



WILL PRINTING MONEY WORK?

GRAHAM PARRY
MARCH 2009

Central Bank Options at 0%: Will “Printing Money” Work?

SUMMARY

- With interest rates approaching 0% in several countries, there is increasing discussion about whether it is good policy for central banks to start "printing money"?
- Printing money is a broad term, which captures a wide range of quantitative policy options that can be funded through an expansion of central bank liabilities.
- In the current crisis, the targeted expansion of the central bank's balance sheet to improve the functioning of impaired credit markets could become an important catalyst for a broader economic recovery.
- While there are long-term inflationary risks from a sustained expansion in central bank liabilities, there are few short-term risks, particularly for an economy limping toward deflation. Any long-term inflationary consequences would only arise over time from a recovery in activity and a closing of the output gap.
- Given the serious complications that deflation poses for balance sheet deleveraging, the targeted expansion of central bank's balance sheet is rapidly becoming a necessary option.
- However, while quantitative action can be a powerful aid to recovery, it is no panacea. In particular, quantitative measures do not replace the need to resolve lingering banking sector problems.

How Do Central Banks Influence Credit Growth?

Any discussion of central bank policy options needs to begin with an understanding of how they control the monetary system and influence lending in an economy.

Central banks control the money base. Central banks control only a narrow component of the money supply, the part that sits directly on their balance sheet. The monetary base (M0 or narrow money) refers to the liabilities of the central bank. It consists of physical currency-on-issue and commercial bank reserves held at the central bank for settlement exchange. Provided a country has a floating exchange rate (or fully sterilises any currency intervention) the central bank has complete control over the monetary base.

This is how they set interest rates. While central banks don't specifically target any particular level of the monetary base, they do actively control the availability of settlement funds to set short-term (usually overnight) interest rates. As commercial banks are required to maintain a positive account position with the central bank, they have a captive demand for central bank liquidity. Through manipulating the terms on which this liquidity is provided, banks are forced to pay whatever interest rate the central bank decides. This central bank rate then sets the floor under market interbank rates and underpins the entire term-structure of interest rates.

Central banks do NOT control broader monetary aggregates. A common misconception is that central banks can directly control broader measures of the money supply (such as M2 or M3)

through changes the monetary base.¹ In a simple textbook “fractional-reserve” banking model, banks are required to keep a fixed proportion of the deposits as reserves at the central bank. Changes in bank reserve requirements then directly impact (through a money multiplier) on the total size of a bank’s deposit base and thus the level of bank lending.

Money supply measures are largely irrelevant to policy makers. This is not how monetary policy works in practice.² In a modern economy, central banks do not directly control the balance sheets of commercial banks. Banks are not required to hold a fraction of their deposits at the central bank as reserve requirements. In most jurisdictions, the only binding requirement on bank reserves is that they maintain a positive account balance with the central bank to meet their settlement obligations.³ With no reserve restrictions, broader measures of the money supply are essentially endogenous (determined by the level of demand); they bear no reliable relationship with the monetary base. Consequently, measures of the money supply are now largely irrelevant for policy.⁴ Central banks only influence the quantity of credit by controlling the cost of debt, not the availability of monetary base. Commercial banks can essentially fund as big (or small) a loan book as they want, provided: (i) there is sufficient loan demand at the prevailing level of interest rates, and (ii) the bank holds sufficient equity to support its loan exposures.

Bank capital is the main constraint on credit. This gets us to the heart of the current credit crisis. The most important binding constraints on the quantity of bank credit are the prudential capital-adequacy requirements placed on banks.⁵ Banks are required to hold a minimum amount of equity relative to the level of their risk-weighted assets to act as a buffer against any unforeseen loan losses.⁶ Because banks are highly leveraged businesses, small movements in their capital base have large consequences for their loan book. When banks start suffering unexpected losses they are forced to write down capital. If they are unable to raise fresh capital, these capital losses have a multiplier effect on the level of loans the bank can support. When banks have insufficient capital they cannot lend, no matter how much the central bank lowers interest rates. When this happens, the economy is essentially caught in a “**liquidity trap**” and interest rates become an ineffective policy tool.⁷

Intermediation also relies heavily on functioning financial markets: Beyond the banking system, financial markets also bear an important influence on the overall cost and availability of credit in an economy. A modern financial system relies heavily on functioning commercial paper, corporate bond and securitisation markets to supplement direct bank lending. Ordinarily, companies can choose between borrowing from a bank and raising debt directly by issuing marketable securities. Indeed, financial institutions themselves have become the major players in these markets. Banks have become increasingly dependent on market funding sources to replace their steadily eroding deposit base. In particular, banks have become heavily reliant on securitisation markets as an outlet to sell down loans and free-up funding for new loans. Financial institutions also dominate swap markets, which play an important role in their ability to provide term funding.

