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The self-financing state: An institutional analysis of government expenditure, revenue collection and debt issuance operations in the United Kingdom

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Abstract

This paper constitutes a first detailed institutional analysis of the UK Government's expenditure, revenue collection and debt issuance processes. We find, first, that the UK Government creates new money and purchasing power when it undertakes expenditure, rather than spending being financed by taxation from, or debt issuance to, the private sector. The spending process is initiated by the government drawing on a sovereign line of credit from the core legal and accounting structure known as the Consolidated Fund (CF). Under directions from the UK finance ministry, the Bank of England debits the CF's account at the Bank and credits other accounts at the Bank held by government entities; a practice mandated in law. This creates new public deposits which are used to settle spending by government departments into the economy via the commercial banking sector. Parliament, rather than the Treasury or central bank, is the sole authority under which expenditures from the Consolidated Fund arise. Revenue collection, including taxation, involves the reverse process, crediting the CF's account at the Bank. With regard to debt issuance, under the current conditions of excess reserve liquidity, the function of debt issuance is best understood as a way of providing safe assets and a reliable source of collateral to the non-bank private sector, insofar as these are not withdrawn by the state via quantitative easing by the Bank of England. The findings support neo-chartalist accounts of the workings of sovereign currency-issuing nations and provide additional institutional detail regarding the apex of the monetary hierarchy in the UK case. The findings also suggest recent debates in the UK around monetary financing and central bank independence need to be reconsidered given the central role of the Consolidated Fund.

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1. Introduction

There are some people who think we don't have to take all these tough difficult decisions to deal with our debts; they say that our focus on deficit reduction is damaging growth and that what we need to do is to spend more and to borrow more. It's as if they think there is some magic money tree, and let me tell you a plain truth: there isn't.

Rt. Hon. David Cameron, UK Prime Minister (2013)

The Great Financial Crisis (GFC) and COVID-19 pandemic have led to growing interest in the limits to state spending and the sustainability of public debt. Governments in high-income countries have engaged in record peace-time deficit-financed fiscal stimuli to support economies during pandemic-induced lockdowns. These have been matched by similarly sized central bank government bond purchase programmes, leading to new discussions around the risks and benefits of fiscal-monetary coordination, monetary financing and its consequences for central bank independence (Bartsch et al. 2020; Blanchard et al. 2020). Yet the actual mechanics of government expenditure, debt management and its relation to the wider monetary and financial system remain areas of contestation with relatively few scholarly analyses on countries other than the US.¹

In this paper we undertake the first detailed institutional analysis of the UK Government's expenditure, revenue collection and debt issuance processes. The UK Exchequer (the legal and accounting entities which support the UK's spending and revenue activities) is one of the oldest surviving institutions of its type in the world, with the key legislation being formed in the mid-19th century. It therefore merits attention for its resilience and the relative economic success it has bequeathed the country over the past 150 years, as well as the fact that the UK is one of the world's major high-income economies.

The analysis is based on an extensive review of current and historical primary legislation, official publications from public authorities including HM Treasury, the Debt Management Office, Her Majesty's Revenue & Customs (HMRC), the Bank of England (BoE) and other relevant institutions, additional pertinent literature describing the historical evolution of the system, and requests made to the above-mentioned departments under the Freedom of Information (FoI) Act 2000 (Berkeley et al. 2021).²

In contrast to previous accounts of the UK state expenditure process (Hills and Fellowes 1932; Ryan-Collins et al. 2012; Pantelopoulos and Watts 2021), we pay particular attention to the role of the Consolidated Fund (CF) as the core legal and accounting construction from which all expenditure and revenue activity is ultimately initiated. The CF, we find, provides a line of sovereign

¹ On the US see especially Bell (2000), Tymoigne (2014) and Fullwiler (2017).

² Although many of the FoI requests were successful, some were refused under exemptions citing concerns over security or financial stability. Among the authorities contacted, including the Bank of England, the Debt Management Office and HMRC, HM Treasury was the greatest user of exemptions. Full correspondence is available on request.

credit-money to the state itself, backed by the state's power to raise future tax revenues. Government 'spending' should then be understood as a form of money creation. This contrasts with the commonly understood idea that government spending is financed through taxation or borrowing from the private sector or via central bank-initiated money creation. Furthermore, we show that it is the UK Parliament rather than the central bank or ministry of finance that governs the CF and thus authorises spending, with the BoE automatically crediting government accounts when spending takes place.

