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To Be Made Sick by Medicine: Quantitative Easing and Inequality After the Financial Crisis

giulio alberto bianchi

The University of Edinburgh, giuliobianchi94@hotmail.co.uk

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To Be Made Sick by Medicine: Quantitative Easing and Inequality After the Financial Crisis

Abstract

During the Global Financial Crisis, central banks attempted to counter the economic downturn by reinforcing their conventional policy toolset with an extensive range of unconventional monetary policies. Paramount amongst these policies was Quantitative Easing (QE), which involves the creation of electronic money to conduct large-scale asset purchases. QE has been accused of increasing economic inequality from multiple political standpoints. By analytically weighing QE's effects on different groups of households, this paper attempts to establish whether the Federal Reserve System, the European Central Bank and the Bank of England fostered income and wealth inequality during the post-crisis period in the areas under these institutions' purview. Before proceeding with this analysis, this paper also outlines the interplays existing between inequality and conventional monetary policy to counter central bankers' established view that inequality should be considered an irrelevant by-product of their policy choices. When looking at QE, this paper argues that this policy fostered a divergence between the relative performances of financial markets and the rest of the economy, which consequently increased inequality. QE was designed with a bias towards effectively supporting financial markets, on which few wealthy households depend. As the benefits accrued by financial markets did not trickle-down; this policy was relatively ineffective at supporting the rest of the economy, on which the majority of households rely.

Keywords

Monetary Policy, Quantitative Easing, Inequality

Cover Page Footnote

I would like to thank Professor Iain Hardie, whose dedicated guidance helped me throughout the research, writing and editing phases of this dissertation. I would also like to show my gratitude to my parents for having helped me to discover the importance of looking beyond one's own field of study. Finally, I would like to thank all those who tolerated my mind-numbing conversations on monetary policy.

I. Introduction

“There are 10^{11} stars in the galaxy. That used to be a huge number. But it's only a hundred billion. It's less than the national deficit! We used to call them astronomical numbers. Now we should call them economical numbers”.

Richard Feynman – Nobel Prize in Physics (The Economist 2011)

One may not have to search afar to find examples revealing the monumental scales to which economists have become accustomed. Beyond national deficits, the cumulative number of United States (US) dollars, pounds and euros injected into financial markets by the Federal Reserve System (Fed), the European Central Bank (ECB) and the Bank of England (BoE) to revive their respective economies following the Global Financial Crisis was on the scale of trillions, thus 10^{12} .¹ Amidst the crisis, central banks reacted rapidly to counter the downturn by utilizing a wide range of conventional and unconventional monetary policy (UMP) tools. In turn, the three central banks under study established two historical records: one for reaching their lowest interest rate levels and the second for expanding their balance sheets in previously unseen ways in absolute terms (Haldane 2014:3). The principal cause of the second record and the most noteworthy policy carried out by central banks during this period has been the so-called Quantitative Easing (QE); a perplexingly cryptic term commonly defined as central banks' creation of electronic money to conduct large-scale asset purchases within financial markets (Bean 2014:2). The rationale for QE's implementation was that markets needed to be stimulated further relative to what could be achieved by using solely conventional monetary policy, which, as Section III will explain, had become almost impotent when interest rates approached the zero boundary.

While QE was intended to spur economic growth and inflation, its implementation has sparked numerous fears. Amongst these, inequality has gained a prominent stance as central bankers have been challenged for potentially intruding into the world of redistributive policies, theoretically confined to democratically appointed fiscal policymakers (The Economist 2015b). Critics from a wide political and national spectrum have blamed the officials at the helm of central banks of unintentionally, yet decisively enhancing the pre-existent historical trend of rising inequality by favouring the recovery of financial markets

¹ Although Quantitative Easing has also been implemented by the Swedish Riksbank and by the Bank of Japan, this paper focuses exclusively on the operations conducted by the Fed, ECB and BoE, as the surveys on households' finances in the areas under these three banks' purview are relatively more accessible and comparable.

and by failing to generate an inclusive growth path (Bernanke 2015; Wolf 2014:375). QE's disparate opponents have included central bankers such as Kevin Warsh who has accused the Fed of operating a "reverse Robin Hood" policy to enrich wealthy financial asset owners, left-wing politicians such as Jeremy Corbyn who has campaigned for a more egalitarian form of QE in the United Kingdom (UK), as well as right-wing politicians such as Mitt Romney who has argued for an auditing process to reconsider central banks' independence (Bivens 2015b:2; The Economist 2015b).

As Atkinson (2015:1) explains, the topic of inequality has been "at the forefront of public debates", while also gaining a "priority" status within the agendas of policymakers in most developed countries. One should note that inequality is a broad concept whose relevance varies according to the ways it is defined and measured (Wilkinson and Pickett 2010:17). Nonetheless, inequality has been pushed at the centre-stage of policymakers' agenda, especially in the US and UK, due to its dramatic rise since the 1980s in terms of the two most widely used metrics: income and wealth inequality (Giles 2015; Wilkinson and Pickett 2010:239). The former looks at the distribution of incomes and the latter at the distribution of assets within a population (IPS 2016). Income inequality in the US, for instance, has reached unprecedented levels since its first known records, as the richest one percent have accrued sixty percent of the total increase in gross domestic product (GDP) between 1977 and 2007, while leaving approximately ninety per cent of the population with close to stagnant wages (Piketty 2014:297; Stiglitz 2013:4).

Despite inequality's rise, economists have generally ignored this topic in studies conducted during the second half of the twentieth-century (Atkinson 2015:15; Rajan 2010:18). As Bauman (2011:9) declares in his book *Collateral Damage*, inequality has repeatedly been "relegated to the status of 'collaterality'", implying that this phenomenon is considered a marginal side effect of achieving the relatively more important ends which monopolize economists' mental bandwidth. Amongst these, economic growth has dominated to the extent that, according to Kuznets's theory, income inequality was expected to decrease as a country reached its later stages of development where "growth is a rising tide that lifts all boats" (Piketty 2014:16). Furthermore, economists have faithfully upheld the view that efficiency and equality are mutually exclusive, and hence attempting to resolve inequality through redistributive policies would necessarily require sacrificing the efficient outcome generated by the market, while also altering individuals' future incentives (Claeys et al. 2015:2). However, in the past few decades, Kuznets's predictions have failed to materialize and the trade-off between equity and efficiency has been deemed less straightforward as

empirical research has demonstrated that high levels of inequality may in fact cripple efficiency and, more decisively, economic growth (Deaton 2015:966). Additionally, the list of adverse consequences of this phenomenon has drastically extended to include a variety of social backlashes such as higher levels of crime, a lack of social cohesion and a greater incidence of health-related problems (Wilkinson and Pickett 2010:4). More recently, as this paper will observe in Section II, inequality has been rounded up in the lengthy line-up of factors accused of provoking the Global Financial Crisis (Blyth 2015:22).

In turn, this paper analyses whether QE's attempt to inhibit the crisis played a role in increasing inequality. This paper focuses on both wealth and income inequality, and these two concepts are used interchangeably due to the presence of a strong overlap between QE's effects on income streams and asset prices. To begin with, Section II of the paper delineates the age-old debate on the relationship between conventional monetary policy and inequality to establish whether there is a relevant interplay between the two. Section III then proceeds to explain the underlying problems that led to the implementation of UMPs and outline QE's core characteristics. Section IV disentangles the complexity behind QE's processes to determine whether this policy has been a "reverse Robin Hood" privileging wealthy financial asset owners over the rest of society. This paper argues that QE's bias towards supporting financial markets relative to the rest of the economy determined its responsibility in increasing inequality during the post-crisis period and eclipsed the offsetting impacts of its weak equalizing channels. Additionally, as the Fed, ECB and BoE have implemented different forms of QE in different economic environments, Section V adds to scholarly work on the topic by explicitly comparing how these differences shaped inequality in unique ways. Finally, Section VI briefly underlines the potential alternatives to QE.

II. Interplays between Inequality and Conventional Monetary Policy

A. Narrow Mandates

During the past few decades, independent central banks pursuing price stability have become globally pervasive. Central banks' independence originates from the theoretical understanding that politicians have a tendency to have time-inconsistent preferences due to their inability to commit to a firm policy stance. Consequently, this unreliability engenders markets' mistrust and an inflationary bias, which may only be contained by a politically sheltered technocratic authority (Barro and Gordon 1983; Kydland and Prescott 1977; Rogoff 1985). While empirical studies demonstrate the presence of a strong negative correlation between the degree of central bank independence and average inflation, in a field antipathetic to silver bullets, the separation between politics and monetary policy is a necessary, yet insufficient, condition for price stability, and even less so for growth (Jàcome and Mancini-Griffoli 2014). In fact, central banks' own credibility also decisively defines the markets' expectations. As argued by Jacomè and Mancini-Griffoli (2014), this credibility stems from three essential qualities: "a clear monetary framework", "central banks' successful track record" and "accountability". Since the early 1990s, the prioritization of these qualities has culminated in the widespread adoption of explicit inflation targets (Roger 2010). Within this framework, medium-term inflation targets concede a degree of flexibility allowing for the promotion of growth in the short-term (Meyer 2001). Nevertheless, central banks' actions are predominantly restricted by their legal commitment to undertake a hierarchical mandate within which inflation has an absolute priority, or a dual mandate, as in the Fed's case, which implies that both maximum employment and inflation are targeted. The confinement of central banks' objectives to narrow targets lessens the arduousness of achieving credibility in the face of trade-offs, competing governmental institutions and limited policy tools (Meyer 2001). As narrowness and credibility remain interconnected, central bankers have been unwilling to broaden their targets beyond inflation and unemployment (Georgsson et al. 2015:24).

While reductionism is a central trait of neoclassical economic thought, inflation's close to absolute monopoly has repeatedly been challenged for being characterized by a narrowness bordering on a counterproductive insularity. Blinder (1988:51), for instance, explains that "inflation, like every teen-ager, is greatly misunderstood" as its sacred status

emanates from the scars of past hyperinflations, which may be deemed archaic and unsubstantiated in the face of the relevant setbacks that low inflation policies may generate for variables ranging from unemployment to growth and, as this paper will argue, inequality. Similarly, Stiglitz (2013:257) argues that the adherence to the price stability creed derives from Milton Friedman's powerful monetarist ideology delineating monetary policy's inability to boost growth in the long run. Even though monetarist mandates have perished, this creed has persisted thanks to an amalgamation of factors including the financial sector's "obsession with inflation" and its ability to foster policymakers' own distaste of this phenomenon through a methodical "cognitive capture" (Stiglitz 2013:261). The exposure of these fault lines, amongst others, has sparked a set of proposals to alter policy mandates through measures ranging from a confined modification of the target itself by allowing for higher inflation levels to a complete reconfiguration of their nature by using nominal GDP targets (Ball 2014; Cooper 2014).

