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BRIEFING

Quantitative (displ)easing?

Does QE work and how should it be used next time?

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September 2019

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Citation
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J Gagnon, J Leslie, F Rahman & J Smith, Quantitative (displ)easing?:
Does QE work and how should it be used next time?, Resolution Foundation, September 2019

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Summary

When the financial crisis plunged the world into a deep recession, central banks purchased massive amounts of long-term bonds to prevent recession becoming depression. Given that interest rates are close to all-time lows, quantitative easing (QE) is very likely to play an important role when the next recession hits. This briefing note looks at whether QE worked, whether it can do so again in future and whether its critics are right that it exacerbates economic inequality.

In theory, QE works by reducing long-term interest rates via reducing expectations of future central bank policy rate rises and by directly raising financial market asset prices. Evidence supports the theory: bond purchases equal to 10 per cent of GDP are typically estimated to reduce long-term interest rates by roughly 0.5 to 1 percentage points. But we might expect future QE programmes to be less effective because long-term bond rates are at or near historic lows, and because financial market expectations now take account of likely QE purchases before announcement.

Critics of QE tend to argue that it exacerbates economic inequality. And this argument seems to be widely supported: a new poll of UK Members of Parliament shows that barely a third support using QE in future. But evidence suggests that, while QE has exacerbated existing absolute wealth inequalities (40 per cent of the aggregate gains in asset prices went to the wealthiest 10 per cent of households in the UK), the macroeconomic effect was positive and progressive. The impact of QE on employment and wages provided a 4.3 per cent income boost to those in the bottom half of the income distribution, compared to a 3.2 per cent boost across the top half.

Looking forward, it is likely QE will be used by central banks in any upcoming recession – especially as space to cut policy rates is very limited across countries. To minimise concerns around the legitimacy of using QE in future, central banks should be more transparent and regular in its use, and politicians can help by providing central banks with clearer mandates.

Looking back: The impact of QE

How does it work in theory?

QE acts to boost demand in much the same way as standard changes in policy rates. When central banks cut their short-term policy rates, that feeds through to a range of more long-term interest rates in the economy, such as those on borrowing by households and firms. In this way, policy rates cuts reduce borrowing costs and so increase spending. QE works by affecting longer-term interest rates directly, and so boosting spending without changing today's short-term policy rates. To do this, central banks buy assets in openly traded financial markets and influence longer-term interest rates in two ways:

- First, QE works by signalling that the policy rate isn't going to rise anytime soon, affecting longer-term interest rates which move with expectations of future movements in policy rates. Put simply, QE convinces people that policy rates are going to stay low for a long time;

- Second, by buying longer-term safe assets like government bonds in open markets, central banks force private investors to undertake portfolio rebalancing. QE reduces the supply of longer-term safe assets available to private investors, pushing down the yields on those assets directly. And it leads some investors to buy more risky assets, such as bonds issued by companies. This puts downward pressure on the yields of those assets too. All this also reduces a range of longer-term interest rates in the economy.

What is the evidence that it actually works in practice?

In answering this question, academic work has focused on the impact of QE in financial markets. The most common examples of this work look at the impact of QE announcements in financial markets over short windows (generally between 30 minutes and three days). But simple approaches of this kind, known as 'event studies', have become less informative as QE has been used more often. This is because financial markets increasingly anticipate those announcements, meaning the reaction no longer gives an accurate estimate of the impact of the policy on asset prices. For this reason, researchers have also looked at the impact of QE over longer time periods, using time-series regression analysis. This approach seeks to measure the effect of changes in the net supply of long-term bonds to private investors on the term structure of interest rates.

The clear conclusion that comes out of this body of research is that QE works. Table 1 summarises the impact of QE on 10-year government bond yields in a range of countries. It shows that QE lowers longer-term interest rates significantly across a number of countries. All these studies find substantial reductions in bond yields: for example, purchases equal to 10 per cent of GDP reduce government bond yields by around half a percentage point, and this holds across countries.