The account presented broadly aligns with descriptions of the US Federal spending process outlined by scholars in the neo-chartalist or Modern Monetary Theory (MMT) tradition (Bell 2000; Fullwiler 2017; Tymoigne 2014). However, we provide important additional institutional detail regarding the apex of the 'monetary hierarchy' in the UK case. Furthermore, while the neo-chartalist literature emphasises the role of debt management in achieving the central banks' targeted short-term interest rate (Bell 2000; Tymoigne 2014), we find that the main purpose of public bond instruments in the UK today is to support the non-bank private sector's desire for a secure store of value and source of collateral, in particular in repo markets. Public debt issuance is no longer a key instrument for controlling the short-term interest rate since the introduction of interest on central bank reserves in 2006 and given the excess liquidity in the commercial banking system created by the programme of quantitative easing (QE) initiated in 2009. In this light, the UK's current debt management focus on 'fully funding' public expenditures — via either raising taxes or borrowing — appears arbitrary and potentially at odds with the functional purpose of private sector bond purchases. This applies particularly under QE, which has involved removing government bonds from the balance sheets of the non-bank private sector on a massive scale.

Our analysis suggests that four of the main purported constraints on government spending are not valid, namely: lack of money (liquidity risk), default risk, bond market discipline and the necessity to repay debt. In regard to debates around central bank independence, we find that the UK Government's power to spend independently of the central bank's monetary policy position is much less constrained than is commonly thought, given the central role of the CF and the importance of government securities (including indemnities and guarantees) within the monetary and financial system. This undermines — in the UK case at least — critiques of MMT, which argue that the central bank and treasury should not be consolidated for analytical purposes on the grounds of the operational independence often granted to central banks (Lavoie 2013; Palley 2015).

The remainder of this paper is structured as follows. Section 2 examines related literature on the theory and institutional mechanics of government expenditure, revenue collection and debt management in the UK and other countries. Section 3 constitutes the detailed case study of the UK's expenditure and revenue collection process, and Section 4 focusses on the mechanics and modern purpose of public debt issuance. Section 5 discusses the findings in relation to the constraints on government expenditure and central bank independence. Section 6 concludes with reflections on policy implications.

2. The mechanics of state financing: existing literature

This section briefly surveys relevant literature on the phenomena of state money and its relationship to the monetary and financial system.³ We focus first on debates around the sequencing of state spending and whether the state spends before it borrows or taxes, or whether it must raise funds from the private sector via these processes to enable spending. The second, related, debate concerns the role of the central bank vis-à-vis the government in initiating and controlling public money creation, central bank independence and the impact on inflation.

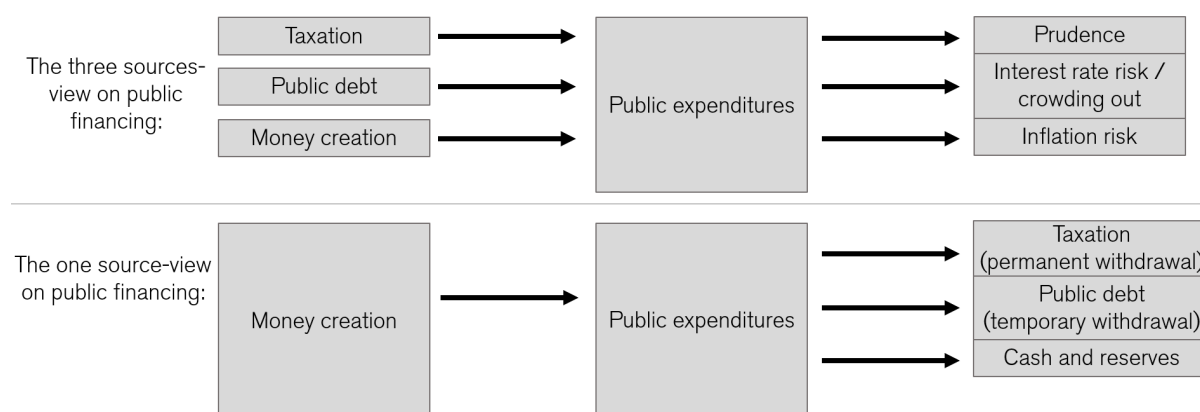
2.1 The mainstream position

In modern mainstream macroeconomic theory, three 'sources of revenue' — taxation, bond issuance and monetary finance — are believed to provide a 'government budget constraint' (GBC) (Chugh 2015; Fischer and Easterly 1990; Fullwiler 2020a; Romer 2019). The central bank is identified as the key public money creating institution rather than the elected government and can finance public spending via balance sheet expansion (described as 'monetary financing' or 'printing money'). Taxation and bond issuance involve withdrawing funds from the private sector and thus maintaining the same quantity of money in circulation, in contrast to monetary financing.

