them. While monetary policy should boost economic activity and thereby corporate profits in the short-term, the so-called "long-run neutrality" hypothesis suggests that it does not have such an effect in the long-term.

While the above literature review suggests some ambiguity about the extent and duration of asset price increases after asset purchases, asset price increases at least in the short-term can have significant distributional consequences given that asset holdings are very much concentrated among the richest households. The Household Finance and Consumption

Survey (HFCS) of the European Central Bank², shows that differences in net wealth between the wealthy and the poor are huge (Figure 2)³. Figure 3 also shows that poorer households hold generally fewer financial assets except deposits.

Figure 2: Net wealth percentiles in the euro area and its four largest countries

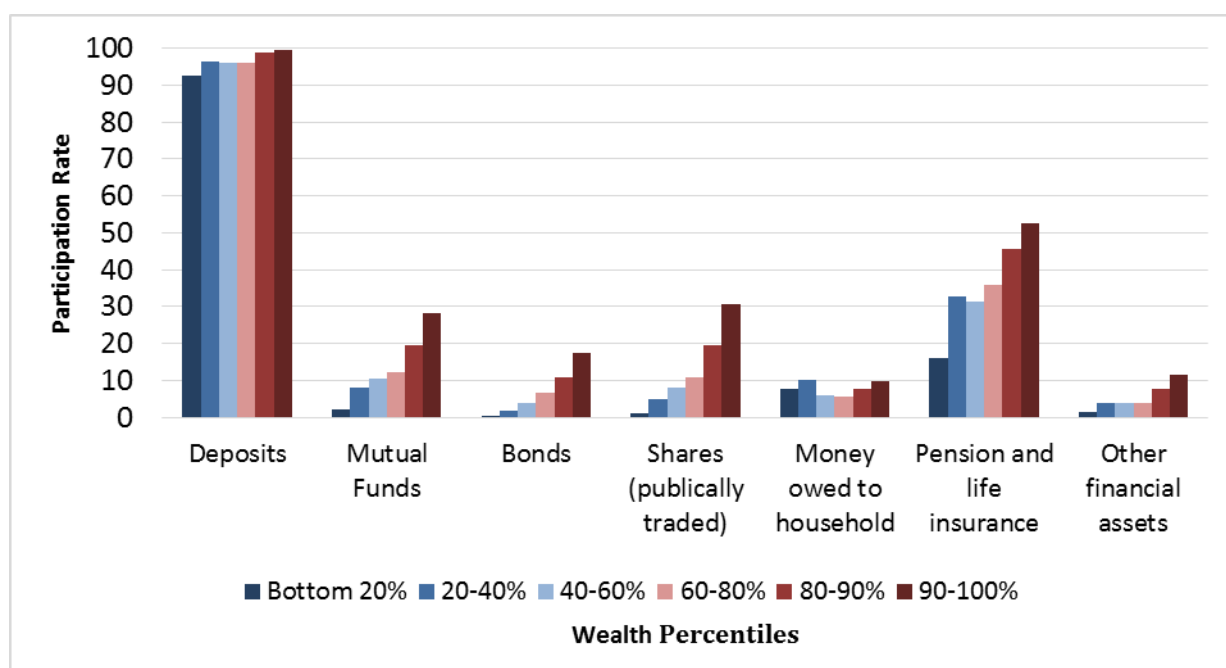


Source: ECB HFCS (2013)

Note: Net Wealth is the difference between total household assets and total household liabilities. Total assets include real and financial assets. Euro area refers to the aggregate of the 15 countries included in the HFCS (see footnote 2).

² The Household Finance and Consumption Statistics (HFCS) survey by the European Central Bank collected household-level data on households' finances and consumption in 15 European countries (Belgium, Germany, Greece, Spain, France, Italy, Cyprus, Luxembourg, Malta, Netherlands, Austria, Portugal, Slovenia, Slovakia and Finland). The data collection took place in 2010 and 2011 in most countries. Henceforth when we refer to Euro area, it is with respect to these 15 countries only.

³ Figure 2 and 3 show data according to the net wealth percentiles: the figures according to income percentiles are very similar.

Figure 3: Financial asset participation rates by wealth percentiles in the Euro Area

Source: ECB HFCS (2013)

Note: Euro area refers to the aggregate of the 15 countries included in the HFCS (see footnote 2).

However, while current asset price increases benefit those that have large holdings of assets today, they also make future buyers of these assets worse off, as they will have to purchase them at higher prices. In general, it is older households that tend hold these assets and plan to sell them in the future in order to maintain their consumption, while younger households will buy these assets in the future in order to save for retirement. This will have distributional effects across generations.

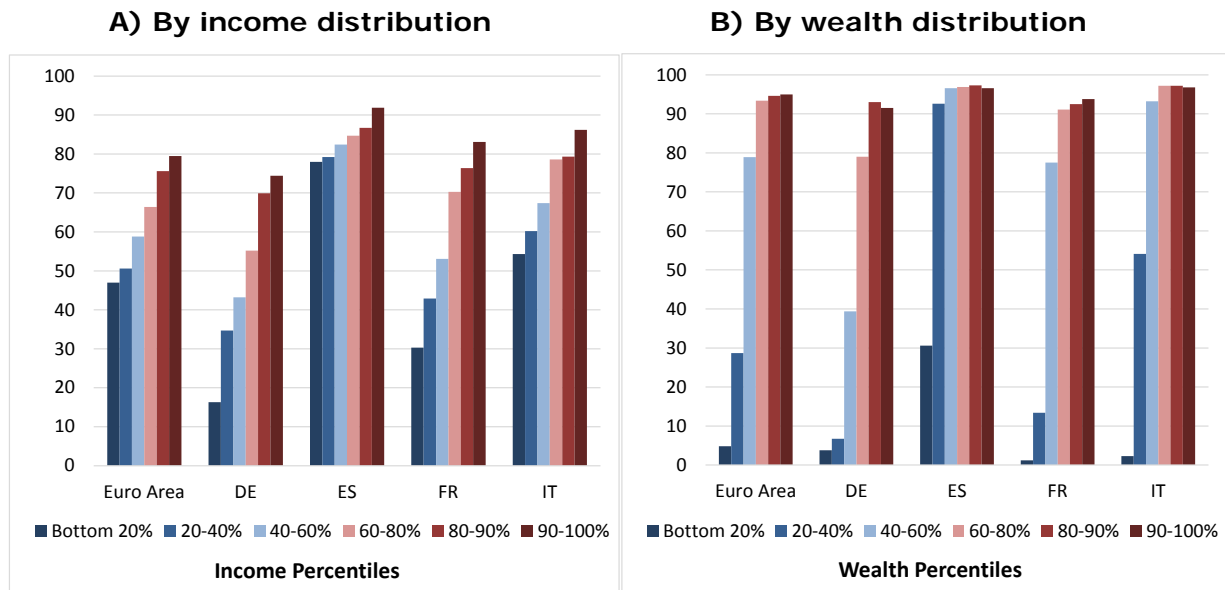
Another important aspect is housing. By reducing long-term yields, ULMP can also have an impact on long-term mortgage interest rates. For example, for the United States, Bivens (2015) reports that a 100 basis points decline in mortgage interest rates boosts home prices by 7 percent. Similarly, the portfolio rebalancing channel could increase the demand for housing further⁴. As the cost of mortgages goes down, it should put some upward pressure on housing prices. As can be seen in Figure 6 of Claey's and Darvas (2015), house prices have been falling throughout the euro area since the bursting of the bubble in 2007. There was a minor increase in real house prices in Germany from 2010, but the level of real house prices in 2014 was still below the 2000 level. Earlier ECB monetary policy measures might have prevented a deeper fall in prices, while the more recent asset purchases might lead to house price increases.

As we can see from the HFCS, home ownership is prevalent even among intermediate income and wealth groups (see Figure 4). There are however some differences between countries and whether we consider income or wealth distributions. In Spain, and Italy to a lesser extent, even among low-income households there is a high rate of home ownership, whereas in France and Germany home ownership is much more dependent on income (Panel A). Since

⁴ In principle, supply can respond to increase in demand and leave housing prices unchanged. Yet experience suggests that sizeable expansions of the construction sector used to coincide with house price increases, suggesting that increased demand for housing used to have an impact on housing prices.

housing wealth constitute a significant fraction of total net wealth, especially for low-wealth households, unsurprisingly low-wealth households tend not to be home owners (panel B).

Figure 4: Home ownership across income and wealth percentiles in the euro area and its four largest countries (percent)

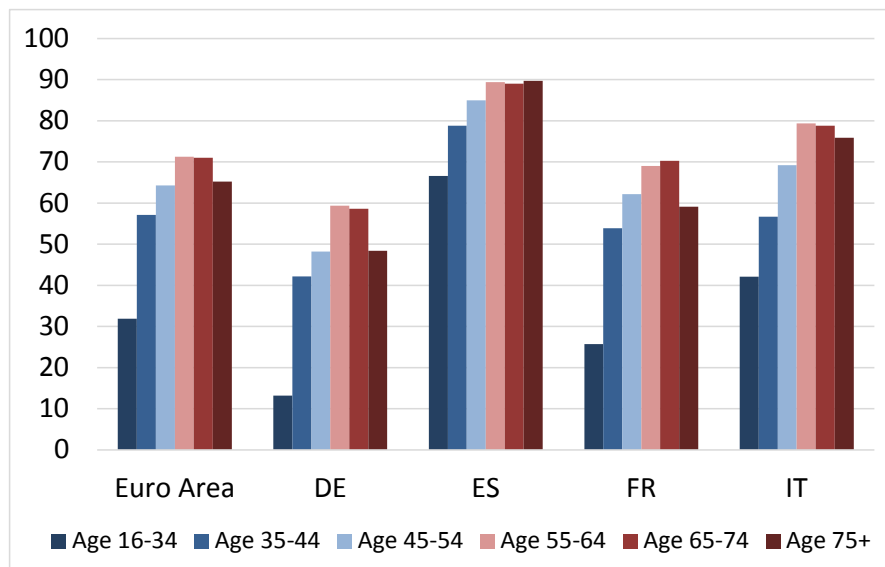


Source: ECB HFCS

Note: The bars indicate the percent of households in the income/wealth group owning their main residence.

ULMP, by raising housing prices, will benefit all homeowners. For households with lower incomes, however, real estate assets represent a much larger share of their total assets than for richer households. Therefore it is possible that ULMP will reduce inequality through the housing channel we have just described.

Figure 5: Home ownership by age of the head of the household in the euro area and its four largest countries



Source: ECB HFCS

As with other assets, rising housing prices will benefit current homeowners at the expense of future buyers, who will tend to be young people. As Figure 5 shows, home ownership tends

to be dependent on the age of the head of the household in France, Germany and Italy, and to a lesser extent in Spain.

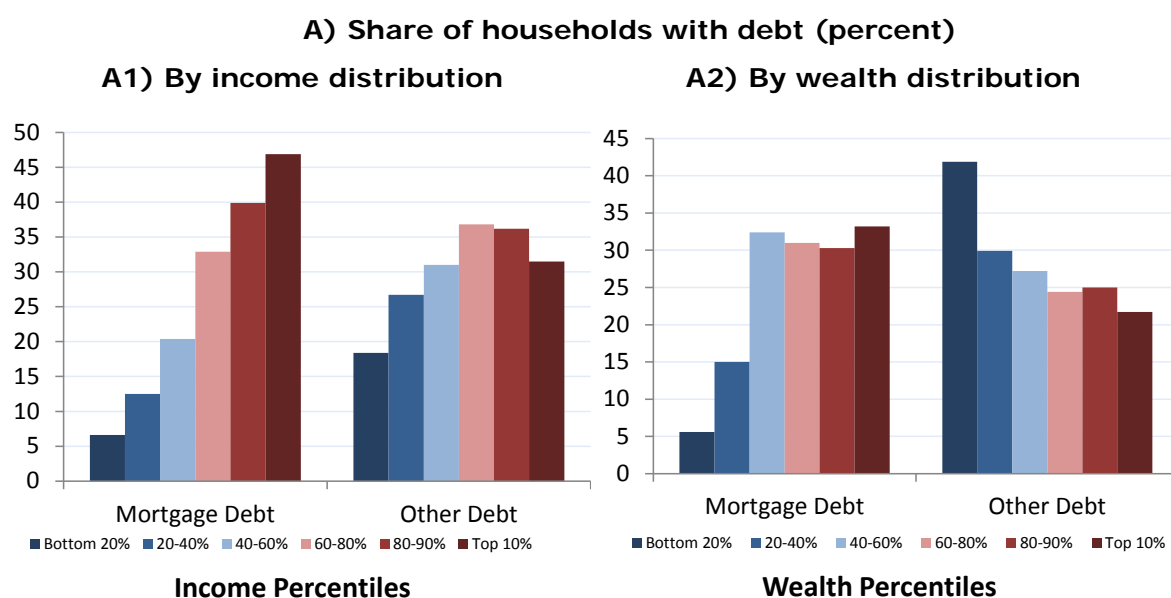
These findings are confirmed by a recent working paper by Adam and Tzamourani (2015). Using data from the HFCS, they show that the median household strongly benefits from housing price increases, while capital gains from bond-price and equity-price increases are shared among relatively few households.

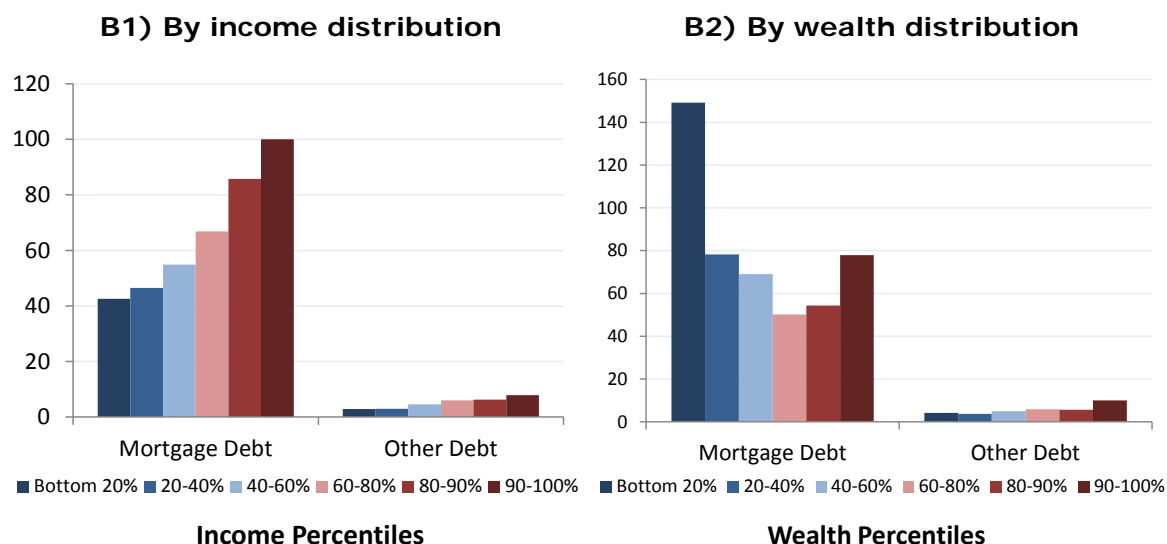
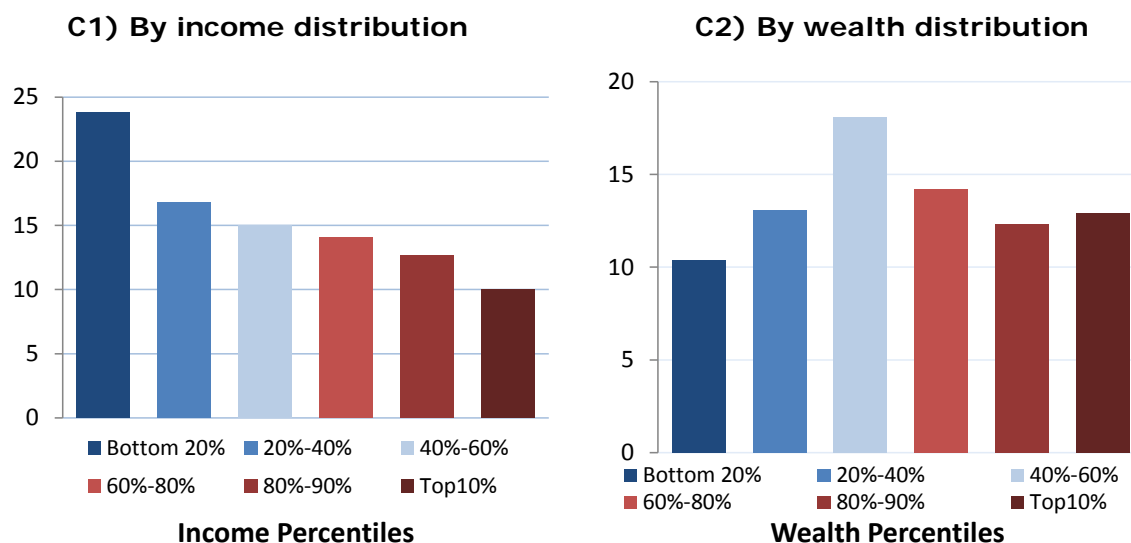
2.2 The impact through interest rates

While ULMP has a positive impact on asset prices, which benefits those who are holding them when the measures are implemented, it also reduces the expected returns on these assets for those who are buying the assets at a high price. These two effects might affect different age groups within income and wealth groups differently. For example, the young generation of the rich, who are acquiring financial assets, might suffer relatively more from the reduced income than older rich generations, who will largely benefit from the stock effect.

More generally, lower interest rates are likely to reduce the financial revenues of savers, who tend to be rich, and benefit debtors, which tend to be households from the middle-class to the rich. Panels A and B of Figure 6 shows that very few low-income and poor households have mortgage debt and while many have other debts (such as overdrafts or credit cards), the median value of non-mortgage debt is very small relative to mortgage debt. However, the debt service to income ratio is the highest for low-income households (Panel C of Figure 6), implying that they would benefit the most from a reduced mortgage interest rate.

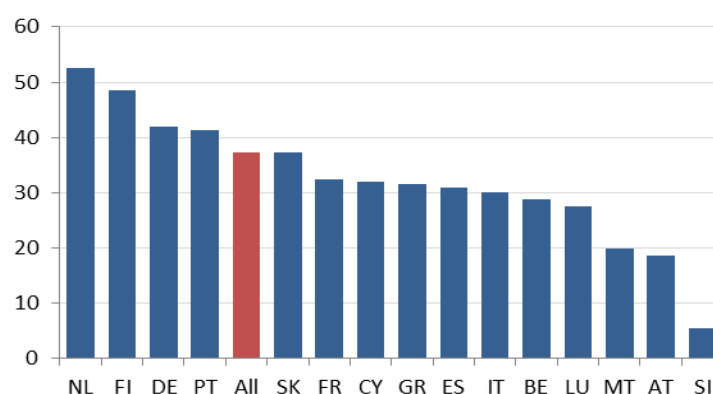
Figure 6: Debt and debt service in the euro area



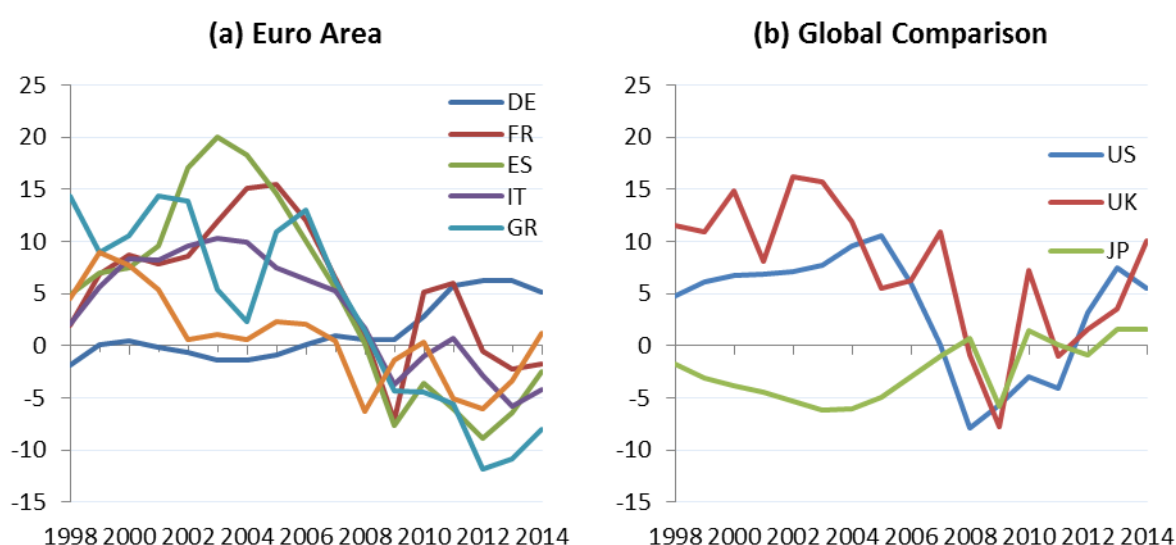
B) Median value of debt among those who have debt (€ thousands)**C) Debt servicing burden among those who have debt (as % of gross income) in the euro area**

Source: ECB HFCS

Another important element, emphasised by Beraja et al (2015), is that ULMP can widen inequality not only between income quintiles but also between regions (or between countries in the case of the euro area). Beraja et al (2015) show that in the US, while in the aggregate asset purchases resulted in more mortgage originations, refinancing, cash-outs, and consequently consumer spending, these effects were much stronger in regions with lower mortgage loan-to-value ratios (LTVs). Regions with numerous homeowners whose house market price is below the value of their mortgage (ie in “negative home equity”), however, do not benefit as much from these stimulative effects because it is more difficult and expensive for them to refinance their mortgages. This effect, which could lead to the amplification of regional inequality, could be important in the euro area, where there is significant disparity in median LTVs in different countries (Figure 7) and where there are differences in the evolution of house prices too. In countries in which LTVs are higher and house prices have fallen more (Figure 8), the share of debtors facing difficulties in refinancing their loans should be higher and should benefit less from the monetary policy accommodation.

Figure 7: Median Loan to Value Ratios of Main Residences in the Euro Area

Source: ECB HFCS

Figure 8: Annual House Price Growth (%)

Source: OECD

The size of the effect of ULMP could therefore depend on whether homeowners have a fixed or variable rate mortgage, and how easy or costly it is to remortgage. In some countries most mortgages are fixed rate, which means that homeowners will have to refinance in order to benefit from lower interest rates, and refinancing can in some cases be very costly. According to the Bank of Spain (2009), the Research Institute for Housing America (2010), and the European Mortgage Federation (2012), Austria, Belgium, Denmark, France, Germany and the Netherlands mostly have fixed-rate mortgages, while Greece, Hungary, Ireland, Portugal, Spain, Sweden and the United Kingdom mostly have variable-rate mortgages. In Italy there is a mix of both. In the countries with dominantly variable-rate mortgages, households with a mortgage would benefit automatically from lower rates, while in countries with fixed-rate mortgages, only households that are able to refinance would benefit from the lower interest rates.

Again, it is important to distinguish between short-term and medium-term effects. In the short term, low rates and ULMP can have negative effects on net savers, but not in the medium term when interest rates normalise.

3. THE IMPACT OF ULTRA-LOOSE MONETARY POLICIES ON INEQUALITY THROUGH THE MACROECONOMY

Those claiming that ULMP is worsening inequality mainly focus on the fact that unconventional monetary works primarily by raising asset prices, as documented in the previous section, resulting in distributional effects in favour of those holding assets. However, one of the most important effects that unconventional monetary policy might have on inequality is its potential impact on the general macroeconomic environment – boosting GDP, raising inflation back to target and supporting employment. The economic gains from these positive developments could again be unequally distributed, but possibly in a different direction to the benefits accruing from asset-price increases.

Households and firms make spending and saving decisions based on their expectations of future income streams. ULMP can affect the decisions of households and firms in several ways: through a “virtuous cycle” of higher revenues and incomes, higher asset prices and wealth effects, higher collateral values, and through higher expected inflation.

Higher expected inflation will induce households and firms to bring consumption spending forward to protect their purchasing power. Higher household and firm spending, in a more benign borrowing environment, should boost inflation and GDP and reduce unemployment. Higher asset prices will increase household and firm wealth, increasing spending, and will increase the value of assets that can be used as potential collateral for credit. By increasing nominal spending, ULMP can also have an indirect effect on equity prices, as companies face more demand and increase their profits, which in turn drives the more favourable macroeconomic environment.

3.1 Academic research on the impact of ULMP on the macroeconomy

Research on the macroeconomic impact of the monetary policy measures implemented since the beginning of the crisis has generally produced consistent results: most papers find a significant positive impact on inflation and GDP.

In terms of empirical evidence from past asset-purchase programmes in other major advanced economies, Chung et al (2011) found that the large-scale asset purchase programme by the US Fed had significant benefits for the macroeconomic situation in the US. Using an internal Federal Reserve Bank/US model, the authors found that asset purchases reduced long-term interest rates on treasuries by up to 50 basis points, while the unemployment rate was about 1.5 percentage points lower, GDP about 3 percentage points higher and core inflation about 1 percentage point higher than the counterfactual scenario without Fed purchases.