There is also evidence linking QE to improvements in the economic outlook. Many of the studies listed in Table 1, as well as others, find that QE has led to falls in a broad range of interest rates, rises in other asset prices, and falls in exchange rates. In turn, economic models of different types imply that these effects boost economic growth. For example, for the UK, Churm, Joyce, Kapetanios and Theodoridis estimate that QE had a cumulative macroeconomic effect equivalent to a short-term interest rate cut of 1.5 to 3 percentage points (or around 1 per cent of GDP).[1]

[1] R Churm, M Joyce, G Kapetanios & K Theodoridis, *Unconventional Monetary Policies and the Macroeconomy: The Impact of the United Kingdom's QE2 and Funding for Lending Scheme*, Bank of England Working Paper no. 542, August 2015

Table 1: Estimates of effects of QE bond purchases on 10-year yields

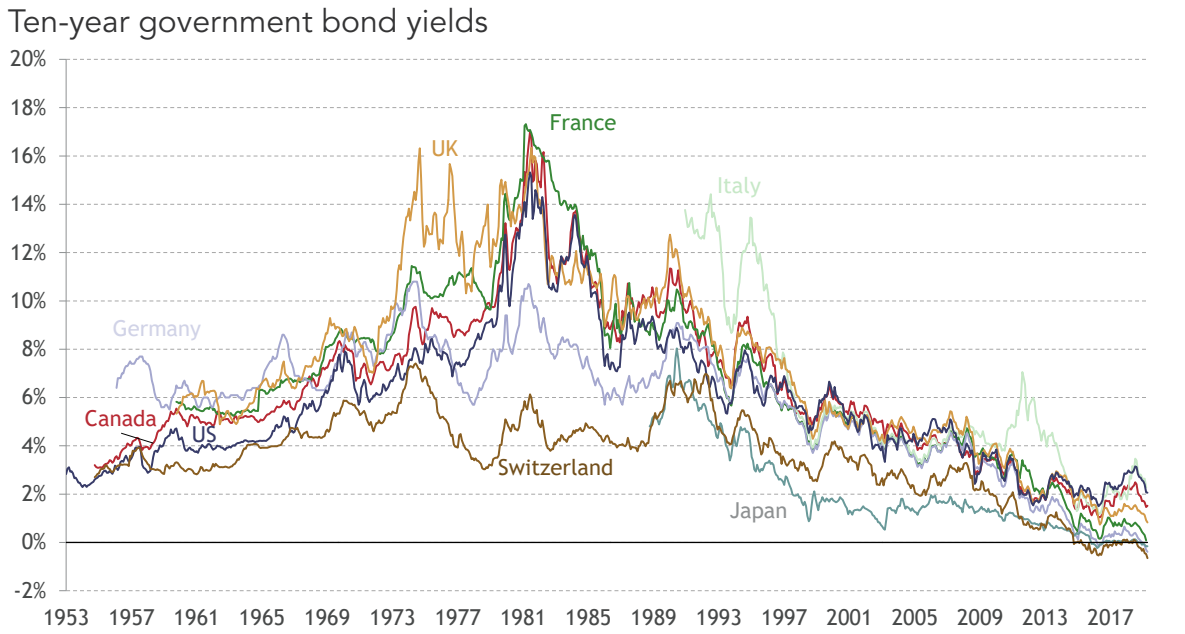
Study	Time period covered	Method	Yield reduction (basis points) for bond purchases equal to 10% of GDP
United Kingdom			
Joyce, Lasaosa, Stevens, & Tong (2011)	2009	Event study	78
	1991-2007	Time series	51
Christensen & Rudebusch (2012)	2009-11	Event study	34
Churm, Joyce, Kapetanios, & Theodoris (2015)	2011-12	Time series	42
Euro area			
Altavilla, Carboni, & Motto (2015)[a]	2014-15	Event study	44
Middeldorp (2015)[b]	2013-15	Event study	45-132
Middeldorp & Wood (2016)[b]	2015	Event study	41-104
Sweden			
De Rezende, Kjellberg, & Tysklind (2015)	2015	Event study	68
United States			
Bauer & Rudebusch (2011)	2008-09	Event study	44
Gagnon, Raskin, Remache, & Sack (2011)	2008-09	Event study	78
	1985-2007	Time series	44
Krishnamurthy & Vissing-Jorgensen (2011)	2008-09	Event study	91
	2010-11	Event study	47
Li & Wei (2012)	1994-2007	Time series	57
Neely (2012)	2008-09	Event study	84
Rosa (2012)	2008-10	Event study	42
Swanson (2015)	2009-15	Time series	40