¹ Broader measures of the money supply (such as M2 or M3) include the liabilities of commercial banks (mostly deposits), which are claims that can be readily converted to currency.

² Disyatat (2008), “Monetary Policy Implementation: Misconceptions and their consequences” BIS Working Paper No.269

³ Some countries do still employ minor reserve requirements, but these are primarily aimed at ensuring banks maintain sufficient liquid assets to meet sudden withdrawal demands. It is really only in emerging markets like China where central banks actively use reserve requirements as a policy tool to directly limit the expansion in banks’ balance sheets.

⁴ Central banks now tend to focus more on growth in bank assets (credit) in assessing monetary policy, rather than the level of bank liabilities (M2 or M3).

⁵ For instance, under US banking regulations a bank must have Tier 1 (equity capital) capital ratio of at least 4% a combined Tier 1 and Tier 2 (supplementary capital) capital ratio of at least 8% and a leverage ratio of at least 4%, to be considered adequately capitalised.

⁶ The riskier the asset the greater the capital the bank is required to hold. Efforts by banks to circumvent these capital regulations was one of the factors behind the boom in off-balance sheet sub-prime lending in the prelude to the crisis.

⁷ A liquidity trap refers to a period of pronounced uncertainty, where banks prefer to hoard excess liquidity at the central bank rather than extend new loans. Technically, in a liquidity trap the demand for money is perfectly elastic, such that any increase in the money supply is perfectly offset by a decline in its velocity.

Any solution to the banking crisis, must deal with the totality of the financial system. The fusion of the banking sector with the broader debt markets has exacerbated the downturn and complicated recovery efforts. The capital problem in banks has been compounded by their losses on market-related instruments and the difficulty of pricing these assets in illiquid markets. Banks balance sheets remain clogged with illiquid assets like RMBS, CMBS etc. For debt markets to operate effectively there needs to be sufficient liquidity for price discovery. The lack of liquidity has resulted in a massive blowout in credit spreads, while issuance in securitisation and corporate paper markets has ground to a virtual halt.

Printing Money: What are the Options?

What is money printing? Given the nature of the crisis, it is no surprise that low interest rates have been so ineffective. Once central banks have cut nominal interest rates to 0%, the next step is generally referred to as “printing money”. Printing money is a very broad term that covers any expansion in the central bank’s liabilities. However, there are 5 broad actions the central bank could consider. The common element of all these policies is that the central bank is purchasing something and paying for it through an increase in its own liabilities.