Wu and Xia (2014) develop a so-called “shadow rate” – an interest rate that captures all the effects of the Fed’s unconventional monetary policy, even if the Federal Funds Rate (FFR) is constrained by the zero lower bound. They find that the shadow rate is a good representation of monetary policy in the pre-crisis period, because the shadow rate tracks the actual FFR very closely. The shadow rate turns strongly negative as a result of policies to ease credit and expand the Fed’s balance sheet. Using a Factor Augmented VAR model, they construct counterfactuals in which the shadow rate is set to the zero lower bound, thus negating the effects of unconventional monetary policy. They find that industrial production is more than 5 percent higher and unemployment 1 percent lower than in a scenario with no unconventional policies. Their model also predicts that forward guidance – the policy of communicating the path of future interest rates – was also successful. In their model, a 1-year extension of the expected zero lower bound period in the future reduces the unemployment rate by 0.25 percentage points.

Kapetanios et al (2012) at the Bank of England found that GDP was boosted by about 2 percent, and at its peak, CPI inflation was about 4 percentage points higher than would otherwise have been the case, averting a situation of outright deflation. The authors use three different vector autoregressive models, which allow for time-varying parameters. They construct their estimates of the effects of QE by creating carefully designed counterfactual scenarios in which there is no effect of QE on government yields. Hence, in their model, the primary effect of QE is through lower interest rates, and the second-order effects on output and inflation happen entirely through the effect on interest rates.

Similarly, Baumeister and Benati (2010) found that the compression in the long-term yield spread has had a strong positive effect on output and inflation in both the UK and US. They use Bayesian time-varying parameter structural VAR, and investigate the effects in reducing yield spreads (assuming a fixed short term rate to simulate the zero lower bound). In the US they find that the yield-compression seen as a result of asset purchases increased growth by about 2 percent and increased inflation by about 1 percent. Results for Japan and the UK are quantitatively similar. It should be noted that the Fed engaged in substantial rounds of further asset purchases after this point.

Focusing on the euro area, Lenza et al (2010) provide evidence, again using counterfactuals via a VAR model, that the ECB's early measures to ease credit in the euro area helped reduce spreads in money markets, which in turn had positive effects on output and inflation. Darracq-Paries and De Santis (2013) specifically focused on the ECB's LTROs of December 2011 and February 2012. They found, using Bank Lending Survey (BLS) data, that the LTROs substantially boosted euro-area lending, and through their VAR model, that GDP was 0.6 percentage points above its counterfactual level by 2013, inflation about 0.2 percentage points higher and outstanding loans 2 percentage points higher.

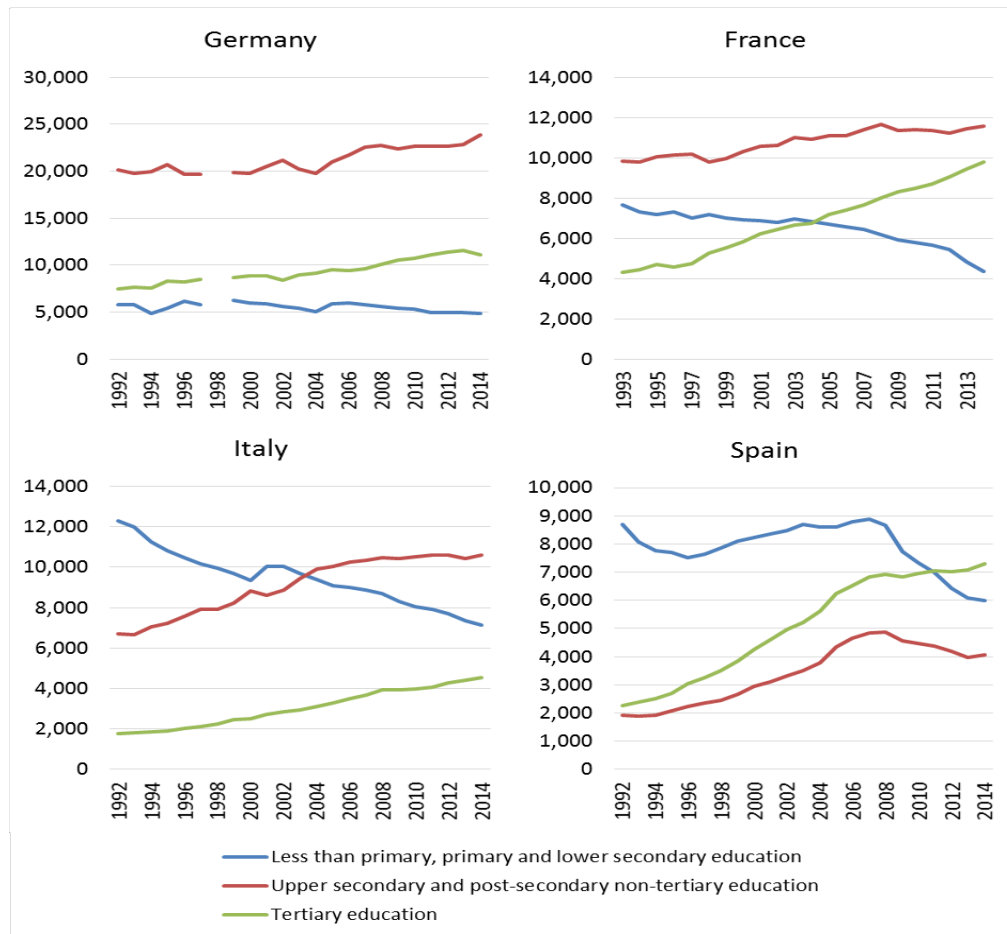
3.2 Implications for inequality

Recessions could potentially increase inequality through two channels: (i) the composition of income, and (ii) the differing impact on employment according to skill levels.

Since the poor rely much more heavily on wages for their income, any change in employment levels will affect them much more than the rich, who accrue income through more diverse channels, such as capital gains. If ULMP is successful in stimulating the economy, this will have net benefits for the poor and low-skilled relative to the rich, and will result in a reduction in inequality.

Furthermore, evidence from the literature shows that the poor and low-skilled are the most likely to lose their jobs in recessions. For example, Figure 9 shows that in the four largest euro-area countries, low-skilled workers (which are at the bottom of income distribution) suffered more relative to high-skilled workers. It is interesting to highlight that employment of high-skilled workers (those with tertiary education) continued to increase throughout the crisis, including in Italy and Spain.

Bitler and Hoynes (2015), using data from the United States, show that those on lower incomes experience much greater income cyclicality than higher earners. Furthermore, this differential effect of recessions on low earners was steeper in the great recession compared to the previous 1980s recession. Therefore, any policy that helps to prevent or alleviate recessions will help to keep those at the bottom end of the income and wealth distribution in jobs and will therefore avoid a further widening of inequality.

Figure 9: Employment (in thousands of people) by educational attainment, 1992-2014

Source: Eurostat "Employment by sex, occupation and educational attainment level (1 000) [Ifsa_egised]" dataset

The academic literature confirms that monetary policy might in fact reduce inequality. For example, Coibion et al (2012), taking an historical perspective and not considering unconventional policies specifically, document that contractionary monetary policy typically increases inequality, while accommodative monetary policy reduces inequality. Bivens (2015) argues that the view that ULMP benefits only the rich through higher asset prices is not correct. Although stock and house prices rose as a result of the Fed's policy measures, helping people who own their home or hold stocks, to the extent that the policies helped maintain employment and output, the Fed's measures reduced inequality. Bivens concludes that in the absence of the Fed's ULMP, wage growth would have been lower and more unequal. For the UK, the Bank of England (2012) makes a very similar case to Bivens (2015) in a review of the effects that its policy had on the distribution of wealth and income, arguing that ULMP in the UK benefited various segments of society through its impact on general economic conditions.

Yet the literature is not unanimous. For example, Saiki and Frost (2014) conclude, using impulse response functions from a VAR model with the Gini coefficient included, that ULMP increased inequality in Japan. Meanwhile Phillippon and Reshaf (2013) have shown that remuneration in the financial sector is extreme, even when one takes into account technological progress and the skill and education levels of employees, and therefore, to the extent that ULMP benefited the financial sector, it also benefited the wealthy owners and employees of the financial sector.

4. CONCLUSIONS

In this paper, we have detailed the channels through which ultra-loose monetary policies (ULMP) might exacerbate or reduce inequality. Broadly speaking, a large number of asset classes will experience price rises; however it is unclear to what extent this might translate into greater inequality. Increases in the value of assets such as equities and government and corporate bonds will tend to favour the rich who hold them in higher proportions. Since older people tend to have higher savings and may sell them in the future in order to maintain their consumption, while younger households are usually the ones that will buy these assets in the future in order to save for retirement, ULMP may have distributional consequences across generations. ULMP can benefit households differently depending on the structure of their financial assets, since certain households could make better use of the opportunity offered by low-interest rate borrowing than others. However, increases in prices of houses, which are the main assets of the middle class, will tend to compress the wealth distribution. Perhaps even more importantly, ULMP has also been shown to have effects on the real economy: on inflation, output and employment. High unemployment will always result in a massive increase in income inequality, because large parts of the population have to rely on transfers and state assistance. It is thus very difficult to assess the impact of ULMP on inequality.

The primary mandate of the European Central Bank is to maintain price stability, and considerations of inequality are not within its purview, unless inequality should prevent the transmission of monetary policy in some way. Yet we recommend the ECB to monitor the side effects of its monetary policy measures, including the potential distributional effects. The ECB has detailed internal datasets which should allow a comprehensive assessment.

The main policy question is how to tackle inequality in general, and whether governments should design special measures in a deep recession or in a situation in which central bank actions widen inequality. For example, in the United States, policies such as the Housing Affordable Refinance Programme (HARP), which helped homeowners with negative home equity to refinance their mortgages, might have helped dampen the rising inequality that resulted from the housing slump.

Fiscal and social policies are the right tools to fight inequality. As documented by Darvas and Wolff (2014), there are huge differences in the efficiency of social redistribution systems in EU countries. For their levels of social expenditure and personal income taxes, several southern European countries and Belgium achieve a much smaller reduction in inequality than other EU countries. Revising national tax/benefit systems for improved efficiency, intergenerational equity and fair burden sharing between the wealthy and poor is the right way to fight inequality.

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DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Quantitative Easing: What are the side effects on income and wealth distribution

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Benjamin BECKERS, Caterina FORTI GRAZZINI**

IN-DEPTH ANALYSIS

Abstract

The introduction of the ECB's most recent extended asset purchase program has raised concerns with respect to its effects on the income and wealth distribution in the euro area. This report reviews evidence about the effects of similar programs in the US, the UK and Japan on interest rates, asset prices, inflation and real economic outcomes against the background of stylized facts of the euro area income and wealth distributions. In the short-run the ECB's purchases are likely to exacerbate any existing income and wealth inequalities; in the long-run, however, if the program will be successful in bringing inflation back to target, promoting economic development and lowering unemployment, its effects on the income and wealth distribution in the euro area are ambiguous, thus justifying the 'benign neglect' of central bankers vis-à-vis distributional aspects of their policies.

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EXECUTIVE SUMMARY

- The European Central Bank (ECB) only announced a large-scale asset purchase (LSAP) program in January 2015, with actual purchases only starting in March. Therefore it is too early to assess the distributional impact that this program may have had.
- Some doubts can be casted on the claim that the ECB's program will have sizeable and long-lasting effects on bond yields and real economic activity based on research investigating the effects of similar purchase programs in the US, the UK and Japan. However, appreciation of asset values observed since the introduction of the program is quite substantial.
- Usually, central banks show an attitude of 'benign neglect' with respect to issues concerning the distribution of the economy's aggregate income and wealth. This is justified insofar as the overall impact of monetary policy on income and wealth distributions in normal times is rather ambiguous.
- However, in exceptional times, when central banks employ large-scale outright purchases programs to overcome the zero-lower-bound restriction on their policy rates, the relative potency of the respective channels by which income and wealth distributions are affected is altered.
- Whenever the main effect of asset purchases occurs initially and primarily in financial markets and induces a pronounced appreciation of financial asset values, adverse distributional effects may result since primarily wealthier households benefit from it.

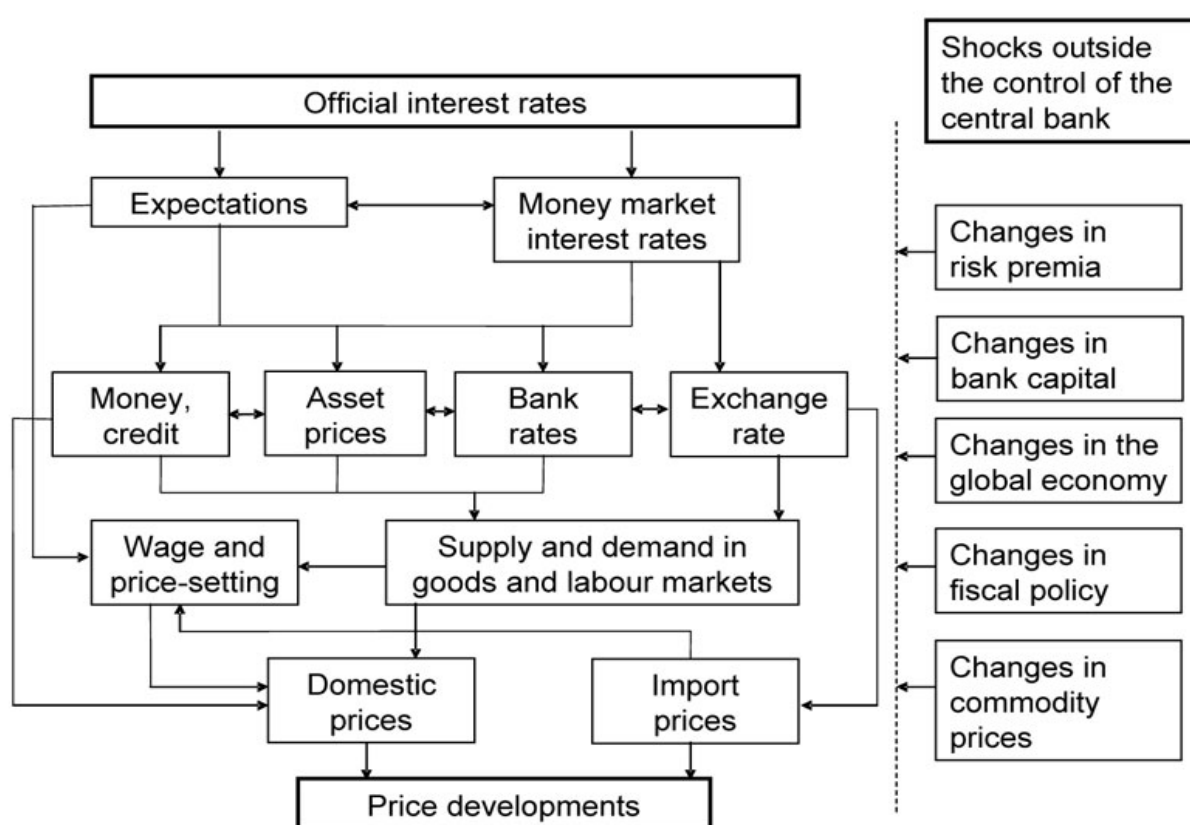
Adverse distributional effects are likely mitigated once the asset purchases unfold their intended impact on real economic activity and inflation.

- Since the ECB's extended asset purchase program started at a time when long-term interest rates were already low and liquidity in the financial system was abundant, major effects are likely to be observed only in financial markets where they lead to an increase in asset prices and therefore valuation gains for the holders of these assets.
- This implies that the ECB's asset purchase program will most likely, at least in the short-run, exacerbate income and wealth inequalities in the euro area.
- Overall, the distributional consequences of the ECB's asset purchase programs are therefore ambiguous. Once the program helps to stabilize and improve real economic activity, it will first and foremost help those at the lower tail of the wealth and income distribution; but as the impact of purchases is, at the moment, primarily felt in financial markets, they are likely to aggravate inequality.

1. INEQUALITY AND THE MONETARY TRANSMISSION PROCESS

The European Central Bank's (ECB) ultimate targets are the macroeconomic variables that it wants to control in order to maintain macroeconomic and financial stability. For the past twenty or so years, a consensus has emerged that an environment of low and stable inflation is important for sound macro-financial conditions and for fostering economic development (Goodfriend, 2007). In this vein the ECB targets, for example, an inflation rate of below, but close to, 2 percent over the medium term. However, central banks are usually not able to directly steer their ultimate target variables, i.e. they do not exert direct control over the aggregate price level or the general levels of unemployment and aggregate production. Therefore they employ operational targets, for example the overnight interest rate on the interbank market, that can be more directly controlled through the central bank's monetary policy instruments. Changes in the operational target then, albeit with a lag, affect the ultimate targets. The process, by which initial monetary policy actions eventually give rise to changes in the ultimate target, is the monetary transmission mechanism. Figure 1 provides a stylized overview of the ECB's transmission process.

Figure 1: ECB's monetary transmission process



Source: European Central Bank

In normal times, the transmission process starts with changes in the central bank's policy rate, which lead to immediate changes in the operational target and further induce agents in the economy to adjust their expectations about the central bank's policy stance and the future course of monetary policy.¹ Via financial markets and the banking sector, these

¹ The ECB employs three policy rates, the rate on the main refinancing operations and the interest rates on its two standing facilities (deposit facility and marginal lending facility). The main refinancing rate is usually

adjustments are further transmitted to interest rates of different maturities (1-month, 1-year, 10-year etc.) for different types of assets (covered bonds, bank bonds, government bonds, stocks, commercial paper etc.) and loans (mortgages, consumption loans, credit lines to firms etc.), thereby also affecting asset prices (including exchange rates) and inducing changes in the consumption, saving and investment decisions of households and firms. These, in turn, give rise to changes in aggregate demand. Thereby prices, employment and output change and eventually the desired level of the ultimate target(s) is achieved; for example, the inflation rate of close to 2 percent as in the case of the European Central Bank.

1.1. How monetary policy changes income and wealth distributions

Although the distributions of income and wealth in the economy are usually not of first-order importance for monetary policymakers and the central bank – neither stated as official ultimate targets nor central to monetary policy announcements and press conferences – this does not imply that monetary policy actions cannot have distributional consequences. In particular, at each instant in the monetary transmission process, the economy's income and wealth distributions may be altered. However, even though such distributional consequences are typically viewed by central banks as unintentional, they can also alternatively be viewed as an essential part of the transmission process (Tobin, 1982). With respect to the way in which monetary policy changes income and wealth distributions, the literature distinguishes between the following channels:²

- a) **Interest rate exposure channel:** Interest rate changes by the central bank affect asset and liability positions of economic agents. Auclert (2015) defines the difference between maturing assets and liabilities at a certain point in time as net saving requirements. A decrease in the interest rate benefits those agents who have negative net saving requirements, while it hurts those with positive net saving requirements. For example, agents who have primarily invested into long-term assets are likely to benefit from interest rate decreases compared to those who hold short-term bonds. Hence, interest rate reductions re-distribute wealth from those with positive to those with negative net saving requirements, and conversely for interest rate increases. To the extent that households saving for retirement are strongly invested into long-term bond holdings, they tend to gain from falling interest rates.
- b) **Financial segmentation channel:** Policy-induced changes in the money supply may primarily benefit those groups of agents who directly interact with the central bank or who participate in financial markets more frequently. This idea goes back to pre-classical economist Richard Cantillon (b. 1680, d. 1730) and was more recently explored by Ledoit (2011) in a financial network model, as well as by Williamson (2008) in a model of asset and goods market segmentation. In Williamson's model, market segmentation induces distortions such that monetary expansions imply inefficient allocations and re-distributions of wealth between different groups of agents. Since wealthier households are more likely to be more strongly connected to financial markets, expansionary monetary policy may exacerbate wealth and income inequalities.
- c) **Earnings heterogeneity channel:** Monetary policy actions may affect earnings of high-income households in a different way than it does for low-income households. In particular, given that labour earnings are the main source of income for most households, monetary policy may lead to changes in the income distribution, if it does

considered to be the ECB's main policy rate. In normal times it is set exactly equal to the midpoint of the corridor provided by the standing facility rates.

² The literature on monetary policy and inequality is not abundant and no consensus terminology is established. Therefore, we use the terminology of Coibion *et al.* (2012) for the description of the different channels.

not affect the employment situation of all income groups homogeneously (Carpenter et al., 2004). For example, because low-income households have a higher unemployment probability than high-income households, expansionary monetary policy shocks may benefit primarily the poorer households unevenly. The earnings heterogeneity channel therefore implies that expansionary monetary policy tends to reduce income and wealth inequalities.

- d) Income composition channel:** Relatedly, the effects of monetary policy on income may be different for those agents who receive a large part of their income from wage earnings compared to those who receive a large fraction of their income from (financial) asset holdings. Expansionary monetary policy may exert upward pressure on the prices of financial assets and thereby benefit the latter group of agents more, thereby exacerbating the income inequality.

While channels a) – d) describe ways how income and wealth distributions may be altered during the transmission process of monetary policy impulses via changes in credit and bank rates, exchange rates and asset prices, the following channels, e) and f), describe how variations in the rate of inflation, which presently constitutes the most important ultimate objective of most central banks, impact income and wealth inequality.

- e) Portfolio channel:** An increase in inflation depresses the real value of cash balances. Thus, agents that hold a large part of their wealth in cash balances or in certain assets whose real values are sensitive to variations in inflation experience a larger drop in their wealth when inflation increases, than agents that hold less of their wealth in inflation-sensitive assets. Erosa and Ventura (2002) point out that this may lead to an increase in wealth inequality as low-income households tend to hold more of their wealth in cash balances than high income households. However, Batthacharya et al. (2005) point out that this effect could also lead to a reduction in wealth inequality. Absent a regular wage income, the older generations tend to hold more of their wealth in cash balances in order to finance their consumption stream than the younger generations. Under the additional assumption that older generations hold a large share of the economy's overall wealth, this could lead to a reduction in wealth inequality between older and younger generations. Hence, the overall effect may be ambiguous.
- f) Savings redistribution channel:** Related to the portfolio channel is the savings redistribution channel; but rather than pertaining to the effects of inflation on wealth held in cash balances in general, the savings redistribution channel points to the redistributive effects of unanticipated inflation. An unexpected increase inflation, e.g. due to a large regime shift in monetary policy, leads to a redistribution from savers, who see the real value of their assets decrease, to borrowers, who see the real value of their liabilities decrease. Whenever savers are wealthier than borrowers, the savings redistribution channel implies that unexpected inflation reduces inequality.

Considering these different channels, it should be clear that the effects of monetary policy actions on wealth and income distributions are quite ambiguous in normal times. This ambiguity is likely to be responsible for the 'benign neglect' of central banks vis-à-vis distributional concerns. After all, the best a central bank can do in normal times is to support stable macro-financial conditions and prevent overly large deviations of realized values from the targeted values of its ultimate objectives.

1.2. Transmission process of large-scale asset purchases

The monetary transmission process changes during exceptional times, for example in case of deep and severe financial crises, for two principle reasons.

First, in the face of malfunctioning financial (especially interbank) markets, the central bank must provide a more-than-normal amount of central bank liquidity in order to keep the banking sector afloat. This provision of 'excess liquidity' implies downward pressure on short-term interest rates in the remaining functioning segments of the interbank market. This, in turn, may hamper a smooth achievement of the central bank's ultimate targets.

Second, as a consequence of deflationary pressures due to depressed economic conditions and banking sector problems, conventional monetary policy may reach its limits. In particular, since the policy rate cannot be lowered below zero, once the central bank reaches this so-called 'zero-lower-bound', its conventional interest rate policy cannot be used to induce additional reductions in longer-term rates that would be needed to provide further stimulus to the economy.

In both cases, the central bank has to rely on unconventional monetary policy measures. Broadly speaking, the following unconventional policy measures can be distinguished: (i) Exceptional provision of liquidity beyond the normal benchmark amounts via credit / repo operations (possibly for an extended maturity); (ii) widening the range of central bank eligible collateral in such operations; (iii) additional strategic communication policy to steer expectations about the future course of monetary policy (so-called forward guidance); and (iv) large-scale outright purchases of particular assets. For the purpose of this analysis, we focus on outright asset purchases (iv). However, firstly, it should be kept in mind that measures (i)-(iii) have been used extensively by the ECB during the most recent turmoil and, secondly, they can also be associated with distributional consequences, albeit on a smaller scale than large-scale outright purchases.

