

WORKING PAPER 1810

Bringing the helicopter to ground: a historical review of fiscal-monetary coordination to support economic growth in the 20th century

Josh Ryan-Collins and Frank Van Lerven

October 2018



Bringing the helicopter to ground: a historical review of fiscal-monetary coordination to support economic growth in the 20th century

Josh Ryan-Collins

Senior Research Associate and Head of Research, Institute for Innovation and Public Purpose

Frank van Lerven

Economist, New Economics Foundation

Abstract

In the face of the perceived high public and private debt levels and sluggish recovery that has followed the financial crisis of 2007-08, there have been calls for greater fiscal-monetary coordination to stimulate nominal demand. Policy debates have been focused upon the inflationary expectations that may be generated by monetary financing or related policies, consistent with New Consensus Macroeconomics theoretical frameworks. Historical examples of fiscal-monetary policy coordination have been largely neglected, along with alternative theoretical views, such as post-Keynesian perspectives that emphasise uncertainty and demand rather than rational expectations. This paper begins to address this omission. First, we provide an overview of the holdings of government debt by both central banks and commercial banks as an imperfect but still informative proxy for fiscal-monetary coordination in advanced economies in the 20th century. Second, we develop a new typology of forms of fiscal-monetary coordination that includes both direct and less direct forms of monetary financing, illustrating this with case-study examples. In particular, we focus on the 1930s-1970s period when central banks and ministries of finance cooperated closely, with less independence accorded to monetary policy and greater weight attached to fiscal policy. We find a number of cases where fiscal-monetary coordination proved useful in stimulating economic growth, supporting industrial policy objectives and managing public debt without excessive inflation.

Keywords: monetary policy; monetary financing; inflation; central bank independence; fiscal policy; debt; credit creation

JEL Classifications: B22; B25; E02; E12; E14; E31; E42; E51; E52; E58; E63; N12; N22; O43

Acknowledgements

The authors would like to thank Alfie Stirling, Rasmus Neilson, Simone Gasperin and Tommaso Gabellini for helpful comments on the text. We'd also like to thank Victoria Chick, Martin Wolf, Ole Bjerg and Tony Greenham for helpful discussions of the topics at the event 'Ten years on: rethinking money after the financial crisis', held at Coin Street, London, on 29 November 2017. Financial support for this paper was provided by KR Foundation Grant FP-1503-01701: 'Monetary policy for a post-growth economy'.

1. Introduction

In modern advanced economies, the state finances itself via the raising of taxes or, if it runs a deficit, by borrowing from domestic or foreign private capital markets. This is despite the fact that publicly owned central banks in states with sovereign currencies are not revenue-constrained, because they are able to create new money and lend to the sovereign without risk of insolvency.¹ Concerns with high inflation led Western advanced economies to shift away from central bank financing of governments, with formal prohibition becoming prevalent in the 1990s as part of the move towards central bank independence. The prohibition of monetary financing by central banks is a key element of the separation of fiscal and monetary policy that has become crucial to the New Macroeconomic Consensus (NMC), which views inflation-targeting via adjustments to interest rates as the most important activity of the central bank (Woodford 1995; Bernanke and Mishkin 1997). This framework also prioritises monetary over fiscal policy, with fiscal policy limited to counter-cyclical short-run stabilisation effects.

Economic developments since the global financial crisis (GFC) of 2007-08 have challenged this consensus. Despite short-term interest rates being reduced to zero and quantitative easing (QE) programmes pushing down the yield on medium and long rates, output growth has remained significantly below the pre-crisis period and central banks have repeatedly undershot their inflation targets. The apparent failure of the standard monetary policy transmission mechanism, whereby the lowering of interest rates should feed through to rising inflation and nominal demand in the real economy, has led to fundamental questions being asked of monetary policy (Yellen 2017; Borio 2017; Borio et al. 2018). Meanwhile, public and private debt to GDP levels have remained high as austerity policies have failed to stimulate private sector investment and growth.

The failure of monetary policy to reflate Western economies has led some economists to argue that advanced economies were in a ‘liquidity trap’ where agents became insensitive to the lowering of interest rates and called for a more active role for counter-cyclical fiscal policy. Others have argued that with already high public debt to GDP ratios or deficits, it is time to consider greater fiscal and monetary policy coordination and, specifically, the monetary financing of fiscal deficits by central banks to boost nominal demand (Woodford 2012; McCulley and Poszar 2013; Turner 2013).

The term ‘helicopter money’, popularised by Milton Friedman (1948), has been widely used to describe monetary financing, with the preferred proposal being either a (one-off) tax break or cash handout to citizens or a permanent monetisation of a proportion of the fiscal deficit (Baldwin 2016). The main advantage of such a policy, its advocates argue, is that it would boost demand without adding to either public or private debt levels because it would overcome the problem of ‘Ricardian equivalence’ (Reichlin et al. 2013). This problem is thought to constrain fiscal policy under conditions of large public deficits because agents realise that increases in spending today will eventually have to be matched by tax increases tomorrow and hence result in saving rather than spending.

The recent discussions of monetary financing have remained largely theoretical, with a strong focus on rational expectations and an assumed preference for long-run independence between fiscal and monetary policy. Accordingly, debate has been somewhat limited to one specific and time-limited form of fiscal-monetary coordination: whether or not this will be inflationary and whether it undermines central bank independence (with the former often axiomatically assumed to be a function of the latter). Importantly, discussions have neglected the actual use, and various forms, of fiscal-monetary policy coordination in Western advanced economies

¹ Central banks with very large foreign-exchange-denominated liabilities or index-linked liabilities are the exception – see Buiter (2008) for a discussion.

with mature institutions over the past century and the way in which they supported aggregate demand, industrial policy and longer-term economic growth. In this paper, we seek to enrich the discussion on fiscal-monetary coordination via three contributions that speak to this gap in the literature.

First, we provide a brief overview of the holdings of government debt in advanced economies by monetary (central bank and commercial bank) and non-monetary institutions over the course of the 20th century.² This provides an imperfect, but still useful, guide to the dynamics of monetary financing. For long periods during the 20th century, under regimes usually described as ‘financially repressive’, governments effectively forced monetary institutions to finance government deficits (i.e. through directives, negotiations and regulations), often at below market rates and for a specified maturity (Fry 1980). We observe descriptively how patterns in the financing of government debt relate to inflation, debt-to-GDP ratios and GDP growth.

Second, we develop a typology of fiscal-monetary policy coordination that incorporates helicopter money, but includes a range of other policy instruments, which could be considered as forms of overt or indirect monetary financing and which actually have historical precedence. These include central bank bond purchasing programmes driven by debt-management or government financing needs (rather than purely by monetary policy), requiring private banks to extend credit to governments, and the financing of state investment banks by central bank money creation to pursue industrial strategy goals.

Third, we illustrate the typology with some specific case studies, largely neglected in the economics literature, from Western economies, including the US, the UK, Japan, New Zealand and Canada.

Our review shows that for a large and economically successful period of the 20th century (1930-1970), monetary financing in various guises was an integral aspect of macroeconomic policy. It was an important means by which governments were able to reflate economies following the Great Depression, finance World War II, and finance fiscal expansion, industrial policy and innovation in the post-war period despite high initial public debt-to-GDP ratios. The historical evidence suggests different forms of monetary financing were not only used during economic downturns, but also more routinely to support fiscal expansion and Keynesian full-employment policies. In this view, the current debate on fiscal-monetary coordination places too much emphasis on Ricardian equivalence and rational expectations, and neglects the possibility of longer term fiscal-monetary coordination to direct resources into the most productive areas of the economy – with resulting multiplier effects – and stimulate demand.

The paper is laid out as follows: Section 2 provides a brief theoretical and empirical review of the literature on fiscal-monetary coordination and monetary financing, including recent debates following the financial crisis. Section 3 provides an overview of patterns of monetary financing in advanced economies in the 20th century. Section 4 develops the typology of different forms of monetary financing, with illustrations from single country case studies with a focus on the 1930s-1970s period. Section 4 concludes.

² When both central banks and commercial banks buy government debt, they create new deposits in government bank accounts, meaning the debt is monetarily financed (Ryan-Collins et al. 2012).

2. Fiscal-monetary policy coordination: literature and current conjecture

2.1. New Macroeconomic Consensus and rational expectations perspectives on fiscal-monetary coordination and monetary financing

Since the 1990s, inflation targeting – with a heavy emphasis on rational expectations – has become the primary focus of monetary policy above and beyond other macroeconomic objectives (Woodford 1995; Bernanke and Mishkin 1997). This New Macroeconomic Consensus (NMC) approach has three key elements, as identified by Arestis and Sawyer (2008): 1) the main task of the central bank should be a focus on consumer price stability and the central bank should publicly commit to an ‘inflation target’, normally around a (historically low) rate of 1-3% rate; 2) to achieve this, the central bank should be operationally and institutionally independent from government or ministries of finance and not be in any way obligated to lend to the government; and 3) that indirect methods of monetary policy (in particular adjustments to interest rates) as opposed to more direct methods of deficit or monetary-financing, credit controls or guidance are most appropriate (Bernanke and Mishkin 1997; Blinder 1999; Epstein, 2006).

This policy framework has its origins in neo-classical equilibrium models of the economy with representative agent models and rational expectations where equilibrium is reached at a ‘natural rate’ of interest when desired savings are aligned with the demand for investment (Lucas 1972; Kydland and Prescott 1977). Nominal rigidities and frictions in the labour market limit the achievement of short-run equilibrium; the key role of the central bank is to steer the economy towards the natural rate via adjustments to the policy rate of interest. By targeting (low) inflation, it is theorised that the central bank automatically guarantees the lowest output gap, or the same level of activity that would prevail in the absence of nominal rigidities (Blanchard and Galí 2007). The ability of the policy rate to achieve this relies on the assumption that what matters are prices and interest rates and not the underlying monetary or credit aggregates or liquidity. In addition, it also assumes that well-functioning financial markets transmit the monetary stimulus across the economy.

In contrast, fiscal policy needs to be managed carefully so as not to distort the natural rate of interest. The financing of government budget deficits by monetary institutions, rather than by savers, will lead to a ‘crowding out’ of the private sector, forcing up the rate of saving and suppressing the efficient allocation of capital (Fry 1980; Roubini and Sala-I-Martin 1995). Moreover, monetary financing is also inflationary compared to bond-financed deficits which involve absorbing existing funds from elsewhere in the economy (Sargent and Wallace 1981; Fischer et al. 2002). Fiscal policy in the NMC is viewed mainly as a counter-cyclical tool for managing short-term business cycles (Bernanke 2003a). Long-run GDP growth is determined on the supply side, for example through improvements in technology and human capital (Barrow 2004).

This ‘fiscal view’ of inflation has been particularly dominant in studies of developing or emerging markets where tax-raising powers and foreign borrowing are limited by institutional and political weaknesses. This ostensibly makes monetary financing relatively more attractive to governments. Even in advanced economies, rational expectations models, which assume a vertical long-run Phillips curve relationship between inflation and employment, maintain that there remains an ‘inflation bias’ in monetary policy. A ‘time inconsistency’ problem arises because, in order to win votes, at certain times in the electoral cycle governments will be prone to financing budget deficits at below market rates via monetary financing, creating short-term inflation and self-fulfilling inflationary expectations (Kydland and Prescott 1977; Gordon 1997; Cukierman 2006). The theoretical idea of central bank independence from governments gained credibility following the publication of a number of empirical papers showing a negative correlation between indices of central bank independence (CBI) and

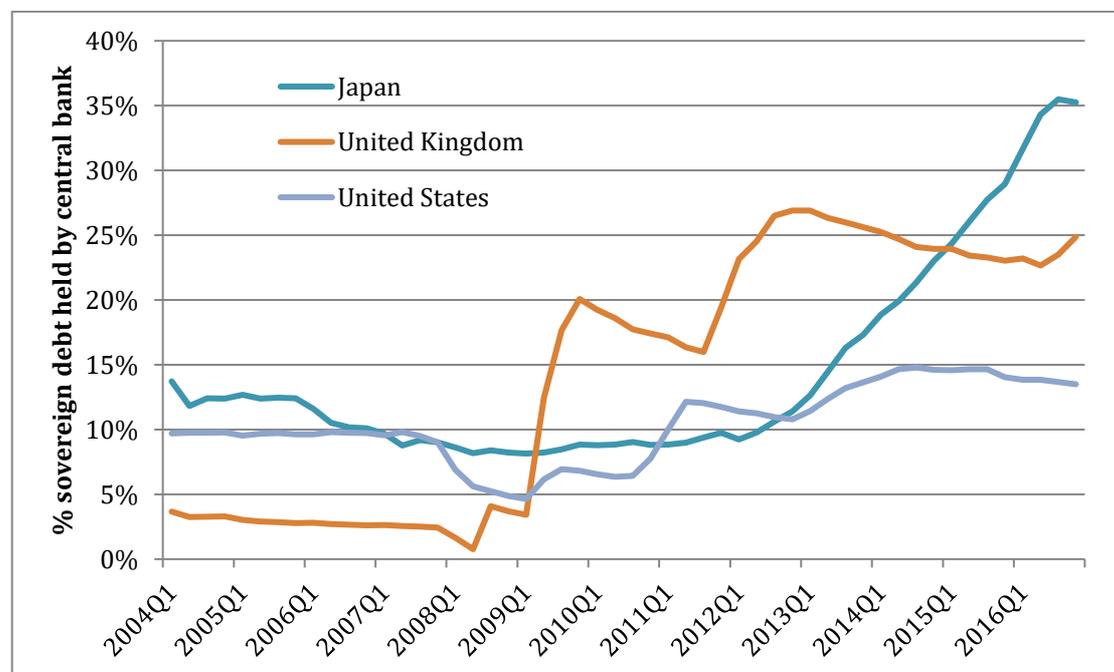
inflation, with prohibition or restrictions on central bank financing of government debt included as one of the indices of CBI (Alesina 1988; Grilli et al. 1991; Cukierman et al. 1992; Alesina and Summers 1993).