Notes: (a) The estimate is for an average of Euro area bonds; (b) The smaller estimate is for German bonds and the larger one is for Italian bonds. There are 100 basis points in 1 percentage point. Most studies present a range of estimates: this table displays the study's preferred estimate if one exists; if not, it presents the midpoint of the range. For event studies, we normalise by purchases of all long-term bonds, not only government bonds. Some of the non-event studies include non-government bond purchases and others do not. For event studies, the normalisation is based on GDP in the final year of the event.
Source: See annex.

As with policy rates, however, there are limits to QE. When longer-term interest rates are close to zero, additional QE is unlikely to drive yields down much further. This is because investors have the option of holding cash with a fixed yield of zero, rather than face negative rates, limiting how far such rates can move below zero.

In that context, longer-term interest rates in many countries are uncomfortably close to zero. Indeed, 10-year government bond yields in a number of countries – including Germany, Japan and Switzerland (see Figure 1) - are currently slightly negative. And while US yields - and to a lesser extent those in the UK – remain somewhat above zero despite recent falls, yields are likely to fall in the event of a recession, as they have in the past. All this points to the idea that, while there is scope for future QE to impart additional stimulus, particularly in the UK and US, further purchases of safe long-term bonds have their own version of the zero bound constraint that limits traditional monetary policy.

Figure 1: The low levels of longer-term rates point to limits to future use of QE



Notes: Averages of daily interest rates implied by the prices at which the government bonds are traded in financial markets.
Source: OECD

The evolving role of QE

The weight of evidence above points to central banks being wise to overcome any reticence to using QE as an ongoing tool, in the same way as they do with short-term policy rates. Not only are most monetary authorities now familiar with operating asset purchases alongside policy through short-term rates, but there is less grounds for believing that the effect of QE have been insufficiently studied and understood.

But despite successfully supporting the recovery from the crisis, QE has taken central banks into uncharted waters, making some nervous about using it in future. In the US, this has manifested itself as political pressure to limit the Federal Reserve's powers, particularly within the Republican Party. Similar objections to QE have been raised in Germany, where quantitative easing has led to protests and court cases.