This fresh breeze of change has rarely entered inequality's domain, as central bankers have customarily taken cover by neglecting equity concerns to remain in line with their mandates' rigid narrowness (Mersch 2014). To understand central bankers' claim of alleged objectivity in the face of inequality, it is essential to distinguish between policies operating through *inter*-temporal and *intra*-temporal redistributions. Modern central banks' conventional policies affect the economy by adjusting short-term interest rates, which in turn determine the incentives to save, borrow and invest. Lowering short-term interest rates, for example, promotes a substitution of future spending for current spending by increasing the markets' incentive to borrow and decreasing their incentive to save, thus generating an *inter*-temporal or so-called "vertical" redistribution through time (Cœuré 2013). As Cœuré (2013) explains, the *intra*-temporal or "horizontal" distribution of income between individuals at a fixed period, on which inequality depends, is currently labelled as "a side effect of a strategy which aims at ensuring price stability". Consequently, progressing into a discussion on QE and inequality would be classified as a relatively futile task according to this "collateral damage" criterion. Nonetheless, this paper will begin by presenting a case for the relevance of inequality in monetary policy debates by demonstrating that there exists a strong interplay between inequality and monetary policy since not only do central bankers' goals influence inequality, but also inequality may powerfully challenge the attainment of these same goals.

B. Inequality's Impact on Monetary Policy

The relationship between monetary policy and inequality has visibly resurfaced as a theme of speeches given by renowned central bankers such as Cœuré (2013), Mersch (2014), Haldane (2014), Carney (2014), Yellen (2014) and Bullard (2014). This apparent craze has not only been driven by the rise of intranational inequality per se, but rather, this concept has surfaced in central bankers' conscience due to mounting evidence of a positive correlation between crises and inequality (Moss 2010). Rajan (2010:9), for instance, anecdotally argues that stagnant wages amongst lower-income households have repeatedly encouraged governments' conscious or unconscious support of mortgage markets as a form of bipartisan redistribution, consequently generating perilous credit booms. Additionally, transcending potential accusations of illusory correlation, Kumhof and Rancière (2010:3) empirically test Rajan's hypothesis by looking at the pre-crisis period and confirm that feeble wage growth amongst the lowest income deciles of the US forced certain households to increase their exposure to debt to unsustainable levels to keep their consumption paths stable. Consequently, as many central banks have acquired more explicit responsibilities to sustain financial stability following a set of post-crisis reforms, monitoring inequality has become part of their own interests (White 2012:36).

Beyond its implications on financial stability, inequality has also been burdened with a plethora of other economic responsibilities specifically relevant to monetary policy. With multiple caveats, an abridged list includes factors such as weaker growth, higher inflation levels, even in the face of independent central banks, as well as the extreme responsibility of causing a loss of cognitive power amongst poorer households, with implications on economic productivity (Cingano 2014; Dolmas et al. 1997; Haldane 2014:6). Conforming to its pariah status, as Raskin (2013) argues, inequality may also have "clogged some of the channels through which monetary policy traditionally works" by depressing demand when central banks may want to foster it, as low-income households, who tend to spend relatively more than high-income households, have lost ground (Skidelsky 2011:11). Therefore, the vast array of economic consequences of inequality intrude within central bankers' mandates both by altering their tools' effectiveness and by directly shaping their objectives. In turn, as this paper has argued that inequality is relevant to monetary policy, it is crucial to determine if the opposite case also holds.

C. Conventional Monetary Policy's Impact on Inequality

When discrediting the common economic modelling assumption that individuals' wealth and incomes are identical across an economy, monetary policy's transmission mechanism may enhance or constrict inequality through five distinct channels: the *income composition channel*, the *financial segmentation channel*, the *portfolio channel*, the *savings redistribution channel* and the *earnings heterogeneity channel* (Mersch 2014). First, the *income composition channel* distinguishes between households whose total revenues are composed by diverse shares of wages, government transfers, as well as business and financial income (Airaudo and Bossi 2014:3). As shown in Table 1, the bottom twenty per cent (1st wealth quintile) in the US gain 78.9 per cent of their income through wages. Meanwhile, the top twenty per cent earn only 51.4 per cent of their income through this same source and compensate with a larger share of business and financial income, which largely depends on companies' profits (Nakajima 2015:14). A hypothetical expansionary policy, thus lowering interest rates, would only maintain inequality constant if all sources of income were equally affected or, in a simplified exposition, if wages and profits increased symmetrically. Overall, generalizations on the consequences of an expansionary policy on this channel are difficult. This complexity is epitomized by the fact that while medium-income households tend to own a disproportionate share of their wealth in the housing sector, which benefits from lower interest rates, they are also relatively more exposed to the potential losses in the inflation-fearful manufacturing sector and to a shrink in governmental transfer payments that generally follows an expansionary policy (Romer and Romer 1998:23).

Table 1: Sources of Income and Wealth in the United States in 2007

	Wealth Quintiles					Top 1%
	1st	2nd	3rd	4th	5th	
Composition of Income (in %)						
Labor Income (from wages)	78.9	81.2	78.6	77.1	51.4	30.2
Financial Income (from capital and business interests)	2	4.7	7.2	10.2	39.7	65.7
Transfer income (from government programs)	15.5	12	12.4	12.1	8.2	3.6

Source: (Nakajima 2015:14)

Second, as changes in the money supply are enforced through financial intermediaries, *the financial segmentation channel* underlines that households with a higher level of interaction with financial markets are more directly exposed to changes in monetary policy (Prasad 2013). Therefore, during a monetary expansion, as households have different levels of participation in financial markets, inequality only remains constant in a system that allows an equal permeation of the increase in the money supply throughout the economy. In reality though, ambitions of perfect permeation encounter a Kafkaesque castle, and as Ledoit (2011:1) explains, “the agent closest to the location where money is injected is better off”, thus generally favouring households who interact more frequently with financial institutions. Nonetheless, this channel is also not characterized by a definite straightforwardness as different types of financial assets have divergent movements following an increase in the supply of money induced by a fall in interest rates (Cœuré 2013). Third, the *portfolio channel* underlines the difference arising between households with assets protected from expected inflation from those who hold mostly unindexed assets that loose value as inflation increases (Coibion et al. 2012:2). Table 2 demonstrates that lower-income households’ relative exclusion from financial markets in the US has decisive implications on their bias towards holding a large portion of their wealth in inflation-sensitive cash (Erosa and Ventura 2002; Nakajima 2015:13). In a scenario where a central bank conducts an expansionary monetary policy with inflationary consequences, lower-income households holding cash will suffer relative to higher-income households with greater access to assets protected from inflation (Nakajima 2015:12).

Table 2: Inflation Sensitivity in the United States in 2014

	Percent (%) of expenditures paid for with:			
Household Income (in \$)	Cash	Debit Cards	Credit Cards	Other
Less than 25,000	55	31	5	9
25,000-49,999	29	51	15	5
50,000-74,999	22	49	24	5
75,000-99,999	16	46	35	3
100000-124,999	16	43	37	4
125,000-199,000	14	40	37	9
200,000 and above	10	15	66	9

Source: (Nakajima 2015:13)

Nevertheless, the effects of an expansionary monetary policy on inequality are ambiguous as the remaining two channels suggest a direct and positive relationship between inequality and interest rates, which runs contrary to the previously introduced channel (Coibion et al. 2012:3). The *savings redistribution channel* observes the impact of changes in interest rates and unexpected inflation on nominal contracts between borrowers and savers (Plihon 2015:4). On average, inflation makes borrowers better off by decreasing the value of their loan repayments relative to their inflated incomes, while savers become worse off as the amounts of goods that they can purchase with a fixed amount of savings decreases as goods become more expensive. Table 3 shows that, on average, low and middle-income households in the US are relatively more likely to borrow, thus benefiting more from unexpected inflation and lower interest rates compared to wealthier households who are more likely to save (Doepke and Schneider 2006; Nakajima 2015:12). Finally, the *earnings heterogeneity channel* underlines that certain households are more exposed to fluctuations in the economy's performance, which in turn is influenced by changes in interest rates (Cœuré 2013). As unemployment is more volatile for low-skilled and hence poorer households, an expansionary monetary policy decreasing unemployment may be relatively more beneficial for these groups (Blinder 1988:36).

Table 3: Net Nominal Position as a Percentage of Net Worth in the United States in 1989

	Net Nominal Position as a Percentage (%) of Net Worth						
Age of head of household	0 - 35	36 - 45	46 - 55	56 - 65	66 - 75	>75	Unweighted Average (all ages)
By household income							
All income levels	-42.6	-10.1	2.3	15.2	19.4	30.6	
Poor (bottom 20%)	-36.6	-33.8	-5.5	7.5	17.5	26.4	-4.08333
Middle-class (middle 70%)	-114	-31.6	-4.8	14	25.2	38.1	-12.1833
Rich (top 10%)	-14	3.8	6.6	16.3	16.7	27.5	9.483333

Source: (Nakajima 2015:11)

Overall, the literature analysing the short-term relationship between conventional monetary policies and inequality has converged towards overweighing the importance of the *savings redistribution* and the *earnings heterogeneity channels* relative to the other channels (Romer and Romer 1998:23). This overweighing stems from the fact that interest rates have a decisive and straightforward impact on the relative stance of savers, borrowers, and the unemployed. In line with the prioritization of these channels, multiple studies have demonstrated a short-term positive correlation between interest rates and inequality, or inversely, that expansionary policies decrease inequality (Coibion et al. 2012; Fouda Ekobena 2014). Airaudo and Bossi (2014:2), for instance, confirm the existence of a relationship between contractionary policies and inequality by showing that a one per cent increase in interest rates increases the Gini coefficient by about 0.08 percentage points. These figures reveal that monetary policy can be a decisive causal factor exacerbating inequality and, in turn, challenge central bankers' current strategy of overlooking this issue in their decision-making processes.

When looking at economists' archetypal distinction between short-run and long-run periods, monetary policy's effects on inequality diverge through time. While in the short run conducting an expansionary monetary policy may be a viable path to counter inequality, the same policy is considered a Sisyphean effort over the long run (Stiglitz 2013:257). Romer and Romer (1998:31), for instance, claim that expansionary "policy has had no impact on the average level of poverty; it has only rearranged its timing". This discrepancy originates from neoclassical economists' faith in money neutrality, which implies that expansionary monetary policies attempting to push unemployment levels below an imaginary boundary defined as the "natural rate" will only generate temporary booms at the cost of permanently higher inflation levels that contractionary policies will have to tame (Romer and Romer 1998:38). As expansions are doomed to be offset by contractions, one could argue that the optimal policy outcome involves creating a stable environment with low inflation levels, which consequently favours capital accumulation, and hence growth (Albanesi 2007; Easterly and Fischer 2001; Nakajima 2015:9).