The NMC framework has been institutionally embedded via constitutional and operational changes to the particular role of central banks vis-à-vis governments since the 1990s (Jácome et al. 2012: 1). International financial regulators such as the IMF, World Bank and the BIS fully subscribe to this approach. In Europe, the Treaty of Maastricht, signed on 7 February 1992, established the details of the formation of the fully independent European Central Bank (ECB) by European Union members and prohibited the direct financing of government spending by any nation’s central bank. This includes any overdraft or credit facility and the direct purchase from the issuers of any government debt instrument (i.e. gilts or treasury bonds).

2.2 The post-crisis period and helicopter money

The reaction of central banks to the financial crisis of 2007-08 has posed some challenges to the New Consensus view on the fiscal-monetary policy divide. Central banks rapidly increased their holdings of government debt, such that by 2017 the six central banks that engaged in post-crisis QE held one fifth of total government debt on average (\$9 trillion out of \$46 trillion total) (*Financial Times* 2017). The most striking cases are the UK and Japan, where sovereign debt holdings have increased by around 25% since 2008 (Figure 1). No time series on total Eurozone government debt held by the ECB was available, but at the time of writing the ECB has acquired an additional €2 trillion of sovereign debt since 2010, equivalent to 20% of total Eurozone sovereign debt holdings. Only the Federal Reserve so far has begun reducing its holdings of government debt.

Figure 1: Domestic central bank holdings of government debt in Japan, US and UK, 2004-2016



Source: Arslanalp, 2012 #2453@{author-year}, April 2017 update, data available at <http://www.imf.org/en/Publications/WP/Issues/2016/12/31/Tracking-Global-Demand-for-Advanced-Economy-Sovereign-Debt-40135>

At the time, a number of economic commentators suggested that QE programmes would debase national currencies and lead to high levels of inflation, perhaps even resulting in hyperinflation (*Wall Street Journal* 2010; Taylor 2009). In fact, the opposite occurred – inflation remained below target in most countries using QE for almost the entire decade following its introduction. Indeed, inflation remained low despite economies shifting towards full employment levels, suggesting the standard vertical Phillips curve relationship no longer applies (Borio et al. 2018). A consensus has emerged that whilst initial rounds of QE were important in preventing serious depression, later rounds more focused on boosting demand when short-term rates are at their zero-bound have been less successful and indeed may have led to excessive asset price bubbles (BIS 2014).

In response to the perceived failure of QE to boost growth rates back to their pre-crisis levels, some New Keynesian economists argued that the economy had entered a ‘liquidity trap’ with excessive private debt constraining demand even at zero interest rates (Summers 2015; Eggertsson and Krugman 2012). Under these conditions expansionary fiscal policy was required. However, others argued that this would be ineffective given already high public debts, which would create Ricardian equivalence problems. Assuming rational expectations, households would choose to save rather than spend the new money and hence not boost demand (Barro 1989).

Instead, explicit monetary-fiscal coordination was required with the central bank agreeing to monetise a proportion of government debt in order to boost inflation and demand – the so called ‘helicopter drop’ (Woodford 2012; McCulley and Poszar 2013; Muellbauer 2014; Turner 2014).³ Since money-financed helicopter drops involve the creation of a non-interest bearing and non-redeemable ‘liability’ (money), they increase the private sector’s net worth and are thus more certain to result in an increase in nominal spending and demand compared to a standard bond-financed increase in borrowing or a temporary expansion of the central bank’s balance sheet (as in QE) (Buiter 2003).

Some authors have countered that there may still be a Ricardian equivalence problem under helicopter money since monetary financing requires the creation of a zero-interest central bank liability (reserves) that must be held by commercial banks (Borio et al. 2016). If interest rates rise under such a scenario, banks holding such reserves will effectively face a tax, since they must attract deposits by paying a higher rate. Either the central bank will have to pay interest on reserves (as a number of countries, including the UK and US, have done) or commercial banks will pass on the tax, in both cases reducing the stimulative impact of the monetary financing over time and making it not fundamentally different from bond financing (Borio et al. 2016).

Responding to this critique, Turner (2016) notes that the future tax can arise only ‘if and when interest rates and inflation have risen, and when banks are creating new credit and deposit money, multiplying the stimulative effect of the initial money-financed tax cut or expenditure’. In a situation where the economy is below full potential employment or output, monetary financing will still increase nominal demand over time. Monetary financing then becomes not a technical but an ‘essentially political issue’ (Turner 2015). But elected politicians have chosen to engage in the topic, whilst monetary policy makers themselves have generally been sceptical of the idea of helicopter money. Whilst acknowledging its potential advantages, they have argued, for example, that the potential long-run loss of independence outweighs short-run gains (Jazbec 2017).

³ The term ‘helicopter drop’ was first used by Milton Friedman (1968) and also floated by Ben Bernanke (2003b) as a means for Japan to boost inflation.

2.3 Critique of the Macroeconomic Consensus view

The Macroeconomic Consensus (NMC) view on the fiscal-monetary policy division and monetary financing has been subjected to both theoretical and empirical critiques which we only briefly summarise here, given the focus of this paper is on historical dynamics.⁴ The most important issues concern the (related) issues of the long-run neutrality of money, rational expectations and the causes of inflation.

In regard to money, the NMC perspective admits of the possibility of short-term disequilibrium conditions caused by external shocks that may be exacerbated by the financial system – so called ‘financial accelerator’ effects (Bernanke et al. 1999) – but in the long run monetary policy is viewed as neutral. As noted by Dow (2017), the NMC approach retains a neutral-money (closed-system) ontology, where money is merely a technical input into exchange; or a veil over barter, allowing the exchange of good or service for another. In this view, inflation is considered purely a monetary issue that central banks can directly influence via the central bank’s primary tool, the overnight policy rate. Price stability – low and stable inflation – was sufficient to ensure macro-economic stability and up until the 2008 GFC financial stability was not a concern for central banks (Dow 2017; Turner 2012).

Accordingly, within the NMC approach bank lending has traditionally been considered a transfer of purchasing power from a saver to a borrower with no implications for real activity (King 2012). As former vice-president of the ECB, Vincent Constancio (2017), suggested, bank defaults were not considered possible and high levels of private debt was not an issue, because for every debt there would always be a creditor – and thus ‘debt was a non-event at the macro level’.

In contrast, economists following Schumpeter (Schumpeter 1983 [1911]) and Keynes (1973 [1933]) have emphasised that capitalist systems are ‘monetary production’ economies in the sense that investment in the real economy requires financing prior to the existence of savings (Moore 1983; Minsky 1993; Graziani 2003; Werner 2005; Fontana and Realfonzo 2005). Here the commercial banking sector plays a key role as it is able to issue liabilities upon itself to finance new investment for creditworthy borrowers without relying on pre-existing savings.

For stable economic growth, advanced capitalist economies thus require investments that generate profits greater than debt commitments. Under conditions of Keynesian uncertainty (Davidson 1972), rather than probabilistic risk as in rational expectations models, this is not guaranteed; rather capitalist systems are prone to financial cycles as capital asset prices rise and fall, and expectations vary over time (Minsky 1986). Rather than being influenced primarily by the rate of interest (and whether it is at an equilibrium level), investment is driven primarily by expectations of future profits and growth opportunities, i.e. effective demand (Chirinko 1993; Shapiro et al. 1986; Deleidi and Mazzucato 2018).

Furthermore, NMC models generally assume that bank lending primarily flows to non-financial firms and for production. In fact, bank credit also finances the purchase of existing physical and financial assets, which may result in asset price inflation rather than GDP transactions (Werner 2005). Recent studies have shown that in the past few decades, in advanced economies bank credit has shifted towards asset markets, in particular towards real estate lending, resulting in lower growth and increased financial instability (Jordà et al. 2016; Bezemer et al. 2016) even if it does not produce consumer price inflation. This may be related to financial deregulation – for much of the 1950s to 1980s period, for example, retail banks were regulated in such a way as to discourage mortgage lending (Ryan-Collins et al. 2017).

⁴ See Ryan-Collins (2015) for a detailed critique.

Under such conditions, fiscal and monetary policy may come to take on an important role in supporting sustainable growth and aggregate demand in the long run, not just in the short run (Arestis and Sawyer 2008). The state may be able to influence business and bank expectations, and, given its ability to finance new and productive technologies (Mazzucato and Wray 2015; Deleidi and Mazzucato 2018), the direction and rate of growth, whilst monetary policy and financial regulation can support this effort or push against it.

Although the helicopter drop models of monetary financing described above are clearly one form of fiscal-monetary coordination, they still largely support a limited role for fiscal policy. The helicopter drop requires only a temporary form of coordination between the central bank and ministry of finance, under extraordinary circumstances. In most of the above models, there is no requirement, for example, for the government to commit to an expansionary fiscal regime as a response to the greater fiscal space the monetisation of debt creates. The boost to inflation and demand is founded upon assumptions about agents' behaviour that have not been empirically demonstrated and may not be easily observable.

Furthermore, as Terzi (2014) argues, explicit monetisation is of no consequence to debt sustainability (and hence Ricardian equivalence debates) as long as the central bank remains able to buy government debt in the secondary market in unlimited quantities. In such a case, the central bank is the 'market maker' of government bonds and can, if it so wishes, ensure that sovereign debt does not carry default risk. If a central bank can trade central bank money for government bonds and vice versa, then the price of government bonds is set by monetary policy, and the only difference between government bonds and central bank money is that one cannot be used to directly settle payments (ibid: 20). Similarly, a central bank which is targeting a specific interest rate may be effectively forced to monetise the government deficit to hit that target since rising deficits may push up interest rates (Buchanan and Wagner 1977; Thornton 1984). This kind of 'two-step' monetisation process (Mishkin 1993: 421) has generally been ignored in the recent literature, but, as we shall see in the next section, it has played an important role in the history of fiscal-monetary coordination and cooperation.

Finally, the NMC view also conceptualises inflation as primarily a monetary phenomenon, but this has been theorised as being multi-causal, with cost-push inflation from wages, import prices, struggles over income shares and inadequate productive capacity all important drivers in addition to the money supply (Arestis and Sawyer 2002; Vernengo 2006). The empirical relationship between central bank independence (and therefore the prohibition of central bank monetary financing) and low inflation has also been subject to serious criticism, despite being broadly accepted by policy makers. The CBI indexes used in the key studies (Alesina and Summers 1993) themselves focus on a short time period of 1970-1990, which were characterised by a number of inflationary shocks that may have had non-monetary causes, including the OPEC crises of the 1970s and balance of payment crises related to the recycling of loans and build-up of third world debts in the 1980s (Hervey 1990: 466; Frieden 2006: 364; Klomp and De Haan 2010). Studies that have included more recent data tend not to find a clear correlation between CBI and inflation (Crowe and Meade 2007). With regard to hyperinflations, the most comprehensive study available of all 56 recorded cases found that the vast majority occurred either during or after major wars or other exogenous shocks (Hanke and Kruse 2013: 12).⁵

Given the above, it is not surprising that it has been a struggle to find statistically significant relationships between fiscal deficits and inflation or base and broad money growth, regardless of whether deficits are 'funded' via private sector bond purchases, commercial bank or central bank monetisation. This applies to cross-country panel studies (Dornbusch and Fischer 1981;

⁵ The authors use Cagan's (1956) widely accepted definition of hyperinflation as a price-level increase of at least 50% per month. When the monthly inflation rate drops below 50% and stays there for at least one year, the episode is said to end.

Seccareccia and Sood 2000; Catao and Terrones 2005; Lin and Chu 2013) and single-country time series studies (King and Plosser 1985; Protopapadakis and Siegel 1987; Barnhart and Darrat 1988) and also during fixed and flexible exchange rate regimes (Demopoulos et al. 1987; Ryan-Collins 2015) from a wide variety of countries, historical periods and different inflation rates.

In summary, the New Consensus view around the need to restrict monetary financing and debt monetisation to a negligible level, in favour of maintaining the independence of a central bank that, for the most part, restricts its activities to inflation targeting via adjustments to short-term interest rates, is coming under considerable scrutiny. Empirical support for such an approach is limited and the theoretical basis for such policies is flawed. Post-crisis QE policies, which clearly do involve the creation of central bank money on a vast scale, have not led to the kind of inflation such theories predict and are seen by some as threatening central bank independence, because of the implicit subsidisation of government debt. Given these findings, what can we learn from the history of monetary financing in advanced economies in the 20th century?

3. An overview of monetary financing as a form of fiscal-monetary coordination in the 20th century

To gain a quick initial overview of the use of monetary financing, in this section we examine the financing of government debt in advanced economies in the 20th century using a number of recently compiled publicly available international datasets. Figure 2 shows the composition of central government debt by owner (central bank or commercial bank, domestic non-bank, non-resident) averaged across 13 advanced economies from 1900 to 2011 as a percentage of total debt.⁶ The data is sourced from an IMF database on sovereign debt composition (Abbas et al. 2014).⁷ The government debt-to-GDP ratio (black dotted line), using a purchasing power parity weighting, is shown on the right hand axis.