Under the assumption of rational expectations, monetarily financed budget deficits can lead to prolonged high inflation episodes and eventually hyperinflation as rational agents keep reducing their real money balances in favour of non-monetary assets with higher yields, such as government bonds (Kiguel 1989; Sargent and Wallace 1981, 1973). Government bond issuance is believed to 'crowd out' private investments by draining a limited supply of 'loanable funds' and in doing so raising the market interest rate on credit. When the interest rate on government bonds rises above the growth rate of the economy, this will lead to unsustainable rises in public debt, which will eventually require monetary financing (Sargent and Wallace 1981). Ultimately, then, a government faces a budget constraint determined by the ratio of spending to taxation. In Figure 1, this general understanding of the sequencing of public financing is described as the three-source view on public financing.

³ There is an extensive literature on theories of money and the historical development of state money which is beyond the scope of this article. See, *inter alia*, Goodhart (1998), Smithin (2000), Ingham (2004), Wray (2004) and Ryan-Collins et al. (2012) for comprehensive overviews.

Figure 1: The three-sources and one-source views on the public financing process



Source: Authors' illustration

Implicit in this view is the idea that governments face an ex-ante challenge to locate financing for their spending plans. Since monetary finance is the ultimate, though likely inflationary, fallback option, this creates a 'game situation' between the fiscal and monetary authorities about who gets to 'move first' and decide either the total quantity of fiscal spending or the total money supply in a given period (Sargent and Wallace 1981). In situations of 'fiscal dominance', 'The onus is then on the central bank to make the consolidated GBC hold by printing some appropriate quantity of money' (Chugh 2015) in line with the fiscal policy decision.

In contrast, a condition of 'monetary dominance' operates when the central bank is independent of the government and freely able to determine the amount of money in the economy based on its own inflation target. It can force the finance ministry to adapt its spending plans to the GBC by refusing to engage in monetary financing. The regime of monetary dominance has also involved the emergence of 'fiscal policy rules' that formalise the GBC by connecting deficit spending to some total debt-to-GDP or rolling public deficit target, thus avoiding the treasury 'forcing' the central bank to finance monetarily by moving first (Leone 1991). Notably, the EU has attempted to further avoid such an outcome by prohibiting the European central banks from directly financing national government expenditure. Similar forms of prohibition of monetary financing exist in many other countries (Jácome et al. 2012).

In the mainstream consensus that developed before the GFC, the key role of the central bank is to stabilise the macroeconomy by adjusting the interest rate to track the (unobservable) 'real natural rate of interest' — the point at which desired savings align with investment demand (Goodfriend 2007, 63). By following an inflation-targeting monetary policy rule, it is theorised that the central bank can fine-tune the economy towards potential output by stabilising prices, although imperfections may introduce trade-offs between price stability and closing output gaps (Blanchard and Galí 2007).

The past decade of record low interest rates, low inflation and sluggish growth have led to a shift in this macroeconomic consensus. Some economists have argued that economies have entered 'liquidity trap' conditions, whereby the natural rate of interest has turned negative, effectively

rendering monetary policy unable to close output gaps by following rates into negative territory (e.g. Blanchard 2019; Furman and Summers 2020). This justifies more active fiscal policy and larger budget deficits, in particular — it is argued — given very low real rates on government debt.

Furthermore, temporary monetary financing may be appropriate in an inflation-targeting framework and may eventually restore policy space for the central bank by raising the 'natural rate', while avoiding excessively high build-up of public debt or demand-suppressing tax rises. Galí (2020) asserts the COVID-19 crisis is indeed such an 'emergency situation' where the otherwise rejected option of monetary financing is warranted. In a similar vein, Blanchard and Pisani-Ferry (2020) argue that the central bank 'monetisation' of public debt through various asset purchase programmes is 'the right thing' to do, as long as it does not become 'excessive' in the sense that it is motivated by 'public finance sustainability objectives rather than price or macroeconomic stability objectives'. In the UK case, concerns have been raised about whether the COVID-19-related QE programme is a form of implicit monetary financing that may create financing difficulties for the government should interest rates need to rise (Stubbington and Giles 2021; House of Lords 2021). The idea that governments rely on three optional sources funding is thus live and well in pandemic-related economic debates.