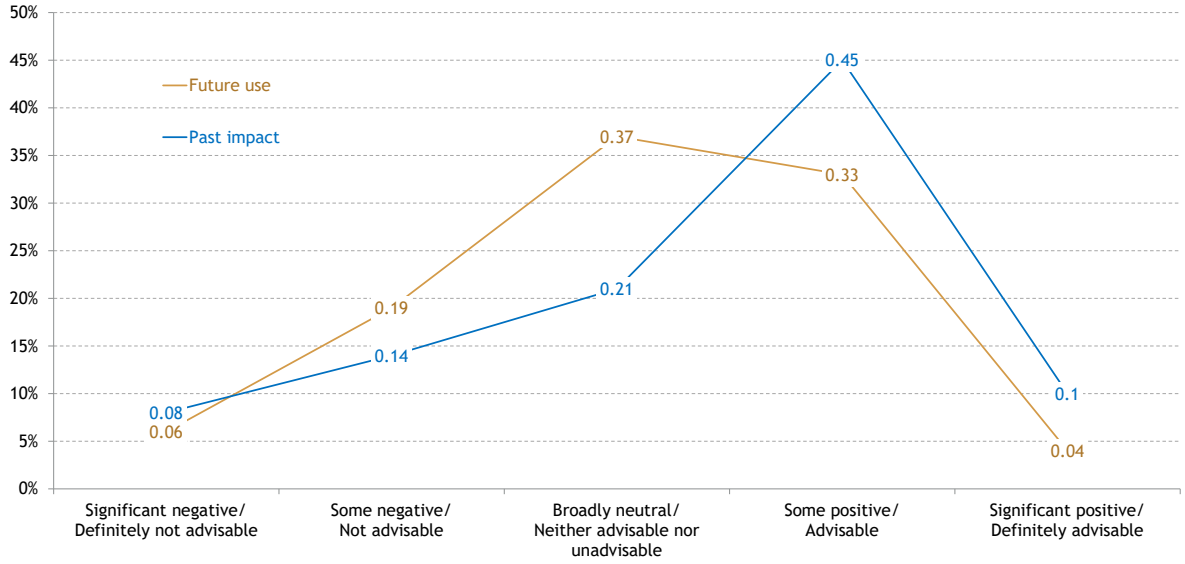
In the UK, public pressure on QE has also grown. A key reason for the unpopularity of QE seems to come from its perceived role in deepening inequality (exemplified by critical remarks made by the then Prime Minister at the October 2016 Conservative Party Conference).[2] More broadly, evidence from a novel survey of Members of Parliament

[2] "Because while monetary policy – with super-low interest rates and quantitative easing – provided the necessary emergency medicine after the financial crash, we have to acknowledge there have been some bad side effects. People with assets have got richer. People without them have suffered. People with mortgages have found their debts cheaper. People with savings have found themselves poorer." See: T May, *The new centre ground,* keynote speech delivered to the Conservative Party conference, October 2016

shows that while MPs are generally neutral or positive about the past impact of QE, they are more reticent to support its use in the future (only 4 per cent of MPs think that future use of QE is 'definitely advisable'). Figure 2 shows the results of this survey, commissioned by the Resolution Foundation.

Figure 2: MPs are reticent about the use of QE in the future

Aggregate responses from a survey of MPs on the efficacy of QE (proportion of all responses)



Notes: Results of a survey of MPs conducted for the Resolution Foundation by ComRes between 4 November 2018 and 13 December 2018. 150 MPs responded to the survey online or by self-completion of a paper survey. Data have been weighted by party and region to be representative of the House of Commons.
Source: ComRes

A common criticism of the Bank of England's QE programme has been that the lion's share of the benefits have accrued to the already wealthy; this is typically used as an argument against future use of QE as a macroeconomic tool. The concern is not without substance; especially as QE is found to work to a large extent by boosting asset prices, suggesting it disproportionately helps wealthy asset holders. But this is only a partial view of the impact of QE and it does not take into account the wider effects on the economy. A more complete analysis of the impact of QE shows a more nuanced picture: by design, QE increases wealth (via rising asset prices) which has the largest effect on the already wealthy. But counterbalancing macroeconomic effects (via changes to inflation, employment and wages) increase income more evenly across the distribution.

Before turning to new analysis which quantifies the distributional impact of QE, it is important to clarify the channels through which QE impacts the welfare of UK households. They are:

Wealth effects:

- Changes in financial wealth. Purchases of government bonds pushes up bond prices and through the portfolio rebalancing mechanism, increases the price of other financial assets. This increases the wealth of those holding these financial assets.[3]

- Changes in property wealth. Financial asset price rises will spill over into increasing property prices and thus property wealth for those owning a house.

- Inflation effect. QE raises the level of inflation which, in real terms, reduces the value of loans and the value of assets held in nominal amounts (e.g. current accounts). This effectively redistributes net wealth from savers towards borrowers.

Income effects:

- Employment effect. QE supports economic activity – reducing the output gap – and therefore raises the employment level, increasing wellbeing for workers who would not have been employed in the absence of QE.