The red block in Figure 2 can be seen as a proxy for monetary financing: it shows the combined stock of central bank and commercial bank holdings of government debt. This is not a perfect proxy for fiscal-monetary coordination or monetary financing, since central banks and commercial banks will have purchased government debt for reasons other than to support government financing or debt management, e.g. for exchange rate management and financial stability objectives. There is also insufficient data available to estimate what proportion of government debt was purchased directly by monetary institutions on primary markets or from secondary markets, although in most countries in the sample there was no formal prohibition of monetary institutions buying directly from governments up until the late 20th century and it was a regular occurrence.⁸

These qualifications reduce the usefulness of this data for empirical analysis. Nevertheless, as recorded in a number of studies to be discussed in the remainder of this article, for long periods of the 20th century, in particular the 1930s-1970s period, there is clear evidence of fiscal-monetary policy coordination whereby both central banks and commercial banks were required (covertly or overtly) to purchase government debt to support fiscal policy objectives (including economic growth and debt sustainability). And even where the majority of

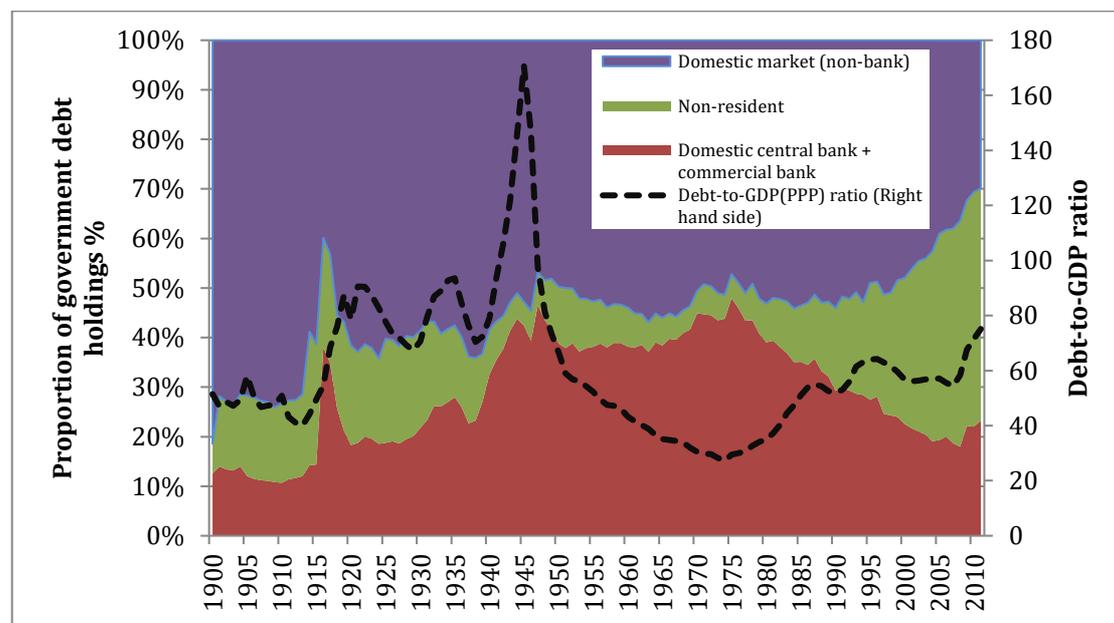
⁶ Belgium, Italy, Japan and the Netherlands are in the sample throughout the period. The US joins in 1916, the UK in 1920, Sweden in 1922, France in 1936, Canada in 1946, Australia and Germany in 1950, Ireland in 1959 and Spain in 1987.

⁷ Domestic market financing is a residual (i.e. total government debt minus the other categories). For more information on the construction of the data set and primary sources see Abbas et al. (2014: 7-9 and 39-41).

⁸ For instance, the Maastricht Treaty, which came into force in 1992 – Article 123 prevents the central bank buying debt on the primary market in the European Union.

monetary financing involved the purchasing of assets on secondary markets, this can still be seen as a form of indirect – or ‘two-step’ – monetary financing (as described in section 2). This is because it will affect the demand for and yield on government debt, and reduce the net debt servicing burden of the government. It is also worth noting that up until the 1990s, over 50% of larger commercial banks were, in fact, state owned, making their lending policies more aligned with government economic policy generally (La Porta et al. 2002).

Figure 2: Composition of ownership of government debt averaged across 13 advanced economies, 1900-2011



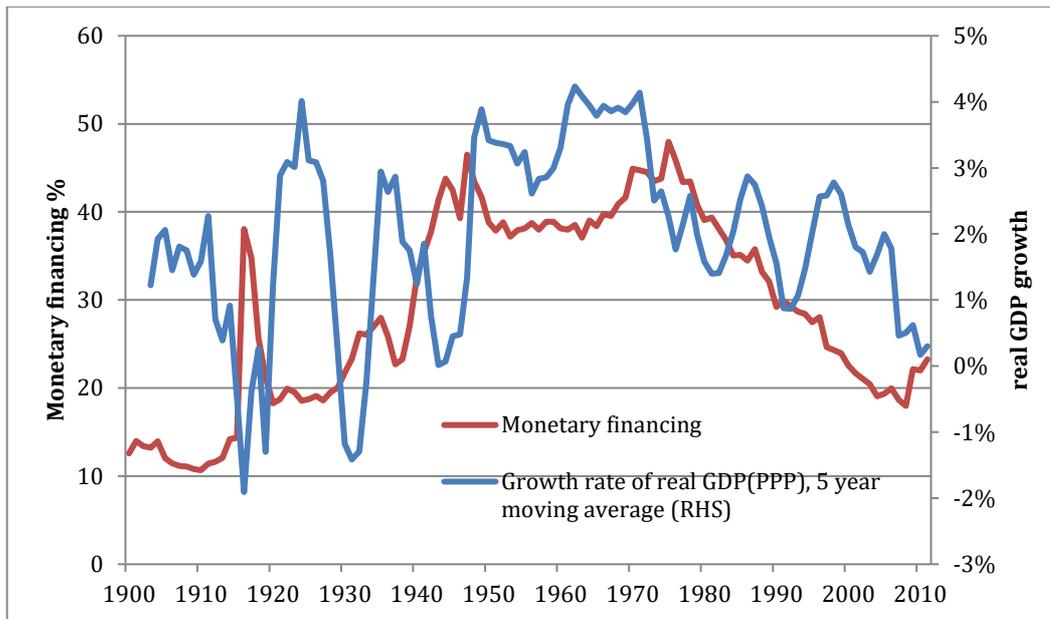
Source: Abbas et al. (2014).

As shown in Figure 2, for a 30-year period following World War II to the late 1970s, between 40-50% of government debt was directly or indirectly funded by domestic monetary institutions rather than non-monetary agents (domestic market or non-resident investors.)⁹ In the pre-World War II period, with the exception of World War I, monetary financing was closer to 20%, rising towards 30% in the 1930s. Since the 1980s, the proportion of domestic monetary financing has been steadily declining, returning to around 20% by the time of the financial crisis of 2007-08. As shown in figure 4, it is now on the up once more. Of non-monetary financing, domestic markets absorbed between 50-60% of government debt between 1920-1995, after which there is a significant reduction, down to 30% by 2011, also coinciding with a rise in non-resident financing.

The period of highest levels of domestic monetary financing (1940-1980) coincided with the longest period of sustained low levels of government debt-to-GDP (black line in Figure 2) in the 20th century and the highest levels of GDP growth (Figure 3). In most advanced economies during this period, governments followed Keynesian-demand management policies targeting full employment often accompanied by national industrial policies and capital controls. This ‘golden period’ of capitalism also saw high levels of capital investment and manageable inflation up until the early 1970s (Epstein and Schor,] 1991). Capital controls limited the share of non-resident holdings of government debt.

Figure 3: Monetary financing (domestic commercial bank and central bank holdings of government debt) and real GDP growth in advanced economies, 1900-2011

⁹ The split of bank and non-bank financing was not available for non-resident debt.



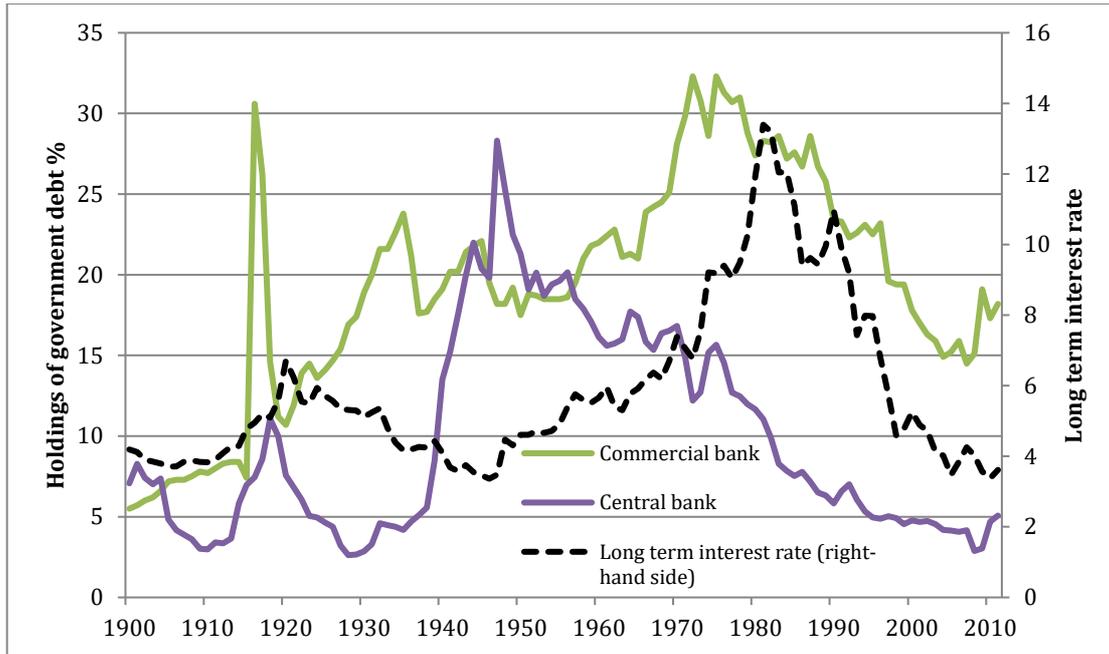
Sources: Monetary financing figures from Abbas et al. (2014); real GDP growth from Jordà (2017).

Economic historians and political scientists studying the period have paid less attention to monetary than fiscal policy, describing the period as one of Keynesian ‘fiscal dominance’ enabled by a fixed exchange-rate regime, regulation of capital flows, and high levels of government spending and investment driving aggregate demand (Eichengreen 1998; Cobham 2012: 730). But these fiscal policies were enabled by accommodating debt-management policies by central banks. Indeed, central banks were often subordinated to ministries of finance and had a wide range of goals aside from price and financial stability. These included the maintenance of historically low interest rates on government and bank debt, as well as the maintenance of exchange-rate parities (Epstein 2006; Goodhart 2010:2-4; Cobham 2012: 730). Without supportive domestic monetary policy, it is not clear how such fiscal policies could have been enacted given the very high debt-GDP ratios facing most countries in the post-World War II period.

Figure 4 disaggregates domestic monetary financing between commercial banks and the central bank. We can see that central bank funding of government varied around 5% until the World War II period, whereupon it rose rapidly to close to 30%. The reduction in central bank holdings that followed was gradual: central banks continued to hold close to one-fifth of government debt until the late 1960s and it is only since the early 1980s that this figure has dropped below 10%. This fall in central bank debt holdings in the 1980s and 1990s was driven by the shift towards central bank independence and the prohibition on monetary financing (Abbas et al. 2014: 27). As interest rates were ramped up globally to try and counter high inflation following the ‘Volcker’ shock in the US, this fall in monetary financing would likely have contributed towards an increase in debt-to-GDP ratios as governments paid out a higher share of interest to private and foreign creditors rather than to their own central banks, which would have, in due course, returned it to the national treasury.¹⁰

Figure 4: Domestic central bank and commercial bank financing of government debt and long-term interest rate averaged across 13 advanced economies, 1900-2011

¹⁰ See Ryan-Collins (2017) for a discussion of these dynamics in Canada.

