STANDING AT THE ABYSS: MONETARY POLICY AT THE ZERO LOWER BOUND

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The current economic crisis has seen a variety of tools used to avert catastrophe, monetary policy being one of them. However, central banks are limited in how much they can increase the supply of money by the zero-lower-bound. Barra Roantree discusses this limitation and outlines the possible alternative policy solutions that can overcome it, including such drastic measures as placing a negative interest rate on physical currency, or even abolishing it altogether.

Introduction

The high levels of inflation experienced in the post-war era resulted in the demotion of the zero-lower-bound (ZLB) from standard economic textbooks and the concept merely being treated by 'a few generations of economists ... [as] a relic of the Depression era' (Bernanke, Sack and Reinhart, 2004, p.5). Following the success of monetary policy in bringing inflation under control, from a worldwide average of 14% in the early 1980s to 4% within twenty years (Goodfriend, 2007), concerns that Japan's 'Lost Decade' could prove to be a more widespread phenomenon lead to the resurgence of interest in the ZLB among professional economists and policy makers alike. With advanced economies suffering the biggest collapse since the Great Depression, nominal interest rates at historic lows and the prospect of sustained deflation, the ZLB has once again become a very real constraint on monetary policy.

This essay explores the operation of monetary policy at the ZLB and the adequacy of the existing monetary policy tool-kit. The theory behind the ZLB and why it poses a problem for the conduct of monetary policy is outlined first. These problems are then illustrated in the context of the ongoing 'Great Recession'. The bulk of the essay is given to consideration of alternative policy responses to the ZLB, before concluding.

The Zero Lower Bound

Over the latter half of the 20th century, a remarkable consensus has built up regarding the

perceived optimal conduct of monetary policy. Independent central banks should target a low but positive level of inflation, operating in a transparent manner with frequent communication to maximise credibility (Goodfriend, 2007). This should be achieved by controlling interest rates, which influence consumption and investment decisions, across the term structure utilising the monetary authority's position as the monopoly supplier of narrow money. The monetary authority should stabilise macroeconomic fluctuations, lowering the real interest rate during times of recession to stimulate demand and investment by increasing the quantity of reserves it lends to commercial banks (and vice-versa when the economy is overheating).

However, the ability of central banks to engage in macroeconomic stabilisation is constrained by the nominal rate of return on currency: zero. This is because lenders and bank depositors will prefer to hold currency if nominal rates of return on non-currency assets are below zero. Strictly speaking, the validity of a lower bound at zero 'depends upon the assumption that it is costless at the margin to store money (the economy's medium of exchange)'. While this assumption is incorrect, the costs of storage amount to a few basis points at most and so have a negligible quantitative effect (McCallum, 2000, p.901). The ZLB is pulled below zero by the carry costs of money or any non-pecuniary benefits of non-money assets, and pushed above zero by non-pecuniary benefits of money, such as the desire to engage in anonymous exchange (Yates, 2004). The implication for monetary policy remains: there is a lower bound close to zero below which the key interest channel of monetary policy is ineffective.

Even with nominal interest rates floored at zero, the monetary authority can still exercise some control over real interest rates to the extent that they can increase expectations of inflation (following from the ex-ante Fischer equation). Krugman (1998) outlines an optimal response for a central bank constrained by the ZLB where it 'credibly promises to be irresponsible'; that is to seek a higher future price level by continuing to hold nominal interest rates at zero beyond the duration of the recession. The higher expected inflation lowers ex-ante real interest rates, providing a boost to consumption and investment.

Such commitments lack credibility however, in a reversal of the classic time-inconsistency problem outlined by Kydland and Prescott (1977) where central banks are unable to credibly commit to low inflation given policy discretion. Rather, in a 'liquidity trap, the problem is that the markets believe that the central bank will target price stability, given the chance, and hence that any current monetary expansion is merely transitory' and ineffective (Krugman, 1998, p.139). The consequence of this is that real interest rates remain too high to stabilise economic output. More seriously, if the economy enters deflation, the real interest rate will increase, further reducing economic activity and leaving the monetary authority with no ability to reduce rates. There is the the potential that this 'liquidity trap', where rates across the yield curve are at zero, could lead to a deflationary spiral. This is a vicious circle where a negative economic shock causes deflation, which raises real interest rates, leading to a contraction in economic activity, prolonging expectations of deflation.

In short, the ZLB arises from the negligible carry costs of currency and has serious consequences for macroeconomic stabilisation. The ZLB implies an inefficient floor on the critical interest-rate channel of monetary policy, while time-inconsistency hampers central banks' efforts to lower real interest rates through the 'Fischer Channel'.