- Wage effect. Improved macroeconomic conditions lead to a tighter labour market, pushing up on wage growth.

As with conventional monetary policy, QE should not have long-run effects on asset prices or economic activity – aside from helping to smooth economic fluctuations and thus reducing the drag on potential output from hysteresis. This analysis abstracts from the long-run view by focusing on the period up to 2014 where we can be more certain of QE's effect. This excludes the most recent round of QE undertaken after the EU referendum.

We use a similar methodology to a Bank of England working paper,[4] with our results conditional on the Bank's estimate of the macroeconomic impacts of QE. We make no adjustments to these estimates – doing so would make the impact of QE on wealth and income smaller or larger in view of the actual efficacy of the asset purchase programme. However, for distributional analysis, what is important is less the size of the macroeconomic impact, rather the *relative* effects across different parts of the economy (e.g. the scale of asset price changes vs improvements in employment/wages). In general, if you believe that the macroeconomic benefits are small relative to increases in asset prices, the benefits of QE accrue more to the already wealthy. And the reverse is true if you believe that the macroeconomic effects are relatively larger.

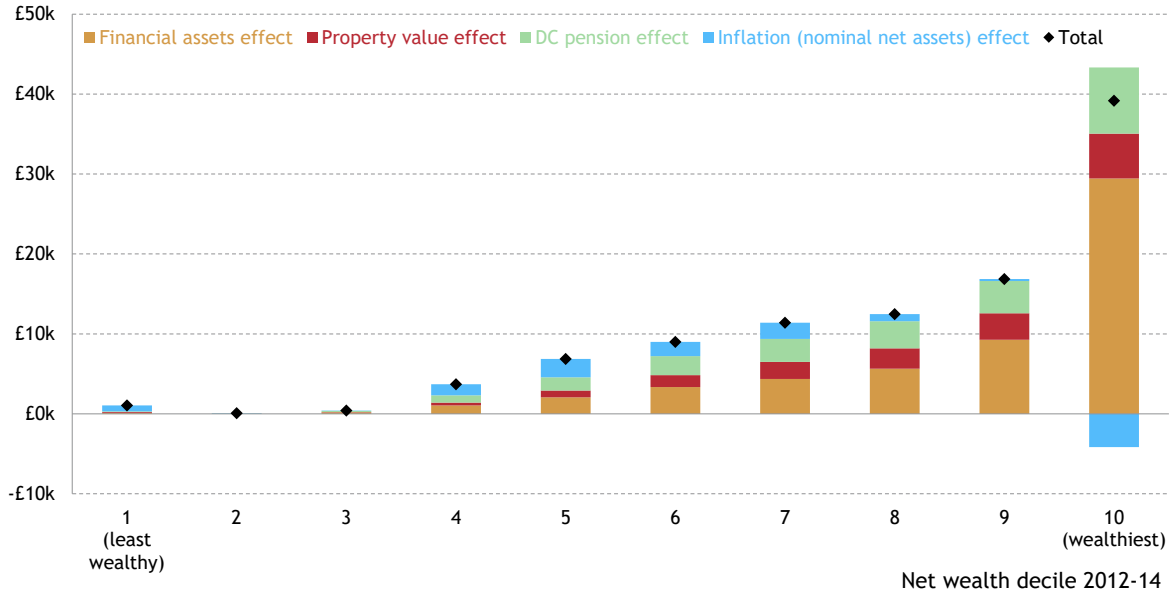
Figure 3 shows the estimated impact of QE, from the first three channels outlined above, on average net wealth for each net wealth decile. Around 40 per cent of the aggregate boost to wealth from changes in financial asset prices, property prices, and inflation