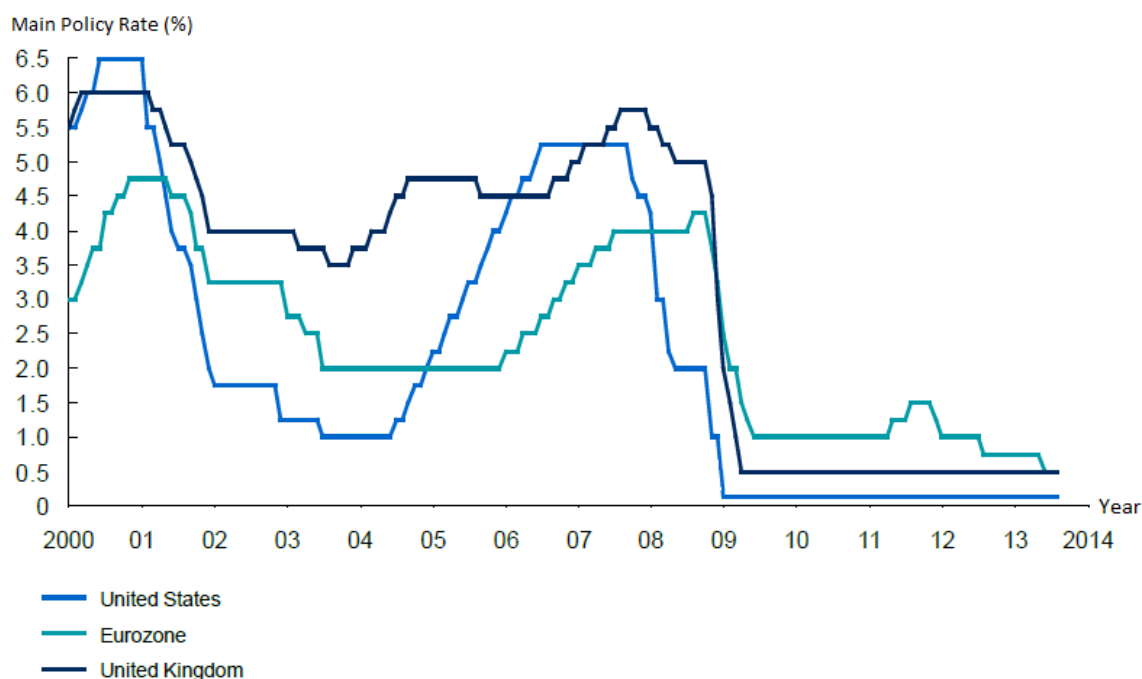
On the other hand, this line of reasoning controversially presumes the existence and relevance of a so-called long-run period, while also indirectly basing the belief of a cancelling out of opposite policies on the presence of a historically absent symmetry between the lengths of booms and busts (Nakajima 2015:10). Boom and bust cycles do not necessarily cancel out, as contractionary policies, on average, have been more prolonged or intense. This asymmetry between contractionary and expansionary policies stems from the fact that the

former have generally been less effective at taming inflation than expansionary policies have been at generating it (Shi et al. 2007:1213). In turn, Coibion et al. (2012:3), for example, question the current mantras of monetary policy by demonstrating that, as a permanently low inflation target has to be sustained with a recurrent use of contractionary policies, these policies have increased inequality in the US throughout multiple boom and bust cycles from the 1990s. As they explain, “monetary policy shocks can account for a surprising amount of historical cyclical changes in income and consumption inequality (...) the contribution of monetary policy shocks to the variance of these variables is also in the 10-20% range for most forecasting horizons” within the US (Coibion et al. 2012:23). Overall, one should note that blaming central bankers for intentionally creating a framework destined to spur inequality would be unsound. Nonetheless, inequality’s paramount importance in terms of monetary policy and financial stability should lead one to challenge central bankers’ decision not to acknowledge and monitor the distributional consequences of their choices. In turn, this paper will outline how the nature and intensity of monetary policy was reconfigured during the Global Financial Crisis and the effects these adjustments had on inequality.

III. What is QE?

At the onset of the financial crisis, central banks were challenged by an unconventional scenario urging them to react in unconventional ways. As shown in figure 1, when the crisis directed the US, the European Union (EU) and the UK towards a state of economic disarray, central banks attempted to alleviate the downturn by slashing interest rates to record-low levels close to zero (Dobbs et al. 2013:6). In this scenario, central banks could have continued their interest rate descent below zero by imposing negative interest rates on bank reserves. Negative interest rates imply that banks have to compensate a central bank with interest payments for holding reserves, which in theory should spur lending as banks want to minimize these payments by diminishing their reserves. Nonetheless, having banks pay central banks for holding reserves was deemed ineffective due to the formers' ability to escape interest payments by transforming deposits into currency, which is not liable to interest payments, and hence constrains central banks' ability to influence a banks' use of money (Haldane 2015).² The need for further action generated by the prospect of deflation in a crippled market and the constrained efficacy of conventional monetary policy in the face of a zero lower bound (ZLB) forced central banks to augment their range of tools by venturing into the domain of UMPs (Benford et al. 2009:90; Fawley and Juvenal 2012). As a report by the International Monetary Fund (2013:1) explains, central banks implemented UMPs with two related goals: "restore the functioning of financial markets" and "provide further monetary policy accommodation at the ZLB". To achieve the first goal central banks aggressively expanded their lending operations, provided liquidity insurance, purchased targeted private assets as a means to avoid fire sales or borrowing cost spikes and focused the early stages of QE on generating liquidity (IMF 2013:1; Joyce et al. 2010:10).

² The relevance of this theoretical constraint has recently been questioned and adopting negative interest rates has become more common worldwide (The Economist 2016a).

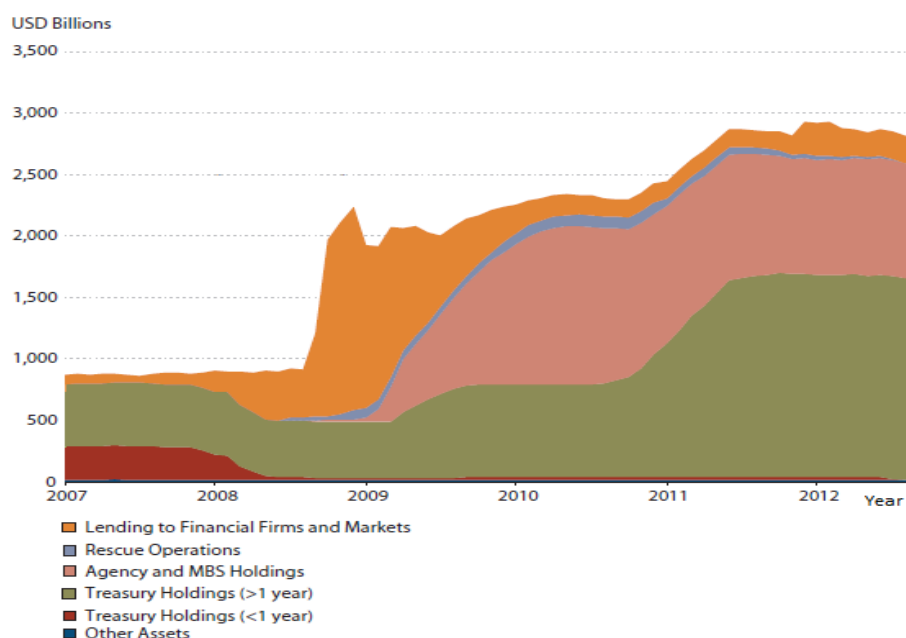
Figure 1: Central Banks' Policy Rates

Source: (Dobbs et al. 2013:6)

Nevertheless, QE's implementation was largely justified by the attempt to achieve the second objective: enhancing monetary easing (Joyce et al. 2012:274). QE is a process whereby a central bank conducts large-scale purchases of private and public sector securities acquired predominantly from non-bank companies such as pension funds (Benford et al. 2009:91; The Economist 2015d). More specifically, central banks generate new electronic money, which they channel into financial markets to alter the overall quantity of money in the economy. Central banks were not novice practitioners of financial asset purchases as their ability to set interest rates or the so-called price of money had previously relied on open market operations, which as Breedon et al. (2012:704) explain involved a "swap of central bank money for privately held assets". However, the size and focus of the purchases conducted through QE was unprecedented. Traditionally, open market operations were devised to have a limited influence on the prices of financial assets, whereas QE's benefits largely relied on snowballing increases in financial asset prices through targeted and vigorous rounds of purchases (Gagnon et al. 2010:7). Additionally, while conventional monetary policy had considered the quantity of money in the market an indirect by-product of the movements in the price of money generated by altering interest rates, QE added a new dimension to central banks' tools by making both the price and quantity of money direct

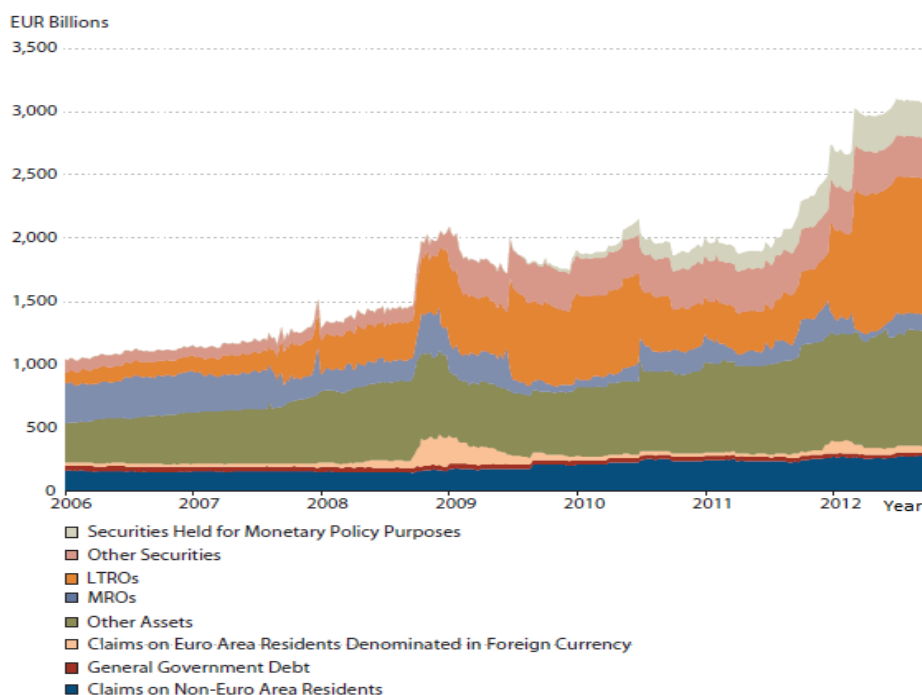
means of stimulating the economy (Benford et al. 2009:90). The quantity component of QE is manifestly visible in figures 2 to 4, which depict the drastic expansion of the assets on central banks' balance sheets since the onset of the financial crisis (Fawley and Neely 2013:66-68).