Standing at the Abyss: Responses to the Great Recession

The policy response to the recession following the 2008 financial crisis was unprecedented. Monetary policy rates across the developed world hit record lows, while the balance sheets of central banks expanded to previously unimaginable levels. The balance sheet of the ECB increased from 10% to 19% of Eurozone GDP between 2008 and 2009, while the corresponding increase was 6% to 15% for the Federal Reserve and 6% to 16% for the Bank of England (BoE). The dramatic nature of the response aimed to address the equally dramatic scale of the crisis. The collapse of Lehman Brothers in September 2008 compounded the financial turbulence that had been ongoing since late 2007, with heightened risk premia leading to the interbank market seizing up. Spreads between the EURIBOR and the overnight swap rate - a measure of risk premia - rose from near 0 to over 180 basis points (ECB, 2010, p.61). This resulted in funding problems for banks, who had become dependent on the interbank market for short term funding.

In response, central banks were quick to cut their policy rates, acting with unparalleled cooperation, and by spring of 2009 the Fed, ECB and BoE had cut rates close to 0%. With limited scope to further pursue traditional monetary policy, central banks began to implement a series of unconventional measures. While such measures differed in detail between various central banks, they can be broadly characterised as quantitative easing (QE) and qualitative, or credit easing (CE). QE involves the expansion of the Central Bank's balance sheet without change in the composition, while CE is a change in the composition, but not the size of the balance sheet (Lenza, Pill and Reichlin, 2010). While such a characterisation can be useful in classifying individual measures, Bernanke (2009) notes that the increase in central bank balance sheets was initially driven by the need to accommodate the large scale of the credit easing programme, and as such the measures should be seen as complimentary rather than substitutes.

The CE programmes of central banks were primarily directed at minimising the disruption to the traditional transmission mechanisms of monetary policy, given the breakdown in the interbank market. Measures included an increase in the eligible counterparties for central bank liquidity programmes[1]; swap agreements with other central banks; an expansion in the types and maturity length of securities bought by central bank open market operations; and the direct purchase of both state agency and private securities (ECB, 2010; Lenza, Pill and Reichlin, 2010). In addition, governments implemented large fiscal stimulus programmes along with bank guarantees and

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[1]   The number of eligible counterparties for ECB refinancing operations was increased from 140 prior to the crisis to over 2,000 (ECB, 2010, p.66).

recapitalisations (Stolz and Wedow, 2010).

Effectiveness

Given the unprecedented and extreme nature of the financial crisis, any evaluation of the effectiveness of the measures taken contains a high degree of uncertainty. However, that hasn't prevented the emergence of a burgeoning literature seeking to provide some estimate of the effectiveness of public interventions. Chung et al. (2011) find that 'alternative monetary policy instruments, such as asset purchases, have been effective at mitigating the adverse macroeconomic effects of the ZLB'. They estimate that the Fed asset purchase programmes are 'roughly equivalent to a 300 basis point reduction in the short-term interest rate' but that despite this 'the ZLB has importantly constrained the ability of conventional monetary policy to limit the depth and duration of the current slump'. Del Negro et al. (2010) estimate that the Fed's unconventional policies prevented an output gap twice the size of that actually experienced by the US, and had a significant effect on interest rate spreads.

Research on the impact of measures in Europe has focused on the more clearly observable impacts of unconventional measures on the financial market and the transmission mechanism of monetary policy. Joyce et al. (2010, p.38) find that British 'guilt yields were about 100 basis points lower than they would otherwise have been as a result of QE'. A directly observable measure of the effectiveness of the European policy response is the reduction in the EURIBOR-EONIA spread from over 180 basis points following the collapse of Lehman Brothers to less than 5 after intervention. A more sophisticated analysis carried out by Lenza et al. (2010) finds that 'the effect of the compression of the spreads stemming from the implementation of the ECB's so-called 'enhanced credit support' has been sizeable on both loans and interest rates, very modest on broad money, and has acted on the real economy with a delay.' In addition, Lenza et al. (2010, pp.34-35) find that measures 'have played a quantitatively significant role in stabilising the financial sector and economy after the collapse of Lehman Bros., even if insufficient to avoid a significant fall in economic and financial activity'.

The lesson to be drawn from the Great Recession is that central bank intervention was successful to the extent it minimised the disruption of the transmission mechanism caused by the financial crisis. However, numerous studies using heuristics like the Taylor rule have shown that monetary policy remains considerably too tight. One such study by Williams (2009) finds that 'an additional 2 to 4 percentage points of rate cuts would help bring unemployment and inflation rates more quickly to longer run values, but the ZLB precludes these actions'. While extraordinary measures in extraordinary times may have preserved the transmission mechanism of the interest rate channel of monetary policy, this is of little consolation given the inability of central banks to lower interest rates to the degree needed. With the economic recovery remaining sluggish at best and unemployment stubbornly high, alternative policy solutions that overcome the ZLB surely demand to be considered.