CENTRAL BANK QUANTITATIVE OPTIONS⁸

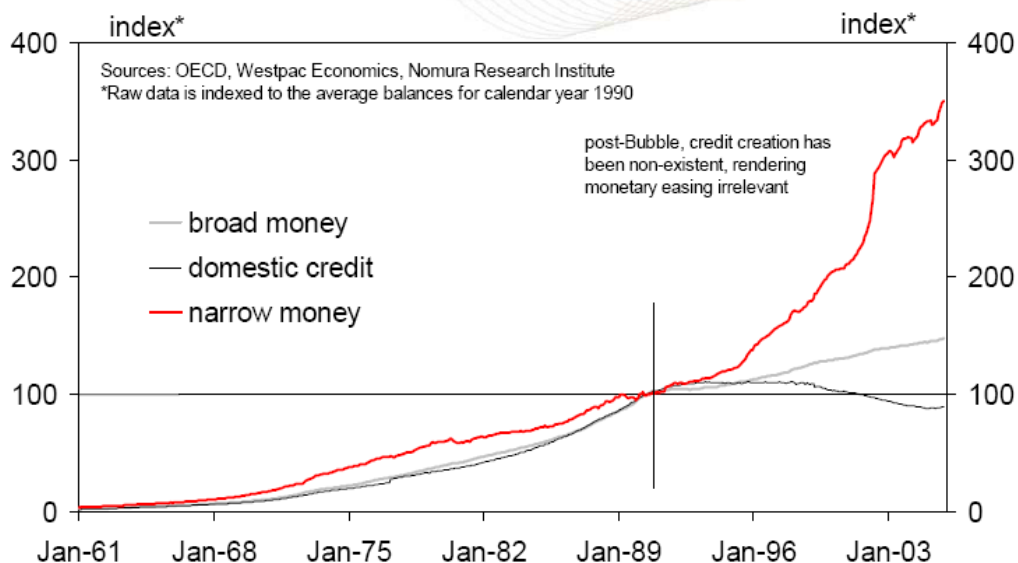
- (i) **Simple Quantitative Easing:** a targeted increase in the monetary base, through a deliberate increase in the level of banks’ reserves held at the central bank.
- (ii) **Buying government bonds:** purchases of existing government debt from the secondary market (usually from banks), aimed at flattening the yield curve.
- (iii) **Credit Easing:** the direct purchase by the central bank of financial assets (including commercial paper and asset-backed securities) in primary and secondary markets, aimed at reducing credit spreads and reviving funding in debt markets.
- (iv) **Monetising new government debt:** Direct funding of the government’s fiscal deficit through the central bank purchase of newly-issued government debt.
- (v) **Printing Currency:** The physical printing of new currency (or issuing central bank cheques) to pay wages, buy goods & services, physical assets etc.

How do these policies work? Excluding option (v), which no advanced economy would seriously contemplate, the other 4 options are all potential policies that a central bank could consider. In evaluating these policies it is more important to look at the outcomes the central bank is pursuing, rather than the sheer quantity of monetary base growth, as a dollar spent funding the government deficit will have a different impact to a dollar spent increasing bank reserves or a dollar spent supporting the commercial paper market.

- I. **Simple quantitative easing is unlikely to be effective:** Under simple quantitative easing, the central bank targets an increase in bank reserves through its normal liquidity channels. The aim is to boost bank lending by providing banks with unlimited free funding from the central bank. However, as the Japanese experience with quantitative easing at the start of the decade showed, simply increasing the monetary base is unlikely to increase overall credit when the economy is caught in a liquidity trap. Pushing reserves onto a bank’s balance sheet will not increase bank lending if the bank does not have sufficient capital to grow its balance sheet. This is highlighted in the graph below: despite a massive rise in Japanese M0 at the start of the decade, domestic credit continued to fall.

⁸ Hereafter referred to collectively as central bank quantitative measures or quantitative actions.

Japan's Quantitative Easing: Simple monetary base growth did not revive lending



- II. **Buying government bonds is a natural extension of interest rate targeting:** A second potential option is for the central bank to buy existing government bonds from secondary markets. In many ways this policy is a natural extension of normal central bank interest rate targeting – it just extends it further out the yield curve. The aim of this policy is to flatten the yield curve, lower the risk-free rate, cut term funding costs and reduce the hurdle rate for all asset classes. Unless offset by other central bank actions, it will also add to bank reserves at the central bank. The Bank of Japan (BoJ) adopted this approach in 2001 and has indicated its intention to resume buying bonds in 2009. The Bank of England (BoE) also indicated its intention to buy up to £75bn on government bonds from the secondary market. While this approach should be positive at the margin, it is unlikely to significantly spur new investment spending during a credit crunch. In the meantime, the excess liquidity from central bank bond purchases is likely to be hoarded by banks until credit markets improve.
- III. **Direct funding of credit markets would be positive:** Given the shortcomings of simple quantitative easing, central banks have started looking at ways they can directly boost liquidity in dysfunctional credit markets to improve overall financing conditions in the economy.⁹ These targeted credit measures are aimed at addressing specific market failures. By increasing activity in distressed markets the aim is to achieve more accurate pricing and allow spreads to return to more normal levels, thus facilitating greater private sector participation. This should stimulate further issuance of some credit instruments and encourage a resumption of capital market flows. However, it is uncertain how large central bank support will need to be to revive funding in these markets.

The US is most advanced down this path, announcing a number of key initiatives in recent months and early results are promising (see below).