Figure 2: Balance Sheet of the Federal Reserve System



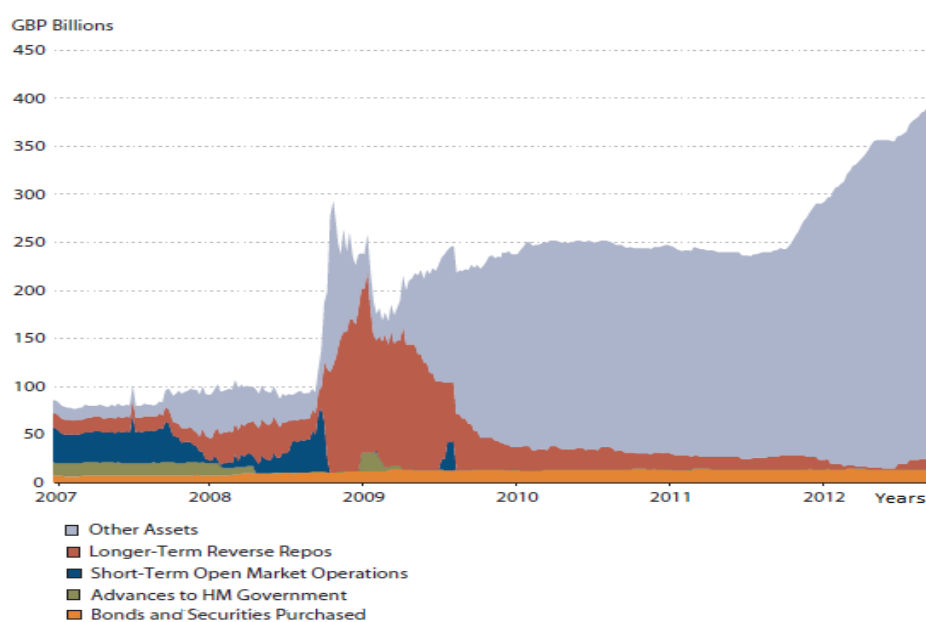
Source: (Fawley and Neely 2013:66)

Figure 3: Balance Sheet of the European Central Bank



Source: (Fawley and Neely 2013:67)

Figure 4: Balance Sheet of the Bank of England



Source: (Fawley and Neely 2013:68)

IV. QE and Inequality

A. Financial Asset Prices

As Benford et al. (2009:91) explain, central banks expected this monetary injection to “ultimately lead to an increase in asset prices and spending, and therefore bring inflation back to target” in the medium term. This paper will analyse the channels depicted in figure 5 through which QE theoretically furthers its expansionary aims. Amidst these channels, the portfolio-rebalancing channel, the liquidity channel and the macro-news channel operated by pushing financial asset prices upward.

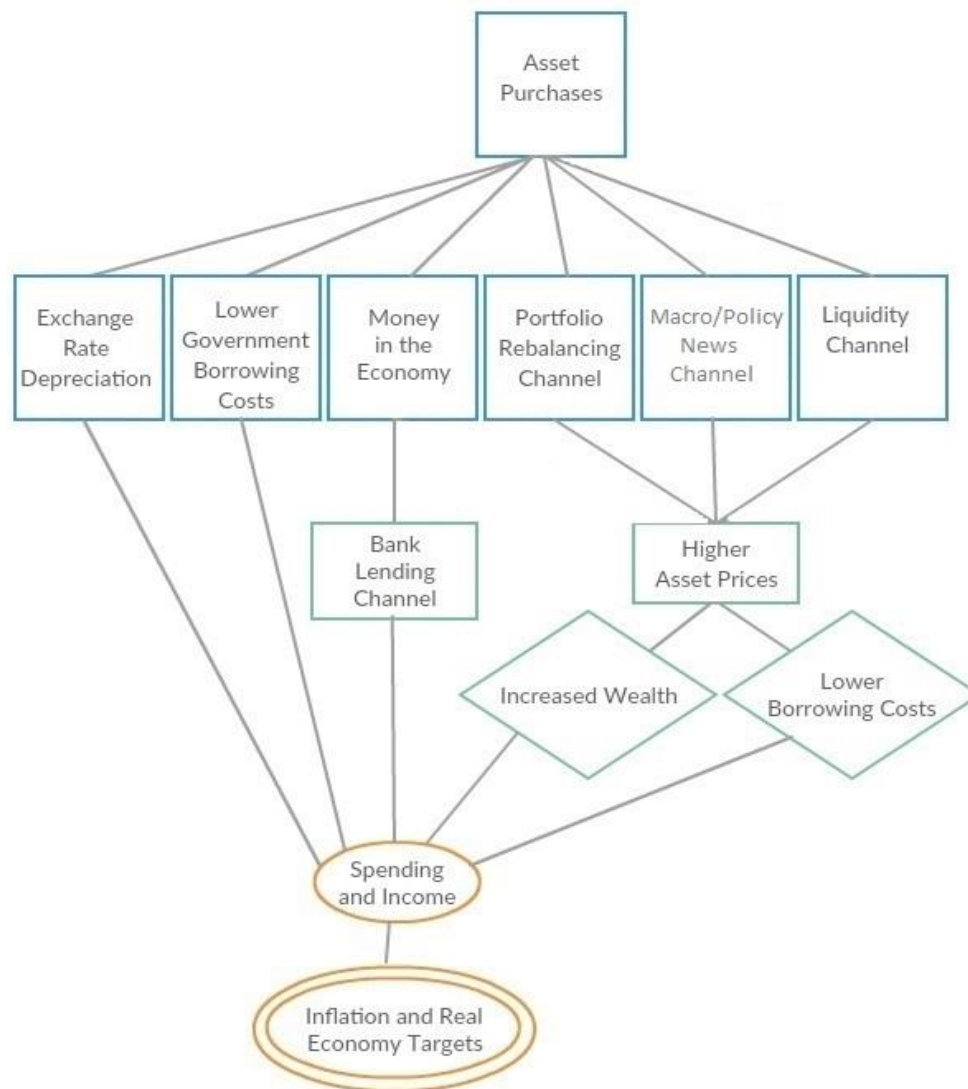
Firstly, the portfolio-rebalancing channel potentially spurred financial asset prices by relying on their imperfect substitutability. When central banks conduct asset purchases, they increase the sellers’ holdings of money, and consequently alter the portfolio composition of banks and non-banks (Green and Lavery 2015:899). If money and the financial assets purchased by the central bank are not perfectly substitutable from the sellers’ point of view, the seller uses the newly acquired money to purchase financial assets that are more in line with the expected risk and return of the previously owned ones. Especially in the US and UK, central banks purchased high-yielding financial assets, which were less likely to be substitutable with money, whose yield is generally close to non-existent. Consequently, sellers’ need to rebalance their portfolios to their prior composition fostered an escalating rise in financial asset prices across the markets where substitute assets were searched for (Benford et al. 2009:92).

Figure 5 also portrays the fact that QE targets financial asset prices to bolster spending in two additional ways. First, by becoming large and ready asset buyers, central banks rehabilitated the ailing levels of liquidity that commonly characterized the markets in QE’s early stages (Gagnon et al. 2010:5). Consequently, the liquidity premium expected by investors for holding the risk of being unable to sell financial assets decreased together with these assets’ yield, and inversely to their rising price (Bowdler and Radia 2012:611). Secondly, QE announcements spurred financial asset prices by providing reliable information about the future stance of both monetary policy and the economy.³ As Krishnamurthy and Vissing-Jorgensen (2011:4) argue, a central bank’s “willingness to undertake an

³ QE’s informatory role was advanced through a symbiotic relationship with forward guidance (Wu 2014:6). Forward guidance is a policy involving a central bank’s management of the markets’ expectations through a clear communication of its future interaction with the latter (IMF 2013:8).

unconventional policy like QE indicates that it will be willing to hold its policy rate low for an extended period". This signal strengthens the markets' confidence in a recovery, thus lowering multiple risk premia demanded by investors, and consequently pushing financial asset prices upward (Joyce et al. 2010:7).

Figure 5: Quantitative Easing's Channels



Source: Adapted from (Benford et al. 2009:93)

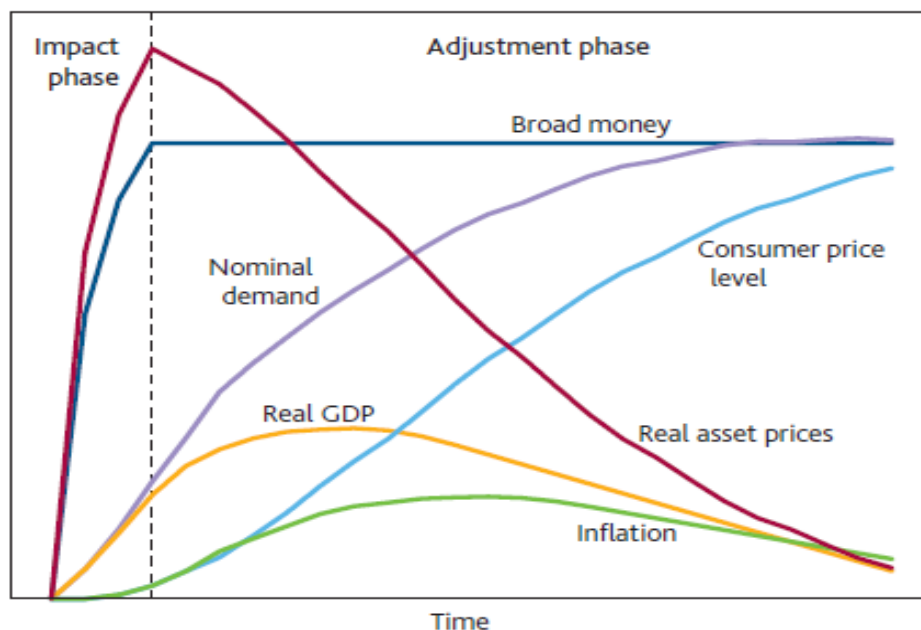
Consequently, QE's implementation has generated a pattern of increasing asset prices within multiple financial markets (Brown 2015:1; Koo 2014:76). While certainty in terms of magnitude is not a defining feature of the empirical studies on QE, there exists a shared tendency for these undertakings to demonstrate that QE had statistically relevant effects on a wide range of asset categories in the financial markets of the three areas under scrutiny

(Williams 2014:10). Empirical research by the BoE, for instance, finds that the first round of QE may have raised equity prices in the UK by approximately twenty per cent (Ryan-Collins et al. 2013:21). QE's potency is also epitomized in a survey conducted by UBS's asset management division, which demonstrates that a wide-range of asset managers thought that QE was the "number one driver of asset price movements" in multiple markets for a few consecutive years following the crisis (Custard 2015:2).