The central bank may use large-scale outright purchases (iv) mainly for providing liquidity to the banking sector, relieving it from certain risky assets and pushing down risk-premia, as well as for achieving its ultimate objective by circumventing the initial stages of the normal transmission process. The latter is particularly important if the stimulus from lowering the policy rate down to the zero lower bound is not enough to relieve the economy from deflationary pressures. In this case, outright purchases are considered a means to push down long-term yields directly rather than via movements in the short-term yields like in normal times, to exert upward pressure on asset prices and thereby eventually affect real economic conditions and to bring inflation back to target. The most important channels through which long-term interest rates and asset prices are considered to be affected via outright purchases are:³

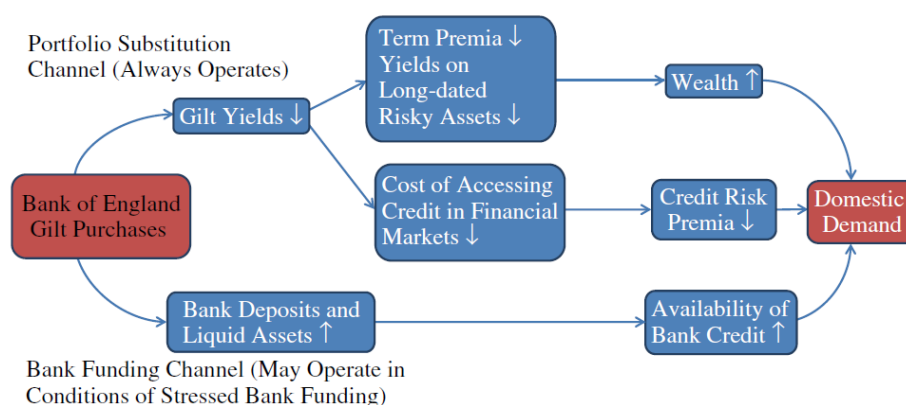
- aa) Portfolio Balance Channel:** Large-scale asset purchases (LSAPs) by the central bank reduce the supply of the purchased asset and, at the same time, increase the amount of central bank money in circulation. As a consequence, prices in the relevant securities segment increase, implying that interest rates for the respective assets decrease. This induces investors to rebalance their portfolios in search for more profitable alternative investments. Thus, the demand for securities that are close substitutes of the purchased securities will rise, leading to further reductions in interest rates and so on. The resulting broad-based decline in interest rates stimulates private consumption and investment activities. This increase in aggregate demand eventually increases the overall price level. The effectiveness of the *portfolio*

³ For overviews, see Bernoth, K., König, P., Raab, C. and Fratzscher, M. (2015), König, P., Bernoth, K. and Raab, C. (2015), Bernoth, K., König, P. and Raab, C. (2015).

balance channel depends crucially on the particular type of security that is purchased outright by the central bank. The acquired assets should not constitute close substitutes to central bank money, since the initial portfolio re-balancing would otherwise not be set in motion. This is more likely to occur, for example, in an environment where interest rates are already very low. Hence, in such a case, outright asset purchases cannot be expected to have quantitatively large effects via the portfolio balance channel.

bb) Bank Funding Channel: The banking sector's credit supply function depends on a large number of different variables. Among other things, it is crucially determined by the availability of central bank liquidity for carrying out payments, settling transactions and refinancing loans. As outright asset purchases by the central bank replace illiquid long-term assets with highly liquid central bank money, the banks' refinancing possibilities and their ability to provide loans to customers are strengthened. The effectiveness of the bank funding channel is greatest during times of acute market stress when banks are facing a shortfall of liquidity availability; whenever banks exhibit a rather long debt maturity structure (otherwise they would likely hoard the liquidity, rather than refinancing new loans to build up liquidity buffers against a sudden dry-out of short-term funds). Figure 2 shows how portfolio balancing and bank funding channel interact.

Figure 2: Joint Operation of Portfolio Balance and Bank Funding Channel



Source: Joyce *et al.* (2012)

cc) Signal and Announcement Channel: The announcement and explicit justification of a LSAP program helps market participants to better understand the central bank's assessment of the monetary and economic situation. It also indicates the monetary authority's willingness to pursue an expansionary monetary policy over a longer period of time. Accordingly, market participants will revise their short-term interest rate expectations downward. The resulting decrease in long-term interest rates stimulates aggregate spending, and simultaneously causes the currency to depreciate. Moreover, inflation expectations will rise, because the central bank signals that it is tackling the deflationary trend with all means possible.⁴

In view of the intentional effects of LSAPs by the central bank on inflation, interest rates, asset prices and the real economy, **Table 1** summarizes the theoretical effects on wealth / income inequality caused by outright asset purchases.

First, if LSAP by the central bank lead to a broad-based reduction in long-term interest rates and increases asset prices, wealth and income distributions are altered via the interest rate

⁴ See Blinder *et al.* (2008) for an overview of central bank communication policies.

exposure channel a), and the financial segmentation channel b). However, the overall effect is ambiguous.

Second, the transmission of unconventional monetary policy, in particular outright asset purchases, may induce distributional effects above and beyond monetary policy measures in normal times since central bank actions directly affect specific parts of financial markets, especially via the portfolio balancing channel aa), implying that the income composition channel d) and the financial segmentation channel b) become more potent. In this respect, whenever financial asset holdings are concentrated among the wealthier, high-income households, outright asset purchases, by potentially raising the value of financial assets, may imply a more-than-proportional gain for these households and may induce more unequal wealth and income distributions.

Thirdly, if unconventional monetary policy is successful in combating disinflationary or even deflationary pressures, thus increasing inflation, this may affect the income and wealth distribution via the portfolio channel e) and the savings redistribution channel f). However, both channels work in opposite direction such that the overall effect is not clear-cut: Inflation harms those agents holding a larger part of their wealth in currency and cash-balances. These are usually agents concentrated among the less well-off at the lower tail of the income and wealth distribution. In this sense, inflation increases wealth inequality by reducing disproportionately nominal wealth and income of the poorer, low-income households and less for the wealthier, high-income households. But, through the savings-redistribution channel and the associated debt-deflation effect, inflation lowers the real value of debt, thereby redistributing from creditors/savers to debtors/borrowers. Whenever borrowers are chiefly concentrated in the lower tail of the wealth distribution, higher inflation induces a redistribution from wealthier to poorer households.

Lastly, given that the central bank is able to stabilize the economy, and particularly employment, it helps to prevent, or at least to mitigate, adverse distributional effects that would otherwise occur via the earnings heterogeneity channel c).

Table 1: The theoretical effects of asset outright purchases on wealth and income inequality

	(Intended) Effects of Asset Outright Purchases on			
	Interest Rates ↓	Asset Prices ↑	Inflation ↑	Unemployment ↓
Channel affecting inequality	Effect on Wealth and Income Inequality			
a) Interest Rate Exposure	(+)/(-)			
b) Financial Segmentation	(+)	(+)		
c) Earnings Heterogeneity				(-)
d) Income Composition		(+)		
e) Portfolio			(+)/(-)	
f) Savings Redistribution			(-)	

Note: The entries in the table show the effects on wealth / income inequality brought about by outright asset purchases via changes in interest rates, asset prices, inflation and unemployment. (+) means that inequality increases, while (-) means that inequality is reduced.

2. DISTRIBUTIONAL IMPLICATIONS OF LARGE-SCALE ASSET PURCHASES IN THE EURO AREA

In January 2015, the ECB extended its previous asset purchase programs – the covered bond purchase program 3 and the ABS purchase program – with a purchase program for government bonds as well as bonds of euro area institutions and agencies. Overall, the extended asset purchase program comprises monthly purchases worth 60 billion euros and is scheduled to last until at least September 2016.

To assess the likely consequences of the ECB's extended asset purchase program on the income and wealth distributions in the euro area, we proceed in two steps. First, we discuss in how much the ECB's asset purchases may potentially affect inflation, interest rates, asset prices and economic activity. Since the latest asset purchase program is in effect only since March 2015, we review evidence for similar programs conducted by the Bank of Japan (BoJ), the U.S. Federal Reserve (FED), and the Bank of England (BoE). The asset purchase programs of all three central banks have generally been directed towards long-term, fixed-income assets such as government bonds, or mortgage-backed securities. Second, we consult the relevant literature plus the Household Finance and Consumption Survey (HFCS), which provides detailed household-level balance sheet information for about 62,000 households in the euro area with reference year 2010, to assess the likely impact of the changes in inflation, interest rate, asset prices and real economic activity on the wealth and income distributions in the euro area.

2.1. Redistribution induced by changes in long-term interest rates

QE and long-term interest rates

Large body of literature addresses the direct effect of central bank outright purchases on long-term interest rates. One strand of the literature uses event studies to investigate the impact on announcement dates, while a second strand attempts to capture the persistence of interest rate declines in response to outright purchase programs using structural vector autoregressive (SVAR) models.

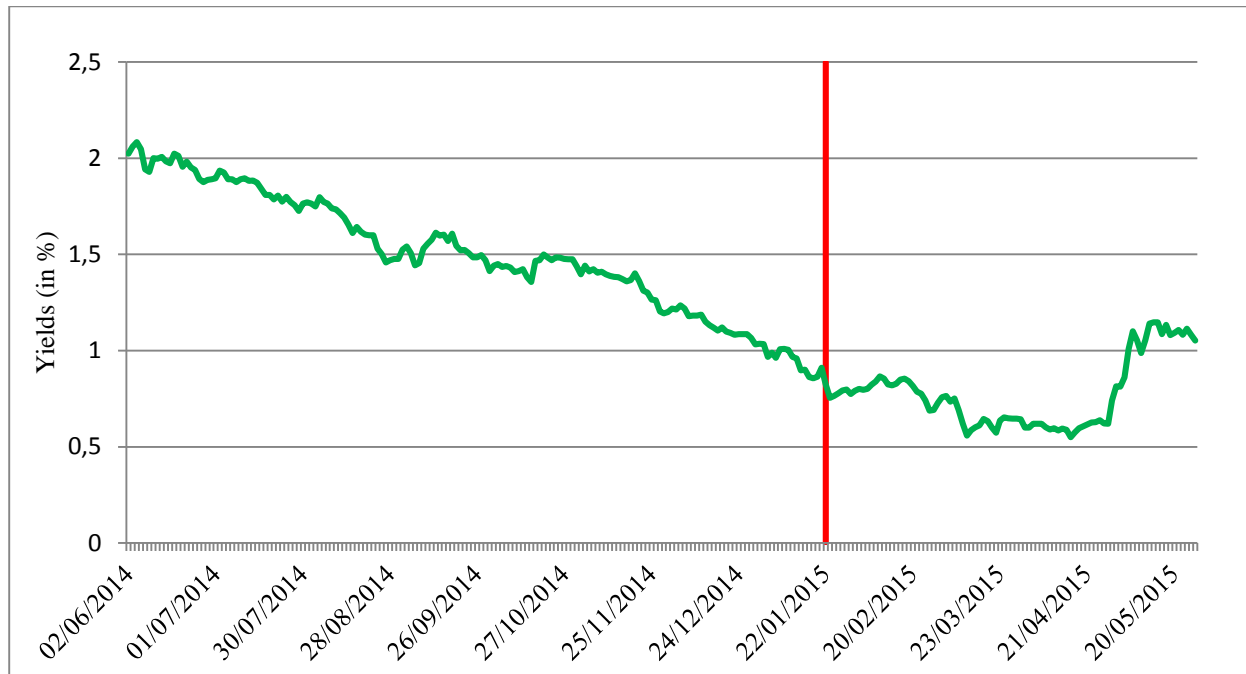
Most studies find sizeable declines of long-term government bond yields on announcement days. For the U.S., Gagnon *et al.* (2011) and Meaning and Zhu (2011) report a cumulative decrease in 10-year U.S. government bond yields over all ten announcement days ranging from 80 to 91 basis points (bps). For the UK and Japan, the interest rate effects are somewhat smaller: 10-year government bond yields for the U.K. decreased by only around 50 bps (Meaning and Zhu, 2011; Glick and Leduc, 2011), whereas 10-year Japanese government bond yields declined by about 25 bps (Glick and Leduc, 2011; Lam, 2011). Gabriel and Lutz (2014) estimate that mortgage yields decreased to a similar extent as 10-year government bond yields and exhibit a comparable persistence pattern.

However, most studies also find that the announcement of the first outright purchase program was associated with the largest effect on long-term yields (Krishnamurthy and Vissing-Jorgensen, 2011). Martin and Milas (2012) attribute this finding to two reasons: First, yields were already at a relatively low level when subsequent programs were implemented in the USA and UK; thus they could not decline much further. Second, the commitment effect to hold interests low for a prolonged period has only been substantial news for the first round of QE.

To investigate the persistence of interest rates effects, Wright (2012) and Rogers *et al.* (2014) study the effect of asset purchase shocks via SVARs. For the U.S. bond market, their estimates indicate that interest rate changes were highly persistent, lasting for more than one year. For the U.K., however, the effects died off much more quickly.

As Figure 3 indicates, the recent outright purchases by the ECB have likely supported the negative trend in bond and credit yields; something underway since 2012. Following the announcement, the average Euro area 10-year government bond yields dropped by around 7 bps, and continued to decrease until the beginning of May. Since bond yields were already rather low before the announcement of outright purchases, an interest rate reduction in the magnitude of the U.S. experiences was unlikely.

Figure 3: 10-Year Government Bond Yield (euro area weighted average), announcement date of ECB's LSAP (22.1.2015) shown in red.



Source: Thomson Reuters, Datastream

Long-term interest rates and inequality

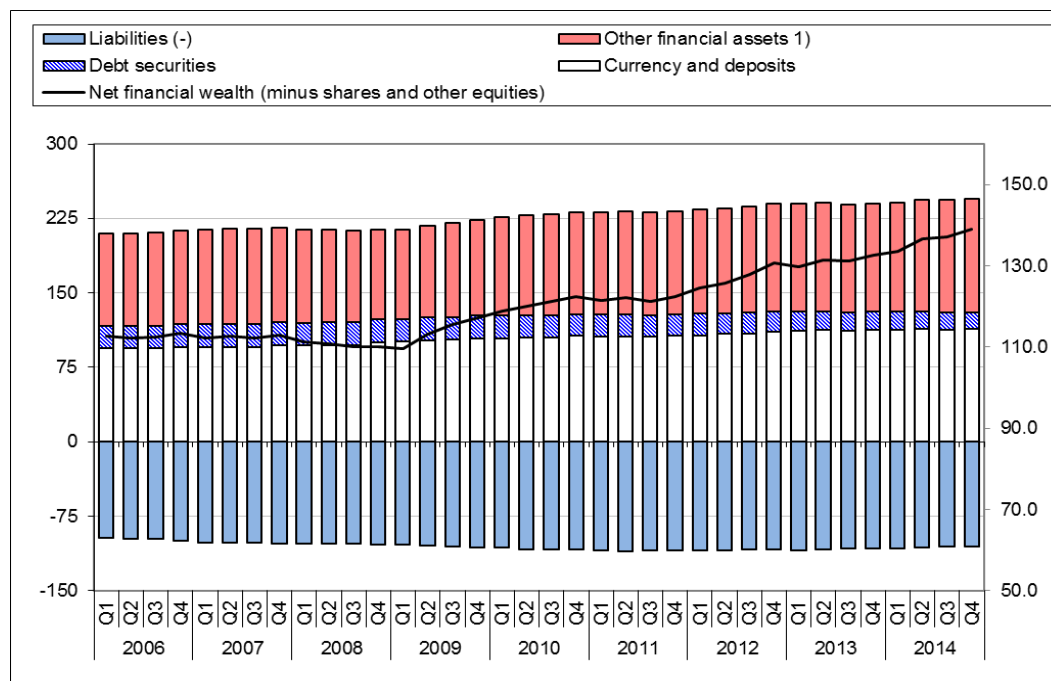
Lower long-term interest rates induce first-round distributional effects from savers to borrowers via the interest rate exposure channel. As one can see in Figure 4, households in the euro area are, on aggregate, net interest rate receivers. Overall, holdings in interest bearing assets such as deposits, debt securities and other financial assets exceed households' liabilities. On aggregate, European households' net wealth decreases with a decrease in interest rates holding all else equal.

However, interest bearing asset holdings and liabilities are not evenly distributed among households. For some households their liabilities exceed their interest bearing asset holdings and they will therefore benefit from falling interest rates; for other households it is the other way around. The Eurosystem Household Finance and Consumption Survey (HFCS) shows that indebtedness, both in nominal terms and relative to total assets, is negatively related to household income and the age of the households' reference person. Approximating interest rate exposure by subtracting deposit, bond and private pension insurance holdings from total debt, we can tentatively conclude that the young and low-income households will profit from interest rate reductions, while the older and medium- to high-income households are likely to experience income losses as a consequence of further interest rate reductions.

However, this rough proxy for interest rate exposure sets an upper bound. Given that mortgages constitute an important part of household balance sheets in the euro area, making up 63 percent of the total debt, and taking into account that around 55 percent of these

active mortgage contracts are fixed-rate mortgages (Ehrmann and Ziegelmeier, 2014), the effect of further interest rate reductions on indebted households will be limited.

Figure 4: Households' interest bearing assets and liabilities in the euro area



Source: European Central Bank and authors' calculations.

Taken together, this implies that even if the ECB can induce further reductions in long-term interest rates, such reductions may have only limited distributional effects. However, if such distributional effects take place, they are likely to lead to losses of older and medium- to high-income households and benefit younger and low-income households.

2.2. Redistribution induced by changes in asset prices

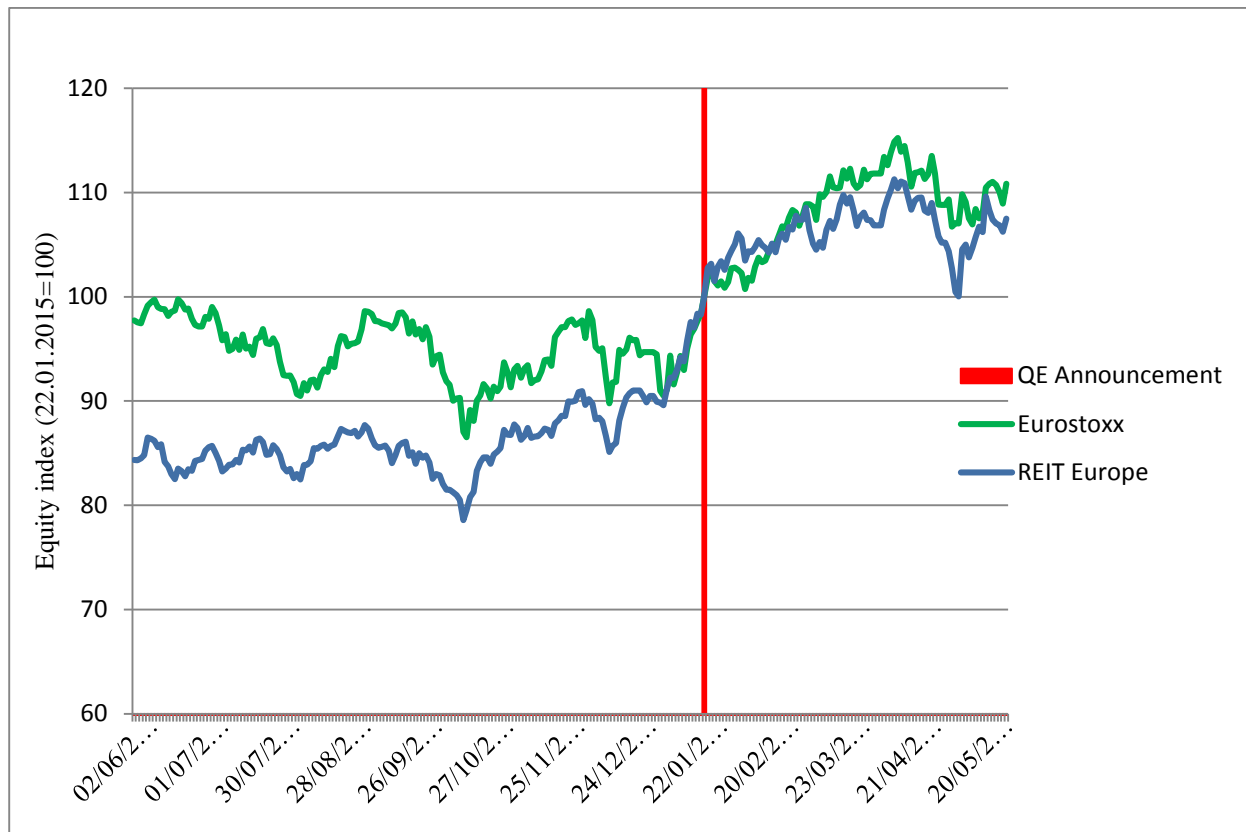
QE and asset prices

The effect of LSAPs on asset prices has, so far, not been studied to a large extent. Rogers *et al.* (2014) find different responses of equity prices following expansionary unconventional monetary policy shocks across countries: While U.S. stock prices increased by 0.86 percent in response to the monetary policy announcement by the FED, announcements by the BoE and the Bank of Japan seem to have had no measureable effect on stock prices in the U.K. and Japan, respectively. These results are confirmed by Fratzscher *et al.* (2013) for the U.S., by Rosa (2012) for the U.K. and Arai (2013) for Japan. Gabriel and Lutz (2014) estimate that stock prices increase by around 12 percent in response to an unconventional monetary policy surprise which reduces the 10-year Treasury yield by 25 bps. This jump is highly persistent. Comparing these findings to those of Bernanke and Kuttner (2005), the authors conclude that unconventional monetary policy surprises have a much stronger (by a multiple of four) effect on asset prices compared to conventional monetary policy surprises that lower the short-term rate by the same magnitude. The authors further estimate the response of returns on real estate investment trusts to LSAPs surprises, finding even stronger increases by about 20 percent compared to general stock indices.

Thus, overall, there seems to be evidence that outright asset purchases by the central bank have strong and lasting effects on the prices of assets such as equity and housing. Similarly, substantial increases in European stock market prices (10.8% for the Eurostoxx index) have been realized since the ECB announcement of the large-scale asset purchase program on

January 22, 2015 (Figure 5). Data for house prices is not yet available, but data on real estate investment trusts (REITs) allows a preliminary assessment. Since the QE announcement the REIT Europe has increased as well, but with roughly 7.5 percent slightly less than the average market. Figure 5, however, reveals that asset purchases have likely been anticipated, as both series started to strongly increase already around January 5, 2015.

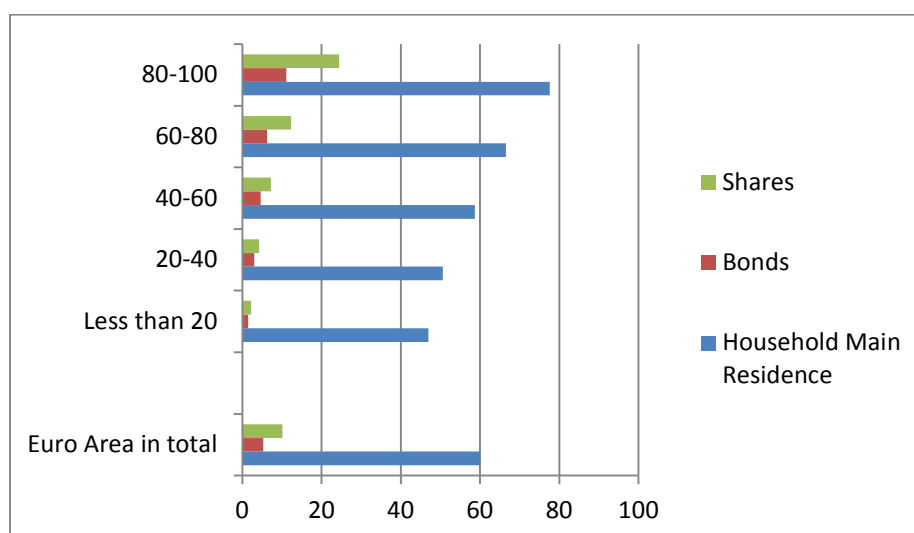
Figure 5: Leading equity price index and REIT for the euro area



Source: Thomson Reuters and Euronext

Asset prices and inequality

Figure 6 shows the share of euro area households that hold part of their wealth in bonds, equity and housing. With a participation rate of 60 percent, investment in household main residence is the most popular of the three asset categories. In contrast, only around five and ten percent of euro area residents invest in bond and in equities, respectively. Participation in all three asset classes increases with household income. Participation in shares is highly concentrated among top income earners. Bond holdings are of lesser importance for all income quintiles. These distributions indicate that primarily equity and house price increases will increase income and wealth inequality and to lesser extent changes in bond prices.