- For some time the Fed has increased liquidity provision to ensure financial institutions have sufficient access to short-term credit. This has helped reduce systemic risks of any short-term funding short-fall and allowed a moderation in LIBOR rates (See graph below).
- Second, the Fed has increased funding in key credit markets through a variety of programs: direct purchase of commercial paper and increased liquidity for money market mutual funds. These actions have improved functioning of the commercial paper market, with rates and spreads declining while the average maturity of issuance has increased (see graph below).

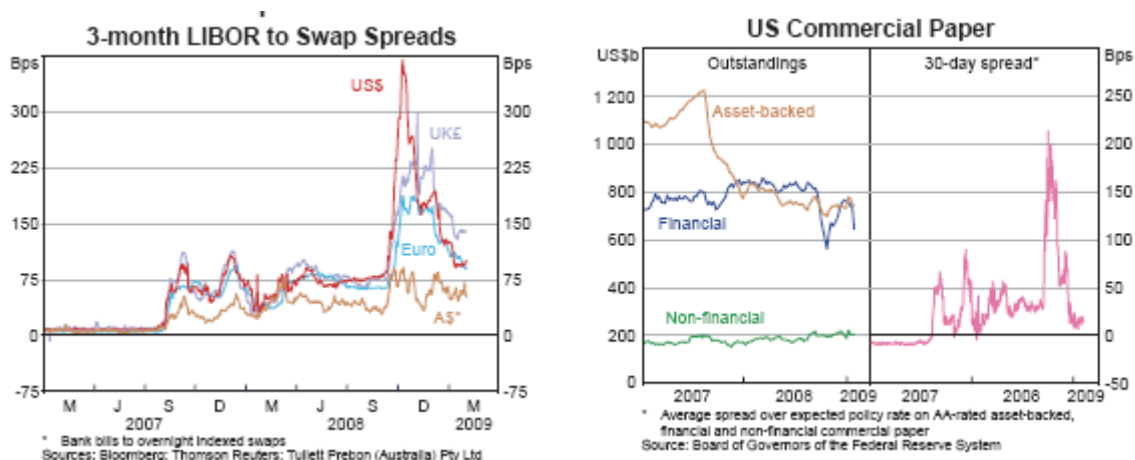
⁹ Bernanke has dubbed this approach "credit easing" to differentiate it from simple quantitative easing.

- c) Third, in an effort to directly boost consumer and small business loans, the Fed (backed by Treasury funding) has established the Term Asset Backed Securities Loan Facility (TALF) to restart securitisation markets. This facility should lead to a greater supply of the underlying consumer and business loans.
- d) To directly assist the housing market, the Fed plans to purchase \$100bn in government-sponsored enterprise (GSE) debt and \$500bn in GSE mortgage-backed securities. Since this program began in November 2008 fixed mortgage rates have fallen around 1.0%.

Other countries are now following this approach. In the UK, the Treasury, in conjunction with the Bank of England (BoE) has established an Asset Purchase Facility to purchase up to £150bn of assets, including private assets.¹⁰ Meanwhile, in Japan the Bank of Japan (BoJ) has announced plans to purchase ¥1.0tr (£9.0bn) in corporate bonds to boost corporate financing.

IV. Monetising new government debt is risky, but would provide significant stimulus.

The most direct way for the central bank to stimulate activity is for the central bank to directly fund the government deficit by purchasing new government debt. This is a powerful tool for directly stimulating demand as it bypasses broken financial markets and directly adds to spending in the economy. For this reason it is also the most dangerous option as it circumvents normal budgetary discipline and effectively hands the government a blank cheque to fund its largesse. Monetising the debt has not been seriously discussed by any central bank, but the BoJ did partially fund the Japanese government deficit at the start of the decade during its quantitative easing phase.¹¹



What are the Inflationary Implications?

A “sustained” increase in central bank’s liabilities is highly inflationary. The great fear with printing money is that it will inevitably result in rampant inflation and a plunging currency. While these fears are often overstated, central banks are understandably wary about resorting to quantitative measures, as the expansion of the central bank balance sheet is the ultimate inflationary tool.¹² Central banks are unique in that they have an unconstrained balance sheet, with

¹⁰ Up to £50bn of this facility can be used to purchase private sector assets, including commercial paper, corporate bonds, CGS paper, syndicated loans and asset-backed securities.