The most prominent case for QE's responsibility in worsening inequality stems from the implications of financial assets' price appreciation on households' wealth. Although ownership rates of financial assets are not easily comparable across countries, high-income households in the US, EU and UK share a general tendency to own more, and rely more on financial assets than middle and low-income households (BoE 2012:10; Claey's et al. 2015:4; Yellen 2014). In the UK, for example, the wealthiest five percent own forty per cent of the overall financial wealth of households in the country (Forbes 2015:16). Middle-income households are in fact less able to afford sophisticated financial services and are relatively more fearful of financial market risk (Forbes 2015:16). Therefore, on average, they are less likely to hold financial assets and more likely to hold interest-bearing savings, which lost out as central banks cut interest rates (Montecino and Epstein 2015:2). Meanwhile, low-income households have an infinitesimally small or non-existent financial asset ownership rate, with the caveat that they are indirectly exposed to these assets through pensions, which, on average, remained unchanged. Higher financial asset prices in fact increased the value of pension pots, yet, the gains generated by this rise were offset, or occasionally outbalanced by the losses households faced due to a fall in their income streams from annuities (Haldane 2014:4). Annuity rates are directly related to bond yields, which, as previously explained, QE lowers through its targeted asset purchases. Therefore, other things being equal, as QE increases financial asset prices, it improves the stance of the wealthiest relative to the rest (Bowdler and Radia 2012:613). In the UK's case, for instance, the BoE (2012:258) crudely estimates that QE's impact on financial asset prices led to an average increase of wealth of £10,000 per household when assuming a homogenous ownership rate of financial assets across households. Meanwhile, according to Green and Lavery (2015:9), when taking into account the disparities in ownership rates existing between households, the wealthiest ten per cent of households may have gained between £128,000 and £322,000, contrary to the majority who compensated for this disproportionate rise by gaining far less than the £10,000 average.

There are two caveats one should note. First, low interest rates and forward guidance also played a decisive role in lifting financial asset prices in ways that complicate the task of disentangling QE's sole responsibility (Dobbs et al. 2013:25). Second, QE theoretically only increases financial asset prices in the short run, while over the long run, it loses its relevance because central banks may have to reverse their stimulus and rational investors determine financial asset prices by looking at so-called "real forces", such as the constancy of economic growth and companies' profitability, which QE cannot determine sustainably (Bivens 2015b:18). As Bernanke (2015) argues, "the Fed's actions have not led to permanent increases in stock prices, but instead have returned them to trend". In turn, this would imply that QE did not increase inequality in the long run, but only re-established the pre-crisis levels of inequality by normalizing financial asset prices, and by reversing the fall in inequality that, all else being equal, the crisis generated by enfeebling financial asset owners relative to the rest.

Central bankers have repeatedly taken refuge against accusations of fomenting inequality by hiding behind this line of reasoning, which is backed by the fact that in the post-crisis period financial markets in the US, EU and UK have not decisively surpassed their historical averages for a range of ratios used by analysts to calculate assets' valuations (Claeys et al. 2015:3). Nevertheless, as is often the case, not all things are equal, and the crisis's crippling effects transcended financial markets and spread to other sectors of the economy, thus harming households across a wider spectrum. QE's objective was to follow a similar path as the crisis, from financial markets to the wider economy, yet, it aimed to prop up the former to reinvigorate the latter. Overall, central banks utilized a so-called financialised demand strategy, thus their actions were heavily biased towards supporting financial markets, with the hope that the benefits reaped by these markets would trickle-down into the broader economy (Watkins 2014:438). Under certain conditions, higher financial asset prices would have boosted spending by reducing borrowing costs and by increasing financial asset owners' wealth (Joyce et al. 2010:6). As Joyce et al. (2011:202) show in figure 6, following QE's initial "impact phase", the "stimulus from asset purchases works through the economy" in a so-called "adjustment phase" where asset prices normalize, while real GDP and inflation rise through time until the economy returns to an equilibrium level. If QE failed to transmit its stimulus beyond financial markets, its biased procedures may be blamed for having privileged wealthy financial asset owners' recovery, while leaving the rest of the economy behind, at least in the short run when financial asset prices do not necessarily adjust with the rest of the economy's inferior performance.

Figure 6: Trickle-Down Effect of Real Asset Prices

Source: (Joyce et al. 2011:202)

Nonetheless, as Section II underlines, one should always be critical of economists' archetypal distinction between the short run and the long run. Divergences between financial markets and the economy do not necessarily extinguish over time, and the increased levels of inequality arising from financial asset owners' privileged position may persist for a longer period than the one subtly suggested by the term "short run". Financial markets' rally relative to the rest of the economy, for instance, may be prolonged by the fact that the finance industry per se composes an important portion of developed economies' total economic output (London Economics 2009). In turn, this industry's superior performance may partially offset financial asset prices' theoretical convergence with the potentially inferior performance of the rest of the economy. Additionally, central bankers' ingrained financial market bias may lead them to postpone a long-run convergence towards a lower performance by extending asset purchases even further or by never reversing past QE purchases. Consequently, this paper will look at QE's effects on the economy as a whole to understand whether a divergence between financial markets and the rest of the economy materialized. However, before proceeding into an economy-wide analysis of QE's implications, this paper will first note that QE may also have shaped inequality by lowering mortgage costs and by reflating house prices.

B. Mortgages and House Prices

QE also intended to foster lending, or at least reduce debtors' burden, by directly lowering borrowing costs. More specifically, targeted purchases of debt-related assets reassured lenders, and consequently decreased mortgage rates. In the UK, for instance, these rates dropped by 322 points between 2007 and 2012 thanks to the conjunct efforts of QE and conventional monetary policy (Lund et al. 2013:30). In turn, as Bernanke (2015) argues, "debtors are generally poorer than creditors, so on this count easier monetary policy again reduces inequality". This statement though is far too simplistic when applied to the US, or when stretched beyond Bernanke's intended remit by looking at the EU and UK. In the US, for instance, while low-income households have a higher exposure to debt as a percentage of their total income relative to their wealthier peers, they are also largely unable to benefit from lower mortgage rates (Doepke et al. 2015). This is caused by the fact that the vast majority of mortgage contracts in the US have a fixed rate (Fuster 2015). In turn, the rate is determined at the time of signing the contract with a lender and does not adapt to changes in mortgage markets. Therefore, fixed-rate mortgage owners do not directly benefit from lower rates, but rather have to get a new mortgage to refinance their existing one, and hence reap the benefits of lower rates (Fuster 2015). Nonetheless, following the crisis, regulators and lenders jointly tightened the equity and income requirements that borrowers have to fulfil to obtain a mortgage, thus strongly favouring wealthier households who are more likely to satisfy the stricter set of criteria (Beraja et al. 2015:28). Beraja et al. (2015), for instance, demonstrate that mortgage refinancing occurred to a greater extent in wealthier areas of the US relative to poorer ones and, in turn, this difference visibly increased consumption inequality following QE's implementation.

Meanwhile, the UK differs from the US both for the fact that it's higher and middle-income households are relatively more exposed to debt than low-income ones and because its households predominantly use adjustable-rate mortgages, implying that they directly benefit from lower rates (Anderson et al. 2014:431; Tracy and Wright 2012). As upper and middle-income households are proportionally more exposed to debt, they are the major beneficiaries of the lower mortgage rates generated by QE. On the other hand, in the EU, households with lower-incomes are typically more exposed to debt relative to the rest, yet generalizations on the effects of lower borrowing costs on inequality in the EU are rendered complex by the diverse levels of usage of variable and fixed-rate mortgages in different European states (Claeys et al. 2015:7; Panetta 2015:5). Overall, QE's implications on inequality through

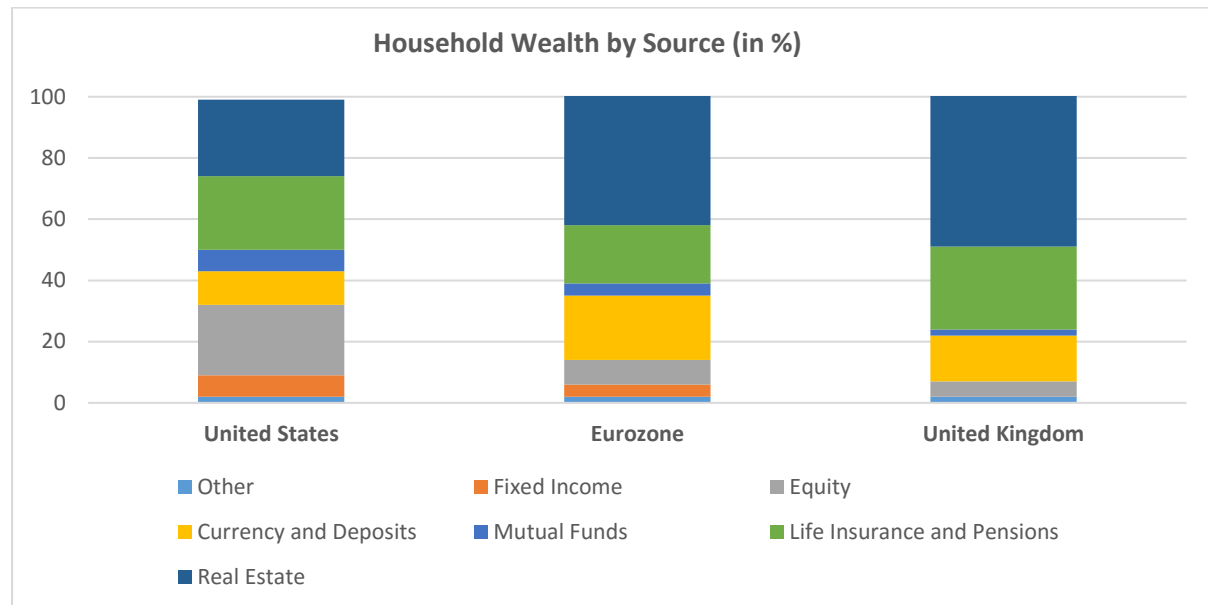
mortgage rates lack the straightforwardness necessary to counter QE's impact on inequality through financial asset prices, and, instead, may occasionally heighten these asset prices' effects by also favouring the wealthy over the poor.

Historically, falls in mortgage rates have been closely correlated with higher house prices, and hence an appreciation of property wealth, which, as Figure 7 shows, composes one of the largest sources of households' total wealth in the US, EU and UK (Lund et al. 2013:28). In the UK, for instance, research conducted by the BoE demonstrates that the low mortgage rates induced by both QE and conventional monetary policy reflated house prices by between fifteen and twenty percent, thus cancelling the fall in prices provoked by the crisis (Bivens 2015a). Additionally, in the UK, houses are a "democratically" held asset, as they compose a larger percentage of total income for low and middle-income households relative to households in the highest echelons of the income distribution (Bivens 2015b:14; ONS 2014:12). Therefore, higher house prices should theoretically have equalizing effects. Nonetheless, as figure 8 demonstrates, when decomposing home-ownership rates even further, one can see that property wealth amongst the lowest income quintile is heavily skewed towards a small minority, as more than half of this group is property-less, and hence, exposed to the higher private sector rents fostered by rising house prices (ONS 2014:12; The Economist 2014). One should also note that house prices are not uniformly affected by QE, as tighter credit constraints impede many low and middle-income households from taking out a mortgage, thus choking the demand pressure on the lower and middle-quality houses owned by these households. As Doepke et al. (2015:5) explain, credit constraints may counter the equalizing effect of higher house prices by generating a scenario where "the price of relatively high-quality houses increases, whereas the price of mid-level houses remains essentially unchanged". On the other hand, in the US and EU, while property wealth does compose a larger proportion of the total wealth of middle-class households relative to the wealthiest ones, poorer households are close to property-less and do not benefit from higher house prices (Bernoth et al. 2015:13; Bivens 2015b:16).⁴ Furthermore, contrary to the UK, house prices in the US and EU have remained sluggish by failing to recover to their pre-crisis levels as an oversupply of housing and elevated levels of household indebtedness played a crucial role in constraining price pressures within these markets (Lund et al. 2013:29; The Economist 2015a). Once again, while QE may have played a role in spurring asset prices that

⁴ Due to differences in data collection methodologies, the relevance of home ownership per household in the three areas under study cannot be compared directly.

are not decisively relevant to the wealthiest households in society, the implications of this effect for low and middle-income households do not point towards a clear equalizing effect capable of countering the impact of financial asset prices on inequality.