Higher Inflation Targets in Normal Times

Blanchard, Dell'Arricia and Mauro (2010) point to the large fiscal deficits incurred, as national governments tried to compensate for the zero lower bound, and their consequences for sovereign creditworthiness. They suggest that a higher targeted level of inflation would give policy makers a greater policy buffer as nominal interest rates would be higher to start with. Williams (2009, p.26) argues that if 'the current global recession represents the death knell of the era of the Great Moderation and the equilibrium real interest rate remains low, then the ZLB may regularly interfere with the ability of central banks to achieve macroeconomic stabilisation goals.'

Blanchard, Dell'Arricia and Mauro (2010, p.11) argue that 'many of the distortions from inflation come from a tax system that is not inflation neutral, for example, from nominal tax brackets or from the deductibility of nominal interest payments' and that fixing such distortions could tip the balance in favour of a higher inflation target. Some critics of the proposal have countered that raising the target risks unanchoring inflation expectations and would result in credibility problems for monetary policy: why would markets believe the goalposts won't be moved again? Ultimately the appropriateness of a higher inflation target rests on whether the net costs associated with a higher inflation target outweigh the benefits from a great policy buffer. The costs of higher inflation, and uncertainty as to whether even the increased policy buffer would provide sufficient room, means other alternatives still should be considered.

Gessel's Solution/Carry Tax

Keynes (1936) and Irving Fisher (1933) revived the innovative monetary theories of German socialist economist Silvio Gesell. Gesell (1958) was motivated by a belief that the growth in real capital was held back by too high a rate of interest; a result of the low carry costs of money. For Gessel (1958, Part IV-1), only 'money that goes out of date like a newspaper, rots like potatoes, rusts like iron, evaporates like ether, is capable of standing the test as an instrument for the exchange of potatoes, newspapers, iron and ether.' His solution was to replace metallic and paper money with stamped money, whereby, to maintain the face value of a note, stamps purchased at a post office would have to be applied to the currency weekly. This implied a depreciation, or negative interest rate on currency of 5.2 percent a year.

Gesell's solution lay in obscurity until resurrected by Goodfriend (2000) and Buiter and Panigirtzoglou (2003). The latter authors demonstrate in a rigorous manner how the Gesellian solution allows central banks to overcome the lower bound, while the former provides a more accessible modern reinterpretation. Goodfriend (2000, p.1015) proposes a 'per period, per dollar carry tax on electronic bank reserves when the interbank interest rate is pressed to zero'. Competition between banks seeking to avoid the tax would have the effect of pushing the interbank rate, upon which most

bank contracts are based, below zero by a magnitude determined by the carry tax. The hoarding of currency would be overcome by the introduction of a fixed carry tax on currency and vault cash when the interbank rate hit zero. This carry tax on currency would be imposed through the modern equivalent of Gesell's stamped currency; a magnetic strip embedded in each bill which could record the date last withdrawn from the banking system and so the tax due.

Regardless of what method is used to impose a carry tax on currency, doing so would give central banks scope to reduce the policy rate significantly below zero, breaking the constraint of the ZLB. In the aftermath of the financial crisis, the Swedish Riksbank imposed a negative interest rate on reserves held at the Bank of minus 0.25 percent, a first for a modern central bank (Ward, 2009). Though not large enough to encourage the hoarding of currency, as the cost was absorbed by the banks, the move served to reduce what the Deputy governor of the Riksbank, Lars Svensson, described as 'zero interest rate mystique [that had] exaggerated the problems' associated with sub-zero rates (cited in Goodfriend, 2000, p.1015). Given the significant costs associated with the ZLB and the technological advances made in the past century, the prospect of Gesell's solution seeing implementation is perhaps not as far fetched as once thought. The inconvenience of checking the magnetic bills on currency to see whether they were valid would in and of itself increase the carry costs of currency, and discourage the use of physical currency. In this case, taking the bold step of abolishing physical currency, as discussed next, would a priori merit consideration.

Abolish Physical Currency

Buiter (2009) forcefully advocates the abolition of physical currency as a solution to the zero lower bound.[2] All money would then be held in accounts at banks subject to interest, positive or negative, determined by the carry tax on reserves. Not only does the technology exist for the abolition of paper and metal currency, but it is already installed in the majority of retail premises in the advanced world. Moving to a completely electronic system of payments would have additional benefits for taxpayers and governments, given that the main beneficiaries from the anonymity provided by currency are criminality, tax evaders and the black economy. The blight of so-called 'tiger robberies' and armed raids on cash-transit vans would also be solved by the move to an electronic system.