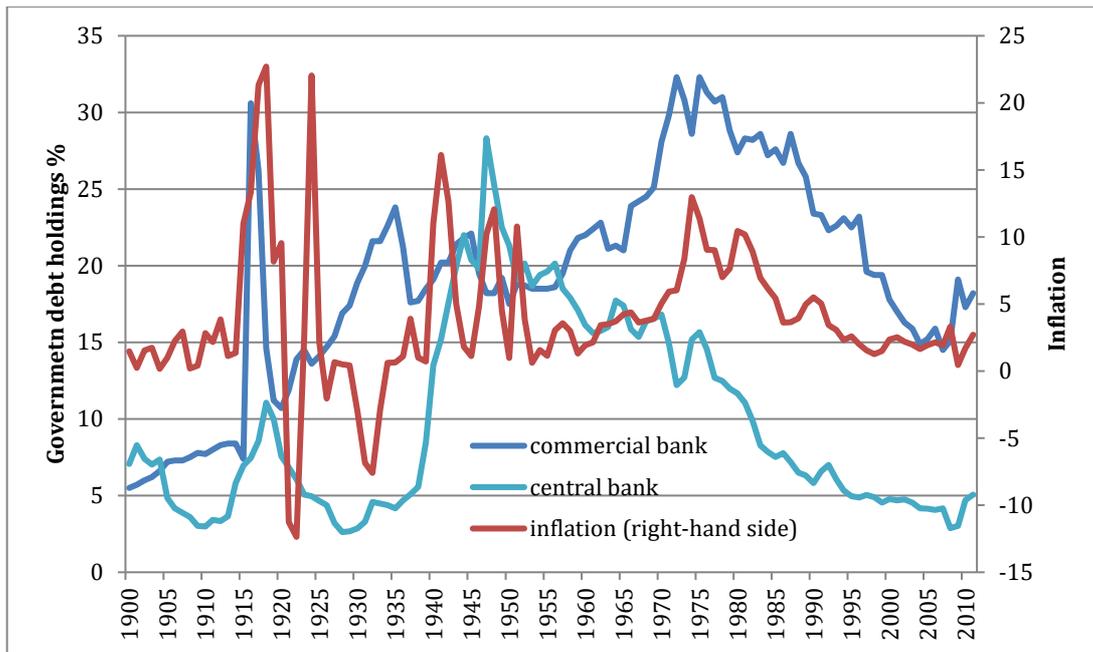


Source: Government debt figures from Abbas et al. (2014); interest rates and inflation from Jordà (2017).

Commercial bank financing of government debt follows a different pattern. This averaged around 20% of total government debt between 1930 and 1965, but then rose to 30% during the 1970s-80s period. In terms of overall domestic monetary financing of the government debt, this effectively compensated for the fall in central bank financing, keeping total domestic monetary financing at around 40% of the total. The 1970s saw a decisive shift away from Keynesian demand management policies and a shift towards monetarism in the face of rapidly rising inflation. The rapid hikes in interest rates that accompanied this shift likely made government debt a more attractive asset for commercial banks. The proportion of commercial holdings declined again in the 1990s and 2000s in the lead up to the financial crisis as liquidity and capital requirements were liberalised and interest rates fell.

What of the relationship between monetary financing and inflation? Figure 5 plots the growth rate of consumer prices against the ratio of central bank and commercial bank holdings of government debt in advanced economies. While this simple assessment is limited, involving only a few variables, there is little evidence of any kind of sustained relationship between the rate of inflation and the proportion of central bank holdings of government debt, aside from the two World War periods. While the oil and food price shocks clearly had a substantial effect on inflation in the 1970-80s, from the 1960s, as the proportion of debt held by central banks diminished, the rate of inflation began to pick up, when the opposite might have been expected under an NMC view.

Figure 5: Domestic central bank and commercial bank holdings of government debt and inflation averaged across 13 advanced economies, 1900-2011



Sources: Debt holdings from Abbas et al. (2014); inflation from Jordà (2017).

This simple descriptive survey of the dynamics of monetary financing casts doubt on the New Consensus models outlined in section 2. For most of the 20th century, large quantities of government debt were funded by monetary institutions, but there is little evidence that this led either to misallocation of capital and hence low growth or dangerously high levels of inflation. However, the advanced economy averages described in this section take us only so far and disguise significant heterogeneity across countries, telling us less about the actual nature of the fiscal-monetary policy coordination involved or how it supported macroeconomic policy goals. We examine this in the next section.

4. Fiscal-monetary policy coordination and monetary financing – typology and case studies

Fiscal-policy coordination relating to the monetary financing of governments can take a number of different forms. Table 1 presents a typology of monetary financing policies (at a country level) with relevant examples from the period. In total, we identify five forms, which lie in three different categories: indirect, direct and ‘devolved’. These are now described in more detail and illustrated with significant examples from a range of countries.

Table 1: Forms of monetary financing in the 20th century

TYPE OF MONETARY FINANCING		OTHER TERMS	LEGAL STATUS ¹¹	PURPOSE	EXAMPLES
INDIRECT/TWO-STEP	1a. Large-scale, long-term government debt purchases, typically on secondary market by central bank	Debt-management; Financial repression (especially when accompanied by high inflation); quantitative easing	Legal	Control cost of government financing/reduce net public debt level; increase banking sector liquidity	USA 1930s; many advanced economies in 1940-1970 period; UK, Eurozone, Japan, US, Switzerland, China and Sweden via QE post-2008
	1b. Raising of liquid asset requirements of commercial banks	Financial repression	Legal	Enhance financial stability/repressing lending with secondary effect of financing government	Common in wartime; particularly used in 1960s-1970s; post-2007-08 financial crisis
DIRECT	2a. Central bank buys government bonds directly from state on permanent basis	‘Monetary financing’; ‘monetisation of debt’; ‘seigniorage financing’	Illegal in EU since 1997; quantity or temporal restrictions in most countries	Enable rapid fiscal expansion, especially during wartime or reconstruction	Throughout history for war; Japan 1931-1935; Canada 1933-1945
	2b. Central bank makes advances to government	‘Advances’/ overdraft facility	Legal in most countries with exception of EU since 1997	Enables smoothing of government spending	Common in most central banks with restrictions on quantity and maturity of loan and often with interest rate linked to market rates. Canada and New Zealand in 1930s for recovery/war
	2c. Private banks lend directly to government at prescribed (low-level) interest rates and specified maturity	‘Financial repression’	Legal	Push down cost of government financing/enable fiscal expansion	Many countries in World War II and post-war reconstruction period, including UK and Canada: ‘Treasury Deposit receipts’

¹¹ See Johnson (1990) for a more detailed analysis of the legal status of the identified forms of monetary financing.

DEVOLVED	3. Central banks or commercial banks capitalise arms-length public development/investment banks	Development banks; industrial development banks; 'finance corporations'	Generally legal but EU state-aid laws complicate usage in EU	Long-term finance for strategic sectors of the economy; support for SME/export sectors; promote and accelerate industrialisation; post-war reconstruction	Europe in 19 th and early 20 th centuries; widely used in developing countries; for reconstruction post-Great Depression/World War II
----------	---	---	--	---	---

4.1 Indirect monetary financing: large scale on-going government debt-purchases on the secondary market by central banks

Bond purchasing on the secondary market post-issuance by the government, better known as Open Market Operations (OMOs), has always been widely practiced by central banks as a standard aspect of monetary policy. Central banks use OMOs to increase or drain liquidity from financial markets and attempt to ensure that the interest rate they charge banks (the short-term or policy rate) is carried through to the lending rate banks offer to the private sector. Such activity would not normally be defined as 'direct' monetary financing since bonds were purchased on the secondary market, instead of the primary.

However, there are frequently times through history when such bond purchases also reflect debt management objectives. Reinhart and Sbrancia (2011) classify large-scale government debt purchasing carried out over many years by central or commercial banks – the latter often required to as part of wider financial sector regulation – as a form of 'financial repression' as it involves interest rates being pushed permanently below market rates. When accompanied by even moderate levels of inflation this can create negative real interest rates that enable governments to significantly reduce public deficits, eventually bringing down debt-to-GDP ratios. This was a feature of the 1945-1970 period for both developed and emerging market economies, as documented by Reinhart and Sbrancia (2011).

Table 2 shows instances of major central bank balance sheet expansion in the post-war period, where the proportion of public debt held by the central bank increased by more than 5% within a five-year window¹². We find that two-thirds of these types of balance sheet expansions occurred alongside an increase in public debt levels (second column) and thus in most cases the increase in public debt was predominantly indirectly financed by the central bank (third column). In fact, in nearly half of these instances the proportion of debt held by a central bank increased by more than 50% of the public deficit. Thus, the central bank in question would appear to have 'accommodated' the increase in the deficit. In most cases this would appear to be a temporary accommodation as many of these expansions were followed by subsequent contractions, a finding also reported in a survey of eight advanced economies over the 1961-1981 period (Demopoulos et al. 1987).

Table 2: Instances of major central bank balance sheet expansions in the post-war period 1950-2000

¹² It should be noted that in all these instances the gross value of public debt held by central banks increased, as well as the proportional increase of their holdings. In this sense, each central bank's balance sheet size did actually expand and the proportion of public debt held by the central bank did not merely increase because the relative outstanding value of gross public debt diminished.

Country and time period	Increase in proportion of public debt held by central banks	Did public debt levels increase?	Portion of newly issued debt (indirectly) financed by central banks ¹³
Australia 1973-1977	4.1% to 18.2%	No	–
Australia 1984-1986	6.4% to 15.2%	Yes	61%
Australia 1990-1993	4.0% to 17.3%	Yes	43%
Australia 1996-1997	13.6% to 20%	No	–
Australia 1999-2000	13.8% to 18.7%	No	–
Belgium 1979-1981	4.8% to 9.9%	Yes	24%
France 1956-1957	15.2% to 23.2%	Yes	214%
France 1965-1966	14.6% to 20.4%	No	–
France 1974-1975	12.8% to 17.6%	Yes	38%
France 1981-1984	3.3% to 8.5%	Yes	16%
Italy 1961-1964	17.5% to 23.9%	Yes	97%
Italy 1973-1976	18.9% to 35%	Yes	107%
Japan 1951-1956	25.7% to 58.7%	Yes	700%
Japan 1957-1959	39.9% to 51.5%	Yes	104%
Japan 1961-1964	23.5% to 56.4%	No	–
Japan 1968-1970	27.8% to 41.3%	Yes	92%
Japan 1972-1975	10.4% to 32.9%	Yes	112%
Japan 1996-1998	8.8% to 15.5%	Yes	51%
Netherlands 1964-1968	2.2% to 6.7%	Yes	43%
Sweden 1953-1957	20.9% to 30.1%	Yes	86%
Sweden 1964-1969	24.4% to 33%	Yes	91%
Sweden 1973-1974	17.3% to 26.9%	Yes	286%
Sweden 1983-1987	8.2% to 15.4%	Yes	63%
UK 1958-1962	9.7% to 18.1%	No	–
UK 1972-1974	17.6% to 27.6%	No	–
UK 1988-1991	1.4% to 7.1%	No	–

Source: Abbas et al. (2011) and Ferguson et al (2015).

Note: Table shows instances where central bank expands balance sheet by more than 5% over a five-year rolling period. Emboldened rows are where the increase was accompanied by/accommodated an increase in public debt levels.

All of this suggests that prior to the 1990s and central bank independence, it was routine for central banks to be involved in the (temporary) financing of government deficits. The QE programmes that have followed the financial crisis, discussed in Section 2.3, could also be potentially classified as debt-management-orientated monetary policy. It is true that the stated objectives of central banks buying debt from the secondary market in the post-crisis period have generally been focused on monetary policy objectives – hitting an inflation target – rather than public debt-sustainability (Jácome et al. 2012). All the central banks practising such activity have argued that, at some point in the future, presumably when conditions have

¹³ This figure is calculated as the amount of existing public debt purchased by the central bank divided by the amount of net new debt. So if a central bank purchases more existing public debt than net new issuances, the resulting figure will be more than 100%.

returned to normal and inflation is becoming a concern, the securities will be sold back into the market in order to maintain price stability.

In reality, however, the sheer scale of the government debt purchases involved lowers government costs and debt in the medium to long term. In the UK case, for example, calculations by Goodhart and Ashworth (2012) suggest the potential savings to the government that can be attributed to the Bank of England's QE programme amounted to £55 billion in total (by 2012). In all cases of QE, the seigniorage profits generated by central banks (the interest paid to them by governments on the outstanding bonds) are returned to the ministry of finance.¹⁴

Moreover, if the value of government debt is permanently held on the balance sheet of the central bank, regardless of whether it is purchased on the primary or secondary market, this portion of government debt will not count towards the long-term debt-servicing burden of the government (Turner 2015). If a central bank does not fully unwind its QE programme, then previous government spending has been financed by central bank money creation and a portion of government debt has been effectively cancelled.

Nevertheless, secondary market purchases of government debt – even if they are declared 'permanent' after the fact – merely alter the composition of how a government's long-term debt servicing is financed and do not directly affect a change in current or future public expenditure. Many governments in the post-financial crisis period continued with austerity programmes despite enjoying much lower interest rates. Similarly, firms and households initially de-leveraged despite low rates. Conversely, if the central bank and treasury coordinate so that a QE programme is accompanied by a direct increase in fiscal spending, then such operations could be viewed as being closer to explicit and direct monetary financing, regardless of whether the government debt is purchased on the primary or secondary market (especially if the balance sheet expansion of the central bank is eventually made permanent).

Case study of indirect monetary financing: The Reconstruction Finance Corporation and open market operations

The Reconstruction Finance Corporation (RFC) was originally created by President Hoover in 1932 to bail out the US banking system during the Great Depression. When President Roosevelt came to power in 1933, he used the RFC to support his New Deal policies, creating public credit for infrastructure, machine-tool design machinery, manufacturing and agriculture, expanding the powers of the RFC to incorporate lending to industry (Freeman 2006). Between 1933-45, the RFC lent \$33 billion (over \$1.2 trillion in today's dollars), making it the largest lending institution in the world at the time (Freeman 2006: 48).