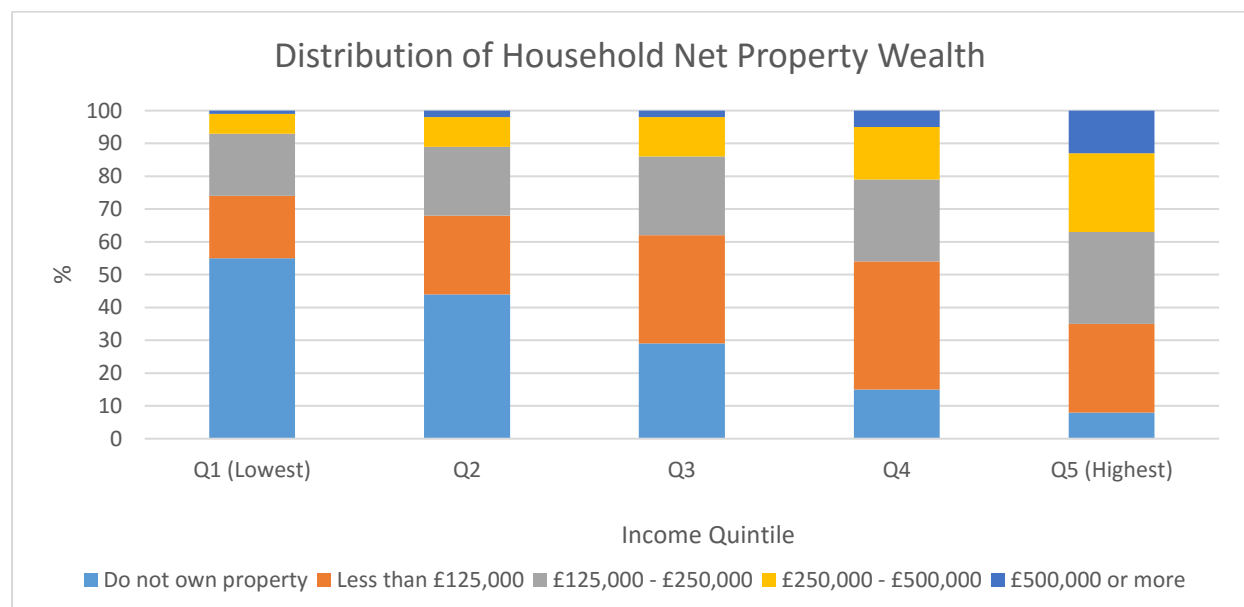
Figure 7: Household Wealth by Source in 2012



Note to reader: numbers do not sum up to 100% due to rounding

Source: (Dobbs et al. 2013:28)

Figure 8: Distribution of Household Net Property Wealth, by Total Household Income Quintile: Great Britain, 2010-12



Note to reader: numbers do not sum up to 100% due to rounding

Source: (ONS 2014:12)

C. Trickle-Down Economics: From Financial Markets to the Rest

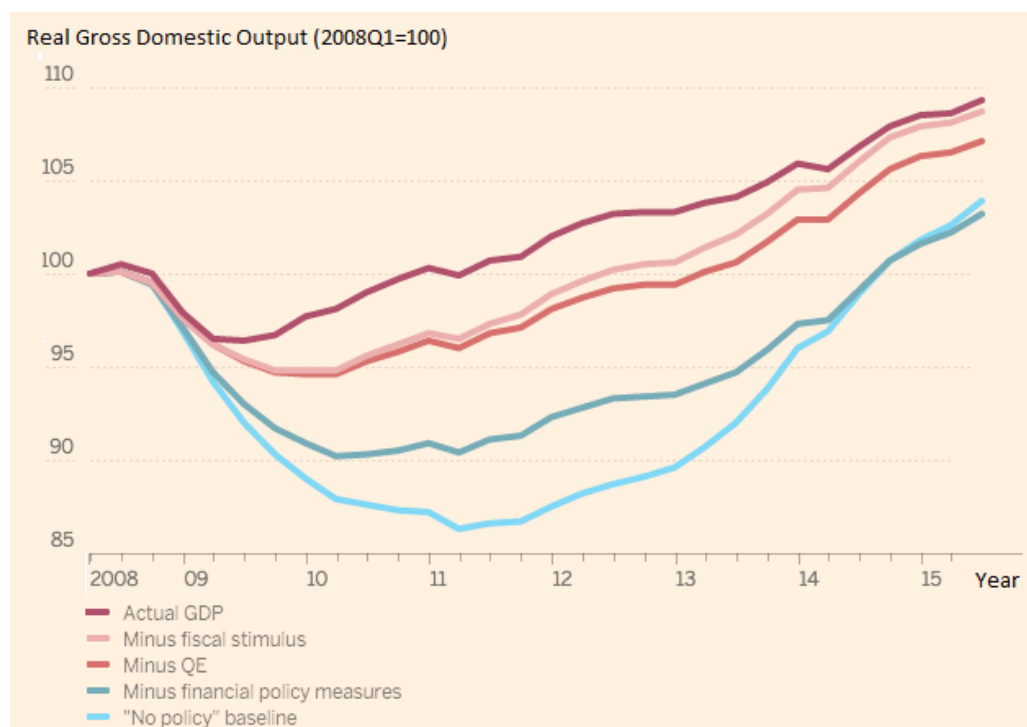
In Piketty's magnum opus *Capital in the Twenty-First Century*, a grand theory on the principal cause of inequality is derived by looking at the difference between the rate of return of capital "r" and economic growth "g". Piketty (2014:245) shows that the ownership of capital, which is used interchangeably with the concept of wealth, is more concentrated amongst the richest cohorts of society than the distribution of labour incomes. Consequently, Piketty (2014:424) argues that when " $r > g$ ", there will be an increase in inequality as the capital owned by wealthy households grows at a faster pace than labour incomes, which depend on economic growth (Atkinson 2015:158). Piketty's central finding is that the rate of return on capital, on average, has surpassed the rate of growth in the past decades, thus contributing to the sustained increases in wealth inequality experienced in most developed countries. One should note that Piketty's (2014:358) definition of capital extends beyond financial assets to include factors ranging from rents to profits; nonetheless, he acknowledges that in the twenty-first century, financial capital has composed a very large portion of total capital.

Ultimately, when looking at QE through Piketty's lenses, establishing whether this policy increased or decreased inequality largely depends on whether its benefits spread beyond financial markets to reach the rest of the economy, on which a wider range of households rely. As previously explained, low and middle-income households obtain a larger percentage of their income from wages relative to financial and business income (Claeys 2015:9). Additionally, poorer households are more susceptible to business cycles, thus they are far more likely to become unemployed during a downturn than wealthier households are, and inversely, as unemployment falls thanks to a stimulus, these same households will, on average, face a faster level of wage growth (Bivens 2015b:29). Therefore, if QE revitalized the wider economy by decreasing unemployment and by raising wages, it may have had equalizing effects, as these two variables determine a large fraction of the welfare of poor and middle-income households, when compared to wealthier ones (Bernanke 2015; Panetta 2015:4).

Nonetheless, recoveries in the US, EU and UK have largely been characterized by delayed rises in employment levels, by slow reinstatements of the pre-crisis output growth trends and by stagnant real wages (Chen et al. 2011:2; Koo 2014:4; Montecino and Epstein

2015:4; Wolf 2014:264).⁵ It is important to note that adequately assessing QE's effects on the economy requires one to compare the current scenario with QE to a theoretical counterfactual or base scenario without QE (Panetta 2015:4). QE's benefits have in fact been partially hidden by the recession. More specifically, while this policy did not necessarily increase wages or decrease unemployment levels, it may have played a subtle role in preventing a greater collapse of these figures (BoE 2012:256). Nonetheless, when considering counterfactual scenarios, as figure 9 shows, for instance, the US's recovery would have been slower, yet only slightly so, if the Fed had not implemented QE (Blinder and Zandi 2015; Sandbu 2015). More generally, the jury is still out on QE's impact on GDP, wages and unemployment (Conaghan 2012:231). Empirical studies on these variables have in fact largely failed to reach a consensus, while instead producing a set of approximations fluctuating on a relatively wide spectrum (Martin and Milas 2012).

Figure 9: Effect of the Post-Crisis Policies Implemented in the United States



Source: (Blinder and Zandi 2015; Sandbu 2015)

⁵ Although the recoveries have been more pronounced in the US and UK than in the EU, this statement gives a general representation of QE's average effects across the three areas under study.

Overall, QE's effectiveness has been less pronounced and certain in terms of real economy indicators than in the domain of financial asset prices. Ryan-Collins et al. (2013:1), for instance, argue that QE "inflates the price of such (financial) assets, and enriches the assets' owners, with minimal positive impact on the real economy". Although QE cannot be held accountable for singlehandedly spurring this divergence, in the UK, for instance, the real output of the business and financial services industry relative to the real output of the construction and manufacturing industries, as well as the performance of overall GDP, have visibly differed following the crisis (Ryan-Collins et al. 2013:7). Backing the interpretation that QE played a role in this divergence, Watkins (2014:431) contentiously states that QE "represents the triumph of pecuniary values over service, financial interests over industrial interests and asset holders over income earners". Similarly, yet from a moderate stance, a group of 19 renowned economists notably published a letter on the Financial Times asking the ECB to recognize that QE had been "an unreliable tool for boosting GDP or unemployment", and hence had to be substituted with a new expansionary approach devised to "bypass the financial system" (Chick et al. 2015). To comprehend the foundations of these arguments one has to observe QE's transmission mechanism.