¹¹ David E Lebow (2004), “The Monetisation of Japan’s Government Debt” BIS Working Paper No.161

¹² In the long-run inflation is always a monetary phenomenon, as the price of goods and services refers to how many units of currency are needed for exchange. This relationship is captured by the economic identity: $MV=PQ$, where M=money supply, V=velocity of circulation, P=prices and Q= the volume of output.

an unlimited ability to grow their liabilities (and thus their assets).¹³ But any linkage between money and prices only holds in the very long-run. So all this really means is that any short-term increase in central bank liabilities will need to be reversed as the economy recovers.

But deflation also poses serious risks. A central bank would only contemplate large-scale quantitative expansion if looked like the economy was drifting toward deflation. Deflation is a major threat to any economy in recession and needs to be attacked pre-emptively, before it becomes entrenched. As Irving Fisher pointed out during the Great Depression, once deflation starts it can exacerbate balance sheet problems and push the economy into a debt-deflation spiral.¹⁴ Falling prices increase the incentive for households to defer consumption, compounding the decline in aggregate demand. As prices start to fall the real interest rate rises. This represents an effective tightening of monetary policy when the economy is already in recession. Furthermore, because wages are relatively “sticky”, a fall in prices tends to push up real labour costs at a time when the unemployment rate is already rising. Deflation also compounds balance sheet problems, since the real quantity of debt is rising as the ability to service that debt is falling, which can force further deleveraging and asset price deflation.

Printing money is not inflationary in a liquidity trap. A temporary increase in monetary base is unlikely to be inflationary when the economy is caught in a liquidity-trap and limping toward deflation. Any rise in inflation would only result from an increase in real activity and a closing in the output gap. There is nothing magical about how printing money becomes inflationary. Its effects can be traced through a standard expectations-augmented Phillips curve.¹⁵ First, printing money lifts activity (either directly through funding government activity or indirectly through lowering spreads and increasing capital market flows). This increased activity then closes the output gap and reduces unemployment. Asset prices start to recover and then finally, as the economy approaches capacity constraints, there is upward pressure on prices and wages, which causes inflation expectations to adjust.

A competitive devaluation is part of the process. In an open economy the impact of quantitative measures could also come through a weaker exchange rate, if the excess liquidity flows offshore in a search for yield. However, provided any currency depreciation is of the “real” exchange rate, this would boost external competitiveness and encourage expenditure switching away from imports toward domestic substitutes.¹⁶ While the weaker currency would directly increase the level of import prices (much like a tax change), it is only when wages rise to compensate for higher import costs that a weaker exchange rate becomes inflationary. This is unlikely to happen when the unemployment rate is high.

An inflation-target is crucial to anchor inflationary expectations. The most important consideration with quantitative action is to ensure there is no excessive increase in inflationary expectations. Once inflationary expectations begin to rise, the impact of printing money begins to have less of an effect on activity and a more direct impact on prices. Consequently, the crucial element of any quantitative measures is that the central bank be bound to a strict inflation target, which acts as “nominal anchor” to ground inflation expectations. This essentially tells market participants the rules for when the central bank’s money tap gets turned on and turned off. The US Fed has indicated it is now moving down this path.

¹³ In a fiat economy, money has no commodity backing; it is a liability of the central bank. Thus, as the central bank expands its liabilities it is expanding the amount of potential claims on currency.

¹⁴ Irving Fisher (1933), “The Debt Deflation Theory of Great Depressions” See also Lars Svensson (2003), “Escaping from a Liquidity Trap and Deflation”, *Journal of Economic Perspectives*.

¹⁵ The expectations-augmented Phillips curve underpins almost every macroeconomic forecasting model. It expresses the relationship between the inflation rate and the unemployment rate (or output gap). In the short-run, there is a trade-off between growth and inflation, but in the long-run inflation expectations adapt to extinguish any trade-off. The quicker that inflation expectations adapt, the faster the unemployment rate returns to its long-run equilibrium (the NAIRU), and the less successful government policies become.

¹⁶ In other words, a fall in the currency is positive provided domestic prices do not rise to completely erode the competitive boost from the fall in the nominal exchange rate.