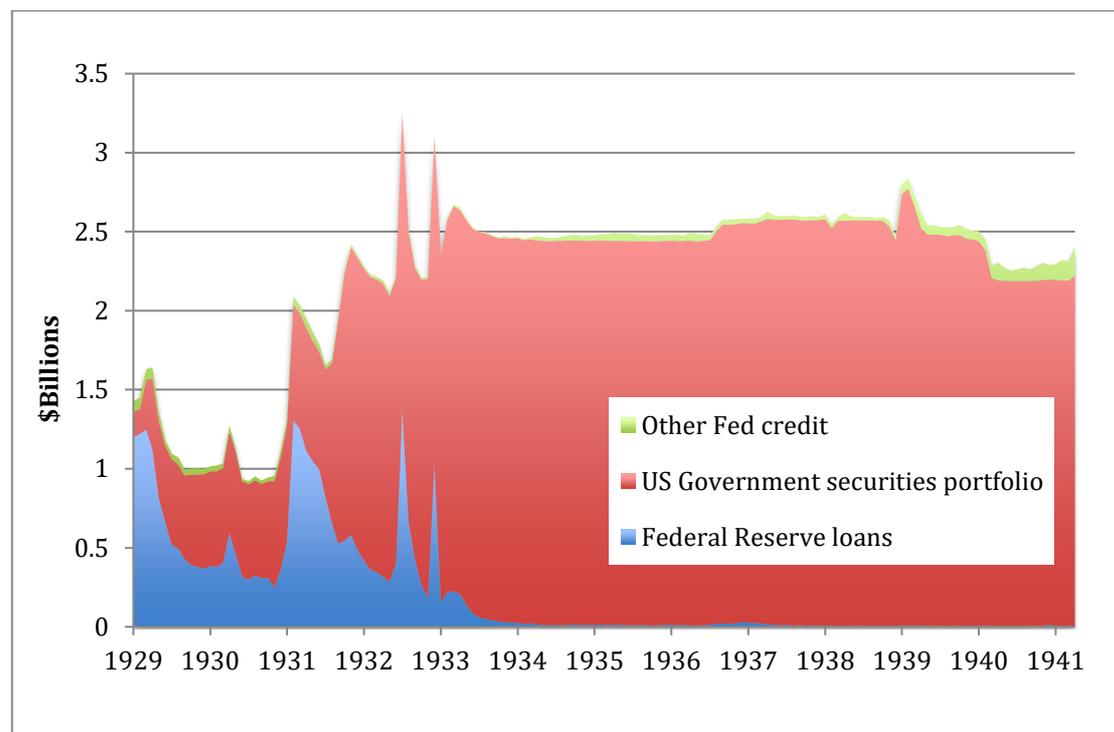
The RFC Act of 1932 enabled the RFC to extend credit to banks and other financial institutions that lacked access to the credit facilities of the Federal Reserve. The RFC was not directly capitalised by the Fed, but rather by the Treasury, which subscribed to the \$500 million of capital stock. In addition, the Treasury was permitted to lend an additional \$1.5 billion to the RFC by purchasing its bonds. The bonds issued by the RFC were ineligible for either discounting or purchase by any of the Federal Reserve Banks in an attempt to preserve the Fed's independence (Todd 1992).

However, the establishment of the RFC coincided with another important piece of legislation: the Banking Act of 1932. A primary provision of the Act was to allow the Fed to use government securities as collateral for Federal Reserve notes (on top of gold and commercial

¹⁴ See Bjerg *et al.* (2017) for a discussion of central bank seigniorage profits.

paper). Accordingly, the Federal Reserve began purchasing government securities from the open market. The programme was not only expansionary, but was unprecedented in terms of scale and scope, amounting to roughly 15% of the monetary base and 2% of GNP. By March 1932, the Federal Reserve System was buying roughly \$25 million in government securities on a weekly basis and by April about \$100 million a week (Figure 6). In March 1932, the Federal Reserve System held approximately \$0.5 billion of government securities on its balance sheet. By August this figure had increased to \$1.85 billion. Then, under Roosevelt, the Fed's holding of government securities increased by another \$0.6 billion, from \$1.85 billion in May to \$2.43 billion in November. The FED never contracted its balance sheet after these purchases and continued rolling over these government securities, permanently keeping the value of the bonds purchased on its balance sheet.

Figure 6: Federal Reserve credit, 1929-1941



Source: Federal Reserve Bank of St Louis (FRED).

The conventional literature reviews this period of large-scale asset swaps as purely a monetary policy operation (e.g. Bordo and Sinha 2015; Meltzer 2010), but historical evidence suggests the decision to conduct open-market operations was seen partly as a means of assisting the Treasury to raise \$1.5 billion in funding needed by the RFC. Minutes from the January 1932 Open Market Policy Conference¹⁵ state:

‘Governor Harrison [New York Fed governor] referred to the Treasury program and indicated that the Treasury would require about one and a half billion dollars of new money between now and June 30 and that under present conditions it would be difficult for the Treasury to borrow this amount without a serious effect on the government security market and the general bond market. He stated that he believed a successful Treasury sale of these securities would require... probably some purchases of Government securities by the [Federal] Reserve banks.’

¹⁵ Minutes of meetings of the Open Market Policy Conference, 11-12 January 1932. Available at: https://fraser.stlouisfed.org/files/docs/historical/FOMC/meetingdocuments/rg82_ompcminutes_19320111-12.pdf

Later in the meeting, undersecretary of the Treasury, Ogden Mills, also requested assistance from the Federal Reserve banks to indirectly finance the RFC:

‘The Treasury faces a problem of raising about one and a half billion dollars additional money between now and June 30 to meet current expenditures and the requirements of the Reconstruction Finance Corporation... The effects of increasing the national debt during the past year had not been inflationary as might have been expected but rather the reverse. Funds appear to have been withdrawn from other necessary uses to finance Treasury requirements... We now have to deal with an emergency only comparable with the emergency of war and are justified in returning to war techniques in the sale of government securities.’

Thus it would appear that the Fed and the Treasury co-operated to indirectly finance the RFC via massive increases in bond purchases on the secondary market. Flooded with newly created cash, private investors bought up new bonds issues from the Treasury. In effect, the newly issued Treasury bonds – used to finance the considerable expenditures of the RFC – were purchased with the money created via open-market operations. This linkage was noted by the *New York Federal Reserve Monthly Review*:

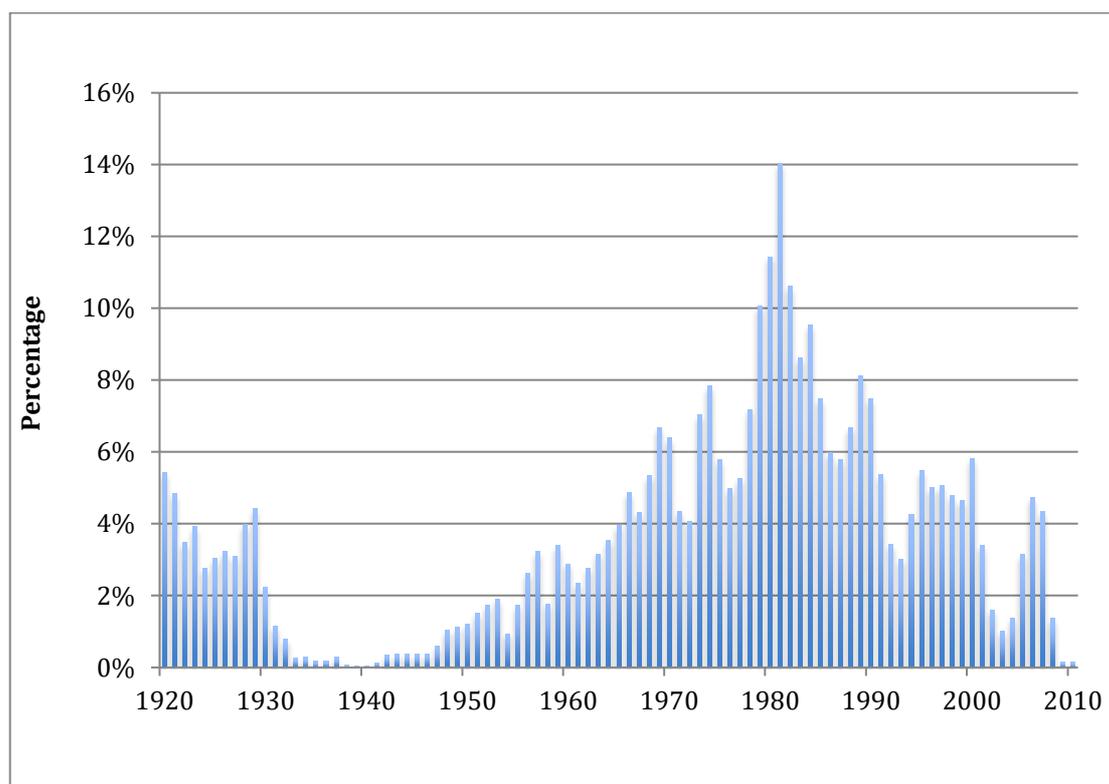
“Federal Reserve purchases of Government securities necessarily were conducted largely in New York, but the funds paid out were widely distributed through Treasury transfers of funds to other parts of the country to cover payments of loans made by the Reconstruction Finance Corporation, as well as ordinary Government expenditures.” (Federal Reserve Bank of New York (1932: 25))

Additionally, these purchases brought down government borrowing costs (especially on the short end) to exceptionally low levels – T-Bills eventually reached their lowest rate in history, enabling the Treasury to further finance the RFC. Indeed, minutes taken from Federal Reserve Board meeting in April 1933¹⁶ indicate that under President Roosevelt the Federal Reserve board voted to conduct open-market purchases in 1933 for the primary purpose of lowering the government’s debt servicing costs:

“...the conference was generally in agreement that during the period of the emergency it would be advisable for the Federal Reserve banks, so far as possible and consistent with their own position and requirement to cooperate with the Treasury with a view to facilitate any necessary issue of government securities or to support the market for government securities in order to make such public issues possible...It was understood that a purchase in such circumstances would be with a view to meeting Treasury requirements...”

¹⁶ Minutes of Meetings of the Open Market Policy Conference, 22 April 1933. Available at: https://fraser.stlouisfed.org/files/docs/historical/FOMC/meetingdocuments/rg82_ompcminutes_19330422.pdf

Figure 7: Three-month Treasury bill returns (1920-2011, monthly)



Source: Federal Reserve Bank of St Louis

The Federal Reserve, after heated debates with Congress, gained formal independence from the Treasury in its monetary policy stance in 1951 with the Treasury Accord. In particular, the Fed was released from the obligation to fix interest rates on long-term Treasury Bills at 4%, which it had become convinced was the cause of post-World War II inflations in the US. The final text of the Accord makes explicit reference to debt monetisation: ‘The Treasury and the Federal Reserve system have reached full accord with respect to debt management and monetary policies to be pursued in furthering their common purpose to assure the successful financing of the Government’s requirements and, at the same time, to minimise monetisation of the public debt’ (US Congress, 1952: pt 1:74). The Accord was one of the earliest examples of formal post-war central bank independence and marked an important turning point in US monetary policy. (Stein 1969; Eichengreen and Garber 1991).¹⁷

Meanwhile, the RFC became a victim of politics with Congressional Republicans turning against the organisation, which was seen as excessively centralising and inefficient (Todd 1992). Its formal operations ceased in 1953. However, some of its operations survived as independent new agencies, such as the Export-Import Bank and the Federal National Mortgage Association.

4.2 Direct monetary financing: (a) monetisation of debt

In contrast to episodes of so called ‘financial repression’ or implicit and explicit government financing via secondary market purchases, the purchase of newly issued state securities directly from governments (or government-owned subsidiaries) has historically involved

¹⁷ For a detailed narrative account of the negotiations leading to the Accord, see Hetzel and Leach (2001).

direct collaboration between central banks and governments. This is often seen as running counter to the notion of central bank independence, although independent central banks can voluntarily cooperate with governments as a means of not losing or *appearing* not to lose independence (Forder 1998). Under such a scenario, governments are in a position to plan and then make investments that would otherwise depend upon the willingness of private capital markets and hence carry greater uncertainty as well as risk in terms of future interest rates.

Direct monetary financing case study: the Japanese regime of Korekiyo Takahasi (1931-1937)

One of the most successful examples of direct debt monetisation was the Takahasi government in Japan in the 1930s. Following the abandonment of the Gold Standard in 1931 and the resulting devaluation of the yen, the Takahasi administration embarked on a massive fiscal expansion that reflated the economy out of the Great Depression. The expansion was largely funded via central bank money creation. In November 1932 the government began to sell entire issues of its deficit bonds directly to the Bank of Japan rather than private institutions. Inflation and excess liquidity were then controlled by the Bank of Japan selling government bonds onto the open market (Metzler 2006: 250; Nakamura 1997: 132).

Central government spending rose from ¥1,42 billion (10.7% of GNP) in 1931 to ¥2.25 billion (14.7% of GNP) in 1933, a level at which it remained fixed, expanding the deficit from a 0.1% of GDP surplus to a 6.1% deficit (Cha 2003: 137). Although widely associated with an expansion in military spending leading up to World War II, in fact the majority of funds spent by Takahasi went on non-military spending. Cha (2003: 137) records that:

‘The rate of dependence of heavy and chemical industrial output on military demand was at its maximum in 1933 at 9.8% and then declined to 7% in 1936. For the machinery industry, this rate peaked in 1932 at 28% but fell to 18% in 1936. Even though the political clout of the military grew stronger, the influence of military spending on the economy was not all that great.’