[3] Changes in financial asset prices and interest rates will have a material effect on the implied value of defined benefit pensions and pensions in payment. However, as QE will not affect actual income for pensioners, these effects have not been discussed here.
[4] P Bunn, A Pugh & C Yeates, *The distributional impact of monetary policy easing in the UK between 2008 and 2014*, Bank of England Working Paper no. 720, March 2018

went to families in the highest wealth decile, while only 12 per cent of the benefit went to the bottom half of the distribution. This reflects the already highly skewed wealth distribution in the UK (around 50 per cent of total wealth is held by the highest wealth decile): a rise in asset prices directly benefits those already holding those assets. In other words, the changes in asset prices scale the existing value of wealth, meaning that the proportional impact is more constant than the absolute effect. But the types of asset held by families in each wealth decile do affect the aggregate impact somewhat: those holding proportionally more financial assets are advantaged more by QE than those with larger property wealth, based on the Bank of England's estimates of the changes in financial and property asset prices.[5]

Figure 3: Increases in financial asset prices lead to large increases in the wealth of families at the top of the wealth distribution

Average real change in net wealth as a result of QE, by net wealth decile: GB, 2006-08 – 2012-14



Notes: Net wealth covers net property wealth, net financial wealth, and private pension wealth; we exclude physical wealth due to data limitations. Wealth is measured for an average adult within a family unit (defined as a single adult or couple and any dependent children). Wealth is measured in real terms at beginning of 2019 prices, adjusted using CPIH.
Source: RF analysis of ONS, *Wealth and Asset Survey*

Moreover, we should expect the wealth effects to unwind when QE is withdrawn. Policy makers originally envisaged QE to be a short-term measure and therefore judged that the 'real world' impact of these temporary changes in wealth would be small.[6] However QE stimulus has been used for a much longer period than originally envisaged, meaning wealth changes will not only feel more permanent but in some cases very directly feed into lasting effects on the real economic position of households. This will happen in three main ways. First, it is more expensive to buy assets (e.g. housing) which will prevent some

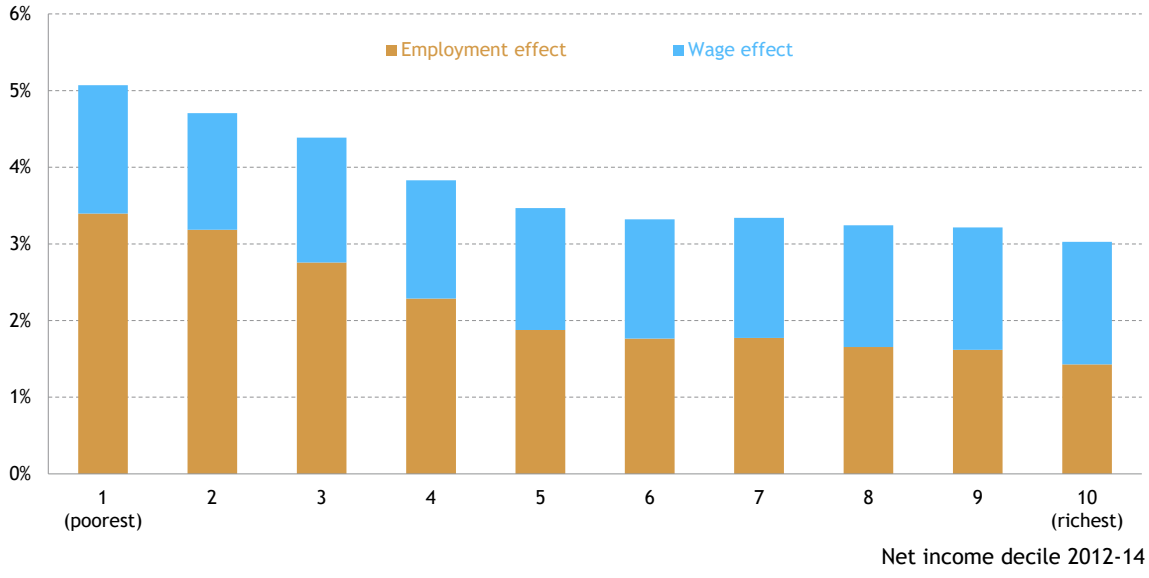
[5] Evidence on the distributional impact of the US QE programme has shown that the property value channel has had a progressive effect (in contrast to the financial asset price channel). This effect appears to be less material in the UK partially due to differences in the distribution of property wealth between the US and UK. See: J Bivens, *Gauging the impact of the Fed on inequality during the great recession*, Brookings working paper no. 12, June 2015
[6] See B Bernanke, *Monetary policy and inequality*, Brookings blog, June 2015