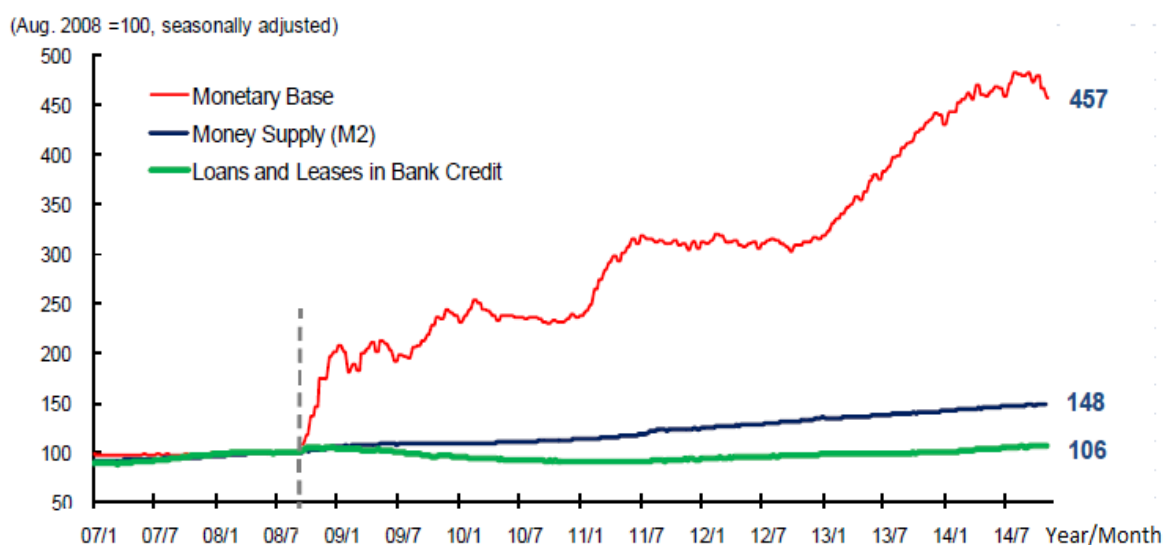
As Irwin (2014) explains, the divergence appearing between the superior performance of financial markets and the relative feebleness of the rest of the economy originates from a "paradox" at the core of central banks' foundation: the mandates focus on real economy indicators, whereas their transmission channels largely rely on financial markets. As Figure 5 shows, QE furthered its expansionary aims indirectly by operating through financial markets, and more specifically, three out of its four central channels revolved around increasing financial asset prices.⁶ Nonetheless, trickle-down economics, which is the idea that enriching the wealthy eventually generates benefits for the whole of society, faced a renewed setback (Chang 2011:137; Stiglitz 2013:6). Financial markets and their wealthy participants in fact largely retained the benefits accrued from QE, as the decisive expansion in central banks' balance sheets failed to revive the wider economy, yet succeeded in increasing financial asset prices. In turn, when looking at QE from Piketty's perspective, as QE fostered financial capital returns and failed to bolster economic growth, it enhanced the pre-existing divergence between "r" and "g", and hence increased inequality.

⁶ One should note that QE also lowered exchange rates and government borrowing costs, yet these effects remain relatively contentious and insufficiently researched.

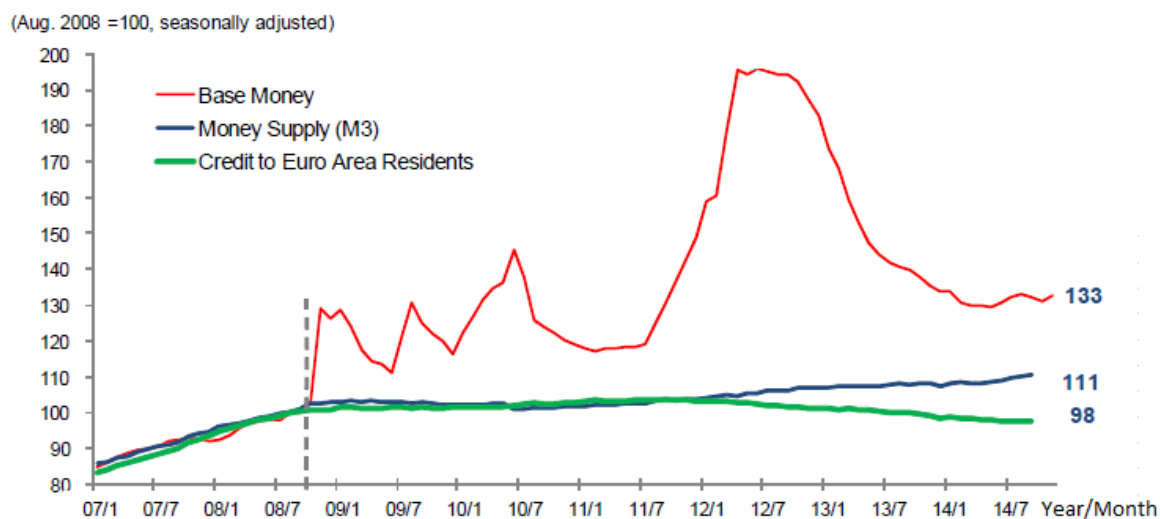
D. The Bank Lending Channel

Figure 5 also shows that QE theoretically could have boosted the wider economy directly, thus without necessarily relying on a trickle-down effect from higher financial asset prices. This process should have occurred through the bank lending channel. In practice, the electronic money created by QE generated large bank deposits as the vast majority of financial assets purchased were owned by non-bank companies but were transacted through banks (Butt et al. 2015). Deposits are an inexpensive source of funding and the increase in deposits largely exceeded banks' demand for liquidity, hence, this increase should have fostered an expansion of lending (Benford et al. 2009:93). Nonetheless, despite the spikes in banks' excess reserves, a combination of factors constrained banks' incentive to lend and the markets' incentive to borrow to the extent that academics have repeatedly classified this channel with the label of irrelevance (Butt et al. 2015). Figures 10 to 12 elucidate this trend by demonstrating a visible and rare divergence between the rise in the overall money in the economy or so-called broad money generated by QE's liquidity injections and the far lower levels of credit creation (Koo 2014:6-8). In the UK's case, for example, the moribund levels of credit creation prompted the BoE to incentivize lending further through the Funding for Lending scheme, which prizes banks according to their lending performance (BoE 2015).

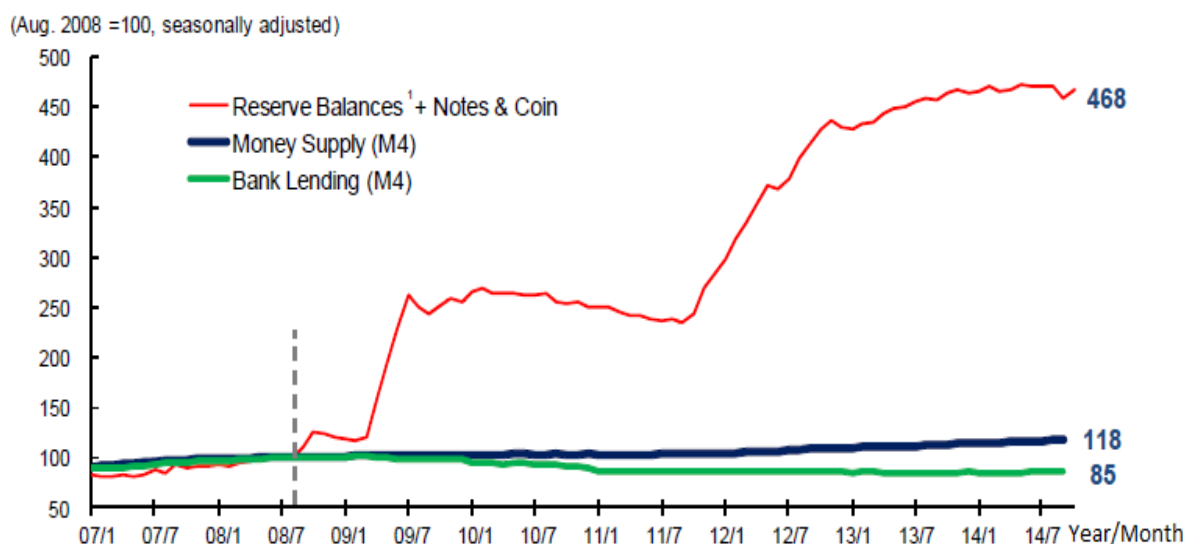
Figure 10: Credit Creation and the Monetary Base in the United States



Source: (Koo 2014:6)

Figure 11: Credit Creation and the Monetary Base in the European Union

Source: (Koo 2014:7)

Figure 12: Credit Creation and the Monetary Base in the United Kingdom

Source: (Koo 2014:8)

There are multiple culprits generating feeble levels of bank lending. Koo (2014:16) has argued that during a balance sheet recession characterized by a collapse in asset prices, it is common for the private sector to “switch from maximising profit to minimizing debt”. Counterintuitively, low rates and elevated liquidity levels do not always entice borrowers as saving and repaying loans become prevalent attitudes that critically inhibit the relevance of an expansionary monetary policy (Koo 2014:14). Accompanying low borrowing demand, banks created supply-side deficiencies as their confidence to lend decreased in line with the

anaemic post-crisis recoveries and with the convergence of the gap existing between long and short-term rates, on which their lending profitability relies (Goodhart and Ashworth 2012:666). Additionally, Butt et al. (2015) argue that the irrelevance of the bank lending channel may depend on the fact that the large deposits created by QE cannot be used as stable sources of funds due to the recurrent rebalancing of portfolios towards higher yields throughout the banking system, which consequently renders the nature of deposits excessively “flighty” for profitable lending to occur. As argued by Ryan-Collins et al. (2013:31), “bank lending is a key driver of nominal GDP”, and hence the feebleness of this channel played a decisive role in constraining QE’s efficacy on the wider economy. Consequently, even though this channel was meant to stimulate the economy directly, due to its weakness, it failed to contrast the divergence between the relative performances of financial markets and the wider economy.

V. Comparing Different QE Formats

While until now this paper has referred to a broad notion of QE, when looking at figures 2 to 4 one notes that the timings, intensities and compositions of QE varied in the US, EU and UK, thus generating different implications for inequality (Fawley and Neely 2013:66-68). Central banks' idiosyncratic choices were shaped by the differences in the structures of the financial systems, the nature of the recessions, the political pressures and the pre-existing legal constraints faced by these institutions (Hausken and Ncube 2013:65). The ECB's implementation of QE, for instance, has differed in two visible ways from the QE programmes executed in the US and UK, which are more akin to each other.⁷ First, as shown in Table 4, the size of the ECB's QE programme relative to GDP remained relatively small during the first years of the post-crisis period (Fawley and Neeley 2013:77; Szczerbowicz and Valla 2015). The ECB's restrained stance largely stemmed from its previously more optimistic assessment of the crisis and from the legal challenges imposed by the Maastricht Treaty (Kang et al. 2016; Klyuev et al. 2009:17). Second, as banks are the most important source of funding in Europe, the ECB attempted to encourage bank lending by focusing its purchases on refinancing banks to decrease their fear of engaging in this activity (Wyplosz 2014). Consequently, the ECB's initial indecisiveness and its focus on bank lending at a time with low demand for loans severely constrained QE's effectiveness in Europe when compared to the US and UK. This ineffectiveness may have played a role in generating the relatively slower economic recovery that characterized the EU in the post-crisis period (Hausken and Ncube 2013:65; Wyplosz 2014). Nonetheless, one should not be led to conclude that this slower recovery generated higher levels of inequality, as QE's relative inefficacy was also experienced by European financial markets, which recovered at a slower pace than the ones in the US and UK (Middeldorp and Wood 2016).