There was a major expansion in public infrastructure investment, particularly public works for rural areas and villages (Nakamura 1997: 135). Japan’s industrial policy was intensified with a significant growth of domestic industry and infant industry protectionism, and the emergence of some sectors with goods approaching world standards (such as electrical machinery and machine tools) and others becoming highly competitive internationally (Nakamura 1997).

By 1933 Japan had emerged from the Great Depression and there was no significant inflation; by 1934 it was moving out of trade deficit into surplus. Inflation began to build up in 1935 and Takahashi reduced government spending, especially military spending, to rein it in and sterilised his previous budget deficits by selling bonds back into the open market. His attempt to reduce military expenditures led to a conspiracy against him and he was assassinated by a group of army officers in February 1936. The policies of Takahashi’s successor gave the army a free hand in budget spending and by early 1937 there was a balance of payments and inflation crisis (Cha 2003: 138).

In a comprehensive empirical study of the period, using structural vector autoregression analysis of monthly data, Cha (2003) analyses six different structural shocks to establish the cause of Japan’s early and rapid recovery from the Great Depression, including proxies for international, wage, fiscal and domestic components,¹⁸ and found that Japan benefited

¹⁸ The variables used were the real effective exchange rate, real deficits of the Japanese government, high-powered money supplied by the bank of Japan, the volume of railway freight (as an index of the aggregate activity) and real wages (Joyce et al. 2012).

significantly from its devaluation from 1931-32, but that this effect had worn off by 1933 as other countries abandoned the Gold Standard. The pace of the recovery was maintained by Takahashi's fiscal expansion starting from late 1932 and ending in late 1935. Cha concludes that: 'Other shocks mattered little in the Japanese recovery from the Great Depression. Overall Takahashi's fiscal expansion stands out as the single most important cause of the upswing' (Cha, 2003).

Direct monetary financing (b): 'advances' to government by central banks

The provision of short-term liquidity – or 'public overdraft' facilities – to governments in terms of day-to-day spending has long been an accepted role of central banks and is still widely practised today, again with the exception of the EU member states. However, limits are usually placed on the quantity and maturity of such loans (Jácome et al. 2012). The incidence of larger and more long-term 'advances' outside wartime is more limited. One example from the Depression era is that of the New Zealand Reserve Bank.

Case Study: central bank public works investment in New Zealand, 1935–1939

In 1934 New Zealand (still a British colony at the time) established its own (partially privately owned) central bank, the Reserve Bank of New Zealand (RBNZ), with the blessing of the Bank of England. The main objective of the Conservative government of the time was to stabilise the national currency and help reflate the economy following the Great Depression.

In 1935 the incoming Labour government made a number of changes to the form of functioning of the RBNZ in its 1936 Reserve Bank Amendment Act. The Act nationalised the organisation completely, with the state buying out the bank's private shareholders, providing more scope for the bank to extend credit to the government and its agencies, and also adding a power that allowed the Reserve Bank to vary the reserve requirements on trading banks (Wright 2006). By the late 1930s the powers exercised by the government through the RBNZ, were 'the most comprehensive wielded by any monetary authority within the Commonwealth except for Britain' (Singleton 1998: 139).

The incoming finance minister, John Nash, was determined to use the RBNZ as a tool to support the massive fiscal expansion the Labour party thought necessary to shift the economy out of recession and tackle the country's widespread unemployment. This broad remit, going well beyond price stability, saw the Reserve Bank being used to support government spending in the form of direct credit creation as well as bond financing of government deficits (Plumptre 1940). The two most notable uses of this policy were RBNZ being used to guarantee farm prices, with shortfalls between market and guaranteed prices met by its advances, and central bank credit for housing finance.

Nash ordered the Reserve Bank to make advances available as a deliberate test of the effect of 'a limited amount of credit expansion' for the building of state housing (Wright 2009:57). The sum involved was significant at NZ£5 million, around 2% of GDP. The new homes built were mainly for poorer households and targeted New Zealand's most serious slums. Aside from housing, the Reserve Bank supported a range of other infrastructure and public works activities and supported farmers by guaranteeing their exports. In total, in the period from 1936 to 1939, the RBNZ created NZ£30 million of credit to support the government. In the latter two years this was 5% and 7% of GDP and 13% and 17% of commercial bank assets.¹⁹

¹⁹ Source: New Zealand Long Term Data Series, Series E.1.1 Nominal Gross Domestic Product, table G.2.1 (consolidated accounts from a range of sources). Retrieved from http://www.stats.govt.nz/browse_for_stats/economic_indicators/NationalAccounts/long-term-data-series/national-income.aspx; Assets and liabilities of the Reserve Bank of New Zealand, 1934-1939, New Zealand yearbook 1940,

Econometric analysis by Greasley and Oxley (2002) finds that the RBNZ's expansionary credit policy was a key feature in reflation of the domestic economy and enabling the country to grow more rapidly out of the 1930s depression than many other countries. Over the four-year period from when the bank commenced its credit creation policies, real GDP increased by 30%, with 15% growth in 1936 and 1937 alone (Rankin 1992). The study carries out a counterfactual exercise and estimates that had the old, sterling-backed regime survived, New Zealand's GDP per capita in 1938 would have been around one third lower (ibid: 718).

Direct monetary financing (c): private bank lending to government

A third version of monetary financing is for governments to borrow directly from private banks in much the same way that households and businesses do today. Given that sovereign states with their own currencies and central banks do not, in practice, default (as central banks can create currency *ex nihilo*), governments should be in a position to issue long-term loan contracts at very low rates of interest; alternatively, states could simply force private banks to accept the loan issued at a maturity and rate of the government's choosing.

During and post-World War II a number of governments engaged in this practice, including the US, where the practice was effectively ended by the Federal Reserve Accord of 1951; Canada (Ryan-Collins 2015, 2017); and the UK. In the UK, the Treasury, following Keynes' advice, forced banks to buy Treasury Deposit Receipts (TDRs) at 1.125% interest to help finance World War II (Howson 1985: 252-253). TDRs were valid for six months but paid 0.125% higher interest than the Treasury Bills at the time (Tily 2007: 205). As they were non-marketable, they prevented banks from using them to expand their balance sheets by trading them for T-bills or cash (Tily 2007: 205).

Canada followed the UK's example. From 1941-1943, the Canadian Government borrowed \$1,165 million directly from the Canadian chartered banks, of which \$715million were illiquid deposit certificates issued at three-eighths of 1% (Neufeld 1958: 133).²⁰ The central bank accommodated such purchases and maintained a low yield on government debt (2.2%) by providing the chartered banks with sufficient liquidity to enable them to maintain their preferred cash ratio of 10% (ibid 134). This policy continued in 1944 when it reduced bank rate and provided the banks with 'more reserves than they had ever had before' (Neufeld 1958: 138) As a result, the chartered banks bought huge quantities of government securities and ensured easy money conditions for the government and general public.²¹

Commercial bank monetary financing has the advantage not only of expanding aggregate purchasing power in comparison to bond-financing, but also has the secondary benefit of improving private banks' balance sheets in times of financial volatility, given that governments are generally considered to be the safest possible borrower.²² For example, loans to governments would be classified as the highest class of risk-weighted asset under current Basel III risk-weightings, so helping banks meet higher capital adequacy ratios. Werner (2014) has proposed that Eurozone governments should issue non-tradeable loan contracts at fixed interest rates to be purchased by domestic banks as a means of raising debt that would not be subject to speculative attacks and increased sovereign risk, in contrast to national

p68. Retrieved from:

http://www3.stats.govt.nz/New_Zealand_Official_Yearbooks/1940/NZOYB_%201940.html#idsect1_1_214423

²⁰For a discussion, see Ascah (1999: 108-111) who notes the initial resistance of the chartered banks to the low rate of interest they would earn.

²¹ See Mcivor (1958: 165-201) for a detailed account of the role of the Bank of Canada in financing the war, including statistical tables.

²² This will not be the case under currency zones such as the Eurozone where sovereign debt still carries default risk in way in which it doesn't in states with sovereign central banks and currencies.

bonds. Unlike central bank financing of government debt on the primary market, there are no rules against commercial bank loans to Eurozone governments.

4.3 Devolved monetary financing: central bank and commercial bank financing of public development banks

Although public and development banks are commonplace today, very few of them are funded by central banks or have the power to autonomously create credit in the way commercial banks do.²³ Rather, their initial capital normally comes from ministries of finance and their lending is limited by the funds they can raise via bond issuance on capital markets. Many development banks also intermediate and leverage existing savings, grants or loans from international organisations, for example the World Bank. They might thus better be described as ‘funds’ than banks. This is not to say they do not have important economic impacts. For example, the German *Kreditanstalt für Wiederaufbau* (KfW), which has assets of half a trillion euro, is roughly twice the size of the World Bank.

The Chinese Development Bank (CDB) is an interesting exception here. When the bank was founded in 1994, the Chinese Central Bank (People’s Bank of China – PBoC) forced other Chinese financial institutions to buy CDB bonds. This meant that whenever the CDB attempted to expand its business other commercial banks had to buy more CDB bonds. As the quantity of non-performing loans on the CDB’s balance sheet grew, however, the commercial banks demanded a higher interest rate and eventually this compulsory arrangement was withdrawn (Macfarlane and Mazzucato 2018: 55). Today the CDB raises the majority of its finance on bond markets. However, it has also received direct central bank financing in recent years. In 2014 the People’s Bank of China began lending directly to the CDB under an initiative called ‘pledged supplementary lending’ (PSL), which was designed as a new channel to inject liquidity into the economy and increase the money supply (Wildau 2015). Under PSL, the PBoC provides long-term loans to the CDB in order to support loans to sectors that struggle to obtain credit, including agriculture, small businesses and shantytown redevelopment.

Historically, however, central banks have often played an important role in the economic and industrial development of economies and this has included the setting up and capitalising of state investment banks (SIBs), as the example of Canada, below, demonstrates.

Case study: the Industrial Development Bank of Canada

The Bank of Canada, created in 1935, set up the Industrial Development Bank of Canada (IDB) in 1944 as a subsidiary institution with a specific remit to support the small- and medium-sized enterprise (SME) sector in Canada. It was one of the first ever development banks and became one of the largest and most successful (Business Development Bank of Canada 2014). The important role of the central bank and monetary policy in the IDB’s creation is made clear in the preamble to the Parliamentary Act which saw the IDB come into force, with the purpose of the bank:

‘...to promote the economic welfare of Canada by increasing the effectiveness of monetary action through ensuring the availability of credit to industrial enterprises which may reasonably be expected to prove successful if a high level of national income and employment is maintained, by supplementing the activities of other

²³ See Macfarlane and Mazzucato (2018) for a recent review of nine major state investment banks and their funding sources. The study finds that only the Chinese Development Bank is directly supported by central bank financing.

lenders and by providing capital assistance to industry with particular consideration to the financing problems of smaller enterprises' (Canadian Parliament 1945: 383, quoted in Clark 1985: 21).

There were concerns in the Canadian parliament that the IDB would create a conflict of interest for the central bank which was also charged with regulating the country's economy. However, the then deputy minister of finance did not see this as a concern, arguing that the link between the two banks would be beneficial to the central bank. It would have 'more intimate contact... with the conditions and the problems of small- and medium-sized industries'. Further, 'the operations of the IDB will naturally have to dovetail into the country's monetary policy' and a corporate link between the two banks would make this easier (House of Commons 1944: 1441-3, in Clark 1985: 21).

Despite gloomy forecasts that IDB would help only bankrupts and 'lame duck' businesses, in its 31 years it authorised 65,000 loans, totalling \$3 billion, for 48,000 businesses. Well over 90% were successful in establishing themselves and retiring their IDB loans, and it was estimated that they employed close to 900,000 people (Clark 1985: 7) Most of the bank's borrowers were small, with the average loan \$47,000, and 48% of the loans authorised were for \$25,000 or less (ibid.). The volume of loans made by the IDB stayed relatively stable throughout this period even as economic conditions fluctuated (ibid: 6). The IDB's importance to the commercial sector grew throughout the 1950s and 1960s, and during its last ten years the bank provided the equivalent of 25% of total domestic bank lending to the private non-financial sector.

The IDB was entirely funded via money creation by the Bank of Canada during its 31-year existence. It was initially funded by the purchase of \$25 million equity stock by the Bank of Canada. By end of 1947, all \$25 million of stock had been taken down, leaving the IDB with significant surplus funds which were invested in government securities. By 1951 virtually all equity funds had been used up in the IDB's loans. It made a number of further sales of bonds to the Bank of Canada to maintain its capital at the same rate as Canadian government three-year bonds. In the early 1970s the federal government recommended that the IDB's link with the Bank of Canada be severed and a separate Crown corporation, owned and funded directly by the federal government, be created.

5. Conclusion

The consensus view in macroeconomic theory is that economic welfare will be maximised via the institutionalisation of a separation between fiscal and monetary policy. The monetary financing of government deficits is viewed as posing serious threats to price stability, allocative efficiency and sustainable economic growth. Despite this, in the post-financial crisis period, central banks have embarked on very large government debt purchase programmes with clear fiscal impacts, raising questions about central bank independence. A number of economists have argued that central banks' QE policies would be effective at stimulating demand if they committed to permanently monetising a proportion of their asset purchases: the so-called helicopter drop. Monetisation would lead to an increase in nominal demand as agents would not be affected by the Ricardian equivalence problem of expecting future tax rises, as would be the case with bond financing. Since central banks with sovereign currencies cannot default, the choice of whether to monetise becomes essentially a political-economy question.