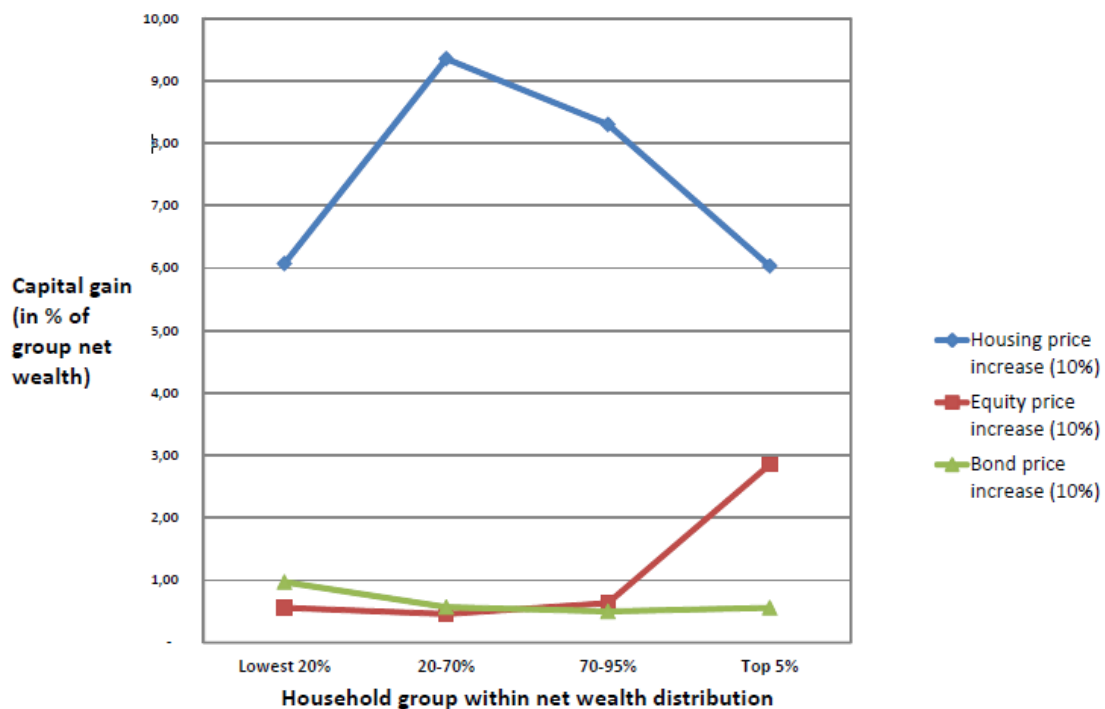
Figure 6: Asset participation by income quintile (in percent)

Source: The Household Finance and Consumption Survey.

This result is partly confirmed in a recent study by Adam and Tzamourani (2015). Using the HFCS data, they study the distributional consequences of a 10 percent increase in house, bond and equity prices, respectively. They find that bond price increases do not seem to have a significant distributional effect on household wealth. Furthermore, capital gains due to bond price increases are rather small, which is in line with the low participation rate in this asset category; a ten percent increase in bond prices raises net wealth by less than one percent on average. Adam and Tzamourani (2015) confirm that capital gains from equity holdings are highly concentrated within the top 5 percent and that stock price increases of ten percent induce an increase in net wealth in this household group by roughly three percent (Figure 7). These results turn out to be very homogenous across all individual euro area member states.

Adam and Tzamourani (2015) further confirm that capital gains arising from a ten percent house price increase are much larger, ranging between six and ten percent of net household wealth. Interestingly, middle class and upper middle class of Euro Area households benefit the most, while relatively poor and rich households benefit (relative to their net wealth) less from housing price increases. This is due to fewer poor households owning houses and because richer households hold a smaller proportion of their wealth in housing compared to the middle and upper middle class.

Thus, the observed increases in equity prices in most European countries that were observed in response to the ECB's outright purchases are likely to have increased net wealth inequality. Since the participation in all three asset categories also tends to rise with the age of the household's representative persons, one may tentatively conclude that equity price increase not only redistributed wealth from low- to high-income households, but also from the young to the old. The recent bond price increases had probably only a negligible impact on net wealth increases. The effect of house price increases on overall income and wealth distributions is unambiguous, though.

Figure 7: Capital gains across euro-area net wealth groups

Source: Adam and Tzamourani (2015), p. 6.

2.3. Redistribution induced by changes in inflation and economic activity

QE, inflation and real economic activity

During long-lasting financial and economic crises, price developments are often very weak and inflation deviates downwards from the central bank's inflation target. The ultimate objective of the ECB's asset purchase program is to spur economic activity and to bring both inflation and inflation expectations back to the target level of close to two percent. The impact of asset outright purchases programs on inflation and real economic activity are difficult to assess due to the limited amount of data available since the beginning of these programs. A possibility to circumvent this issue is to rely on counterfactual simulations. For example, Baumeister and Benati (2010) find that given the above described impact of outright purchase programs on long-term yields, the FED and BoE measures have likely averted significant downward risks to inflation and output. In particular, they observe that for the U.S. and the UK, large-scale asset purchases by the central banks have kept the economy away from deflation and softened output contraction a considerable extent. In specific, the authors' best estimate suggests that U.S. GDP growth was held at -6 percent in 2009Q1 instead of -10 percent without the LSAPs and inflation was about 1 percent higher than under the no-response scenario. The estimated gains for the U.K. are even larger with output shrinking by only about 8 percent instead of 13 percent and a short deflationary period with -1 percent price increases instead of -4 percent. It is important to keep in mind, however, that their results are based on the assumption that the respective central banks have been able to successfully lower long-term yields by around 60 bps in the U.S. and 50 bps in the U.K. Similarly, Chung *et al.* (2012) find in their simulation study that the first asset purchase program by the Fed lowered the unemployment rate by 1.5 percentage points and helped to avoid severe deflation.

Studies attempting to identify unconventional monetary shocks in the data in order to study the initial and long-run effects on both inflation and output, find less pronounced effects. For Japan, Schenkelberg and Watzka (2013) find that output and inflation respond positively to expansionary unconventional monetary policy; however, the output level is raised only with a lag of about 20 months. This casts some doubt on the findings of Baumeister and Benati (2010) who claim that unconventional monetary policy exerts an immediate effect on output and inflation.

All in all, there is some tentative evidence that shows that inflation and economic activity may respond positively to LSAPs. However, the size of these effects is difficult to assess and it depends crucially on the magnitude of the reaction of long-term interest rates. While one may conclude that previous QE measures have likely helped avoid a larger recession and further job losses, it is uncertain whether the ECB's purchase program will bring about a reduction of long-term interest rates sufficiently strong to bring inflation back to target in the near future.

Inflation and real economic activity on inequality

Adam and Zhu (*forthcoming*) estimate the redistribution effects from unexpected price level movements in the euro area following the approach of Doepke and Schneider (2006). They compute the net nominal positions (NNP) of the household, the firm and the government sector using data from the HFCS and the Euro Area Accounts (EAA). The NNP measures the net inflation exposure of a sector arising from ownership of nominal claims and liabilities. They show that households' inflation exposure varies systematically across euro area countries. Households in traditionally high-inflation countries, such as Greece, Portugal, Slovakia, Slovenia and Spain, hold lower nominal exposure compared to households of traditionally low-inflation countries, such as Austria, Belgium, Germany, Finland or France. This implies that households' wealth in the latter group of countries is usually more affected by unexpected price increases.

Moreover, Adam and Zhu (2015) find that relatively young middle class households, which turn out to be net borrowers, are net winners of unexpected inflation, while older and richer households tend to lose. As a result, wealth inequality in the euro area decreases with unexpected inflation. However, they also find considerable heterogeneity across the individual EMU countries. In some countries, i.e. Germany, Austria and Malta, inequality increases due to the presence of relatively few young borrowing households.

Ampudia *et al.* (2014) combine household-level data from the HFCS with country-level aggregate time series and analyse the impact of unemployment on income. They find that an increase in the unemployment rate results in a significant drop in mean and median household income. However, their simulation method preserves some information on the heterogeneity across household characteristics. Low-income households are much more likely to become unemployed in adverse economic situations and also experience larger drops in income than higher income households.

As such, the likely stabilization effect of the asset-purchase program of the ECB might help to improve primarily the employment and income situation of low income households, which will induce a decline in income and wealth inequality.

2.4. Overall Impact

The overall impact of large-scale asset purchases by the central bank on wealth and income inequality is ambiguous given the various transmission channels discussed above. So far, only a few studies investigate the overall effect of asset purchase programs on inequality. An in-depth study by Coibion *et al.* (2012) evaluates the effects of conventional monetary policy shocks and concludes that, contrary to popular concerns, it is rather a contractionary monetary policy shock that leads to an increase in inequality. However, it is questionable whether these findings can be directly translated to outright purchase programs. In particular, as asset valuation effects are likely to be much more important for an outright purchase program than for conventional monetary policy measures, it is very possible that also the distributional effects of both policy tools differ largely. This perception is confirmed by the study of Saiki and Frost (2014). The authors focus solely on the period of unconventional monetary policy and quantitative easing in Japan since the second quarter of 2002. In this period they find that outright purchases widened income inequality.

3. CONCLUSION

The announcement of the ECB's extended large-scale asset purchase program was widely applauded by financial market participants and economic policy circles across Europe. Outright purchase programs have become an important policy tool to circumvent the initial stages of the monetary transmission process when further monetary stimulus is needed and policy rates have already hit the zero lower bound. The programs have a common goal in reducing long-run interest rates and boosting asset prices to spur economic growth. Although intended, the recent boom in asset prices has raised concerns about undesirable distributional side effects that may increase income and wealth inequality.

Assessing the effects of purchase programs in the US, the UK and Japan with respect to their intended effects, the literature finds that the very first programs at the beginning of the global financial crisis were the most effective at bringing down long-term interest rates. This is likely due to the fact that interest rates at the time were quite high. Against this background it is rather unclear whether the ECB's purchases will produce sizeable effects on long-term interest rates. Therefore it is also unclear whether the program will produce a sizeable and long-lasting effect on real economic activity. The development of inflation rates in the euro area has shown some slight improvement since the beginning of the program, but it is unclear to which extent these developments can be directly attributed to the ECB's asset purchases or whether they are a consequence of a general improvement in euro area-specific economic conditions and global macroeconomic factors, such as recent oil price developments.

However, given recent developments in equity markets across euro area countries, it seems that the purchases have already led to a strong increase in asset prices, thereby helping asset prices remain rather elevated.

With respect to the distributional side effects, even a sizeable reduction in bond yields is, in itself, unlikely to have strong distributional effects in the euro area. This is due to households holding only a small part of their wealth in the form of bonds. In case the ECB's purchases help strengthen real economic conditions, they probably reduce inequality as they help the less wealthy, low-income households that tend to be more-than-proportionally affected by income losses and unemployment during a recession. Finally, the pronounced increase in asset prices that has been observed since the introduction of the asset purchase program, however, has likely exacerbated any prevailing income and wealth inequality in the euro area. This is due to the fact that especially high-income households hold a large part of their wealth in financial assets.

Overall, this implies that the distributional consequences of the ECB's asset purchase programs are ambiguous. Once the program helps to stabilize and improve real economic activity, it will first and foremost help those at the lower tail of the wealth and income distribution; but as the impact of purchases is, at the moment, primarily felt in financial markets, the purchases are likely to aggravate inequality. The benign neglect shown by central bankers for the distribution of income and wealth is therefore appropriate once asset purchases indeed bring inflation back to target, thus boosting aggregate demand and income. In this case, one may tolerate any counteracting effects on wealth and income inequality brought about by elevated asset prices. However, once the purchases fail to have substantive impact on the real economy and on the inflation rate, central bankers have to start rethink their attitude towards potential distributional side effects of their policies.

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DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Quantitative Easing: Side effects in the financial markets, in inequality and in the risk of secular stagnation

Andrew HUGHES HALLETT

IN-DEPTH ANALYSIS

Abstract

This paper reviews the implications of Quantitative Easing (QE) for the distribution of income and wealth, and for the channels by which it affects the working of an economy. We start with a discussion of how QE stimulates an economy through low interest rates, increased liquidity and credit, higher asset prices and increased wealth effects. This raises the obvious concern that asset purchases and liquidity injections will favour the financial firms and owners of capital over labour income: thus high income groups over low income groups, borrowers over savers, current pensioners over future pensioners, non-taxpayers over taxpayers.

We find there are a large number of redistribution and inequality mechanisms in play. Income and wealth inequalities are the most obvious, and appear to have been unexpectedly strong. They reflect the principle side-effect of QE, which is the stabilisation of the financial markets (the result of large liquidity injections). There are also important intergenerational transfers by virtue of asset ownership and in the pensions sector. Redistribution of the burden of taxation is comparatively unimportant, but there are interesting bi-products in the form of lower costs of government and reduced trading costs. Spillovers on neighbouring economies are likewise probably benign; and a consideration of the risk of secular stagnation (QE being necessary, but not sufficient to kick start a recovery) brings transmission repair and regional inequalities to the fore with QE acting as a form of "monetary federalism".

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EXECUTIVE SUMMARY

- Quantitative Easing (QE) is a form of monetary policy in which market interest rates are reduced differentially at different maturities – principally at longer rates which affect investment and household consumption decisions. It is designed to stimulate spending by increasing broad money holdings, pushing up asset prices, producing wealth effects, lowering borrowing costs and stimulating expenditure.
- The experience of those who have tried QE (US Federal Reserve, Bank of England, Bank of Japan) is fairly uniform: small but significant increases in GDP of $\frac{1}{4}\%$ - $\frac{1}{2}\%$ each year; and 10-year interest rates lower by $\frac{1}{4}\%$ - $\frac{3}{8}\%$. But the impact on prices and inflation has been negligible ($<0.1\%$) in each case.
- If the execution and impact of QE are now well understood, the side effects are not. Since QE has to work through asset prices, investment and wealth effects, the side effects inevitably have inequality and redistributive consequences.
- Large scale asset purchases inject extra liquidity into the financial markets, reducing financial stress, lowering uncertainty, stabilising financial institutions and easing portfolio rebalancing away from risk. This reduces the risk of financial disruption.
- Lower interest rates and abundant liquidity will benefit investors, banks, firms, mortgage holders more than savers, employees, or pensioners. But compared to a world without QE, most people will be better off: unemployment would have been higher, more firms would have closed and growth would be lower.
- Direct effects on wealth are important. Rising asset prices will boost dividends and reduce defaults/bankruptcies. In individual cases it depends if the individual is a net asset holder (typically those later in life) or a net liability holder (early in life). So even if QE brings gains for the economy as a whole, there will be important intergenerational transfers and rising intergenerational inequality.
- To give an idea of the scale of the changes, the gains to the top 5% in the wealth distribution in the UK were 13 times bigger than the gains for the other 95%. And the older generation (over 45) gained 26 times as much as the younger generation.
- Within pension funds there is some redistribution of wealth to current pensioners at the expense of future pensioners, but in the long term the QE effects are neutral. However, if a declining birth rate is the origin of a declining or aging population, the intergenerational transfers not only put an extra burden on the younger generation, but an increasing burden as time goes on.
- By expanding the size of the overall market for asset trades, QE has increased pricing efficiency and lowered the cost of government.
- Initially QE transfers income to investors, away from taxpayers; but later, as bond markets become more efficient, there is a transfer back again as excess profits are removed and because more efficient pricing leads to lower trading costs.
- A bond default is no risk to taxpayers, but may have implications for inflation.
- Investors, specifically insurance or pension companies, enter riskier investments in search of higher returns to offset QE's lower yields on safe investments. Prudential regulation and higher capital ratios are needed to counter this tendency.
- Under QE, structural reforms may be delayed or postponed. But for those reforms to take place at all we need liquidity, credit and fiscal space. This is what QE provides.

1. INTRODUCTION

1.1 Unconventional monetary policies

The impact of monetary action on the economy depends on the level of long-term interest rates, being the rates that determine household consumption and business investment decisions. Conventionally, expansionary monetary policy stimulates the economy by buying short-term government bonds in order to lower short-term interest rates and/or changing overnight lending rates in the interbank market. Arbitrage then provides the transmission from short-term to long-term rates via the yield curve, which balances rates of return vs. those on other assets of similar maturity and the risk of inflation at that maturity. But when policy rates hit the zero lower bound level, or are close to it, variations in conventional monetary policy become disabled and inoperative on the expansionary side.

Unconventional monetary policy actions are based on the idea that the central bank can still stimulate the economy when monetary policy has become ineffective by intervening to change long-term market rates, as opposed to the short-term policy rate. Monetary policy may attempt to lower market rates directly by undertaking large-scale asset purchases (quantitative easing); or indirectly by forward guidance designed to boost expectations of policies which are designed to create better outcomes in the future.

1.2 Transmission channels

Quantitative easing is designed to stimulate spending by increasing broad money holdings, pushing up asset prices, producing wealth effects, lowering borrowing costs and stimulating expenditure. This portfolio rebalancing process, activated by quantitative easing, lowers “the spreads of longer-term interest rates over expected short-term policy rates....and the required return on risky assets relative to risk-free assets”: Joyce *et al.* (2011).

This portfolio balance channel is the main policy transmission mechanism of concern to QE. There are others, each of which will also be touched on: the signalling channel (a commitment to keep future policy rates low); the liquidity-credit channel (the translation of greater liquidity and more stable financial markets into credit and loans); and the exchange rate channel (a depreciated exchange rate and increased exports). Since they operate at the same time and alongside the portfolio rebalancing effects, these additional channels produce important side-effects to the main thrust of quantitative easing.

However, even if it is fair to say that the execution and impact of QE are now comparatively well understood (a summary appears in section 2), the likely side effects are not. And if QE has to work through asset prices, and investment or wealth effects, then those side effects will inevitably have serious inequality and redistributive consequences. The implications of these QE consequences are analysed in sections 3 to 7.

2. QUANTITATIVE EASING: PERFORMANCE AND COSTS

2.1 Quantitative Easing by Large-scale Asset Purchases

The foundation of unconventional policies is that financial markets are neither perfect nor complete. Therefore arbitrage tends to work in an imperfect way, depending on expected future interest rates as well as on the preference for short-term over long term assets – a preference that tends to rise in times of financial distress or uncertainty.

In such circumstances, monetary authorities can purchase significant quantities of Treasury securities of longer maturity, or mortgage-backed securities or corporate bonds, altering their relative supply vs. demand. This raises bond prices and lowers interest rates at that maturity. These effects then extend to other longer-term assets as investors who just sold securities to the central bank move to invest in substitutes that are closer to the asset sold than cash, thereby adding to the downward pressure on longer-term interest rates further along the yield curve or in neighbouring markets. Using this portfolio balance or “ripple” effect (Tobin, 1958), the central bank is able to affect both the spread of long-term interest rates over policy rates (term premium) *and* the required return on risky assets relative to risk-free assets (risk premium). Monetary authorities are thus able to manipulate the interest rates relevant to consumption and investment spending.

The policy process described above is an example of the quantitative easing implemented by the U.S. and others after the financial crisis. Available data confirm the impact of this policy channel. In the U.S., before quantitative easing, there was an average excess term premium of almost 200 basis points for securities with a 10 year over a 9 year term. This excess premium then dropped by 75 basis points as a consequence of quantitative easing. Other determinants of the long-term interest rate were less important (Fawley and Juvenal 2012). In the UK, quantitative easing reduced the spread of corporate bonds over gilts by between 2000 and 200 basis points after 2009, and the yield on 10-year gilts from 5% to 2% (Miles, 2012). Thus the ripple effect to neighbouring markets, other maturities, and in particular to reducing risk premia was quite strong. The question is, how much did those changes translate into gains in output and employment, or losses in inflation?

The answer is again fairly consistent. A range of estimates for the US, reported in Williams (2011), suggest that these QE policies reduced interest rates by between 0.15% to 0.3% points in this period – which corresponds to having increased GDP by similar amounts or perhaps a little more. That is a valuable contribution, but not large.

In the UK, QE is estimated to have added 3% to the level of GDP over the 6 years since 2009 compared to what would have happened otherwise, with negligible effects on inflation [0.1% or less in the three economies where QE has been used: US, UK, Japan]¹. Thus, real output is higher by ½% on average each year; equivalent to an extra 0.4% on the growth rate. However, unemployment typically follows output with a one to two year delay. Hence QE operations may take a year or more to achieve their full effect on the economy.²

2.2 Credit Easing vs. Quantitative Easing

According to former Fed Chairman Bernanke, we can classify unconventional policies into quantitative easing and credit easing. The former refers to money injections from the Fed through commercial banks. The latter where the central bank provides liquidity to economy bypassing financial intermediaries, by buying private-sector assets such as corporate bonds

¹ Kapetanios *et al* (2012); Joyce *et al* (2012); Bank of England (2012).

² The results for output (but *not* inflation) were less favourable in Japan where circumstances were different: see my earlier paper on quantitative easing (Hughes Hallett, 2015). QE has also been effective in other countries by promoting financial stability (Santor and Suchanek, 2013; Fratzscher *et al.*, 2013; Carpenter *et al.*, 2013).

or residential mortgage backed securities. Included in this definition of credit easing are subsidised loans, cheap loans, funds for lending, or *direct* liquidity provision to the markets. This credit easing channel is particularly important where there are liquidity restraints in the banking system which would prevent any money injections from being transformed into loans to households and firms; or when banks are thought more likely to use the extra liquidity provided by QE to pay off their past debts, or raise their capital or liquidity ratios (as they are required to do under the new financial regulation arrangements associated with Basel III, Dodd-Frank or the EU's new banking union). Ways to resolve this apparent conflict, a side-effect of QE that has strong distributional consequences because it serves to undo QE's favourable effects on output, employment and firm survival, while helping the financial markets and owners of capital, are treated in section 7 of this paper.

2.3 Exit Strategy

In May 2013, Fed Chairman Ben Bernanke announced his exit strategy from the Fed's expansionary QE stance. It was a necessary step to counter expectations of future inflation, to assure the markets that the Fed would indeed exit QE in due time, and that expansions of the Fed's balance sheet would not continue to generate inflationary pressures.

This hit financial markets negatively which had assumed that the era of low interest rates was now past. He had to correct his announcement to signal that the current stance would not be abandoned until the Fed's targets (in terms of either unemployment and growth or inflation) were reached. This should have been unnecessary since Chairman Bernanke had already explained publically that there would be an exit strategy and why; defined how it would work; and then carried out a test and published its results

Further Fed announcements of a gradual tapering of the size of quantitative easing followed in December 2013/January 2014. This also had negative effects, this time on international financial markets because of the implied shifts in interest rate differentials in favour of the U.S. In October 2014, quantitative easing was discontinued as a result of improvements in the economy and the exit began.

2.4 Redistributive Side-effects: Inequality vs. Potential Costs

Unconventional monetary policies may have important consequences for income and wealth distributions in the long run, especially if those policies last a long time. The impact of quantitative easing on inequality is a case in point, and a source of debate since QE can affect the distribution of wealth through many channels. No monetary policy, conventional or unconventional, is a neutral policy action. Lower long-term yields benefit borrowers over savers, portfolio rebalancing favours equities over bondholders. Both create wealth effects. Lower interest rates benefit investors, owners of capital over labour, home owners over renters, consumers over pensioners, exporters over importers, irrespective of the instrument chosen to conduct the policy. Large corporations are one of the main beneficiaries of quantitative easing since they can borrow more cheaply, buy back their own stock, or retire past debt. In another example, rising asset prices benefit current pensioners over future pensioners who face lower returns on their contributions to the pension fund – a matter of some importance and concern in an era of ageing (and often declining) populations. At the same time, reducing the funding costs of public debt will benefit taxpayers over non-taxpayers; also higher taxpayers over lower taxpayers in a progressive tax system.

Large-scale asset purchases and unconventional policies more widely are not a free lunch; they have potential costs. Apart from the effects on financial stability and redistribution, extended balance sheets expose central banks to potential losses and imply greater risks to the economy (Carpenter *et al.*, 2013), although this is unlikely to affect tax payers much (de Grauwe, 2015). Portfolio rebalancing can increase vulnerabilities in the financial system too,

and thereby undermine financial stability in the long run. In fact, it could lead to excessive risk taking in insurance companies and pension funds, which need to hold long-term assets in their portfolios and need to match their investment returns to their long-term liabilities (Carney, 2010) – difficult in an era when yields are being pushed down.

The extent of the costs associated with quantitative easing depends on the exit strategy designed to reverse QE's effects; on the form of financial regulation that replaces unconventional policies in normal times; and on how this process is communicated and understood by the public. Moral hazard can also arise as a consequence of unconventional policies. For example, commercial banks and financial intermediaries may increase liquidity risk by relying on central bank intervention. And the success of quantitative easing may delay or postpone structural and regulatory reform, thus reducing the effectiveness of future monetary policies. Similarly large-scale asset purchases may undermine central bank credibility, independence and hence inflation control, to the extent that they are thought to be a form of permanent government financing designed to sustain large structural deficits.

Given small economic impacts, the indirect effects of extra liquidity, stability in the financial markets, less uncertainty, and an easier rebalancing of balance sheets away from risk and insolvency, are likely to be the most important benefits of QE. In particular, a judicious choice of assets to be bought can be used to reduce risk premia on the debt of distressed governments or on corporate bonds in distressed sectors (given that market imperfections, inefficiencies or frictions must have caused the risk premia in the first place). This offers a way to reduce borrowing and refinancing costs for governments or businesses in depressed areas. The central bank has therefore to decide whether its first priority is to promote general recovery, or to design policies to relieve depression in poorly performing areas. This highlights the inevitable tension between policies designed to steer the economy as a whole vs. policies designed to reduce *regional inequalities*. These are not mutually exclusive options, but we need to achieve a balance between them.

3. SIDE-EFFECTS IN THE FINANCIAL SECTOR

The immediate counterpart to QE's asset purchases is large injections of liquidity into the financial system. What effect does that have; and where should the injections be placed?