2.2 Chartalism and post-Keynesian perspectives

In contrast to the mainstream position outlined above, chartalism principally views money as an abstract and unlimited unit of account defined and issued by a central authority (in modern times, the state) as a liability on itself. The power to define the unit of account derives from the authority's ability to tax in that unit (Innes 1914; Knapp, [1924] 2013; Keynes 1930; Ingham 2004). Taxes then drive demand for the currency rather than raising funds for the state to spend, and currency is a public monopoly designed to extract real resources and services to advance the central authority's public purposes (Knapp, [1924] 2013; Keynes 1930; Mosler 1995; Wray 1998; Bell 2000).

Chartalist scholarship has advanced the concept of a 'hierarchy of money' (Bell 2001; Minsky 2008) to explain the relationship between state money and commercial bank money. Each tier of economic actors uses the IOUs of the higher tiers as settlement balances and creates settlement balances for the lower tiers. The commercial banking tier settles payments with the top IOUs in the country, namely state money or central bank reserves. Non-bank firms and households, in turn, use commercial bank deposits for settlement of payments, and banks create money endogenously in the act of lending to such non-bank entities (Moore 1983; Lavoie 1984; Rochon 1999). The understanding of the non-state tiers of the monetary hierarchy has received considerable attention in the post-GFC period, including from central banks themselves (McLeay et al. 2014; Mehrling 2012; Ryan-Collins et al. 2012; Werner 2014; Deutsche Bundesbank 2017). However, the apex of the hierarchy has received less attention and is still disputed territory (Lavoie 2013; Palley 2015; Cesaratto 2016), motivating our study of UK expenditure and state money.

From a logical point of view, since the state is the monopoly issuer of the country's currency, the means to pay taxes and purchase bonds must either be spent or lent into existence by the

government before taxes can be paid or bonds purchased (Wray 1998). The chartalist perspective is therefore represented in Figure 1 as the one source-view on public financing. The three 'sources' of finance in the GBC literature are instead viewed as possible subsequent uses for the money created in the act of spending. Relatedly, bonds are not issued by governments to obtain the funds needed for spending, but to influence private credit conditions via interest rates (Lerner 1943; Wray 1998). While the private sector ends up holding public bonds as a consequence of fiscal deficits, it does not provide governments with the means of payment. Bond issuance is instead a monetary policy tool that assists the central bank's liquidity management to implement its monetary policy interest rate target (Tymoigne 2016; Fullwiler 2020). This distinction can, in the circuitist approach, be framed as 'initial finance' vs. 'final finance' or 'financing' vs. 'funding' (Tymoigne 2014, 643).

Modern monetary systems have typically operated under 'corridor'-type systems of reserve management where the interbank overnight interest rate is floating between the central bank's two standing facilities: the lending rate as ceiling and interest paid on reserves as floor. When the government spends or central banks acquire bonds by issuing reserves, commercial banks experience a rise in their reserve balances which lowers the interest rate in the interbank market; issuing bonds does the opposite by draining such liquidity. Bell (2000; see also Bell and Wray 2002) analyse the 'reserve effects' of government spending in the US financial system. Bell (2000, 617) concludes that:

...all government spending is financed by the direct creation of high-powered money; bond sales and taxation are merely alternative means by which to drain reserves/destroy high-powered money. The debate over alternative "financing" methods, then, should really be a debate over the alternative methods for draining reserves (taxes vs. bond sales) in order to prevent the overnight lending rate from falling to zero.