⁷ The QE programmes carried out in the US and UK are similar in terms of size relative to GDP and centrepiece focus on government bonds.

Table 4: Sizes of the Asset Purchase Programmes up to December 2012

Central Bank	Programme	Assets Purchased	Peak Size (Billion)	Peak Size (Billion USD)	2008 GDP (Billion)	Share of the Economy (%)
Fed	QE1	GSE Agency Debt	\$175		\$14292	1.2
		MBS	\$1250			8.7
		Treasuries	\$300			2.1
	QE2	Treasuries	\$600			4.2
	Maturity Extension Programme	Treasuries	\$667			4.7
	QE3	MBS	\$160			1.1
		Treasuries	0			0
BoE	APF	Gilts	£375	\$590	£1,441	26
		Commercial Paper	£1.97	\$3.1		0.1
		Corporate Bonds	£1.60	\$2.52		0.1
ECB	CBPP	Covered Bonds	€ 60	\$81	€ 9,219	0.7
	SMP	Euro Area Sovereign Debt	€ 220	\$297		2.4
	CBPP2	Covered Bonds	€ 40	\$54		0.4
Fed Total			\$3152	\$3153		22.1
BoE Total			£379	\$596		26.3
ECB Total			£320	\$432		3.5

Source: (Fawley and Neeley 2013:77)

One may also compare the Fed's QE programme with the one conducted by the BoE. The former's focus on purchasing risky mortgage-backed securities to support the heavily hit housing market has in fact been deemed more effective at boosting economic growth when compared to the latter's programme, which is relatively more centred on safer government bond purchases (Szczerbowicz and Valla 2015). Overall though, as QE is a somewhat new and unfamiliar policy, the literature comparing different QE formats remains very limited. In turn, asserting whether a divergence between the performances of financial markets and the rest of the economy has been more visible in one of the areas under study would lead one to reach faulty conclusions. Therefore, discerning how different configurations of QE affect

inequality in different ways is a task that calls for future research to allow policymakers to design their policies in more optimal ways.

VI. Alternatives

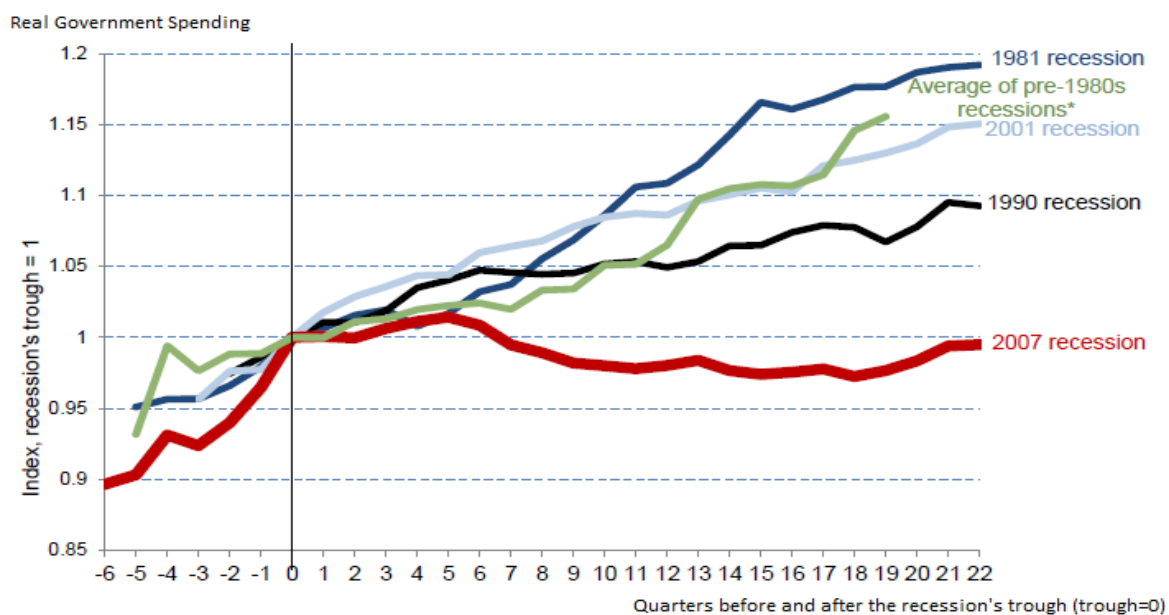
During the past few decades, the collapse of average long-term rates has increased the likelihood of central banks having to face deflation traps at the ZLB (Haldane 2015). In turn, as conventional monetary policies remain feeble in these scenarios, QE is likely to gain a prominent stance in future policymaking. Nonetheless, together with inequality, QE poses a plethora of relevant threats as its implementation may delay structural reforms, distort financial market signals, undermine central bank's independence and compromise the future potency of conventional monetary policy (Joyce 2012:54; Koo 2014:100). Compounding these risks, the consequences of reversing QE policies remain close to untested, and hence central banks' exit strategies are currently surrounded by perilous levels of uncertainty (Marron 2013; Treanor 2013).

These risks have encouraged a search for alternative policies that may halt QE's entry into the realm of conventionality. Amongst central bankers, proposals to revamp monetary policies have ranged from moderate plans to test negative interest rates, to more extreme proposals to increase inflation targets or abolish paper currency altogether (Haldane 2015; The Economist 2016b; Wolf 2016). On the other hand, outside of central bankers' sphere, support for a policy proposal named "QE for the people", a variant of Friedman's "helicopter money", has gathered momentum (Blyth and Lonergan 2014). This policy involves having central banks electronically create money to be distributed directly and irreversibly to households rather than to financial markets (Blyth and Lonergan 2014). Whether the distribution is conducted by the central bank or in conjunction with a government, this policy has been deemed more likely to increase spending in the economy than QE. Money handouts, for instance, may be designed in a way that favours low and middle-income households who are proportionally greater spenders than their wealthier peers are (Blyth and Lonergan 2014). Nonetheless, this policy's short-term effectiveness is eclipsed by its long-term risks, as its implementation could undermine the public's faith in the currency and in central banks' commitment to price stability (Cumming 2015). Ideological concerns on the ethicality of handouts and central bankers' straitjacketed dependence on maintaining an allegedly apolitical and credible stance are also likely to trump this policy's future (Muellbauer 2014;

The Economist 2015c). Overall, while this policy is unlikely to gain traction within central bankers' circles, its radical essence and the impetus of its backers reveal the elevated levels of discontent towards monetary policy's current response to the crisis.

The acknowledgement that central banks' tools have been blunted by the weight of the crisis also reinforces the case for addressing the imbalance between the use of fiscal and monetary policies that has characterized the post-crisis period. As Bivens (2015b:23) demonstrates in figure 13, for instance, in the most recent recession, "total government expenditures have risen more slowly than during any other post World War II business cycle" in the US. To different extents, partisan divisions and budget stringencies have stifled the use of fiscal policies in the US, EU and UK, thus leaving a large demand for expansionary stimulus to be supplied by the more expedited decisions taken by central bankers (Blyth and Lonergan 2014). Although one may not clearly establish the extent to which fiscal policy's relative lethargy determined monetary policy's need to redefine its boundaries, the latter's venturesome stance may partially originate from the need to complement or even substitute the former's role (Bernanke 2002; Bivens 2015b:24). To counter this process, the Bank for International Settlements (2012:3), amongst others, has called for greater caution when using UMPs, while also advocating for governments to support central banks with fiscal policies, as the latter risk being overburdened by market expectations that far exceed UMPs' uncertain potential. More importantly, as elected officials design fiscal policies, they are arguably more likely to take into account, and be held accountable for the distributional implications of their decisions than central bankers are (Green and Lavery 2015:10).

Figure 13: Real Government Spending During Recessions and Recoveries in the United States



Source: (Bivens 2015b:23)

VII. Conclusion

Within many developed economies, increasing levels of inequality have opened a number of fault lines threatening the sustenance of economic growth, social cohesion and democracy (Deaton 2015:978; Motesharrei et al. 2014:99). This paper does not argue that monetary policy should be directly responsible for addressing this overall rise in inequality. However, as inequality affects central bankers' objectives and monetary policy intrinsically has distributional implications, central bankers should acknowledge, monitor and mitigate their role in shaping this trend.

This paper cannot provide an indication of the extent to which QE caused inequality, as the outcomes of the empirical literature attempting to measure QE's impacts remain diverse and uncertain. Nonetheless, this paper argues that QE's design shaped the direction of its effects on inequality. More specifically, central bankers structured this policy with a bias towards supporting financial markets relative to the rest of the economy. This bias originates from the central role played by financial asset prices in QE's transmission mechanism and it is reinforced by the weakness of the bank lending channel. As the gains received by financial markets failed to spread towards the rest of the economy, QE favoured wealthy households who are more reliant on financial asset prices relative to low and middle-income households. Furthermore, this paper notes that QE may theoretically have had some equalizing effects by lowering borrowing costs and by reflating house prices. Nevertheless, these equalizing effects are relatively ambiguous and weak when compared to QE's dis-equalizing effects through financial asset prices. To sum up, when adjoining these findings with Section II's conclusion that contractionary monetary policies generally increase inequality, middle and low-income households find themselves in a paradoxical scenario where, as Montecino and Epstein (2015:25) explain, "given the current structure of the economy and monetary policy strategies, both loose and tight monetary policy are likely to be dis-equalizing". In turn, if further expansionary policies are needed at the ZLB, central bankers should counter this paradox by re-designing or substituting QE with mechanisms reflecting a greater awareness of the distributional consequences of their choices.

When looking beyond the scope of this paper, QE's relative novelty provides a fertile ground for future research. Research investigating QE's role in altering intergenerational and international inequality, for instance, is virtually absent. Nonetheless, the arguments in favour of the current pertinence of these issues are compelling. In terms of intergenerational

inequality, for instance, the elevated concentration of financial asset holdings amongst older households has guided the preliminary hypothesis that QE may have potentially disadvantaged younger households (BoE 2012:259). Meanwhile, in terms of international inequality, QE's intent of favouring growth in the US, EU and UK has eerily revived memories of the devaluation policies that followed the 1929 Great Depression, as countries implementing QE have transferred some of the post-crisis readjustment costs on emerging economies by making the latter's exports relatively less attractive (Eichengreen 2013:4). In turn, alarming calls that QE may fuel a so-called "currency war" have become common within academia, finance ministries and G7 summits (Rickards 2011:124). Flattening the meaningful risks posed by these forms of inequality is a task that will have to rely on more in-depth research investigating QE's potent distributional effects. Additionally, while this paper has focused exclusively on QE, future research should also look at the interaction between inequality and other UMPs implemented by central banks during the post-crisis period.

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