However, there has been scarcely any discussion of the historical realities of past occurrences of fiscal-monetary policy coordination and monetary financing. This is somewhat surprising, given that for the 30 years that followed World War II, on average, across advanced economies, almost half of government debt was held by monetary institutions, including

central banks. In this paper we introduced a typology for understanding different forms of monetary financing. We identified three main categories: indirect monetary financing aimed at public debt reduction (often dependent on a degree of cooperation between the central bank and the treasury); direct monetary financing aimed at meeting specific economic goals such as industrial development, reconstruction or the fighting of wars; and thirdly ‘devolved’ monetary financing whereby the central bank plays a role in financing a public corporation with fiscal objectives, often a state development bank.

Keynes (1933: 23), keen for depression-era governments to boost demand through direct ‘loan expenditure’ (his term for monetary financing), rued that ‘Hitherto war has been the only object of government loan expenditure on a large scale which governments have considered respectable.’ Our examination of historical trends and case studies suggest that monetary financing was an effective tool in supporting standard macroeconomics policy goals such as nominal GDP growth and industrial policy without excessive inflation. Monetary accommodation was an important feature of large-scale public capital expansion at times of crisis and more routinely. Central banks supported government spending without adding to the net level of public debt via direct lending to governments or debt monetisation policies. They also enlisted the private banking system to lend to the government at low or effectively negative rates of interest – another form of debt monetisation.

None of this is to deny that under certain other conditions it is possible that monetary financing will lead to inflation. However, our evidence suggests the reasons for this may not be those suggested by the rational expectations models featured in New Consensus economic theory which have an overly deterministic view of the relationship between monetary financing and inflation and rest on a faulty understanding of the role of commercial bank credit creation. Weak governance and tax-raising powers, corruption and war, loss of control over exchange rates or bottlenecks where the economy is at full capacity may be stronger candidates to explain extended periods of inflation or hyperinflation.

Despite these findings, in most advanced economies today there are legal and constitutional impediments to governments considering borrowing directly from central banks for extended periods. The rationale for this should perhaps be scrutinised as part of the wider re-examination of monetary and macroeconomic policy that now appears to be under way in the post-crisis period, when central banks have been unable to stimulate aggregate demand or inflation using adjustments to interest rates (Lavoie 2014; Turner 2015; Borio et al. 2018).

In the shorter term, however, governments could consider debt monetisation via borrowing directly from private banks at below market interest rates, for which there are no legal or constitutional barriers (Werner 2014). Monetary financing may provide greater fiscal autonomy to governments, not least in the Eurozone, whose debt may be subject to speculative attacks and/or who find it increasingly challenging to increase deficits or raise taxes from a political economy perspective.

Overall, our review also suggests that monetary financing may be most effective in supporting growth alongside directed and expansionary fiscal policy. Debates focused narrowly on Ricardian equivalence as a justification for helicopter money-type approaches largely neglect the demand side role that fiscal policy can take and which is illustrated in our historical case studies. Instead, empirical and historical research into the historical and institutional relationship between monetary financing and fiscal policy looks to be a fruitful avenue for further investigation.

References

- Abbas, S.A., Blattner, L., De Broeck, M., El-Ganainy, M.A. and Hu, M. (2014), *Sovereign debt composition in advanced economies: a historical perspective*, Washington: International Monetary Fund.
- Alesina, A. (1988), 'Macroeconomics and politics', *NBER Macroeconomics Annual*, Massachusetts: MIT Press, pp. 13-62.
- Alesina, A. and Summers, L.H. (1993), 'Central bank independence and macroeconomic performance: some comparative evidence', *Journal of Money, Credit and Banking*, Vol. 25, No. 2, pp. 151-162.
- Arestis, P. and Sawyer, M. (2008), 'A critical reconsideration of the foundations of monetary policy in the new consensus macroeconomics framework', *Cambridge Journal of Economics*, Vol. 32, No. 5, pp. 761-779.
- Arestis, P. and Sawyer, M.C. (2002), 'Can monetary policy affect the real economy?', *Levy Economics Institute of Bard College Working Paper*, No. 355.
- Ascah, R.L. (1999), *Politics and public debt: the Dominion, the banks and Alberta's Social Credit*, Alberta: University of Alberta.
- BIS (2014), '84th Annual Report: 1 April 2013-31 March 2014', Basel: Bank of International Settlements.
- Baldwin, R. (2016), *Helicopter money: Views of leading economists*. Available: <http://voxeu.org/article/helicopter-money-views-leading-economists> [accessed 13 April 2016].
- Barnhart, S.W. and Darrat, A.F. (1988), 'Budget deficits, money growth and causality: Further OECD evidence', *Journal of International Money and Finance*, Vol. 7, No. 2, pp. 231-242.
- Barro, R.J. (1989), 'The Ricardian approach to budget deficits', *Journal of Economic Perspectives*, Vol. 3, No. 2, pp. 37-54.
- Barrow, R., Sala-i-Martin, X., (2004), *Economic Growth*, Cambridge, MA: MIT Press.
- Bernanke, B. (2003a), 'A perspective on inflation targeting: why it seems to work', *Business Economics*, Vol. 38, No. 3, pp. 7-16.
- Bernanke, B.S. (2003b), 'Some Thoughts on Monetary Policy in Japan: Paper presented at the Japan Society of Macroeconomics, May 31st 2003', Tokyo, Japan.
- Bernanke, B.S., Gertler, M. and Gilchrist, S. (1999), 'The financial accelerator in a quantitative business cycle framework', in Taylor, J. and Woodford, M. (eds.), *Handbook of macroeconomics, vol 1*, Holland: Elsevier, pp. 1341-1393.
- Bernanke, B.S. and Mishkin, F.S. (1997), 'Inflation targeting: a new framework for monetary policy', *NBER Working Paper Series*, No. 5893.
- Bezemer, D., Grydaki, M. and Zhang, L. (2016), 'More Mortgages, Lower Growth?', *Economic Inquiry*, Vol. 54, No. 1, pp. 652-674.
- Bjerg, O., Mccann, D., Macfarlane, L., Nielsen, R.H. and Ryan-Collins, J. (2017), 'Seigniorage in the 21st Century: A study of the profits from money creation in the United Kingdom and Denmark', *SSRN Electronic Journal*.
- Blanchard, O. and Galí, J. (2007), 'Real wage rigidities and the New Keynesian model', *Journal of money, credit and banking*, Vol. 39, pp. 35-65.
- Blinder, A.S. (1999), *Central banking in theory and practice*, Massachusetts: MIT Press.
- Borio, C. (2017), 'Through the looking glass: OMFIF City Lecture, September 22nd, 2017', Basel: Bank of International Settlements.
- Borio, C., Disyatat, P. and Zabai, A. (2016), 'Helicopter money: The illusion of a free lunch', *VoxEU.org*, Vol. 24.
- Borio, C.E., Disyatat, P., Juselius, M. and Rungcharoenkitkul, P. (2018), 'Monetary policy in the grip of a pincer movement', *Bank of International Settlements Working Paper*, No. 706.
- Buchanan, J.M. and Wagner, R.E. (1977), *Democracy in deficit*, New York: Academic Press.

- Buiter, W.H. (2003), 'Helicopter money: irredeemable fiat money and the liquidity trap', *NBER Working Paper Series*, No. 10163.
- Buiter, W.H. (2008), 'Can central banks go broke?', *CEPR Discussion papers*, No. 6827.
- Business Development Bank of Canada (2014), 'History: 1965-1974', No. May 24 2014. Available:
http://www.bdc.ca/EN/about/overview/history/Pages/diversification_years.aspx.
- Cagan, P. (1956), 'The Monetary Dynamics of Hyperinflation', in Friedman, M. (ed.) *Studies in the Quantity Theory of Money*, Chicago: University of Chicago Press.
- Canadian Parliament (1945), 'White Paper on Employment and income with special reference to the initial period of reconstruction', *Federal Reserve Bulletin*, No. June, pp. 536-549.
- Catao, L.a.V. and Terrones, M.E. (2005), 'Fiscal deficits and inflation', *Journal of Monetary Economics*, Vol. 52, No. 3, pp. 529-554.
- Cha, M.S. (2003), 'Did Takahashi Korekiyo rescue Japan from the great depression?', *The Journal of Economic History*, Vol. 63, No. 01, pp. 127-144.
- Chirinko, R.S. (1993), 'Business fixed investment spending: Modeling strategies, empirical results, and policy implications', *Journal of Economic literature*, Vol. 31, No. 4, pp. 1875-1911.
- Clark, E.R. (1985), *The IDB: A History of Canada's Industrial Development Bank*, Toronto: University of Toronto Press.
- Cobham, D. (2012), 'The past, present, and future of central banking', *Oxford Review of Economic Policy*, Vol. 28, No. 4, pp. 729-749.
- Constancio, V. (2017), 'Remarks by Vitor Constancio at the 2nd ECB Macroeconomic Policy and Research Conference, 11 May 2017', Frankfurt am Main: European Central Bank.
- Crowe, C. and Meade, E.E. (2007), 'The evolution of central bank governance around the world', *The Journal of Economic Perspectives*, Vol. 21, No. 4, pp. 69-90.
- Cukierman, A. (2006), 'Central bank independence and monetary policymaking institutions: past, present and future', *Central Bank of Chile working papers*, No. 360.
- Cukierman, A., Web, S.B. and Neyapti, B. (1992), 'Measuring the independence of central banks and its effect on policy outcomes', *The World Bank Economic Review*, Vol. 6, No. 3, pp. 353-398.
- Davidson, P. (1972), 'Money and the real world', *The Economic Journal*, Vol. 82, No. 325, pp. 101-115.
- Deleidi, M. and Mazzucato, M. (2018), 'Putting Austerity to Bed: Technical progress, aggregate demand and the supermultiplier', *Institute for Innovation and Public Purpose working paper*, Vol. 2018, No. 02.
- Demopoulos, G.D., Katsimbris, G.M. and Miller, S.M. (1987), 'Monetary policy and central-bank financing of government budget deficits: a cross-country comparison', *European Economic Review*, Vol. 31, No. 5, pp. 1023-1050.
- Dornbusch, R. and Fischer, S. (1981), 'Budget deficits and inflation', in Flanders, M.J. and Razin, A. (eds.), *Development in an Inflationary World*, New York: Academic Press.
- Dow, S. (2017), 'Central banking in the twenty-first century', *Cambridge Journal of Economics*, Vol. 41, No. 6, pp. 1539-1557.
- Eggertsson, G.B. and Krugman, P. (2012), 'Debt, deleveraging, and the liquidity trap: A Fisher-Minsky-Koo approach', *The Quarterly Journal of Economics*, Vol. 127, No. 3, pp. 1469-1513.
- Eichengreen, B. and Garber, P.M. (1991), 'Before the Accord: US Monetary-Financial Policy, 1945-51', in Hubbard, R.G. (ed.), *Financial markets and financial crises*, Chicago: University of Chicago Press, pp. 175-206.
- Eichengreen, B.J. (1998), *Globalizing capital: a history of the international monetary system*, Princeton: Princeton University Press.
- Epstein, G. (2006), 'Central banks as agents of economic development', research paper, *UNU-WIDER*, No. 2006/54.