A timely exit strategy is crucial for avoiding inflation. Once the economy starts improving, the central bank will need to reverse its monetary base expansion to remove any lingering inflationary stimulus. This will involve the central bank selling the assets it has purchased back to the market to remove the excess liquidity (or refraining from buying new assets as existing assets mature). In theory, provided the increase in central bank liabilities is unwound before inflation exceeds the central bank's inflation target, there should be no enduring inflationary consequences from "reflating" the economy. This may prove challenging in practice; as it may be hard for the central bank to gauge when and how quickly it needs to start unwinding quantitative measures. However, Japan's experience suggests there is likely to be a fairly wide window of opportunity for the central bank to withdraw stimulus before the output gap closes and inflationary expectations rise.

Conclusion: Fine in theory, but will it work in practice?

Quantitative measures are a logical option for central banks. In summary, this note argues that central bank quantitative action can exert a powerful stimulus on the economy. Just as a central bank controls movements in its balance sheet to set short-term interest rates, it also has an unlimited ability to expand its balance sheet to directly influence the cost and availability of funds in a wide range of credit markets. As such, recent moves by central banks to expand their balance sheets should be seen as a welcome step in the right direction.

Initial quantitative efforts have already been marginally beneficial. How long it actually takes for central bank action to start boosting growth is difficult to say and depends very much on which measures the central bank adopts and how aggressively it pursues them. Of the four quantitative options listed above, the main focus by to date has been on measures to boost short-term liquidity, improve funding in dysfunctional credit markets and reducing long bond yields by buying bonds. While it is still early days, recent evidence from the US suggests that the Fed's quantitative measures have had a positive impact on financial markets in recent months, with a moderate narrowing of spreads and increased issuance.

But more will be needed to engender a sustained economic recovery. However, the measures announced to date are still well short of a comprehensive recovery solution. While the size of the packages announced in the US and the UK may sound large, if anything they can be criticised as being too timid in both their size and scope. Credit markets remain deeply distressed and announced central bank asset purchase plans are still fairly small compared with the overall size of the funding needs in these markets. At this stage, central banks still seem reluctant to move too far ahead of public opinion by adopting anything too radical. Nonetheless, by establishing an initial framework for quantitative action, central banks are at least in a position to refine and extend quantitative policies should conditions continue to deteriorate.

Poor central bank communication remains a major problem. Part of the problem for central banks is that they have been unable to build a broad consensus that quantitative action is sensible policy that will work. The quantitative measures announced still smack of a desperate attempt to "do something", rather than a carefully crafted policy response. To rectify this, central banks need to better communicate their policy objectives and convince market participants they will take whatever action is needed to restore credit flows. Changing market perceptions is a crucial element of policy effectiveness. The reason interest rate targeting works so well is because the public fully understand the policy framework that the central bank is pursuing.

A final point: Quantitative action does NOT replace the need for bank restructuring: While quantitative action can be a powerful aid to recovery, it is no panacea. In particular, central bank quantitative action does not replace the need for comprehensive resolution of lingering banking sector problems. The quickest way to enhance central bank policy and speed up a broader economic recovery is to clean-up banks' balance sheets so they have sufficient capital to support new lending. Banks balance sheets are still clogged with toxic assets. Many of these toxic assets have complex structures that will be difficult to dispose of and they will ultimately need to be

liquidated to recover their underlying collateral (largely mortgages).¹⁷ A key criticism of government recovery policy remains the lack of a comprehensive disposal mechanism for liquidating toxic assets. While both the US and the UK have been forced to inject public funds into distressed institutions, they have so far been unwilling to nationalise banks and set up explicit government-funded asset management vehicles to deal with the disposal of toxic assets.¹⁸

Until the problems in the banking system are adequately resolved, central bank quantitative actions can only be partial solution to a sustained recovery.

¹⁷ Furthermore, it is still unclear whether the existing legal framework is sufficient for dealing with foreclosure and creditor claims involving complex off-balance investment vehicles.

¹⁸ Widespread nationalisation of banks and the establishment of government funded asset management companies to deal with non-performing bank loans were key elements of the IMF recovery policies during the Asian crisis. However, the concern in the US is that nationalisation of weak banks could potentially trigger a major crisis for companies with large credit default swap exposures (particularly insurance companies).