The chartalist view therefore rejects the 'natural rate' of interest hypothesis. Rather than seeing the official or short-term rate as an objective, equilibrating economic phenomenon, it is viewed as a policy variable for countries that issue debt denominated in their own free-floating currency. The natural rate is better understood as zero since this is the 'base case' of the prevailing interest rate in the absence of policy interference in the monetary system via the issuance of alternative government debt instruments or interest paid on reserves (Forstater and Mosler 2005). It may be preferable to instead allow the market to factor in risk to determine subsequent credit spreads. Doing so may stimulate investment, reduce inequitable transfers across the income groups, minimise financial rents and prevent policy-induced financial fragility by reducing private debt relative to income (Mosler 2004). However, it may be advisable to issue short-term bonds to maintain the possibility for non-banks to hold the government's debt securities as safe assets. Moreover, since the interest rate can always be set below the economy's growth rate, the concerns over debt sustainability in terms of interest payments that have replaced concerns over arbitrary public deficit and debt thresholds in mainstream circles in recent years (e.g. Blanchard 2019;

Furman and Summers 2020) are unfounded (with the exception of countries using fixed exchange rates or with debt in foreign currency where there exists default risk) (Fullwiler 2020). Furthermore, one can consolidate the balances of the central bank and the rest of the government as a 'theoretical simplification that makes sense once one understands the logic of the interrelations between the central bank and the Treasury, and between the government and non-government' (Tymoigne and Wray 2015, 29). The implication of the consolidation is that the government's account at the central bank and the central bank's holding of government securities both disappear, and this renders the central bank reserves and government securities held by the private sector as simply alternative monetary instruments issued by a single central authority.

Some post-Keynesian economists have criticised the consolidated government balance sheet view for not being descriptively realistic given the operational independence commonly granted to monetary policy authorities by governments from the late 1980s and 1990s, including prohibitions on direct monetary financing (Fiebiger 2012; Lavoie 2013; Palley 2015). Notably, Lavoie (2013, 1) argues that the neo-chartalist proposition that the state finances itself in the act of spending depends on the 'counter-factual' consolidated view of the central bank being an integral part of government. Likewise, Palley (2015, 4-5) states that the consolidation hypothesis is dependent on the willingness of the central bank 'to provide the government with the initial money balances to finance its spending.' Therefore, it is argued that governments can 'in principle, finance spending by printing money' but this 'requires a particular institutional arrangement between the fiscal authority and the central bank' (ibid). As such, the consolidation hypothesis is viewed as a normative prescription rather than institutionally valid proposition; a prescription Palley does not share as independent central banks 'must sometimes... take away the punchbowl in the middle of the party' (ibid).⁴

A number of neo-chartalist scholars have examined how monetary institutions have found ways to bypass self-imposed constraints on central bank financing of government spending. Tymoigne (2014, 652-656) documents how the US Treasury issues bonds to selected private financial institutions, the 'primary dealers', which are obligated to place bids in all bond auctions at a reasonable price. Meanwhile, the central bank stands ready to either lend to the primary dealers or supply more funds to the interbank market to offset the draining effects of bond sales. If the central bank does not participate in this way, it would create significant disruptions in the money markets and prevent the passing of budgets through Congress (Tymoigne 2016, 1323-24).

Felipe and Fullwiler (2021) review monetary operations in the Philippines, Singapore and the People's Republic of China during the bond market stress engendered by COVID-19 in March 2020. The Philippine central bank both smoothed market liquidity conditions for bond issuance and provided direct finance to the treasury via credit and advanced dividends. Singapore's fixed exchange rate against a basket of currencies does not alter the fundamentals of liquidity management and its implications for indirect central bank financing. It merely means that the target interest rate is continuously set according to the conditions in the foreign exchange market. Moreover, the apparent funding via returns on public foreign investment 'may provide the legal

⁴ See also Tymoigne and Wray (2015) and Cesarotto (2016) for further details on this debate.

authority for the government to spend, but the operational reality is the spending is “funded” when [the central bank] credits the government’s account as the law requires it to do’ (ibid. 2021, 16).

Regarding China, Felipe and Fullwiler show how the COVID-19-related debate on whether to ‘monetise the deficit’ was moot, as the decision was essentially a monetary policy discussion on whether to issue long-term liabilities by the treasury or short-term liabilities by the central bank with little macroeconomic impact. He and Jia (2020, 854) similarly find that the ‘The PBOC [Chinese central bank] creates a financial situation in which the Treasury bond auction is easily successful by keeping the financial market stable and supplied with enough reserves, [therefore] it is hard for commercial banks to refuse the Treasury bonds—which are not only profitable but also highly liquid.’