- Epstein, G.A. and Schor, J.B. (1991), 'Macropolicy in the rise and fall of the golden age', in Stephen A. Marglin and Schor, J.B. (eds.), *The Golden Age of Capitalism: Reinterpreting the Postwar Experience*, Oxford: Oxford University Press.
- Federal Reserve Bank of New York (1932), *New York Federal Reserve Bank Monthly Review*, April 1932, available online at <https://fraser.stlouisfed.org/title/1170#2628>
- Financial Times (2017), 'Central banks hold a fifth of their governments' debt', 5 March 2017.
- Fischer, S., Sahay, R. and Végh, C.A. (2002), 'Modern hyper-and high inflations', *Journal of Economic Literature*, Vol. 40, No. 3, pp. 837-880.
- Fontana, G. and Realfonzo, R. (2005), *The Monetary Theory of Production: tradition and perspectives*, London: Palgrave.
- Forder, J. (1998), 'Central bank independence – conceptual clarifications and interim assessment', *Oxford Economic Papers*, Vol. 50, No. 3, pp. 307-334.
- Freeman, R. (2006), 'How Roosevelt's RFC Revived Economic Growth, 1933-45', *EIR Economics*.
- Frieden, J.A. (2006), *Global capitalism: Its fall and rise in the twentieth century*, New York: WW Norton.
- Friedman, M. (1948), 'A monetary and fiscal framework for economic stability', *The American Economic Review*, Vol. 38, No. 3, pp. 245-264.
- Friedman, M. (1968), 'The Role of Monetary Policy', *The American Economic Review*, Vol. 58, No. 1.
- Fry, M.J. (1980), 'Saving, investment, growth and the cost of financial repression', *World Development*, Vol. 8, No. 4, pp. 317-327.
- Goodhart, C. (2010), 'The changing role of central banks', *BIS Working Paper*, No. 326.
- Goodhart, C. and Ashworth, J. (2012), 'QE: a successful start may be running into diminishing returns', *Oxford Review of Economic Policy*, Vol. 28, No. 4, pp. 640-670.
- Gordon, R. (1997), 'The time-varying NAIRU and its implications for economic policy', *The Journal of Economic Perspectives*, Vol. 11, No. 1.
- Graziani, A. (2003), *The monetary theory of production*, Cambridge: Cambridge University Press
- Greasley, D. and Oxley, L. (2002), 'Regime shift and fast recovery on the periphery: New Zealand in the 1930s', *The Economic History Review*, Vol. 55, No. 4, pp. 697-720.
- Grilli, V., Masciandaro, D. and Tabellini, G. (1991), 'Political and monetary institutions and public financial policies in the industrial countries', *Economic policy*, Vol. 13, No. 341, p. 92.
- Hanke, S.H. and Krus, N. (2013), 'World Hyperinflations', in Randall Parker and Whaples, R. (eds.), *The Handbook of Major Events in Economic History*, London & New York: Routledge.
- Hervey, J.L. (1990), 'Changing US trade patterns', *Economic Perspectives: Federal Reserve Bank of Chicago*.
- Hetzl, R.L. and Leach, R.F. (2001), 'The Treasury-Fed Accord: a new narrative account', *Economic Quarterly-Federal Reserve Bank of Richmond*, Vol. 87, No. 1, pp. 33-56.
- House of Commons (1944), *Debates of the House of Commons: Canadian House of Parliament*.
- Howson, S. (1985), 'Cheap Money and Debt Management, 1932-51', in Cottrell, P.L. and Moggridge, D.E. (eds.), *Money and Power: Essays in Honor of L. S. Pressnell*, London: Macmillan.
- Jácome, L.I., Matamoros-Indorf, M., Sharma, M. and Townsend, S.B. (2012), 'Central Bank Credit to the Government: What Can We Learn from International Practices?', *IMF Working Papers*, Vol. 12, No. 16.
- Jazbec, B. (2017), 'Opening remarks', in Jazbec, B. and Banerjee, B. (eds.), *Rethinking monetary-fiscal policy coordination; proceedings of a seminar jointly organised by the Bank of Slovenia and the International Monetary Fund*, Ljubljana, Slovenia: Bank of Slovenia and the International Monetary Fund.

- Johnson, D.R. (1990), 'Co-integration, Error Correction, and Purchasing Power Parity between Canada and the United States', *Canadian Journal of Economics*, Vol. 23, No. 4, pp. 839-55.
- Jordà, Ò., Schularick, M. and Taylor, A.M. (2016), 'The great mortgaging: housing finance, crises and business cycles', *Economic Policy*, Vol. 31, No. 85, pp. 107-152.
- Jordà, Ò.S., Moritz, Taylor, Alan. M. (2017), 'Macrofinancial History and the New Business Cycle Facts', in Eichenbaum, M. and Parker, J.A. (eds.), *NBER Macroeconomics Annual 2016*, Chicago: University of Chicago Press.
- Joyce, M., Miles, D., Scott, A. and Vayanos, D. (2012), 'Quantitative Easing and Unconventional Monetary Policy—an Introduction', *The Economic Journal*, Vol. 122, No. 564, pp. F271-F288.
- Keynes, J.M. (1933), *The means to prosperity*, London: Macmillan.
- Keynes, J.M. (1973 [1933]), 'A monetary theory of production', in Moggridge, D.E. and Johnson, E.S. (eds.), *The Collected Writings of John Maynard Keynes*, London: Macmillan, pp. 408-411.
- King, M. (2012), 'Twenty years of inflation targeting: Speech', *Stamp Memorial Lecture*, London School of Economics, London.
- King, R.G. and Plosser, C.I. (1985), 'Money, deficits, and inflation', *Carnegie-Rochester Conference Series on Public Policy*, Vol. 22, pp. 147-195.
- Klomp, J. and De Haan, J. (2010), 'Inflation and Central Bank Independence: A Meta-Regression Analysis', *Journal of Economic Surveys*, Vol. 24, No. 4, pp. 593-621.
- Kydland, F.E. and Prescott, E.C. (1977), 'Rules rather than discretion: The inconsistency of optimal plans', *The Journal of Political Economy*, Vol. 85, No. 3, pp. 473-491.
- La Porta, R., Lopez- De- Silanes, F. and Shleifer, A. (2002), 'Government ownership of banks', *The Journal of Finance*, Vol. 57, No. 1, pp. 265-301.
- Lavoie, M. (2014), *Post-Keynesian economics: new foundations*: Edward Elgar Publishing.
- Lin, H.-Y. and Chu, H.-P. (2013), 'Are fiscal deficits inflationary?', *Journal of International Money and Finance*, Vol. 32, pp. 214-233.
- Lucas, R.E. (1972), 'Expectations and the Neutrality of Money', *Journal of economic theory*, Vol. 4, No. 2, pp. 103-124.
- Macfarlane, L. and Mazzucato, M. (2018), 'State investment banks and patient finance: An international comparison', *IIPP Policy Report*, London: Institute for Innovation and Public Purpose.
- Mazzucato, M. and Wray, L.R. (2015), 'Financing the Capital Development of the Economy: A Keynes-Schumpeter-Minsky Synthesis', *Levy Economics Institute of Bard College Working Paper*, No. 837.
- McCulley, P. and Poszar, Z. (2013), 'Helicopter Money: or how I stopped worrying and love fiscal-monetary cooperation', *Global Society of Fellows*, Vol. 7.
- Mcivor, R.C. (1958), *Canadian monetary, banking, and fiscal development*, Toronto: Macmillan Co. of Canada.
- Metzler, M. (2006), *Lever of Empire: The International Gold Standard and the Crisis of Liberalism in Prewar Japan*, California: University of California Press.
- Minsky, H. (1986), *Stabilizing an Unstable Economy*, New Haven: Yale University Press.
- Minsky, H.P. (1993), 'On the non-neutrality of money', *Federal Reserve Bank of New York Quarterly Review*, Vol. 18, No. 1, pp. 77-82.
- Mishkin, F.S. (1993), *The economics of money, banking, and financial markets*, New York: Harper Collins.
- Moore, B.J. (1983), 'Unpacking the post Keynesian black box: bank lending and the money supply', *Journal of Post Keynesian Economics*, Vol. 5, No. 4, pp. 537-556.
- Muellbauer, J. (2014), 'Combatting Eurozone deflation: QE for the people', *VoxEU.org*: CEPR.
- Nakamura, T. (1997), 'Depression, Recovery and War, 1920–1945', in Yamamura, K. (ed.) *The Economic Emergence of Modern Japan*, Cambridge: Cambridge University Press, pp. 116–158.

- Neufeld, E.P. (1958), *Bank of Canada operations and policy*, Toronto: University of Toronto Press.
- Plumptre, A.F.W. (1940), *Central banking in the British dominions*, Toronto: The University of Toronto press.
- Protopapadakis, A.A. and Siegel, J.J. (1987), 'Are money growth and inflation related to government deficits? Evidence from ten industrialized economies', *Journal of International Money and Finance*, Vol. 6, No. 1, pp. 31-48.
- Rankin, K. (1992), 'New Zealand's Gross National Product: 1859–1939', *Review of Income and Wealth*, Vol. 38, No. 1, pp. 49-69.
- Reichlin, L., Turner, A. and Woodford, M. (2013), 'Helicopter money as a policy option', *VoxEU.org*, No. 21 August 2015. Available: <http://www.voxeu.org/article/helicopter-money-policy-option>.
- Reinhart, C.M. and Sbrancia, M.B. (2011), 'The liquidation of government debt', *NBER Working Paper Series*, No. 16893.
- Roubini, N. and Sala-I-Martin, X. (1995), 'A growth model of inflation, tax evasion, and financial repression', *Journal of Monetary Economics*, Vol. 35, No. 2, pp. 275-301.
- Ryan-Collins, J. (2015), 'Is Monetary Financing Inflationary? A Case Study of the Canadian Economy, 1935–75', *Levy Economics Institute of Bard College Working Paper*, No. 848.
- Ryan-Collins, J. (2017), 'Breaking the taboo: a history of monetary financing Canada, 1930–1975', *The British Journal of Sociology*, Vol. 68, No. 4, pp. 643-669.
- Ryan-Collins, J., Greenham, T., Werner, R. and Jackson, A. (2012), *Where does money come from?: a guide to the UK monetary and banking system, 2nd edition*, London: New Economics Foundation.
- Ryan-Collins, J., Lloyd, T. and Macfarlane, L. (2017), *Rethinking the economics of land and housing*: Zed Books Ltd.
- Sargent, T.J. and Wallace, N. (1981), 'Rational expectations and the dynamics of hyperinflation', *Rational Expectations and Econometrics Practice*, Vol. 2.
- Schumpeter, J.A. (1983 [1911]), *The theory of economic development : an inquiry into profits, capital, credit, interest, and the business cycle*, New Brunswick, N.J.: Transaction Books.
- Seccareccia, M. and Sood, A. (2000), 'Government Debt Monetization and Inflation: A Somewhat Jaundiced View', in Bougraine, H. (ed.) *The Economics of Public Spending: Debts, Deficits and Economic Performance*, Cheltenham, UK: Edward Elgar, pp. 98-121.
- Shapiro, M.D., Blanchard, O.J. and Lovell, M.C. (1986), 'Investment, output, and the cost of capital', *Brookings Papers on Economic Activity*, Vol. 1986, No. 1, pp. 111-164.
- Singleton, J. (1998), 'Anglo-New Zealand financial relations, 1945–61', *Financial History Review*, Vol. 5, No. 02, pp. 139-157.
- Stein, H. (1969), *The Fiscal Revolution in America*, Washington DC: AEI Press.
- Summers, L.H. (2015), 'Demand side secular stagnation', *The American Economic Review*, Vol. 105, No. 5, pp. 60-65.
- Taylor, J. (2009), 'The threat posed by ballooning Federal reserves', *Financial Times*, 23 March 2009.
- Terzi, A. (2014), 'When Good Intentions Pave the Road to Hell: Monetization Fears and Europe's Narrowing Options', *Levy Economics Institute of Bard College Working Paper*, No. 810.
- Thornton, D.L. (1984), 'Monetizing the debt', *Federal Reserve Bank of St. Louis Review*, Vol. 66, No. 10, pp. 30-43.
- Tily, G. (2007), *Keynes betrayed: Keynes's General theory, the rate of interest and Keynesian economics*, New York: Palgrave Macmillan.
- Todd, W.F. (1992), 'History of and rationales for the Reconstruction Finance Corporation', *Federal Reserve Bank of Cleveland Economic Review*, Vol. 28, No. 4, pp. 22-35.
- Turner, A. (2012), 'Credit creation and social optimality', *International Review of Financial Analysis*, Vol. 25, pp. 142-153.

- Turner, A. (2013), 'Debt, Money, and Mephistopheles: How Do We Get Out of this Mess?', *Cass Business School Annual Lecture*, London, 6 February 2013.
- Turner, A. (2014), 'Rethinking the monetization taboo', *Project Syndicate* [Online], No. 18 March 2014, Available: <http://www.project-syndicate.org/commentary/adair-turner-says-that-some-central-banks--particularly-japan-s--will-never-shrink-their-balance-sheets>.
- Turner, A. (2015), 'The case for monetary finance – An essentially political issue: Paper presented at the IMF 16th Jacques Polak Annual Research Conference', Washington DC: International Monetary Fund.
- Turner, A. (2016), *Demystifying monetary finance*. Available: <https://www.ineteconomics.org/perspectives/blog/demystifying-monetary-finance> [accessed 2 August 2018].
- US Congress (1952), *Monetary Policy and the Management of the Public Debt*, Washington, DC: GPO.
- Vernengo, M. (2006), 'Money and inflation', IN, Arestis, P. and Sawyer, M. (eds.), *A handbook of monetary economics*, Cheltenham: Edward Elgar, pp. 471-489.
- Wall Street Journal (2010), 'Open letter to Ben Bernanke', *Wall Street Journal*, 15th November 2015.
- Werner, R.A. (2005), *New paradigm in macroeconomics : solving the riddle of Japanese macroeconomic performance*, Houndmills, Basingstoke: Palgrave Macmillan.
- Werner, R.A. (2014), 'Enhanced Debt Management: Solving the eurozone crisis by linking debt management with fiscal and monetary policy', *Journal of International Money and Finance*, Vol. 49, No. Part B, pp. 443-469.
- Wildau, G. (2015), 'Chinese monetary policy undergoes big shift', *Financial Times*, February 11th 2015.
- Woodford, M. (1995), 'Price-level determinacy without control of a monetary aggregate', *Carnegie-Rochester Conference Series on Public Policy*, Vol. 43, pp. 1-46.
- Woodford, M. (2012), 'Methods of policy accommodation at the interest-rate lower bound: Paper presented at the 'The Changing Policy Landscape: Jackson Hole Symposium', Jackson Hole, 16 September 2012.
- Wright, M. (2006), 'The policy origins of the Reserve Bank of New Zealand', *Australian Economic History Review*, Vol. 11, p. 49.
- Wright, M. (2009), "'Mordacious years": socio-economic aspects and outcomes of New Zealand's experience in the Great Depression', *Editor's note*, p. 43.
- Yellen, J.L. (2017), 'Speech: Inflation, uncertainty and monetary policy', 'Prospects for Growth: Reassessing the Fundamentals', 59th annual meeting of the National Association for Business Economics, Cleveland, Ohio.