Those who worry about an overbearing state infringing individual rights by monitoring purchases of citizens can be placated by the provision of pre-paid cash cards, like those currently offered by the major credit card companies or the Transport for London 'Oyster card'. A limited amount could be transferred to such cards with a carry tax charged on the average balance, thus preserving an individuals ability to engage in legitimate anonymous activity. An additional cost to consider from the abolition of currency is that the central bank would lose revenues from seigniorage.

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[2]   Currency is used interchangeably with physical currency in what follows.

A less radical version of this solution could be introduced initially. The abolition of currency in denominations greater than €2 would significantly reduce the lower-bound on interest rates, given the large costs associated with hoarding significant quantities of currency in such small denominations without detection. This is similar to the Gesellian solution discussed above, acting as a permanent fixed carry tax on currency providing the central bank with the scope to reduce interest rates to significantly below zero.

Fiscal Policy

The aftermath of the 2008 financial crisis has seen a remarkable rise in public deficits as governments borrowed huge amounts to recapitalise the fragile banking system and provide a fiscal stimulus to recession hit economies. Despite the demise in popularity of Keynesian style fiscal policy over the latter part of the 20th century, the constraint of the ZLB convinced governments that such policies were necessary.

Woodford (2010b, p.40) shows that in Great Depression-like circumstances - that is when 'a disturbance to the financial sector results in insufficient aggregate demand even with the central bank's policy rate at the lower bound of zero, and when there is feared to be a substantial probability of the constraint continuing to bind for years to come, standard models of the kind widely used in analyses of monetary stabilisation policy imply that the government expenditure multiplier should be larger than one, and may be well above one'. Indeed, Kuttner and Posen's (2001, p.157) analysis of Japan's experience 'shows that fiscal policy works pretty much the way Keynes suggested it does: contractions are contractionary and expansions expansionary, and even wasteful public spending has a clear multiplier effect (although it is disadvantageous in other ways)'.

However, as the ongoing sovereign debt crisis is demonstrating, expansionary fiscal policy requires that a country has sufficient creditworthiness to borrow in often risk adverse markets. Political factors, such as ideologically motivated opposition to government intervention (e.g. Republican control of the Houses of Congress in the United States) may prevent an economically justified fiscal stimulus. In addition, the beneficial effects of fiscal stimulus are reduced the more open, the smaller and the more indebted a country is (Woodford, 2010b).

Commitment Devices

While promises to target a higher future inflation rate suffer from time-inconsistency problems (as discussed above), Bernanke and Reinhart (2004) argue that open market operations in longer term bonds can act as a commitment device. As a large participant in the Treasuries market across the maturity spectrum, the Treasury can push longer term yields on Treasury bonds down, signalling that it is committed to keeping interest rates low. Clouse et al. (2003) suggest that central banks could write options on future Treasury bills as a stronger way of committing themselves to

lower rates. Those sceptical of the credibility of such commitments could then insure themselves against a policy reversal at the cost of the central bank.

Another suggestion is that the primary target of monetary policy itself should be revisited. Woodford (2010a) argues that rather than concerning themselves with an inflation target, central banks should instead aim for a price level target. By targeting the price level, the central bank can more credibly commit to a higher future inflation rate in deflationary times, as the price level target implicitly promises to make up for any undershooting of the target.

Conclusion

This essay has explored the constraints on monetary policy imposed by the zero-lower-bound and what alternative policy solutions exist. It first discussed how the negligible carry costs of money imply a lower bound close to zero for nominal interest rates, given lenders will prefer to hold money at sub-zero rates. Time-inconsistency hampers the credibility of central bank commitments to target higher levels of inflation. The combined result of this is that central banks cannot stabilise economic fluctuations by reducing real interest rates. The essay then illustrated the consequences of the binding zero-lower-bound in the context of the ongoing Great Recession. Policy alternatives for overcoming the zero-lower-bound were then considered. These included: the abolition of physical currency, Gesellian stamped currency and the use of fiscal policy.

What this essay has demonstrated is that while the zero-lower-bound poses a serious challenge for monetary policy, alternative solutions do exist. Much like John Law's advocacy of paper currency was decried as lunacy, so too will suggestions that physical currency be done away with entirely, or replaced by the script stamp of Gesell. However, the economic and human costs, in terms of lost output and increased unemployment, of central banks' inability to symmetrically respond to severe economic shocks surely warrants that radical alternatives be thoroughly explored.

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