To the extent that QE reduces the risk premia in corporate bonds, or on bank loans, or on loans to regional or national governments, it will have an important impact on the cost of borrowing and growth prospects in the economy – over and above what may have been achieved in the underlying market interest rate. Indeed, some (eg Gagnon *et al* 2011) have argued that this is the more important part of a QE programme in practice. Obviously this has to do with liquidity provision, and QE's ability to stabilise fragile or dysfunctional financial markets. It also raises a difficult question for the Euro area: which assets should the ECB buy in its QE operations? Evidently it should go beyond core government bonds and include corporate bonds and those of the distressed governments if it is to rebalance the playing field in terms of commercial borrowing costs and regional inequalities. But it should focus on a spread of bonds if the priority is to revive a deflating Euro area economy. I stress the former approach in view of the need to counteract QE's natural and obvious tendency to boost and redistribute activity to more prosperous regions.

At the same time, QE has also meant that the risk of an asset price collapse, and the financial disruption that would follow, is dramatically reduced. Put differently, QE has a big (but hard to measure) effect in stabilising financial markets, while providing new liquidity, resolving dysfunctional financial markets and reducing uncertainty. In difficult or potentially deflationary times, this is a considerable advantage even if the direct impacts on GDP and prices are not very large³ – provided that the QE horizon is long enough, and the ECB's commitment to seeing the QE programme through is credible enough. Given that, QE will have important effects in terms of reducing risk premia for borrowers and those who would refinance their debts, be they in national government or in the corporate/private sector.

The logic of this comment is that the portfolio balance effects may be the more important side-effect of QE. If so, QE would be best implemented by buying assets, not from banks who would use the funds to deleverage their own debt position (in which case nothing will come from the easing); but from corporations or non-bank financial institutions more likely to buy corporate bonds or invest in assets which yield a return. Thus QE is probably most effective when markets are dysfunctional and not working efficiently, meaning that assets have become hard to substitute due to rigidities or credit/liquidity constraints. QE then has its effect through reducing bid-ask spreads, risk premia, trading costs, pricing "errors", rather than through lowering baseline market interest rates per se.

In summary, the financial side-effects of QE are: extending financial stability and providing extra liquidity to the financial sector in difficult times, lower risk premia, firmer and more credible expectations of the future, thereby lowering uncertainty, lowering market volatility, reinforcing commitment to a recovery, preventing premature raising of interest rates as the recovery takes hold, cheaper borrowing costs for distressed governments and businesses.

³ Some of the impact of QE will be dissipated by the demand that liquidity ratios should now rise (section 2.2).

4. CHANGES TO THE DISTRIBUTION OF INCOME AND WEALTH

The discussion above shows that quantitative easing can be expected to make significant changes to the distribution of income and wealth – generally but not always in the direction of the owners of capital, houses and financial assets, but away from employees, savers and possibly pensioners. Indeed, estimates for the UK suggest that 40% of the gains made by supporting asset prices have gone to the 5% wealthiest in the population (Bank of England 2012). That represents a significant rise in inequality.

To some extent the wealth effects of this change will mitigate the implied deterioration in the distribution of income. But it is important to be careful of the comparisons being made. Compared to history, low interest rates and abundant liquidity will benefit investors, banks, firms, mortgage holders more than savers, employees, or pensioners. But compared to what could have happened without QE, most people would be better off: unemployment would have been higher, more firms would have closed and growth would be lower. That would have damaged employees, savers and pensioners even more.

That said, income from savings is more tied to the central bank policy rate (not part of QE) and available estimates show that asset purchases have pushed the prices of equities and similar assets up by as much as bond prices. This implies the ripple effect is strong and that most of the impact of QE on consumption and saving will come through wealth effects.

4.1 Savings, Consumption, Wealth: rising inequality

The two biggest influences on savings and consumption spending in this context will be the loss of jobs (or reduced earnings) and expectations of inflation. In practice, QE has limited both – meaning that (savings) deposits are healthier than they would have been otherwise. Beyond that, lower interest rates reduce interest income and interest payments (for example, on mortgages or personal and small business loans). Since most savings deposits are at short-term rates, but QE operates at long rates, the *net* effect is that income gains from saving under QE are small but positive, meaning households typically gain in savings income. This is confirmed by Bank of England (2012, Table 1). There may be other factors: rising asset prices mean households with assets benefit more than those without. If the exchange rate depreciates, import prices may rise (hurting the poor if essential commodities are involved) but the owners of foreign wealth are better off.⁴

More important are the direct effects on wealth. Rising asset prices (and falling interest payments) will boost dividend payments and reduce defaults/bankruptcies. So the larger is the share of assets in household or corporate portfolios, the greater the gains from QE. And from there the greater boost to the economy from increased consumption spending or new investment spending (one hopes). However, this line of causality is reversible. In individual cases it depends if the individual is a *net* asset holder (typically those later in the life cycle) or a *net* liability holder (early in the life cycle). So even if QE brings gains for the economy as a whole, there will be important intergenerational transfers and rising intergenerational inequality behind the scenes.

Finally, to give an idea of the scale of the changes here, the Bank of England assessment of the gains in net wealth in the UK was 16% by mid-2012, or £600bn (£10000 per head). If the top 5% have 40% of the assets, this means gains of £80000 per person went to the top 5%, and £6300 per head went to the bottom 95% (assuming the asset distributions were even in each group, which of course they are not). That means the rich gained by 13 times more than the poor. And since (from the same source) the over 45s hold 80% of the non-

⁴ But those who borrowed abroad will be worse off.

pension assets, the older generation must have gained roughly 26 times as much as the younger generation. The difference perhaps is that everyone gets a chance to be old, but not everyone can become rich.

4.2 Pension Funds: rising intergenerational inequality

To go further with the intergenerational redistributions, we need to know what happens to the pension funds themselves since they represent the capacity to pay future pensions.

There are two types of funded pension schemes: defined benefit (the payout is defined by final salary and length of service) and defined contributions (the payout is defined by the market value of the sum of contributions made during employment). Both may place a lump sum in an annuity fund on retirement whose value will not be much affected by QE since the higher asset prices at the moment of buying in, imply a bigger fund but a lower net present value of the yields/payout due per asset.⁵ These effects net out.

Defined benefit pensions: At this point the argument gets more complicated. Suppose we start with a scheme that is fully funded (that is, the assets held exactly match the expected net present value of future liabilities/out-payments). The typical pension fund portfolio contains 40% equities, 60% bonds; but the impact of QE has been to raise share prices as much as bond prices⁶. So we need to make no distinctions between asset types: arbitrage will make their prices and yields move by similar amounts when QE starts. At that point, the value of the fund's assets (bonds) will increase. But so will the net present value of the provision for the liabilities needed to be paid out as future pensions since the yield on those assets will have gone down. The subtlety is that the actual revenues will go down only to the extent that the underlying assets have been sold into QE. If the QE programme buys about one-third of the total bond issue in existence, plus one-sixth of the corporate bonds or assets reflected in share prices (UK figures; Steeley, 2015), then future revenues in the short term only fall by half the drop in yields caused by QE (the "unbought" assets continue to bring in what they did before in money terms). But **all** the asset holdings, including any replacement bonds or their cash value, will have gone up by the full amount; while the net present value of the cash needed to pay the promised pensions goes up by half that amount.

Hence the fund will move into a small surplus. But only temporarily since the unbought assets will mature in due course and will need to be replaced, if nothing else changes, by higher priced, lower yield in money terms assets. At that point the fund returns to balance. Similarly, if we exit QE, the process is reversed producing a temporary deficit and eventual balance, *ceteris paribus*. So in the long term QE has no effect, but in the short term there is a redistribution of wealth (and possibly higher pensions, if the fund so decides) to current pensioners at the expense of future pensioners – in a way that will not be reversed until QE is removed or all the maturity dates are passed.

If the same pension fund is underfunded (has net liabilities at the start), then the story is slightly different. Since the proportionate changes to the assets and net present value of the liabilities are the same, but the latter is larger in absolute value, the funds underlying deficit will increase in money terms. That means the movement to a temporary surplus described above will be smaller, or may never happen, depending on how large the initial deficit was. If the initial deficit is smaller than that temporary surplus, then the temporary surplus generated will be smaller. Otherwise the deficit remains, even if smaller than in the absence of QE. But in the long run we return to the same deficit, increased by the cost of funding the new pensions arising in the deficit period. So the intergenerational transfer from young to

⁵ We do not treat state pensions funded by taxes here since they are affected by changing tax revenues, not asset values: see section 4.3 for the tax effects.

⁶ Miles (2012); notice the strength of the ripple effect. The analysis here extends that in Bank of England (2012).

old remains, smaller in that a temporary surplus (if it should appear) could be used to offset the higher costs of the new pensions for a while.

Defined contribution pensions: Here the story is the same as for the defined benefit case on the asset side. But there is no obligation to pay any specific sums out; the future pension payments will simply be the market value of the fund at that point. If asset values rise with QE, then the market value of the fund goes up, but the yield on existing investments and hence the accumulation of that fund will be smaller. In efficient markets, those two factors net out. QE probably increases the efficiency of the bond markets in practice (see section 4.3 below), so we can assume the value of the fund remains broadly neutral. There are no additional short or long term intergenerational transfers in this case.

Weakening demographics: The concern here is that, if a declining birth rate is the origin of a declining or aging population, these intergenerational transfers will not only put an extra burden on the younger generation, but that it will be an increasing burden as time goes on.

4.3 Impact on taxpayers: more inequality, then more redistribution

We can get an idea of the differential impacts of QE on taxpayers and investors, and of the cost of government more generally, from a detailed study of the behaviour of the UK bond markets presented by Steeley (2015). The approach is to study of how the bond markets reacted to large scale asset purchases before, in, and between the different episodes of QE, relative to the large issues of new debt that were being sold into the markets at the same time to finance the economy through its financial crisis. Comparing yields in the two cases, we can see how the efficiency of pricing in the asset markets has developed – and hence whether the possibility of excess profits for investors, and/or increased tax liabilities for the taxpayers, arose from the interventions of QE itself.

Steeley finds that there is evidence of mispricing at the outset, and thus excess profits and transfers to investors, implying an increased tax burden on the taxpayers who have to foot the bill. Asset purchases are shown to have been inefficiently priced (too low), particularly on days when purchases and sales occurred together, which implies that the new debt was correspondingly *overpriced*. Hence the excess profits for investors and losses for taxpayers. But gradually, with the passage of time, these pricing inefficiencies were competed away and the potential excess profits fell below the cost of trading and vanished. Trading costs were also reduced as a side-effect of the increased competition in this now larger market for asset trades. Consequently, whereas initially there was an income transfer to investors and away from taxpayers as a result of QE; later on, as the bond markets became more efficient, there was a *net* transfer back again, that is from investors to taxpayers, because the opportunities for excess profits were removed and because more efficient pricing leads to lower trading costs in addition to cheaper borrowing costs. This then implies a net contribution, if small, to the budget and thus a lower burden on taxpayers overall.⁷

The bottom line here is that, by expanding the size of the overall market for asset trades, QE has increased the pressure of competition in these markets, lowered trading costs, removed price irregularities, and lowered the cost of government (in addition to reducing the cost of servicing existing debt).

These are beneficial side-effects of QE. But how do they arise? It appears that, at the start of QE, yields from the assets purchased, having risen, showed significant positive auto-correlated errors – implying that not all the information about the state of the market had been absorbed into the price, and that investors could still make profits by buying extra

⁷ In a progressive tax regime, this may translate into larger tax increases for higher rate payers (investors) at the start, but larger savings later on. If so, the size of implied income transfers each way would be moderated.

bonds or retaining them to sell later (inefficient pricing). That implies a transfer to investors and away from the government/taxpayers/central bank who then have also to pay higher yields to the investors than if the bonds had been priced fairly to start with. The same does not happen with new debt, so it is clearly a QE effect. Steeley shows that the potential excess return to investors was, on days when new debt was being issued as well, equivalent to about 50% on an annualised basis. So these transfers are not unimportant.

However, it is this positive autocorrelation effect which disappears in later QE periods and between QE periods. So the market evidently learns to compete away these low prices and higher returns. Pricing becomes efficient and the potential for excess profits goes away. At the same time, bid-ask spreads in these markets fell by one-half over the QE era, implying a big fall in trading costs. Not only does that show that the fall in trading costs contributed to eliminating the excess profits, making it easier to trade away price inefficiencies, but also that improved trading efficiency (lowering the cost of government) went along with improved price efficiency. In a second round effect, spreads with respect to other types of assets reduced also. Again, this makes the bond markets more attractive, reducing the cost of funding government and the burden on taxpayers.

An important component in this generalised shrinking of bid-ask spreads appears to be the size of the market owned by the central bank. The higher is that ownership, the more liquid the market and the less risk in holding assets – reduction in uncertainty that would make bonds more attractive and lower the tax burden.

5. SPILLOVERS TO PARTNER COUNTRIES

Quantitative easing clearly has an ability to affect countries linked by either trade or capital flows to an economy that decides to conduct QE operations. The most obvious channel is through the exchange rate: lower asset yields in the QE economy will prompt capital outflows and hence a depreciation of the domestic currency, and hence a loss of exports for the trade partners who face an appreciating currency in one of their export markets. This is clear to see in the Euro-zone; since QE was announced at the end of 2014, the euro has depreciated significantly (aided and abetted by a secular appreciation of the US dollar) and this may have been a significant factor in the recent upturn in the prospects for growth in the Euro-area. As such, this is an important side-effect of QE (good for the Euro economies, damaging for the trading partners) and should be taken into account when introducing QE.⁸

Nevertheless there are at least two reasons why the damage to outsiders may be less than one might think. First, if QE is to some extent successful in rescuing the domestic economy from recession and financial disruption, lowering the cost of capital, then domestic demand will not fall as much as it might have done and the demand for imports will be sustained allowing the outsiders to continue exporting. The exchange rate channel will be offset to a large degree⁹. Second, if falling yields at home trigger a capital outflow, these asset sales will themselves exert a countervailing upward pressure on interest rates that will limit the damage caused by the depreciating exchange rate. Instead, as Lavigne et al (2014) point out, the damage is more likely to come from the financial disruption caused by abrupt capital withdrawals from the smaller economies with less financial depth when QE comes to an end. This we have seen in Eastern Europe and the BRICS. It suggests the exit strategy needs to be carefully calibrated and communicated beyond Euro-zone markets.

Allied to that problem is that, with falling yields in the QE economies, investors will typically look for higher yield (more risky) investments elsewhere, transferring risk taking to other economies and easing monetary conditions in those economies against their will. Prudential regulation might limit this effect to an extent. But, like the issues in the paragraph above, it is a simply consequence of monetary easing of any kind, conventional or unconventional, not specifically a problem with QE. This supplies the conclusion for this section: Fic (2013) has shown that the impacts of QE have been 70% through reduced term premia and only 30% through lower risk premia and the incentives to pursue riskier types of investment. So the larger economies are likely to adopt QE anyway, despite the impacts on others.

⁸ According to Fratscher et al (2013), this has been an explicit concern of the Fed in designing its QE policies.

⁹ The consensus in the literature is in fact, that the revival of import demand outweighs the loss of exports. So the net effect is positive, the QE countries being larger than their trading partners: Lavigne et al (2014).

6. OTHER NEGATIVE SIDE EFFECTS

- a) A reduced default rate among firms means less constructive destruction as QE eases the depression, leaving a tail of unreformed “zombie” firms in the recovery. Similarly, structural reforms more generally may be postponed. This is true; but for those reforms to take place at all we need liquidity/credit and fiscal space. This is what QE provides.
- b) Mortgage and other lending decline because the central bank takes so many bonds out of the market that firms cannot acquire enough high quality bonds to act as collateral for their loans. Schemes like funds for lending are designed to get round this difficulty.
- c) Investors, and specifically insurance or pension companies, enter into riskier investments in search of higher returns, QE having lowered the yields on safe investments. Likewise, speculation on higher asset prices creates a risk of an asset bubble (especially in housing¹⁰). Prudential regulation and higher capital ratios will counter these effects.
- d) The risk of default on a bond held by the central bank creates a possible loss on the ECB's balance sheet – instead of on the balance sheet of an already indebted government¹¹. There are two points here. i) The changes to income flows wash out: the interest payments made to the ECB would cease, but the extra profits paid to national governments by the ECB will also cease. ii) The write down of the ECB's assets will have no implications for taxpayers since central banks do not need to maintain capital/asset ratios to function. Even if the ECB felt the need to repair its capital base¹², it would ask its shareholder governments for extra capital which they would supply in the form of bonds – in effect replacement QE assets with new interest payments and income refunds. No implications for taxpayers. In fact, the real danger here is rather different. If the defaulted bond is not replaced, there will be no bond to sell back into the market in the exit strategy. Realising that, private agents will expect (and get) a residual degree of inflation from the QE process.

¹⁰ Yiu and Sahminan, 2014

¹¹ The latter might imply even worse damage to the economy in question, which is exactly what we want to avoid.

¹² Designed to bail out a national central bank (the technical owners of the ECB's QE assets) in order to avoid the collapse of a section of the Target2 payments system, for example.

7. SECULAR STAGNATION, REPAIRING TRANSMISSIONS AND REGIONAL INEQUALITIES

Quantitative easing may not be sufficient on to spark a recovery in output or prices in bad times. Lower interest rates at the maturities that would normally persuade businesses to invest, or consumers to buy durable goods, does not guarantee they will necessarily invest or consume. Faced with declining incomes and/or high levels of debt, they may well prefer (and have in practice preferred) to conserve what resources they have to pay off past debts. The pass-through (transmission mechanism) from cheap credit to borrowing and new spending is impaired by this reluctance. To some extent, this is understandable. Why would a business invest if the prospects of being able to profit from rising incomes and economic recovery appear remote? Similarly, consumers will prefer to save than spend if there are significant risks that incomes will fall or unemployment rise because the economy fails to recover – the more so, the more they are indebted.

Hence to revive investment or consumption, businesses and consumers need to be faced with the prospect of rising incomes, rising profits and higher prices, alongside available credit, low borrowing costs and sufficient liquidity, to induce them to invest or consume. In other words, monetary policy may be ineffective because it is trying to “push on a piece of string”.

7.1 The need to repair the monetary transmission mechanisms

Although the problem of an impaired transition mechanism (a reluctance to borrow or lend) is widely recognised, there have been few policy initiatives designed to overcome this kind of impediment to recovery. Perhaps the most obvious and direct attempt to find a way out has been the “Funds for Lending” scheme run by the Bank of England from 2012-16.

This scheme was set up to induce banks and building societies to lend more from the extra liquidity and rising deposits that flow from easy money and unconventional policies in the financial crisis, by offering them additional funds in the form of safe assets (government bonds) borrowed at subsidised interest rates for extended periods to back their lending portfolios – provided that the extra loanable funds thus generated are used to lend on to firms and households. If this is not done, the subsidy element is withdrawn, and the interest charged on the underlying asset loans rises by a factor of 6 or more. In this way banks are encouraged to supply more credit than they otherwise would, by making more and cheaper funding available if they lend more. Easier access to bank credit in this fashion should boost consumption and investment by households and businesses. The increased economic activity should, then, raise incomes and induce further deposits and hence more subsidised lending to keep the necessary loan book percentage up.

Early signs have been encouraging, as funding costs for UK banks have fallen sharply. In practice, the new lending has been deliberately skewed towards small and medium sized firms to boost growth and employment; and also to households to increase consumption spending (but which may have the effect of increasing house prices and the risk of a house price bubble instead, since much of the new lending went into mortgages).

How does a “funds for lending” scheme work in practice? The basic element, in the UK, is an offer by the Bank of England to lend 10 year Treasury Bills to commercial banks at a subsidised interest rate of 0.25% (at the time market rates were at about 2%). These bills were considered safe and risk premium free, and even held at market rates would still be cheaper than the loans that banks could obtain by themselves. But the loans could be obtained only if they represented 5% or more of a bank’s loan book, and if they could be demonstrated to have been used to back new, *additional* loans/credit to the private sector. They therefore have to be used as collateral for raising new “zero risk” credit from the money markets and then passed on as new loans to private sector clients.

If banks fail to comply with these conditions, specifically if they do not borrow 5% or more of their loan book, or fail to pass on the extra funds raised as new credit, they are charged a penalty rate of interest of 1½%. Thus the more you lend, the more you can borrow at preferential rates and lend at higher margins. But if you fail to borrow 5% or more of your loan book, or if your loan book shrinks through repayments, or if the extra funds are used to make repayments or pay down past debt, then these advantages are lost.

Apart from the financial advantage to the banks to borrow this way and to leverage up their own loans by collateralising them against higher quality collateral than they themselves could offer in periods of stress, there are further advantages to the economy as a whole. Arbitrage and greater stability in financial markets would be expected to reduce borrowing costs even for those who not participate, and because portfolio rebalancing does not have to draw so heavily on non “funds for lending” sources, and because any loan repayments to the central bank means banks have to lend more in new credit to keep their underlying borrowing above 5% of the loan book. These factors serve to protect lending when the banks are put under pressure to raise capital and liquidity ratios (as they are), or face an incentive to retrench, repay debt or rebalance portfolios.

The weakness of this kind of scheme is that it is designed to repair damaged transmission mechanisms, but cannot force extra lending. A lot depends on the take up (that is to say, elasticity) of credit as a function of the credit on offer. In the event, this has turned out to be variable. Borrowing costs in the UK fell to 2% points lower than for wholesale borrowing, but that margin fell to 1% as the markets adjusted (so the arbitrage mechanism works). Arrangements have been made to allow the extra funds borrowed to be put into reserves to raise capital and reserve ratios, which lowers risk premia both for the bank and others in the financial sector. Against that, we have to reckon with lost margins on funds used for that purpose and with the need to *over*-collateralise the funds lent on. Nevertheless, there has been a fall in the costs of borrowing and new/additional loans have been made in roughly equal measure to small companies, large firms and mortgages. The scheme has now started to decline as conditions in the financial markets have improved, which actually translates into small declines in revenues to the central bank.

7.2 Other ways to repair monetary transmissions:

a) Cheap loans from the ECB or via Target2

Cheap loans from the ECB via its Long Term Refinancing Operations (LTRO) programme, or liquidity support to the banking sector through the Target2 payments system, in which national central banks are empowered to provide credit support to domestic banks under pressure if they are short of funds, would appear to do the same as “funds for lending”. They both create extra liquidity at home and increase the value of the stock of home assets. That in turn reduces the *net* foreign liability position and leads to lower interest rates (shown in Hughes Hallett and Martinez Oliva, 2015). Cash injections from the ESM or asset purchases by the ECB would reinforce this effect.

Thus, on the face of it, all these programs appear to work the same way as funds for lending. Nevertheless, there are two crucial differences:

i) Although the loans under the LTRO program were intended for domestic banks to be lent on to the private firms, in practice they were mostly lent on to distressed governments (to lower their borrowing costs, and to reduce the level of risk to the home banking system should there be a liquidity or solvency crisis). Because the loan contracts were not written with an explicit penalty clause, there was no mechanism to prevent this kind of behaviour. The upshot was that a bank’s extra liquidity was not lent on for investment or consumption spending. Instead the funds were used to ease or retire debt, not for spending in a way that would help revive aggregate demand and economic performance. As a result, the main

impact of this policy has been via the side effects of improved liquidity and greater financial stability – and from there to lower borrowing costs, lower risk premia, less risk, and hence a gradual improvement in output and employment. The results were clear to see in the 2012-13 era, when the spreads of 10 year borrowing rates over German rates fell dramatically in the distressed economies. Not all those improvements can be ascribed to the LTRO program of course, because the loans were short term and comparatively modest (certainly not in the “doing whatever it takes” league) and because they came just before the Outright Monetary Transactions (OMT) initiative which had a similar but larger effect. But the point is nevertheless made.

ii) Because any loans to, or implicit borrowing by home banks were made from European institutions, those loans are in effect foreign liabilities. If you are not in control of your own money supply and prices, the net foreign liability position matters. That means the capacity to earn additional “foreign” revenues to pay off the loans and interest plays a central role, which implies that either *relative* growth or the current account balance has to improve to make that happen. If that fails to happen, repeated loans or liquidity injections will be necessary to keep interest rates down – until the **real** exchange rate has to be forced down by enough to raise growth relative to others and/or improve the trade balance. That is relatively easy when you operate your own currency; the nominal exchange rate can be forced down by printing money or buying foreign currencies. But in the Euro-zone this has to be done by structural reforms which depress domestic prices relative to Euro prices. This typically takes 6 to 10 years to achieve, and with a painful recession in the interim, which condemns the economy to seek repeated loans and increasing net foreign liabilities until the process is complete. Understandably therefore, this approach has had little success to this point and has not been repeated.

b) The Junker investment plan:

The anti-secular stagnation schemes discussed in this section are usually seen as part of (or extensions to) monetary policy, unconventional or traditional. Yet an astute observer might well ask if they could not originate from fiscal policy instead?

The Junker investment plan for Europe, proposed in 2014, is a fiscal policy variant of the funds for lending scheme. It starts off from contributions €21bn [€8bn from the European budget, €8bn from national fiscal budgets, and €5bn from the European Investment Bank (EIB)] to be made to a strategic investment fund operated by the EIB. Thus there is no loan component, or incentive margins on credit offered by the EIB. However, the definition of strategic investments (small firms, infrastructure, R&D projects) is consistent with the optimal debt literature that emphasises the marginal product (rate of return on) of public capital as the key criterion for increasing public sector debt (Checherita et al, 2013).