people from purchasing them over time. Second, when QE is unwound and asset prices move back to their underlying value, those who purchased assets at the higher price will lose out. And third, pre-existing owners of assets are able to sell them at the higher price and realise a higher level of consumption.

The asset price impact of QE is of course not the ultimate objective of the policy, but too often is the only issue considered when discussing its distributional effects. QE's macroeconomic effects on output, inflation and the labour market are often overlooked. The increase in asset prices and falls in real interest rates from QE should boost economic growth and reduce any output gap. This will result in lower unemployment and therefore higher wage growth via a tighter labour market. Together these effects will boost average labour income. Figure 4 shows the effect of QE on average annual incomes, split by net income decile. The benefits are much more evenly distributed across the income distribution than the wealth effects were and, as a proportion of income, help the bottom half of the distribution the most. This is driven by the fact that QE is estimated to have increased employment more at the bottom of the income distribution than the top. The aggregate result of this is that the macroeconomic effect will reduce, rather than increase, income inequality. This is in contrast to the asset price effect, which appears to increase absolute wealth gaps (and be broadly neutral in relation to *relative* wealth inequality). The income effect is also progressive when split by wealth decile, meaning that families not benefiting from higher asset prices are partially compensated by the income effect.

Figure 4: The effect of QE on income is much more evenly distributed

Average real change in annual labour and benefit income as a result of QE, by net income decile: GB, 2006-08 – 2012-14



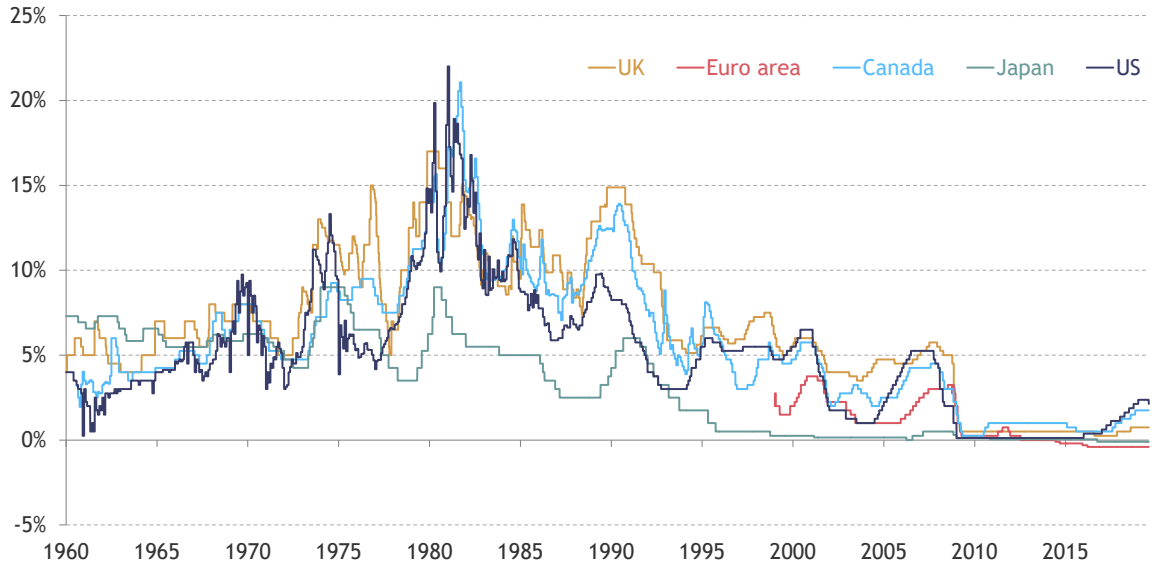
Notes: Income refers to net household income before housing costs. It is measured in real terms, adjusted using CPIH. Individuals are randomly drawn to become unemployed based on the probability of becoming unemployed that was observed during the Great Recession according to individual characteristics (age and education level). The newly unemployed are assigned additional benefit income to replace lost wages (which is based on the observed benefits level of unemployed people and is conditional on the individual's partner's employment status). This simulation is repeated 4,000 times and results are averaged over the entire sample. See notes to Figure 3.
Source: RF analysis of ONS, *Wealth and Asset Survey*