Such insights about indirect central bank financing are also described in financial systems in the non-US Global North. In Canada, the central bank likewise maintains a corridor interest rate system and stands ready to ‘neutralize the net impact of any public sector flows’ and finance the primary dealers in government bond auctions. On days with large anticipated monetary drains (e.g. from tax payments or bond sales), ‘The Bank will be providing central bank credit from the outset so as to maintain liquidity’ (Lavoie 2019, 152-153). In one study of the Danish monetary system, the central bank governor supported the consolidated government view by stating, ‘We are the agent of the state. In this way, one can also consolidate the state’s balance and our balance,’ which implies that the government spends by issuing money in accordance with the consolidated government hypothesis (Voldsgaard Ruge 2018, 61).

In the UK context, Pantelopoulos and Watts (2021) argue that the BoE and the Exchequer (i.e. treasury department) can ‘finesse’ around the ‘full funding rule’ (discussed in more depth in Section 4), which requires all fiscal deficits to be matched by bond sales over the year, by using the UK Government’s Ways and Means (W&M) overdraft account at the bank. They therefore view the full funding rule as a voluntary constraint that can be bypassed if needed and note occasions when it has been used over the course of the 20th century, including wartime. While the W&M is available in the background, the full funding rule is intended to subject the Exchequer and its Debt Management Office (DMO) to fiscal discipline via the bond market. However, Pantelopoulos and Watts (2021, 238) point to the same indirect financing mechanism observed in the US and elsewhere, where, ‘The BoE cannot be truly independent in an operational sense, as it must behave in an accommodative manner to defend its policy rate target.’ By examining the financial operations in the UK in further details below, we argue that the public financing occurs in a more direct fashion than the indirect accommodation known from the US system, where the central bank assists private actors in pre-funding the government’s spending account.

2.3 Summary

In summary, we have identified two main perspectives on the mechanics of state financing. First, the mainstream perspective argues that governments face an ex-ante challenge to locate financing for their spending plans, and a budget constraint given the inherently inflationary effects of borrowing and monetary financing by the central bank. An independent central bank can help

entrench a macroeconomic regime of monetary dominance that helps avoid excessive borrowing and inflation. Second, the neo-chartalist position posits that all government spending is monetarily financed (by a central bank), that taxation drives the demand for the currency and debt issuance is primarily a tool to support monetary policy. Under such conditions, even an ostensibly independent central bank is forced to accommodate the state's spending demands in order to fulfill its interest rate target and role as banker of the state. Some post-Keynesians have argued that an independent central bank has more influence on public spending options than the neo-chartalist position recognises, given central bank operational independence, while being open to alternative institutional configurations.⁵ In the next two sections, we undertake a detailed institutional analysis of expenditure, debt-issuance and revenue mechanics for the UK to test these hypotheses.