The EIB is then charged with leveraging up the credit offered by this fund, by a factor of 15, by collateralising its loans with the contributions, equity, loans or guarantees. This is expected to bring the fund’s loan portfolio to €315bn, an ambitious figure since the original contributions would be largely in the form of guarantees. That means there is no certainty that the markets will offer the leverage funds anticipated – which case the EIB would be able to lend only €63bn on the €21bn base. Nevertheless the aim is as before: to generate growth or jobs from loans made to bypass an impaired transmission mechanism.

Apart from a concern that the private sector may not participate in the leveraging process, there are also doubts that private interests may not participate because they do not wish to invest in projects that, left to themselves, they would not have supported. There is no risk protection for their share; and as public-private partnerships go, the public component is minimal. Governments in the successful economies may also make the same argument when

considering their contributions. Instead some may reject the plan as a disguised form of state aid.

But the main problem is that there are no obvious financial incentives to provide extra loans, in which case it is little different from a Keynesian pump priming exercise without the arbitrage effects to lower borrowing costs for nonparticipants. That would not repair the transmission mechanism. In which case, why not use fiscal policy directly? This is certainly a possibility, but it is hardly a practical proposition in those economies suffering a sovereign debt crisis or excess and repeated deficits – which are exactly the economies most in need of additional policies to support a recovery. The only way out of that impasse is to adopt some form of redistributive fiscal federalism (Bayoumi and Masson, 1995), so that those with some residual fiscal capacity can help those with none. This underlines once again the importance of targeting regional inequalities. It could be done in conjunction with QE acting on risk premia in the distressed regions, to limit the actual transfers required.

8. CONCLUSION

Quantitative Easing has important side-effects; of that there is no doubt. In fact, based on the most recent literature, there is a wide range of possible side effects – some of them complicated and rather hard to pin down in size. But the most important are a worsening of the wealth and income distributions through asset price effects, rising regional inequalities, and greater financial stability if the liquidity injections translate into a credit expansion.

To the extent that these effects are unwelcome and counterproductive, or the credit expansion fails to materialise, we face a dilemma since these are also the mechanisms by which QE is supposed to create a recovery in growth and employment in the economy as a whole. So either we accept a recovery with side-effects; or no recovery but no side-effects. Hence, if one does accept QE for the sake of recovery, it would be wise not to keep it in place too long. The other more positive conclusion is the possibility that QE may act as an instrument of “monetary federalism” in a de facto federation that lacks (as yet) any federal powers.

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NOTES

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POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

The redistributive effects of Quantitative Easing

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IN-DEPTH ANALYSIS

Abstract

The on-going debate about income and wealth inequality has recently hit the sphere of monetary policymaking: some analysts argued that the quantitative easing would benefit the rich at the expense of the poor, whereas some argued the contrary. This briefing paper reviews the arguments on both sides, while going back to the relationship between conventional monetary policy and income inequality. An empirical test on the euro area shows that monetary policy has an impact on the unemployment rate, hours worked and the inflation rate. We interpret it as a positive, though relatively minor, effect of conventional and unconventional monetary policies on equality in the euro area.

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EXECUTIVE SUMMARY

- The rise in inequality is at the center of macroeconomic debates and has therefore spurred some empirical assessments of monetary policy in the US and Japan.
- Two conflicting conclusions have emerged so far. First, in the US economy, a restrictive (conventional) monetary policy would raise inequality. Second, in the Japanese economy, an expansionary (unconventional) monetary policy would raise inequality.
- We review the different arguments which have related conventional monetary policy with households' inequality. Then, we give analytical intuitions on the possible amplification effects of Quantitative Easing (QE) on inequality.
- Drawing on macro data for the euro area, we show that conventional and unconventional monetary policies have had a minor impact on the unemployment rate, hours worked and the inflation rate.
- Assuming that these macro variables have an impact on wage and income inequality, we interpret this result as a minor side effect of ECB monetary policy: the expected QE *exit* may impinge only marginally on inequality.
- We conclude on the requirement to reinforce the accountability of the European central bank: it should not only be accountable for the price stability objective, but also for the consequences of monetary policy on the well-being of European citizens, including its possible incidence on households' inequality.

1. INTRODUCTION

The growing importance of income and wealth inequality in the public debate, after the global financial crisis and after the publication of Piketty's book (2013), has recently spread to the monetary policymaking sphere. Though not entirely new, the debate has been finally spurred by the massive asset purchases of the Fed, the Bank of England, the Bank of Japan and, recently, the European Central Bank, and by the so-called risk that increases in asset prices made possible by QE policies would benefit the rich at the expense of the poor.

As we observed only few periods of quantitative easing, the effect of money creation at the zero lower bound on households' inequality and welfare has not been studied extensively. However, the expected effect of quantitative easing is first a lowering and a flattening of the yield curve and, second, an increase in inflation expectations (and hopefully in inflation realization). As there is a literature which studies the link between these changes in asset prices and in the price level on household inequality, one can assess the effect of quantitative easing on households' inequality.

We first focus on the effect of interest rate, second on the effect of inflation. In a third part, we discuss the link between unconventional monetary policy, asset prices and inequality.

The fourth part aims at assessing the impact of ECB's QE on euro area aggregate dynamics and more precisely its potential effect on some macro proxies for inequality. We develop a VAR model that allows us to identify exogenous monetary policy shocks and to estimate their effects on macroeconomic developments. Results show that monetary policy, be it conventional or unconventional, has had an impact on macro variables which impinge on households' inequality. More than QE per se, it is QE exit which may finally prove detrimental to households' inequality.

2. CONVENTIONAL MONETARY POLICY AND INEQUALITY

The topic of monetary policy and inequality is not new. Romer and Romer (1999) reviewed the effects of monetary policy on the poor, in the short and the long run, paying much attention to the incidence of expected and unexpected inflation on the poverty rate or the average income of the poorest fifth of the US population. They concluded that expansionary policy can reduce poverty, but only temporarily, and that this effect might be reversed in the long run if the former short run policy has raised inflation and spurred more aggressive policy in the long run. In a Post-Keynesian tradition, Niggle (1989) and Argitis and Pitelis (2001) concluded that tight monetary policies lead to uneven distribution of income.

2.1 Decrease in interest rates and households' inequality

A decrease in interest rates affects households' consumption income and wealth through changes in prices in almost all markets: the goods market, the labour market and financial markets (Coibion et al. 2014 or Mersch 2014 for a summary). A first direct channel is the heterogeneous impact of a change in interest rate on households' income due to their portfolio heterogeneity or due to their access to financial markets. This is the so-called *portfolio channel*. Households who hold some assets, the return of which are linked to interest rate such as life insurance (Dobbs et al. 2013) will see a decrease in the return of their saving. Households who mainly issue debt with variable interest rates will benefit from a decrease in interest rate payment. As poorer households tend to have more debt than richer ones, one can expect a redistributive effect of a decrease in interest rate from high wealth households to low wealth households, and thus a decrease in households' income inequality.

Other channels come from the general equilibrium effect of a lower interest rate on economic activity. A low nominal interest rate first generates an increase in economic activity that increases wages, business income and inflation, and contributes to decrease unemployment (see Christiano, Eichenbaum, Evans 1996 for an early identification). The *income composition channel* refers to the heterogeneity in households' income: The income of households at the bottom of the wealth distribution is primarily labour income, whereas the income at the top of the wealth distribution is more correlated to firm profits, due to higher stock market participation for instance (Bricker et al. 2014 for the US). As a consequence, the relative increase in labour and business income can affect households' inequality. One must acknowledge a specific channel, the "employment channel" which is likely to decrease inequality. As unemployment falls after a decrease in interest rate, households finding a job experience an increase in their income. This obviously increases their welfare, although it can have an ambiguous effect on inequality (as income dispersion can increase when unemployment decreases). The unemployment channel is often included in a broader channel, the *earning heterogeneity channel*, in the literature. This broader channel refers more generally to changes in non-financial income after a decrease in interest rate.

Finally, these previous effects focused on income effect of a change in interest rate. In addition, a decrease in interest rates can generate important changes in the price of long-lived assets, which directly affect the wealth of households. For instance, a decrease in interest rates contributes to increase house prices (Dobbs 2014). This generates a transfer from households who are net buyer of houses toward households who are net seller of houses. This transfer depends however on the ability of households to issue some debts. Besides, the net effect also depends on the change in the interest burden for buyers. For former buyers, who are still engaged in a mortgage at a variable interest rate, the decrease in interest rate will unambiguously trigger a positive income effect. Households who buy houses without increasing their indebtedness suffer more from increases in house prices due to the lowering of interest rates.

As a summary, a decrease in interest rates has many partial equilibrium and general equilibrium on households' income and welfare. The overall effect of a decrease in interest rate is thus an empirical question. Coibion et al. (2012) present an empirical investigation of the effect of monetary policy on households' inequality on US data for the period 1980-2008. They identify monetary policy shock by two procedures. The first one is the change in the target Federal Funds rate at each FOMC meeting, following the Romer and Romer (2004) strategy. The second one is the change in the inflation target identified in Coibion and Gorodnichenko (2011). They find that a decrease in interest rate decreases income and consumption inequalities. Labour income increases at the lower end of the income distribution (after a decrease in interest rates), and that labour income decreases at the upper end of the distribution. This effect at the upper end of the distribution is hard to explain at this stage but it can come from the earning of households in the finance sector for instance. Second, they find that consumption expenditures at the upper end of the expenditure distribution decreases a lot after a decrease in interest rate. This is an indication that a decrease in interest rate must generate a decrease in the wealth of the richest households, who react by decreasing their expenditures. This wealth transfer cannot be identified in Coibion et al. (2012) due to data availability. The literature on the effect of inflation on households' inequality and welfare is useful to identify those channels.

2.2 Inflation and households' inequality and welfare

The effect of inflation on households' inequality and welfare has been studied considering the household portfolio. First studies such as Albanesi (2007) or Erosa and Ventura (2004) concluded that an increase in inflation was increasing inequality in wealth, because poor households hold a greater share of their portfolio in money and lose from the inflation tax. Very poor households actually only hold money (M1) and no other financial assets that would offer a better protection against inflation (like stocks or inflation-indexed bonds, for instance).

This initial result is not confirmed by other studies, which carefully look at households' portfolio. First, Doepke and Schneider (2006) look at the redistributive effect of an inflation shock, by carefully recomposing the share of nominal asset held by each type of households in the US. They find that an unexpected increase in inflation transfers some wealth (due to the inflation tax) from old and rich households, who hold nominal assets, to young and poor household who have nominal debt. An additional effect of an inflation shock is to decrease the real interest payment of the State, which can be thought as a tax on public bond holders. As only few households hold nominal bonds (20% of households, mainly at the upper end of the wealth distribution in the US, Bricker et al. 2014), this tends to decrease inequality.

Second Ragot (2014) shows that money holdings (M1) are very unequally distributed and are correlated with wealth in the US and in Italy for which good data were available. As a consequence, the direct effect of the inflation tax is ambiguous, as the level of the tax paid by richer households over their revenue is higher. Algan and Ragot (2010) investigate the indirect effect of an increase in inflation on capital accumulation. They find that for low level of inflation (which corresponds to the current situation), an increase in inflation raises the capital stock due to the so-called Tobin effect. Households buy more real claims on the capital stock when inflation increases, because the opportunity cost of the liquidity services of money (M1 or M2) decreases. As a consequence, real wage increases and real interest decreases, what tends to decrease inequality.

From these studies, one can conclude that both unexpected and expected inflation are more likely to decrease inequality income and consumption and that it increases relatively more the income of the poor.

3. UNCONVENTIONAL MONETARY POLICY AND INEQUALITY

Though the literature on the impact of monetary policy on inequality is not new (see above), it has only dealt with the consequences of standard monetary policy and not with unconventional monetary policy and QE precisely. There is neither theoretical nor empirical study on that issue (with only one exception mentioned below). The question that arises is then whether QE alters (magnifies or mitigates) the general conclusion which has been emphasized with conventional monetary policy. Considering the transmission channels of QE (see Blot et al., 2015), and based on the effects emphasized in the previous section, we consider some likely effects of QE on inequality.

3.1 Does QE amplify the interest rates' effects on households' inequality?

In normal times, the instrument of monetary policy is the short-term interest rate, which influences indirectly asset prices and market rates at all maturities. As reminded by Brunnermeier and Sannikov (2012) conventional monetary policy mainly focuses on the short end of the yield curve whereas unconventional measures are implemented in order to act more directly on asset prices and market rates at longer maturities, that is, on the long end of the yield curve. Does it necessarily imply that QE effects, through the portfolio channel, are amplified? For this to be true, asset purchases should have more powerful effects than short-term interest rates decisions on long-term market interest rates.

Recent empirical evidence has pointed out that Fed's or BoE's asset purchases had significant effect on Treasuries and corporate bonds. Gagnon et al. (2011) suggest an impact on the 10-year interest rate between 30 and 100 basis points. Though these results are confirmed by other studies, it is worth mentioning that Hamilton and Wu (2012) conclude on rather smaller effects whereas Wright (2012) reports very short-lived effects.

Considering the portfolio channel effect of monetary policy on inequality, evidence does not clearly point to a magnified effect of QE. It may lower return and reduce financial incomes, hurting savers and benefiting debtors, but not necessarily more than standard monetary policy. As a matter of fact, if policy rate is already constrained by the zero lower bound, additional effect of QE may not be very strong.

Besides, the income composition channel emphasizes the impact of monetary policy on labour incomes versus profit incomes. Here, it seems that there is no strong argument to favour a different effect of QE compared to standard monetary policy. In the current euro area situation, the composition of a potential increase in national incomes would certainly depend on the heterogeneous situation of firms and labour markets.

Finally, the bulk of the impact of monetary policy and of QE on inequality may be channelled through the unemployment channel and then through the macroeconomic incidence of QE. There is no formal evidence concluding that unconventional monetary policy would be more powerful than standard monetary policy. Peersman (2011) for the euro area and Gambacorta et al. (2014), based on a cross-country analysis, do not find significant differences on the output effects between conventional and unconventional monetary policy. Then, the reduction in unemployment, which would result from QE may reduce inequality by the same channel emphasized by Hoynes et al. (2012) and Bitler and Hoynes (2015) according to which low-educated workers have been more hurt by the rise in the US unemployment rate during the Great recession than high-educated workers.

3.2 QE and asset prices

The relation between QE, asset prices and households wealth inequality has attracted lots of attention due the recent upsurge in asset prices. As financial asset are mainly held by rich households, an increase in asset prices is sometimes perceived as an unfair increase in the wealth of rich households. A lot of confusion appears in this debate. The increase in asset prices when interest rates decrease is the general outcome. As potential buyers of financial assets can borrow at lower rate, their demand for financial assets will increase up to the point where the increase in prices offsets the decrease in interest payments. The increase in asset prices prevents buyers to benefit from low interest rate. Low interest rates are thus not a transfer to buyers. However, the increase in asset prices can generate a wealth effect for holders of financial assets, but if the increase in asset prices is temporary, their permanent income is little affected by the current increase in asset prices and consumption inequality (which is a key measure of inequality) is not affected. In other words, the transitory increase in asset prices does not translate into income and consumption inequalities. Second, although temporary, the increase in the price of financial assets transfers some wealth from net lenders to net buyers in the short run. This argument was already discussed for the price of houses. These redistributive effects among households participating to financial markets (which less than 50% of households in developed countries, even in the US), are difficult to assess due to data availability and are likely to generate some redistribution among the group of the richest households.

To conclude, the recent literature on monetary policy and households' inequality indicates that the effect of QE is likely to decrease income and consumption inequality, whereas it can generate a transitory increase in wealth inequality due to the transitory increase in asset prices. In addition QE generates a temporary increase in asset prices, which yields a transfer from net sellers toward net buyers. More generally, households who dis-save or borrow will gain from QE, whereas households who save will suffer from low interest rate.

In terms of savings in an ageing population, the former argument also means that people close to retirement will benefit from a positive *stock* effect of QE: the higher price of their assets will improve their well-being. Conversely, people less close to retirement will suffer from a negative *flow* effect of QE: the return on their saving will decrease. In light of life-cycle differences among countries, unconventional policy measures may give rise to heterogeneous impacts in the euro area. When it turns to empirical evidence, Saiki and Frost (2014) showed that the portfolio channel has been working in Japan during a decade of unconventional monetary policy. Drawing on a vector autoregressive model including GDP growth, CPI inflation, monetary base, stock prices and Gini coefficient, and identifying monetary policy shocks through a Cholesky decomposition, they show that an expansion in the monetary base positively affects the Gini coefficient. The impact is smaller if the authors extend their sample to periods of conventional monetary policy. Hence they conclude that QE in Japan has had a specific positive impact on inequality.

3.3 Avoiding deflation with QE

As stressed previously, notably by Doepke and Schneider (2006) higher inflation would transfer wealth from old and rich households to young and poor households. Regarding the QE effect on inequality, the issue would then be related to the specific impact on inflation. Does it help to prevent from deflation? As reminded in Mario Draghi's statement the 22/01/2015, the aim of the expanded asset purchase programme is to bring euro area inflation rate closer to the 2 % target. Inflation dynamics has slowed down continuously since July 2013 increasing the risk of deflation in the euro area. Thus, if QE is powerful to avoid the deflation trap it would have a positive impact on equality. Besides, we may assume that the consequences of inflation on inequality are asymmetric. Under high inflation, it is likely

that households, or at least some of them, would adjust their portfolio to hold more assets offering a better protection against inflation. The impact on inequality would not completely vanish but may be asymmetric: debtors benefit from unexpected inflation whereas creditors may be hurt less if they hold more stock than bonds. In a deflation scenario, creditors benefit from lower inflation whereas debtor would not have the opportunity to adjust their debt payment. Considering this argument, QE help to avoid negative consequences of deflation on inequality.

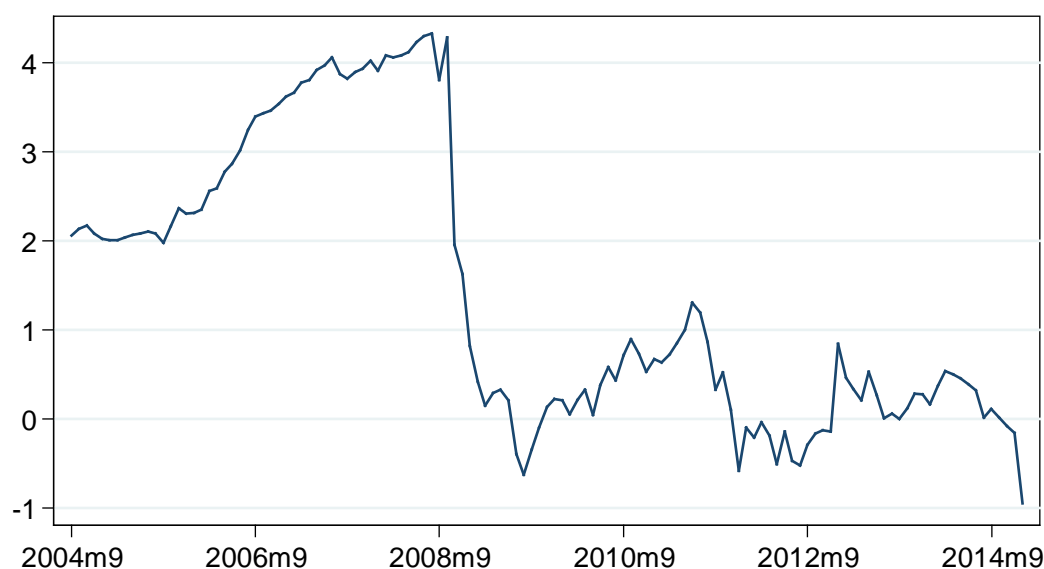
4. A VAR MODEL OF QE'S EFFECTS IN THE EURO AREA

We aim at assessing the impact of the ECB's QE on euro area aggregate dynamics and more precisely its potential effect on some proxies for inequality. To do so, we propose an empirical evaluation of the unconventional measures in every sense implemented by the ECB since 2008. We develop a VAR model that allows us to identify exogenous monetary policy shocks and to estimate their effects on macroeconomic developments.

Adopting a general equilibrium perspective, we do not focus on the micro effects of policy shocks on inequality or on the disaggregated effects through each and every transmission channel but on the overall effect on aggregate dynamics. One major assumption in this section is therefore to approximate the effect of QE on inequality by the effect of QE on some aggregate data series. Monetary policy shocks influence the macroeconomy through several channels, which will ultimately influence investment, production, employment and inflation. By influencing economic activity, unemployment and inflation, monetary policy has an impact on income inequality. One could also argue that we can observe income inequality even in the absence of unemployment with the development of low-paid part-time jobs (this refers to whether the adjustment of the labour market following all sort of shocks is made on the extensive or intensive margin). We therefore extend the analysis to the effects of QE on the overall amount of hours worked in the economy.

We use data from the ECB's Statistical Data Warehouse, except for the ECB's shadow rate that is computed by Wu and Xia (2014) based on a term structure model. This measure takes into account all conventional and unconventional measures implemented by the ECB and generates their "implicit" effect on the main refinancing operation interest rate. This variable thus captures the overall stance of monetary policy and puts in the same space conventional and unconventional measures (see Figure 1). Moreover, this methodology allows us to capture ECB's interest rate dynamics even below the zero lower bound.

Figure 1 –ECB shadow rate, in %



Source: Wu and Xia, 2014

A VAR model with a Cholesky decomposition is used to decompose ECB shadow rate shocks into mutually orthogonal components with a structural economic interpretation. The Cholesky recursive identification assumption postulates that the structural errors are independent, and that reduced-form errors are related to structural errors through a lower triangular matrix,

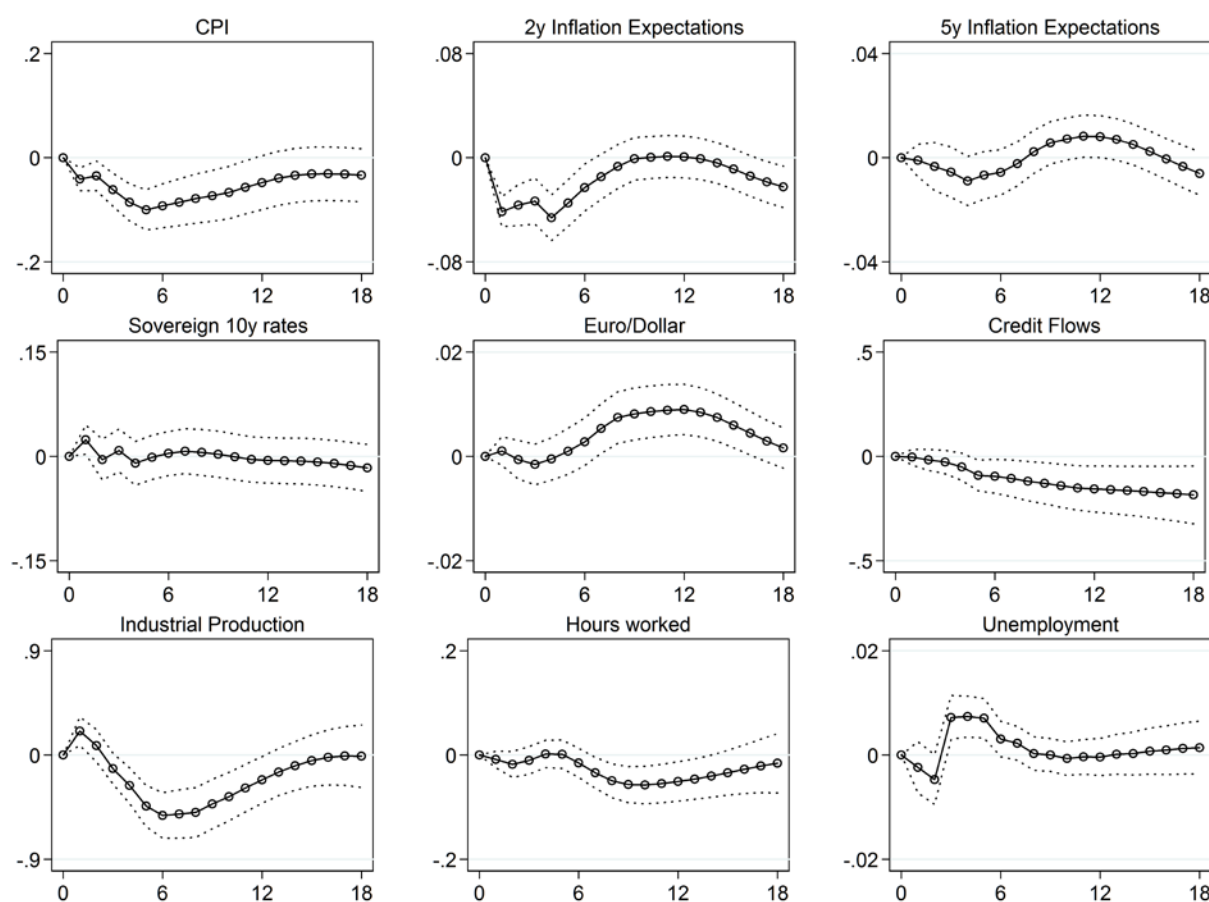
which means that the identification of structural shocks depends on the ordering of the variables in the vector of endogenous variables. A given variable will then respond contemporaneously to shocks to variables ordered after it and with a lag to shocks to variable ordered before it. The identification strategy then relies on the speed of adjustment of the different variables.