Having this rounded picture of the distributional impact of QE in mind is crucial to policy makers both evaluating the policy, but also considering what wider policies might best sit alongside any future use of QE. More controversy over the looseness of monetary conditions should also not be a surprise after such a long period. In many ways, the deeper issue is that QE is conflated in the public mind with a secular decline in interest rates of all kinds – one that preceded the financial crisis and appears to be continuing.[7]

The challenge is that with policy rates still close to all-time lows in many countries, as Figure 5 shows, QE will almost certainly be asked to play a key role in supporting the economy in future. So having a well-articulated plan for using it is essential, and a key part of that plan must be ensuring that QE can be used in a transparent way that eases the pressure on central banks to refrain from using it.

Figure 5: Policy rates remain close to zero across advanced economies

Official policy rates for major advanced economies



Source: RF analysis of Bank of England; ECB; Federal Reserve Board; BIS

A proposed approach for future QE

There is an argument for changing the way QE is used so that it can operate more like changes in policy rates. That means it would be ready for use in a downturn without triggering the same level of public concern about an extraordinary policy being used. Three steps would help achieve this.

First, central banks can make their QE more transparent by making announcements in a way that emphasises the similarity to changes in the policy rate. This could be done by couching QE in terms of the equivalent change in short-term interest rates that they would have undertaken absent the lower bound. Many central banks tend to move policy rates in quarter-point steps. For the UK, research points to £30 billion of QE as being

[7] See, for example: K Holston, T Laubach & J C Williams, 'Measuring the natural rate of interest: International trends and determinants', *Journal of International Economics* 108, pages 59-75, 2017

roughly equivalent to a quarter-point cut in the Monetary Policy Committee's (MPC's) policy rate; for the US, it is roughly $300 billion.

Second, central banks should seek to build understanding of their policies by using QE in a gradual and transparent way, similar to that for changes in policy rates. Prior to the crisis, the MPC adjusted policy rates gradually towards the level consistent with bringing inflation to target, typically moving in quarter-point or half-point steps.[8] This means adjusting policy in a smooth, predictable manner so that an increase in asset holdings in one month gives rise to expectations of similar moves in subsequent months. Adjusting QE holdings gradually allows central banks to explain fully their views on economic developments, and how they plan to react to them. This will help in communicating the distributional impacts, too.

And third, central banks need a clear mandate to implement the necessary QE to achieve their targets, with their ability to do so without further political approval being put beyond doubt prior to any future recession. Elected officials rightly define central banks' structure and powers. To avoid public pressure building on the central bank, it is important for politicians to stand behind decisions on QE, including through legal clarity and prior public commitments to support QE.

Conclusion

Even though constraints mean QE is unlikely to be as effective in a future recession as it was in the financial crisis, it is still highly likely to be used once the next economic downturn arrives. As a result, having a plan for implementing QE in a way that allows it to support the economy effectively is desirable. The proposal in this briefing note is intended as a step towards that, and is intended to provoke discussion about how central banks can support the economy in an environment of sustained low real interest rates when the next recession arrives.

[8] Larger policy moves would still be possible under this approach, should they prove necessary. But moves of more than a half of a percentage point are rare.

Annex: Sources for Table 1 – studies of the impact of QE

Sources are listed in order of appearance in Table 1.

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