3. Government spending and revenue collection in the UK

3.1 Government spending and the role of the Consolidated Fund

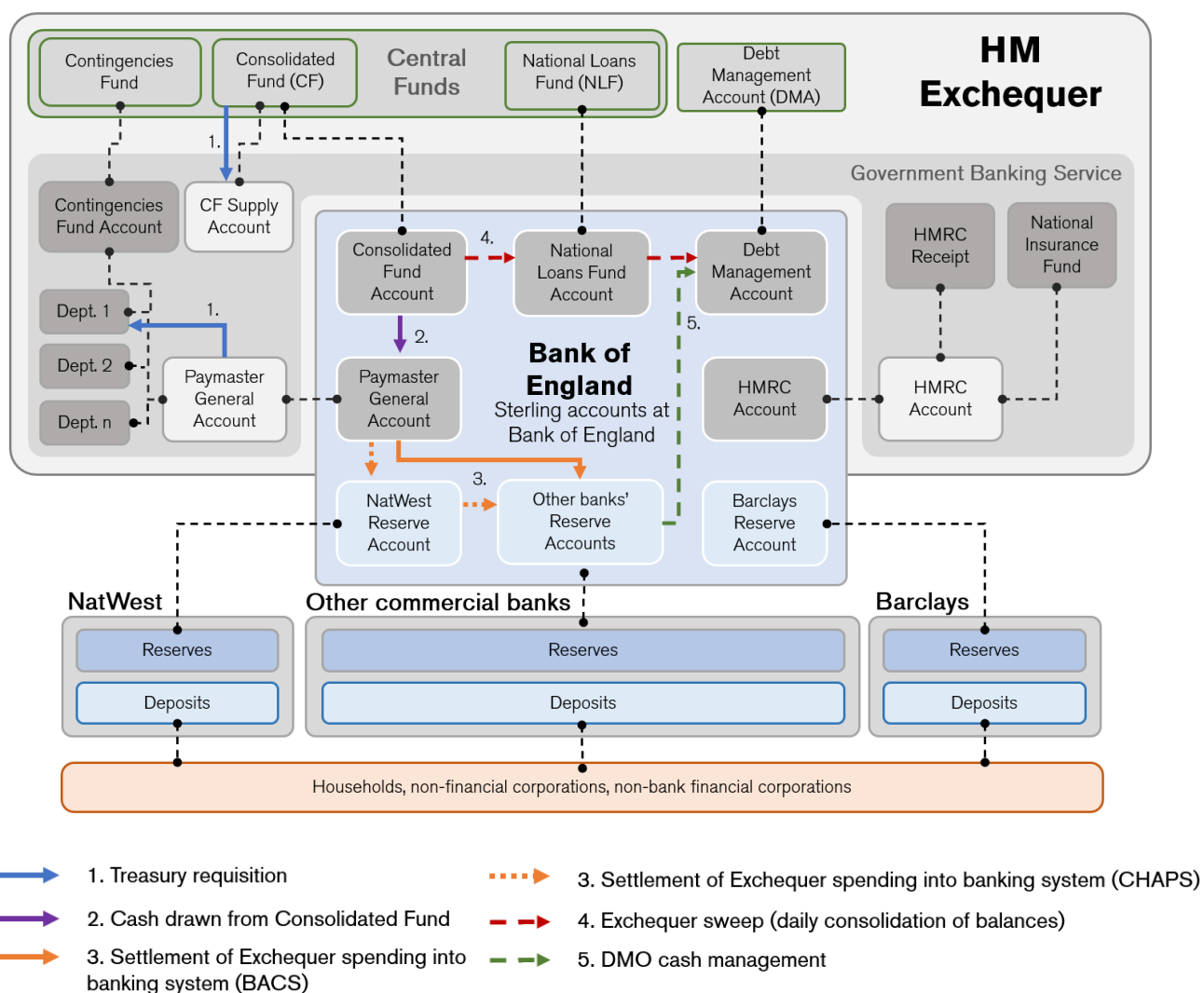
Figure 2 gives an overview of the institutional landscape within which the UK Government's financial activities are undertaken and, along with Figure 3, traces the accounting processes and flow of funds involved with public expenditure. Within the public sector, the key body is the Exchequer, pictured in the grey boxes. The BoE, while wholly owned by the government, connects the Exchequer to the commercial banking system, which services the private sector money-users (households, non-financial institutions and non-bank financial corporations).

The UK Government maintains several core accounting structures known as the 'Central Funds' (Figure 2, top left box). These sit apart from any specific government department and represent the legal entities from which all government expenditure arises, from which all government securities are issued, and to which most government revenue is ultimately surrendered. The Central Funds comprise the Consolidated Fund (CF), the National Loans Fund (NLF), the Contingencies Fund (CCF) and the Exchange Equalisation Account (EEA) (not shown).⁶ They each provide an accounting framework for distinct aspects of the Government's financial activities. Despite their central importance to government accounting, the functioning of the Central Funds are not widely known or understood by the general public and rarely, if ever, mentioned by economic or media commentators.

⁵ For a more detailed accounts of the neo-chartalist vs. post-Keynesian debates, see Tymoigne and Wray (2015) and Cesarroto (2016).

⁶ The Exchange Equalisation Account is used to manage the Government's foreign exchange and other financial reserves. It is not explored in detail here given the focus on domestic spending activity.

Figure 2: Public sector accounting of the expenditure process in the UK



Note: The expenditure process from step 1 to 3 is illustrated in Figure 3. The daily consolidation of public balances (Exchequer sweep) in step 4 is explained in Section 3.3 and illustrated in Figure 5. The cash management in step 5 is explained in Section 4.1 and illustrated in Figure 6.