The VAR model includes the following variables in that specific order: unemployment rate, hours worked, industrial production, new credits, inflation, an index of euro area 10-year sovereign interest rates, a financial instability index (the Composite Index for Systemic Stress –CISS– computed by the ECB), the euro/dollar exchange rate, crude Brent oil prices, 2-year ahead inflation expectations (measured on financial markets by inflation swaps, source: Bloomberg), 5-year inflation expectations, and the ECB's shadow rate. The frequency of the dataset is monthly, starts in September 2004 and ends in January 2015. Our sample is thus constituted by a “normal times” period before 2008 and a “crisis” period when unconventional policies have been implemented since then.

We therefore assume that shifts in all macro variables included in our model result in a contemporaneous change in the ECB monetary policy variable which is ranked last. Low frequency variables like unemployment, hours worked, industrial production, credit and inflation are ordered first, so by construction would not react contemporaneously to innovations in the other variables. Variables generated on financial markets – long term interest rates, the CISS, the exchange rate and oil prices – are ranked afterwards. Finally, inflation expectations appear just before the ECB shadow rate. These identification assumptions are extremely conservative in the extent that shocks to the ECB shadow rate are cleaned for all other contributions and can be seen as a lower bound of the potential magnitude of ECB monetary policy shocks.

The structural VAR analysis is performed with 3 lags, and a small sample estimator to correct for this potential bias. With this VAR model, we are able to estimate the effects over a long horizon (here, 18 months) of ECB monetary policy shocks on all the variables above-mentioned. Figure 2 shows the impulse response functions to an exogenous positive monetary shock, that is to say an increase in the main refinancing operation interest rate measured with the shadow rate. The size of the monetary shock corresponds to a one-standard-deviation innovation in the shadow rate which corresponds to a 0.23 percentage point increase, close to the usual 0.25 percentage point step in ECB interest rate variations. The dotted lines represent the 68% confidence interval.

We can observe that an increase of almost 0.25 percentage point of the shadow rate has the theoretically expected effects on all variables. More precisely, this restrictive monetary policy shock has a negative effect on inflation (around 0.1 percentage point) and a negative effect on inflation expectations. We also observe an appreciation of the euro exchange rate, a decrease of credit flows and a decrease of the industrial production. Regarding the effects on variables that could shed light on income inequality, we observe that a restrictive monetary policy has a negative effect on hours worked and raises unemployment after eight months.

Figure 2 - Responses to a restrictive monetary policy shock

To estimate QE's effects with this model, we make the assumption that the monetary shock associated with the ECB's QE of 1.000 billion euros announced in January 2015 would be equivalent to a decrease of 2 percentage points in the shadow rate, which corresponds to the observed decline in the shadow rate between mid-2011 and mid-2012, period during which the ECB's balance sheet has increased by almost 1,000 billion euros. In addition, we have to assume that the estimated effects on the period 2004-2015 can be transposed to the months ahead.

Under these assumptions, we can expect that the most recent ECB's QE (which corresponds to an expansionary monetary policy shock, so all impulse responses have to be read symmetrically) will increase inflation expectations at 2 and 5 years with a maximum impact of 0.4 and 0.16 percentage points respectively at the horizon of 6 months. It will also lead to a depreciation of the euro vis-à-vis the US dollar, with a maximum impact of 0.08 percentage points after 10 months. The estimated effect on inflation would be positive with a maximum impact of 0.8 percentage point after 6 months and positive on industrial production with an effect of 4 percentage points after 8 months. The redistributive effect of monetary policy through inflation could then be at work with QE. We also observe that hours worked will increase and the unemployment will decrease. These last two effects show that the QE's effect on economic activity will raise both dimensions of employment which is probably one of the most efficient channels, through which monetary policy influences inequality, to decrease income inequality. The effects of such a policy are not immediate and will appear several months after the implementation of the program, but these effects are relatively high especially when we observe the cumulated effects over the 18 months.

5. CONCLUSION

The issue of the impact of unconventional monetary policy on inequality arose recently in the academic literature and in the public debate. These potential side-effects of QE are of crucial importance and deserve a particular attention. It must yet be recognized that evidence is still sparse so that any conclusion should be considered with caution. Theoretical analysis has stressed that the impact of monetary policy on inequality is channelled through several channels, some of them leading to opposite conclusions. Consequently, it mainly remains an empirical issue. In light of empirical work so far, it seems that an expansionary policy would lead to a reduction in inequality. The sparse available evidence has mainly focused on standard monetary policy but there is no clear and convincing argument according to which the effect of QE might be strongly modified. Consequently, a more expansionary monetary policy is expected to reduce inequality, notably because it would prevent deflation while fostering economic growth (and then a reduction of unemployment).

Besides, if inequality is a policy objective, one should keep in mind that other economic policies have also an important impact on inequality. Fiscal policy and taxation policy are certainly more powerful than monetary policy in impinging on inequality. Furthermore, inequality may also result from financial frictions, with destabilizing amplification effects (Brunnermeier and Sannikov, 2012).

Finally, there is growing evidence that the effects of monetary policy go well beyond the inflation rate and the GDP growth rate, or macroeconomic stabilization. Monetary policy has an incidence on financial stability and on inequality. Hence the accountability of central banks becomes ever more crucial: certainly, they should not only be accountable for the price stability objective, but also for the consequences of their policies on the well-being of European citizens, be it in terms of banking and financial stability, or in terms of inequality. The conduct of monetary policy, when it comes to potentially modifying households' inequality, undoubtedly requires a strong democratic control.

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NOTES

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Does Quantitative Easing have unpleasant side effects?

Karl WHELAN

IN-DEPTH ANALYSIS

Abstract

The ECB has finally introduced a Quantitative Easing (QE) programme. Predictably, the programme has faced many critics. Two criticisms are that the programme risks unleashing high inflation and that it worsens inequality. This paper argues that the perceived inflation threat from QE programmes largely relies on inaccurate macroeconomic theories about the relationship between the monetary base and inflation. In relation to inequality, criticisms of QE have generally ignored the various ways that lower interest rates benefit borrowers, reduces unemployment and boosts wages at the lower end of the income distribution. The available evidence actually suggests these channels dominates and QE reduces inequality. Claims that QE particularly helps banks or generates large commissions for traders are also false.

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EXECUTIVE SUMMARY

- The ECB has finally introduced a QE programme. Predictably, the programme has faced many critics.
- Two criticisms are that the programme risks unleashing high inflation and that it worsens inequality.
- This paper argues that the perceived inflation threat from QE programmes largely relies on inaccurate macroeconomic theories about the relationship between the monetary base and inflation.
- Contrary to the basic textbook model, expansions of the monetary base do not automatically translate into proportional increases in the money supply. In fact, where QE programmes have been implemented, money multipliers have fallen sharply.
- Contrary to the quantity theory of money, there is very little evidence in modern economies for a direct link between the growth rate of the money supply and either nominal GDP growth or inflation.
- In relation to inequality, QE tends to boost asset prices but it is not clear that it does so in a way that boosts wealth inequality. Evidence from the United States suggests that QE boosted the net wealth position of middle-class households by increasing house prices and that it had very little impact on the overall inequality of wealth.
- Criticisms of QE have also generally ignored the various ways that lower interest rates benefit borrowers, reduces unemployment and boosts wages at the lower end of the income distribution. The available evidence actually suggests these channels dominate and QE reduces inequality.
- Claims that QE particularly helps banks or generates large commissions for traders are also false
- In relation to the idea that QE is boosting inequality, even if this was the case, it is unclear whether the ECB should concern itself with such a development. The ECB has an explicit primary goal of maintaining price stability, as defined by meeting its inflation target of 2% over the medium term. Currently, it is failing to meet that target and its QE programme should be viewed as an overdue positive step aimed at restoring the credibility of its commitment to meeting its target
- To the extent that the ECB does decide to concern itself with inequality, Governing Council members should argue that they are helping rather than hurting.
- Those who are genuinely concerned about reducing inequality would be better off focusing on areas that really matter, such as taxation and education policies, rather than on the ECB's monetary policy.

1. INTRODUCTION

The ECB has finally followed the lead taken years ago by most of the world's important central banks in adopting a Quantitative Easing (QE) programme. However, the decision to introduce this programme was controversial, with objections from Governing Council members such as the Bundesbank's Jens Weidmann.

These objections shouldn't be too surprising. Since their introductions, QE programmes have been criticised for many reasons and a paper devoted to all of these criticisms would be far longer than I have space for here. So in this paper I will set aside objections such as the ideas that QE facilitate higher fiscal deficits or somehow "distorts" financial markets. Instead, I will focus on two different types of objections to QE.

First, perhaps the most common objection to QE is that because these programmes produce large increases in the monetary base, they will inevitably lead to a significant rise in inflation. Euro area inflation is currently running well below the ECB's inflation target, so it could be argued that increasing inflation would not be a "side effect" of its QE programme but rather the desired effect.

Nevertheless, the idea that QE programmes will, at some point, unleash a bout of uncontrollable high inflation remains popular among the ECB's critics. In part, the belief that QE will trigger significant inflation stems from faith in a standard textbook model of how money affects the economy. In this model, increases in the monetary base translate into increases in the wider money supply via a stable money multiplier. The higher money supply then translates into higher prices via the mechanisms described in the so-called quantity theory of money. In this paper, I will discuss briefly why these two elements of textbook macroeconomics do not describe how modern economies function and thus why QE is unlikely to trigger a serious inflation problem in Europe.

The second set of objections to QE relates to perceptions that these programmes have contributed to increasing inequality. This claim often focuses on the idea that QE benefits the rich by boosting asset prices but a number of other, more specific, claims have been made. For example, in a recent article in the New York Times, William D. Cohan, a former banker, described a series of mechanisms through which QE has raised inequality.¹ These include low returns for people reliant to fixed income investments, that low interest rates have hugely benefited Wall Street banks and that these banks have benefited from the trading fees associated with the Fed's bond purchases. Indeed, former Federal Reserve Governor, Kevin Warsh, has described QE programmes as a "reverse Robin Hood" because they benefit the rich and hurt the poor.²

In the second part of this paper, I discuss these concerns and argue that they are either incorrect or over-stated. Monetary policy influences the economy in many ways and it is difficult to summarise its effects on inequality with a simple argument or a single piece of evidence. However, the fact that poorer people tend to be harder hit by economic slumps, particularly due to unemployment, makes it likely that any policy aimed at reduced slack in the economy will ultimately reduce inequality.

¹ William D. Cohan: "How Quantitative Easing Contributed to the Nation's Inequality Problem" <http://dealbook.nytimes.com/2014/10/22/how-quantitative-easing-contributed-to-the-nations-inequality-problem/>

² Video of Warsh discussing this issue is available at <http://video.cnbc.com/gallery/?video=3000287822>

2. PROBLEMS WITH THE TEXTBOOK MODEL OF MONEY

I recently finished grading about 250 exam papers for my undergraduate module “International Money and Banking”.³ One of the questions asked the students to describe how QE affected the economy. Many of them wrote that QE worked by increasing the money supply and this acted to boost the economy and raise the price level. This is an explanation consistent with much of textbook macroeconomics but I do not believe it is an accurate description of how QE works and, alas, these students didn’t score too well on this question. This is because this interpretation of QE’s impact relies on two flawed macroeconomic ideas.

2.1. The Money Multiplier

For generations, macroeconomists have been teaching introductory students a flawed model of how monetary policy affects the economy. The basis for this flawed model is that central banks influence the economy by controlling the money supply. For example, the IS-LM model teaches students that monetary is set to control a measure of the money supply such as M1 (which includes currency and checking deposits). The introductory macro model teaches that the central bank does this by controlling the monetary base (which equals currency and central bank reserves and is also known as M0) and this automatically translates into an increase in M1 via a simple relationship whereby M1 is a constant multiple of the monetary base.

This “money multiplier” story relies on assumptions about the banking system which are highly inaccurate. The story assumes that after money is deposited with a bank, the bank will automatically loan out almost all of this money, keeping only a small amount as reserves to satisfy minimum reserve requirements. The money loaned out is again re-deposited in the banking system and thus generates further loans. This process thus sees the total amount of money created from an initial increase in the monetary base being a simple multiple of the original increase, where the multiple depends on minimum reserve requirements. Since central banks control both the monetary base and reserve requirements, this model assumes central banks have direct control over measures of the money supply such as M1.

In reality, banks do not operate in the manner described in the money multiplier story. Banks do not automatically loan out a fixed percentage of any new deposit and they do not seek to constantly meet the minimum reserve requirements. Instead, banks make loan decisions based on a wide variety of factors, including their assessments of the credit-worthiness of borrowers, the attractiveness of alternative uses of funds such as purchasing securities and their regulatory capital positions.

In particular, under the Basel regulatory framework, banks have to monitor their risk-weighted assets to ensure their capital ratios do not approach regulatory minimum levels. So, for example, banks that are concerned about raising their capital ratios will seek to reduce risk-weighted assets. This may mean that additional deposits are kept as reserves or are used to purchase assets with low risk weights. (This is easily done in Europe since all euro-denominated government bonds issued by EU member states are unjustifiably classified as having a zero risk weight). This process of reducing risk weighted assets has been evident in Europe in recent years. The European Banking Authority has reported that

³ Lecture notes for this course are available at <http://karlwhelan.com/blog/?p=587>

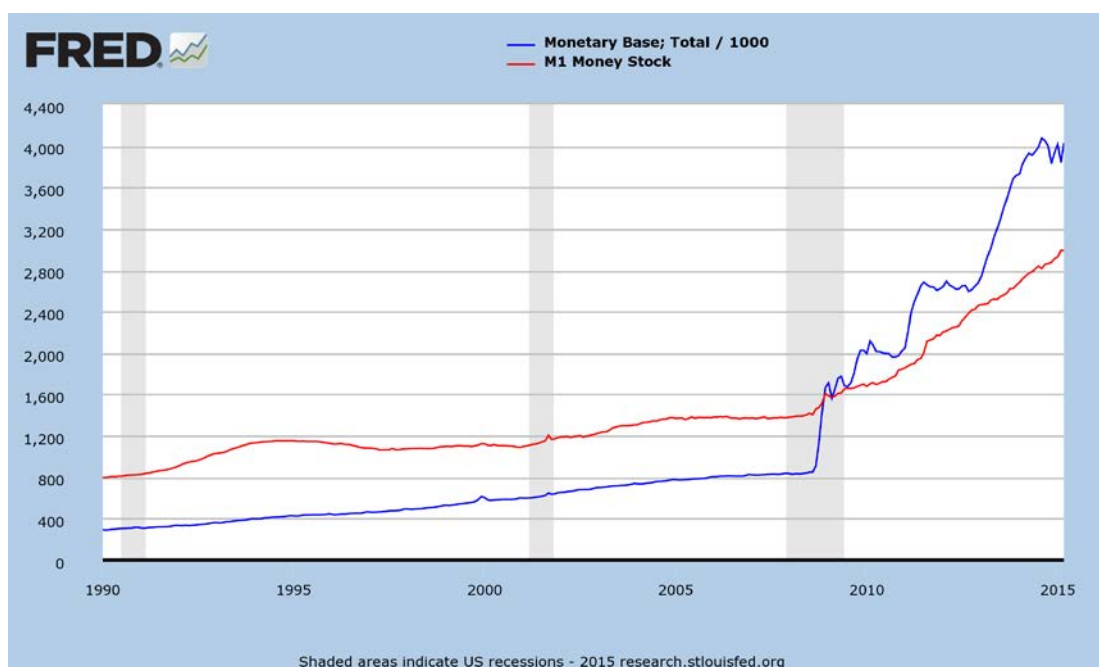
Europe's largest banks reduced their risk-weighted assets by almost 20 percent between June 2011 and June 2014.⁴

For these reasons, the banking system cannot be considered a simple mechanism that directly translates the central bank's changes in the monetary base into broader changes in the money supply. This is one of the reasons that no modern advanced country central bank currently practices money supply targeting. Historical examples of money supply targeting, such as during Paul Volcker's term as Fed chairman in the early 1980s, provided plenty of evidence of the difficulty of predicting money multipliers and finding stable relationships between various measures of the money supply.

For these reasons, despite the warnings of some economists that the QE programme would cause significant inflation, very few professional central bankers expected the Fed's QE programme to produce increases in the broader money supply that would be consistent with historical values of the money multiplier.⁵

Indeed, as Figure 1 shows, the huge increase in the monetary base associated with the Fed's large-scale asset purchases were not matched by proportionate increases in the M1 money stock. Indeed, the monetary base in the U.S. is now larger than M1, meaning the amount of reserves held at the Fed is larger than the total amount of deposits—this is completely at odds with the traditional money multiplier story. As Figure 2 shows, the money multiplier in the United States fell sharply once the QE programme began.

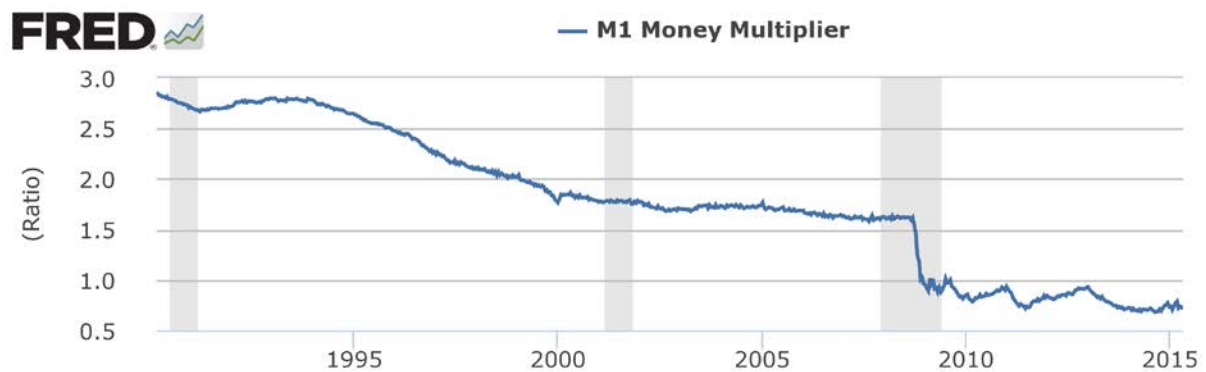
Figure 1: Monetary Base and M1 in the United States



Source: St. Louis Fed FRED Database

⁴ This information is available at <http://www.eba.europa.eu/documents/10180/950548/CRDIV-CRR+Basel+III+monitoring+Report+-+Results+as+of+June+2014.pdf/92bc3251-f527-4f6f-9dc0-5edd5132f65d>

⁵ For example, in an open Letter to Ben Bernanke, a number of prominent Republican economists warned that QE "risked currency debasement and inflation". Wall Street Journal, November 15, 2010. <http://blogs.wsj.com/economics/2010/11/15/open-letter-to-ben-bernanke/>

Figure 2: The M1 Money Multiplier in the United States

Source: Federal Reserve Bank of St. Louis

Shaded areas indicate US recessions - 2015 research.stlouisfed.org

For these reasons, there is no reason to expect that the ECB's QE programme to automatically trigger a corresponding proportional increase in broader measures of the money supply via increases in bank lending. That said, there are signs that the European banking sector is recovering. Large European banks have improved their capital ratios via raising new capital and deleveraging. In addition, the ECB's comprehensive assessment has improved transparency for investors across the banking system. As such, it may be the case that credit growth will pick up over the next few years. However, I suspect the ECB's QE programme will play a limited role in this recovery.

2.2. The Quantity Theory

The other element of the traditional textbook model of money is the quantity theory of money, which describes a long-run relationship between money and inflation. Defining the velocity of a stock of money, V , as the ratio of nominal GDP (real GDP, Y , times a price level, P) to that stock, M , then one arrives at the famous expression $MV = PY$.

If velocity is constant, then nominal GDP is strictly proportional to the stock of money. And if money is neutral in the long run (i.e. if real GDP has no relationship with the stock of money in the long run) then the price level will be strictly proportional to the stock of money over this long run. This is the sense in which Milton Friedman (1963) meant his famous statement that "Inflation is always and everywhere a monetary phenomenon."

In practice, of course, velocity is not constant but if changes in velocity were predictable then it would still be the case that changes in the money supply would translate into predictable long-run changes in the price level. Up until the 1980s, velocity in the United States showed a relatively predictable upward trend over time. However, over the past 35 years, the velocities of the various monetary aggregates have been unpredictable. Notably, in recent years the velocity of M1 has almost halved (see Figure 3).

Because of these developments, time series data now show a very weak relationship between the growth rate of the stock of money and nominal GDP: See Figure 4 for the relationship between M1 money growth and nominal GDP growth in the United States. The relationship between money growth and inflation is even weaker: See Figure 5.

These figures rely on U.S. data and on the use of the M1 money supply measure but the points hold for data for other countries and other monetary aggregates. ECB has tended to emphasise the M3 measure of the money supply but, as shown in Figure 6 there is little evidence for a relationship between this measure and price inflation in the euro area.

Figure 3: The Velocity of M1 in the United States

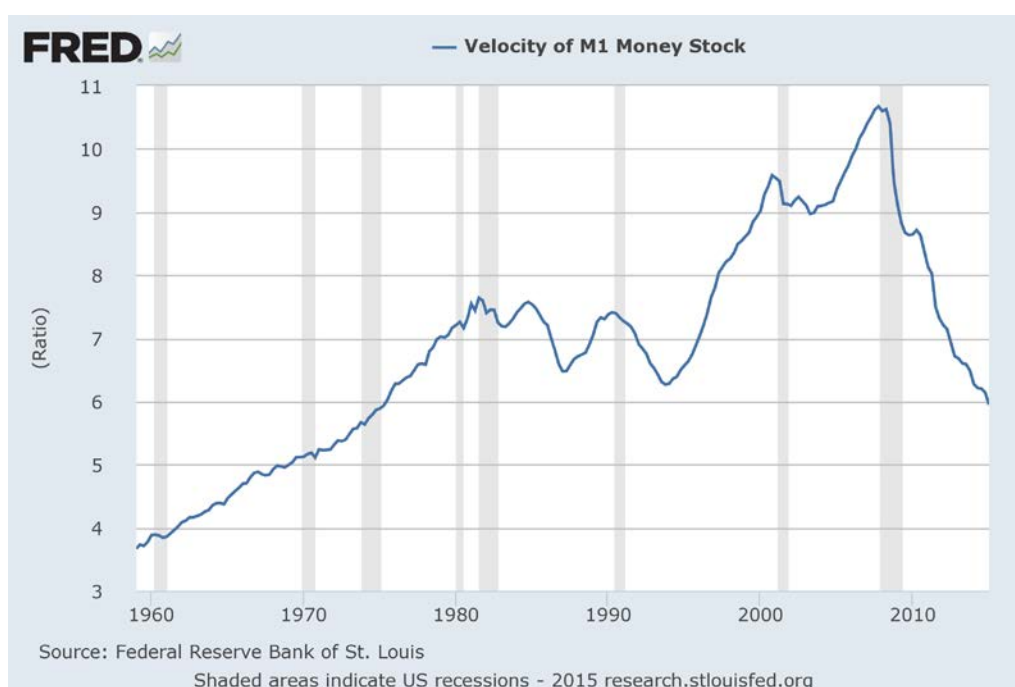


Figure 4: Growth Rates of U.S. M1 Money Stock and Nominal GDP

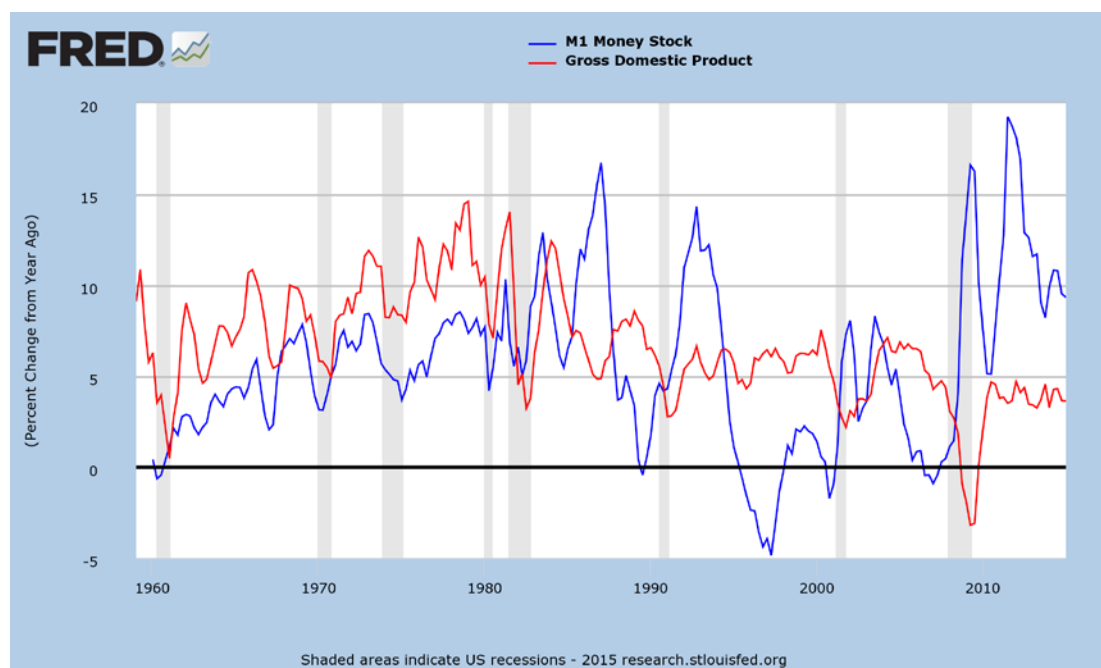
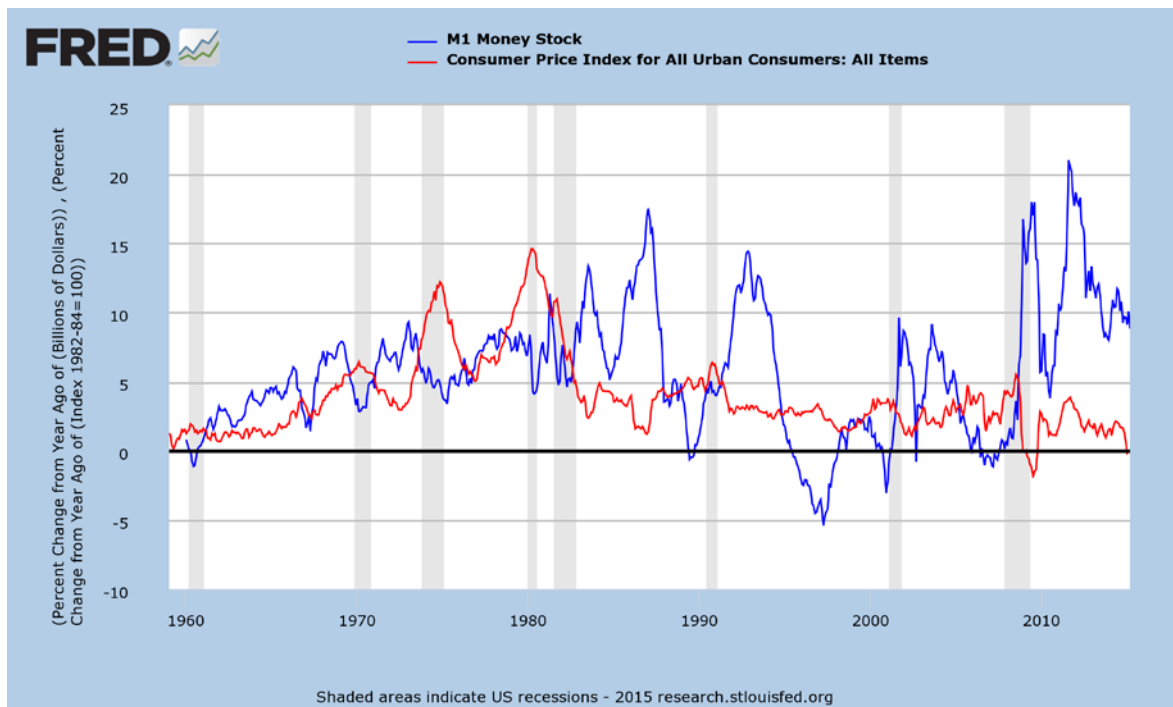
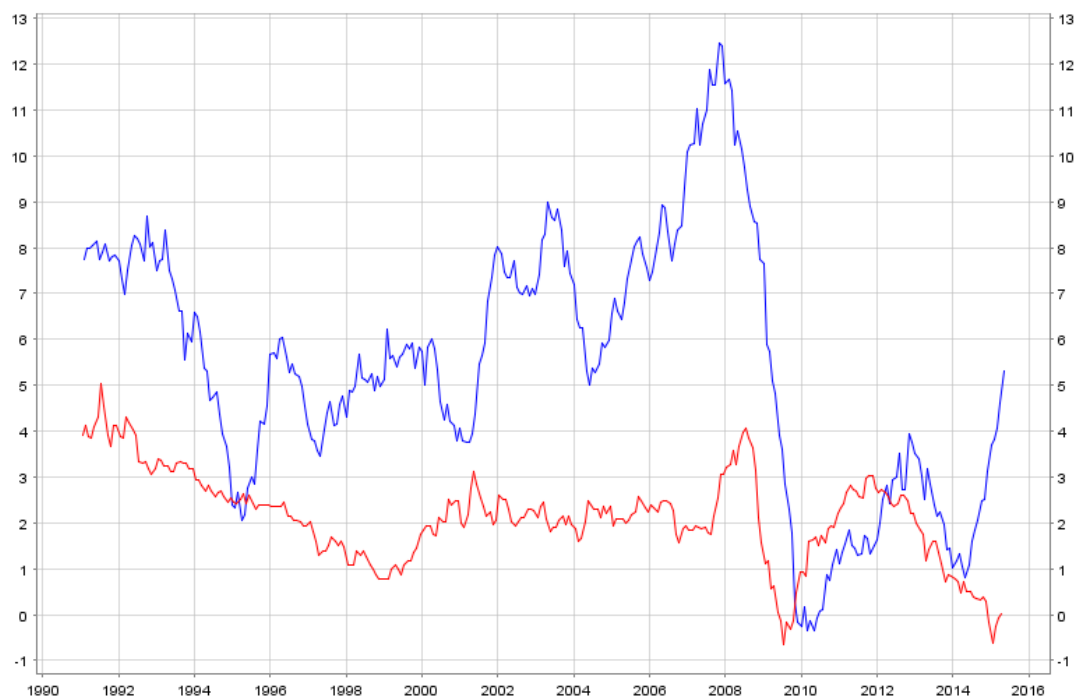


Figure 5: Growth Rates of U.S. M1 Money Stock and Inflation**Figure 6: Growth Rates of Euro Area M3 Money Stock and HICP Inflation
(M3 Growth is the Blue Line, Inflation is the Red Line)**

Source: ECB Statistical Data Warehouse

2.3. So how does QE work?

These considerations imply that there is little reason to expect a QE programme to automatically trigger large increases in bank lending, nominal GDP or inflation. So what are the channels through which QE may have a positive impact on the economy?

In one sense, the answer is simple. QE involves large-scale purchases of various types of long-term bonds. By increasing the demand for these bonds, their prices rise via normal supply-and-demand mechanisms. Higher bond prices imply lower yields on long-term bonds and these lower yields are then passed on via the usual processes of arbitrage in financial markets to a wider range of financial market instruments. The result is lower borrowing rates for governments, firms and households and these lower rates act to boost consumption and investment.

In another sense, however, the explanation is not so simple. For those trained in modern academic finance theory, the idea that Central Banks purchasing large amounts of an asset should change its price is not at all straightforward. Traditional finance theory teaches that assets are priced according to their “fundamental” value so that each asset has the “correct” price based on its expected return and perceived riskiness. According to this theory, there should be no role for “demand” effects as just described. This is what prompted Ben Bernanke to joke - “The problem with QE is it works in practice, but it doesn’t work in theory.”⁶

But, of course, there are plenty of other theories. One reason there are demand effects for bonds is that investors differ in their preferences and assessments of risk. Consider the case of a bond that was yielding 3% and whose yield then dropped to 2% (In other words, the bond’s price goes up). Some investors that may have been comfortable with the risk-return trade-off associated with the bond when it yielded 3% but now view it as too risky to be worth holding at a 2% yield. Alternatively, some types of investors (such as pension funds, mutual funds or hedge funds) may have target rates of return and will be forced to sell the bond to chase higher returns on other assets. Through these channels, the demand for a bond would fall.

This line of reasoning appears to explain why QE lowers bond yields. If there is a fixed supply of the bond and demand is larger the lower the price is (the higher the yield) then the equilibrium bond price is the one that equates supply and demand. If the central bank decides to purchase a specific quantity of a specific type of bond, then the demand curve for this bond will shift out: This will raise the price of the bond and reduce the yield.

Alternatively, you could argue that the “private sector demand curve” is unchanged but the “private sector supply curve” shifts in when central banks purchase some of the bonds, thus raising prices. In practice, bond yields are not set by two curves intersecting. They are set on a second-by-second basis by brokers who are matching up those wishing to sell and those wishing to buy. But the basic principle still applies: When there is heavy demand to buy the bonds, the broker raises the price to induce people to sell and this lowers the yield.

Prior to the launch of QE programmes by the Fed and the Bank of England, there was only limited empirical evidence as to how these programmes might work in practice. However, the evidence from carefully-designed studies by researchers at these institutions (including Gagnon et al, 2010, D’Amico et al, 2012 and Joyce et al, 2011) all point to QE as having impacted interest rates on the targeted bonds.

For example, D’Amico et al (2012) state their results as follows, using the terminology Large-Scale Asset Purchase (LSAP) program rather than QE:

⁶ See “US quantitative measures worked in defiance of theory” <http://www.ft.com/intl/cms/s/0/3b164d2e-4f03-11e4-9c88-00144feab7de.html>

"For longer-term Treasury securities, the first LSAP program (undertaken in 2009) consisted of \$300 billion of Federal Reserve purchases, while the second program (in late 2010 to mid-2011) consisted of \$600 billion of purchases. Our preferred estimates suggest that, taking scarcity and duration together, the first program of LSAPs reduced longer-term Treasury yields by about 35 basis points; the second program, larger in dollar amount but smaller in its impact on duration, reduced longer-term Treasury yields by about 45 basis points."

So while QE programmes do work to reduce long-term interest rates, the evidence for existing programmes suggests the effects are modest enough. This means that QE programmes are a poor substitute for the ability to cut short-term interest rates by another couple of percentage points.

This illustrates one of the downsides of operating in a low inflation environment. When the target inflation rate is as low as 2 percent, average nominal interest rates will also tend to be quite low. This makes it far more likely that interest rates will reach the zero bound in a situation where the central bank would like to have more monetary stimulus. Indeed, since international central banks converged during the 1990s on the idea of an inflation target of about 2 percent, zero bound restrictions have become a regular feature of monetary policy during recessions.

3. QE AND INEQUALITY

In this section, I discuss two different aspects of the recent debate about the impact of QE on inequality. The first aspect relates to its impact on the general distribution of income and wealth. The second aspect is the idea that QE specifically benefits a small group of people associated with the financial sector.

3.1 Inequality amongst households

Economic studies of inequality have tended to focus mainly on income inequality, with measures like Gini coefficients used to estimate how unequal the distribution of income is. This focus on income inequality is partly due to the fact that income data tends to be widely available from sources such as microeconomic surveys or from tax-related datasets. In more recent years, thanks partly to the work of Tony Atkinson, Thomas Piketty and others, there has been increased attention paid to inequality in wealth.

QE programmes can potentially affect both types of inequality. Here I discuss wealth inequality first and then income inequality.

Wealth inequality

The most common explanation of how QE raises inequality is that lower interest rates boost asset prices and this tends to benefit the wealthier classes that hold most of the assets. Whether this effect actually makes the distribution of wealth more unequal, however, requires consideration of a number of other factors. In a recent paper, Bivens (2015), considers how QE affected the prices of various types of assets and then considers the impact on wealth of different types of households. He estimates that the Fed's "LSAPs" boosted long-term bond prices by 9 to 14 percent, equity prices by 5 percent and house prices by 7 percent.

He notes that the overall impact on wealth inequality is limited, summarising his results as follows:

While stock price increases stemming from LSAPs accrue disproportionately to the top 1 percent, home price appreciation disproportionately benefits the bottom 90 percent. In fact, the symmetry of the respective holdings of stocks and home equity is striking: the top 1 percent owns just 9.8 percent of total housing wealth while the bottom 90 percent owns just 9.1 percent of total stock and mutual fund wealth. Given this pattern, there would have to be a very large difference in the effect of LSAPs on the prices of stocks versus the prices of homes to really gain distributional traction. Not only is there no particularly large difference in the effects of LSAPs on these prices, but the impact on home prices (the more democratically held asset) seems in our estimate to be larger.

The situation in Europe appears to be quite similar. The ECB's 2013 report on its Eurosystem Household Finance and Consumption Survey (HFCS) shows that median household net wealth in the euro area is €109,200. Median holdings of financial assets, however, are only €11,400 with housing equity providing the vast majority of the rest of the net wealth of average households. A study using HFCS data to calculate the impact on wealth inequality of the ECB QE programme would be a worthwhile exercise. It seems, likely, however that the impact on wealth inequality of this programme will be small.

Income inequality: Financial income

In relation to income inequality, the reduction in interest rates associated with QE programmes almost certainly reduces inequality.

While a fall in yields on long-term bonds boosts the value of various types of assets, the usual mechanism by which this works is that asset prices rise to a point where future returns on assets have fallen in line with the decline in yields on long-term bonds. So, for example, someone who owned a long-term German government bond issued ten years ago will have seen the price of this bond increase. However, the schedule of coupon and principal payments associated with this bond will not have changed. Over the longer term, this person will not be better off: The short-term capital gain associated with the reduction in bond yields will ultimately be exactly offset by lower future yields so that the final value of payments from the bond has not changed.

Lower interest rates also have a redistributive income effect because they benefit borrowers and hurt those who hold assets. Microeconomic survey data such as the HFCN generally show borrowers to be younger and less well-off on average than those with large positive asset holdings.

Moreover, the available evidence suggests that wealth in the euro area is more concentrated among households that are older and have higher incomes. Table 1 on the next page reproduces a table from the ECB's 2013 report on its Eurosystem Household Finance and Consumption Survey (HFCS).⁷ This shows that average net wealth for households with a reference person aged between 55 and 64 are almost twice those of households with a reference person aged between 35 and 44. Average net assets of those in the top income quintile are over ten times the average net assets for those in the bottom quintile.

So while QE programmes may appear to help the wealthy by boosting asset prices, they also hurt the wealthy by reducing financial income. This point was clearly expressed in a recent blog post by Ben Bernanke, in which he wrote the following about critics of the Fed's low interest rate policy.⁸

"Interestingly, some of the same critics who say that the Fed's policies disproportionately help the wealthy also claim that they "hurt savers" by lowering rates of return. Since the wealthy tend to be savers, and the middle class and poor tend to be borrowers, the assertions that Fed policy helps the wealthy and hurts savers cannot generally both be true."

Bernanke notes that there are clearly exceptions to this general point: There are some poorer people who live off interest from savings accounts. But, overall, the lower return on assets appears to be something that reduces the incomes of the rich more than the poor.

⁷ ECB (2013).

⁸ This blog post is available at <http://www.brookings.edu/blogs/ben-bernanke/posts/2015/06/01-monetary-policy-and-inequality>

Table 1: The Distribution of Net Wealth in the Euro Area

Table 4.1 Net wealth by demographic and country characteristics				
	Median Net Wealth (€1,000)	Mean Net Wealth (€1,000)	Share of Total Net Wealth (%)	Share of Households (%)
Euro Area	109.2	230.8	100.0	100.0
<i>S.E.</i>	<i>(1.9)</i>	<i>(4.2)</i>		
Household Size				
1	39.6	134.9	18.5	31.6
2	148.2	279.4	38.9	32.1
3	135.2	246.7	17.7	16.6
4	175.4	285.4	17.5	14.1
5 and More	121.6	307.9	7.5	5.6
Housing Status				
Owner-Outright	241.2	391.3	69.1	40.7
Owner-with Mortgage	171.1	266.6	22.4	19.4
Renter or Other	9.1	49.5	8.6	39.9
Percentile of EA Income				
Less than 20	26.7	89.2	7.7	20.0
20-39	53.2	124.9	10.8	20.0
40-59	104.9	172.5	14.9	20.0
60-79	157.3	226.8	19.7	20.0
80-100	295.3	540.8	46.8	20.0
Percentile of EA Net Wealth				
Less than 20	1.2	-2.8	-0.2	20.1
20-39	27.0	29.4	2.5	19.9
40-59	109.2	111.9	9.7	20.0
60-79	230.6	235.1	20.4	20.0
80-100	506.2	780.7	67.6	20.0
Age of Reference Person				
16-34	16.1	71.3	4.9	15.7
35-44	94.5	191.3	16.2	19.6
45-54	148.3	266.6	22.9	19.9
55-64	186.6	344.4	25.5	17.1
65-74	163.9	283.6	17.8	14.5
75+	126.1	220.9	12.7	13.2

Source: ECB Household Consumption and Finance Network

Income inequality: Wage income

Changes in asset prices and financial income are some of the ways that QE programmes can affect inequality but they are not the only ways. To the extent that lower interest rates stimulate the economy, they reduce unemployment. Indeed, Engen, Laubach and Reifschneider (2015) estimate that the Fed's unconventional monetary policies (which they describe as both QE and "increasingly explicit and forward-leaning guidance for the future path of the federal funds rate") have reduced the unemployment rate in United States this year by 1.25 percentage points.

This has an impact on inequality because the most significant income reductions in a recession are experienced by those who lose their job and job loss disproportionately impacts those on lower incomes. Lower unemployment thus directly benefits those at the bottom end of the income distribution more than those at the top end.

Reductions in unemployment also have indirect benefits for those workers at the lower end of the income distribution that have not lost their job. Katz and Krueger (1999) reported that wages for lower-paid workers are more responsive to the overall unemployment rate. This result has been recently updated and verified in the paper by Bivens (2015). Thus, the impact of QE in raising the wages of lower-income workers more than others could be an important channel through which inequality is reduced.

Income Inequality: Effect of Inflation

One of the explicit goals of the ECB's QE programme is to raise inflation. If this is successful, it will have a series of distributional effects. Borrowers will generally benefit unless they are on variable rate contracts that adjust upwards with inflation. In contrast, those who own assets that provide returns that are not linked to inflation (or earn incomes that do not adjust with inflation) will tend to lose out.

A recent paper by Doepke, Schneider and Selezneva (2015) provides a detailed examination of the various channels through inflation affects different classes of households in the United States. They summarise their results as follows:

"When the Fed aims for higher inflation, middle-aged, middle-class households, who tend to have big mortgages, benefit at the expense of wealthy retirees, who have a lot of their savings in bank accounts and bonds. Poor and young households are less affected because they are less likely to own homes and their debt burdens are low."

This is also work that could perhaps be undertaken for euro area countries using the ECB's HFCN dataset. This appears, however, to be another channel through which the ECB's QE policy may reduce inequality.

Income inequality: The combined impact of QE

So there are lots of ways that QE may impact inequality and neither economic theory nor a simple examination of the data are likely to give us a straight answer on the precise effects of monetary policies of this type on inequality.

One way to assess the combined impact of the various channels through which QE affects inequality is to design a study that identifies how inequality is affected by pure shifts in monetary policy (i.e. those shifts that are not related to common cyclical factors that may influence both monetary policy and inequality). One paper that does this using U.S. data is Coibon et al (2012). Their study concludes that monetary easing reduces inequality. They examine microeconomic data from the U.S. Consumer Expenditure Survey that wage income for workers at the lower end of the distribution rises in response to monetary easing while financial income for those at the high end tends to decline.

This is an area where more research would be welcome but it is my assessment that the evidence currently points to QE as having a small positive effect in reducing income inequality.

3.2. Financial Institutions

A related, but more specific, criticism of QE is that it particularly helps financial institutions and thus benefits the top 1% of the income distribution by boosting bonuses for bankers. For example, the New York Times article by William D. Cohan (cited above) states

"The first beneficiaries are the big Wall Street banks, the so-called group of 22 primary dealers, which can borrow directly from the Fed, essentially free. Because banks are in the business of making money from money, they use the Fed's money to make more money by trading with it, investing it in government debt and pocketing the profit or by lending it out at wide spreads. Thanks to the Fed's low-interest rate policy, the big banks also make a lot of money by taking our deposits, which they also pay us virtually nothing for – my savings account pays me an annual interest rate of 10 basis points, or one-tenth of one percent and lending them out at wide spreads."

He also describes another possible benefit of QE:

"Then there is the gift the Fed has given to Wall Street's traders and investment bankers. The traders benefit because they know – and have known for years, thanks to the Fed's telegraphing of its quantitative easing program – that the Fed will be a continuing buyer of their risky securities at (ever-rising) market prices. Since the onset of Mr. Bernanke and Ms. Yellen's policy, the Fed's balance sheet has grown to \$4.5 trillion, from around \$800 billion before the crisis. That's a whole lot of securities bought at high, profitable prices and paid directly to Wall Street traders. The Fed might as well have been paying the traders' seven-figure bonuses directly."

My assessment is that both of these criticisms are, at best, over-statements.

Low yields and bank profits

Traditional conventional wisdom is that bank profits benefit from low short-term interest rates. However, this is because temporary low interest rates during a recession and the early stages of a recovery imply a steepening of the yield curve. Bank assets tend to be longer in duration than bank liabilities, so a steepening of the yield curve reduces costs relative to income and raises net interest margins. A reduction in interest rates tends to see a higher fraction of a bank's liabilities being reset to lower interest rates than its assets (e.g. long-term fixed rate mortgages are not reset) which also boosts profitability.

The low interest rates of more recent years, however, have been different from the scenarios of the past where interest rates were temporarily low during a recession and were expected to rise quickly once the economy had recovered. Due to a combination of economic weakness and a commitment to use QE to maintain low interest rates for a long period, interest rates on many asset categories are now very low right across the yield spectrum. For example, during 2009, in the early days of the ECB's low interest rate policy, the average difference between yields on 10 year AAA-rated euro area government bonds and 1 year AAA-rated bonds (as measured by the ECB's yield curve) was 2.9

percentage points.⁹ As of June 1, a few months into the ECB's QE programme, this gap stood at only 0.85 percentage points.¹⁰

This shows there is no direct link between QE policies and higher bank profits via improved net interest margins.

Profits from purchase of risky securities

Mr. Cohan's point that the Fed's bond purchases have produced a bonanza for Wall Street traders due to large purchases of "risky securities" is also misplaced. The Fed has been purchasing Treasury bonds and agency-issued Mortgage Backed Securities (MBS). It is presumably the latter that Cohan is referring to as risky securities.

In reality, however, statistics from the Securities Industry and Financial Markets Association (SIFMA) show that issuance and average daily trading volume of mortgage backed securities have been falling in recent years and are well below the levels seen prior to the global financial crisis.¹¹ In addition, while these bonds may be purchased from Wall Street traders, the vast majority of the money paid out for these bonds goes back to the banks that originate the mortgages used to back the securities. The idea that the Fed is generating a wave of bonuses on Wall Street via MBS purchases is not accurate.

⁹ These data are available at http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=165.YC.B.U2.EUR.4F.G_N_A.SV_C_YM.SR_1Y and http://sdw.ecb.europa.eu/quickview.do?SERIES_KEY=165.YC.B.U2.EUR.4F.G_N_A.SV_C_YM.SR_10Y

¹⁰ See Genay and Podjasek (2014) for a discussion of the negative effects of a flat yield curve on bank profitability in the US.

¹¹ These data are available at <http://www.sifma.org/research/statistics.aspx>

4. CONCLUSIONS

Monetary policy is almost always a controversial area and complaints about the impact of policy on the economy from various interest groups always need to be understood in the context of the vested interests of these groups.

One group that traditionally have a loud voice in debates about monetary policy are those who benefit from low inflation, such as retired people who live on fixed incomes or financial institutions that rely on income from bonds. These groups are currently happy that the ECB is undershooting its inflation target and will likely continue to warn about the inflationary dangers of QE.

However, if the ECB's inflation target is to remain credible to the public, it is important that deviations to the downside are treated as seriously as deviations to the upside. Warnings that QE's expansion of the monetary base will result in rampant inflation rely on a highly flawed view of the role of money in the economy and have been directly contradicted by the evidence from the UK and US. Despite some signs of improvement in the euro area economy, I still believe the more likely risk is that the impact of QE through lower interest rates will be relatively marginal and inflation will remain below target for longer than the ECB Governing Council desires.

In relation to the idea that QE is boosting inequality, even if this was the case, it is unclear whether the ECB should concern itself with such a development. The ECB has an explicit primary goal of maintaining price stability, as defined by meeting its inflation target. Currently, it is failing to meet that target and its QE programme should be viewed as an overdue positive step aimed at restoring the credibility of its commitment to meeting its target. Beyond meeting its inflation target, the ECB has a secondary task of supporting the economic policies of the European Union. It seems clear that a policy that focuses on boosting economic growth and lower unemployment fits well with the majority of the Union's economic goals.

In any case, despite vigorous attacks from both left-leaning liberals (people who focus on the idea that QE benefits "the 1%" who work on Wall Street) and right-leaning conservative (people who focus on the idea that QE hurts poor retired savers) the balance of the evidence actually supports the idea that looser monetary policy has a marginal impact in reducing inequality. By reducing unemployment, QE can help the unemployed get jobs and reduce pressure on those at the bottom end of the income distribution.

To the extent that the ECB does decide to concern itself with inequality, Governing Council members should argue that they are helping rather than hurting. And those who are genuinely concerned about reducing inequality would be better off focusing on areas that really matter, such as taxation and education policies.

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