The CF was established in 1787 as ‘...one fund into which shall flow every stream of public revenue and from which shall come the supply for every service’ (HM Treasury 2021). The NLF was established in 1968 to account for the Government’s lending and borrowing activities separately (National Loans Act 1968). As such, the CF is, today, sometimes conceptualised as the Government’s ‘current account’, dealing ostensibly with the cash flows associated with daily expenditure and revenue, while the NLF records many of the Government’s financial assets and liabilities. The CCF is used to enable urgent expenditure beyond that which is provided by routine parliamentary supply procedure. An additional account, the Debt Management Account (DMA), is not formally one of the Central Funds, but operates as an agent of the NLF and exhibits some of the characteristics of the Central Funds. In any case, each of these entities is funded, directly or

indirectly, by the CF and therefore the latter can be considered to represent the core Central Fund on which all others depend.

The CF is most easily understood as a sovereign line of credit that only the Government, via consent from the Parliament, can draw upon to initiate the spending process. The CF is governed by the Exchequer and Audit Departments Act 1866 (the '1866 Act'), which stipulates that, '...this enactment shall not be construed to empower the Treasury or any authority to direct the payment... of expenditure not sanctioned by any Act whereby services are or may be charged on the CF, or by a vote of the House of Commons, or by an Act for the appropriation of the supplies annually granted by Parliament' (Exchequer and Audit Departments Act, 1866). In other words, Parliament has supreme jurisdiction over government spending and individual departments cannot spend autonomously of parliamentary authorisation. Sections 13 and 15 of the 1866 Act specify the mechanism which relates two forms of Parliamentary authorisation explicitly to the provision of money: Standing Services and Supply Services.

Standing Services are forms of government expenditure which are authorised from the CF permanently by virtue of specific acts of Parliament. For example, HM Treasury may issue from the CF to make urgent advances to government departments (Contingencies Fund Act 1974), for making interventions in the banking sector for purposes of financial stability (Banking Act 2009) and for making interest payments on government debt (National Loans Act 1968).

Supply Services, in contrast, are voted annually and result in the passing of Supply and Appropriation Acts by Parliament. There are usually two such acts each year (in March and July) and they itemise what would typically be considered to be the routine expenditure of government, including allowances for individual government departments and other public bodies (e.g. health, education, defence, etc.).

Sections 13 (Standing Services) and 15 (Supply Services) of the 1866 Act detail how provisions made in such legislation are discharged within the banking system. In both cases, the mechanism is, for all intents and purposes, identical. The first step is the passing of legislation through Parliament which authorises an issue from the CF. Next is a requisition by the Treasury for funds granted by Parliament to the Comptroller and Auditor General (today, the head of the National Audit Office) whose responsibility it is to verify that the request is consistent with the terms under which Parliament authorised the expenditure. If satisfied, the Comptroller and Auditor General grants a 'credit' on the CF account, whereupon HM Treasury may order the BoE to make issues to Principal Accountants. These accountants are public entities holding accounts at the BoE.

Today the most important Principal Accounts fall under the auspices of the Commissioners for Revenue and Customs due to their specific responsibility for the activities of HMRC, but more generally to their oversight of the Government Banking Service (GBS). The GBS was established in 2008 to consolidate the Government's banking arrangements into a single, 'shared service'. Previously, much of the Government's banking activities were concentrated in the Office of Her Majesty's Paymaster General (OPG), with the exception of HMRC, which had held alternative banking arrangements with commercial partners. The consolidation expanded the previous OPG banking model across the whole of government and parts of the wider public sector. The main

difference was the introduction of commercial banking partners for the provision of retail banking transmission services previously provided by the BoE. Currently, NatWest provides accounts for most government departments, facilitating spending into the banking sector, while Barclays serves HMRC and the Driving Vehicle License Authority (DVLA) and thus administers the majority of the Government's revenue (Figure 2). Settlement on behalf of these departmental accounts is, however, bound to accounts held within the Exchequer at the BoE and the commercial partner's balance sheets are impacted only transiently or not at all depending on the type of transaction undertaken (BACS or CHAPS protocol, see Figure 2).⁷

The consequence of the 1866 Act is that, following the granting of parliamentary authorisation for expenditure, a cash balance is credited by the BoE to an Exchequer account within the GBS.⁸ This constitutes the initiation of the government expenditure process which is laid out graphically in Figure 3. This shows the changing balance sheets of the CF and the GBS (together making up the Exchequer), a representative government department (Dept.) and the BoE in three steps. The process is also marked in Figure 2 by the coloured arrows numbered 1 to 5.

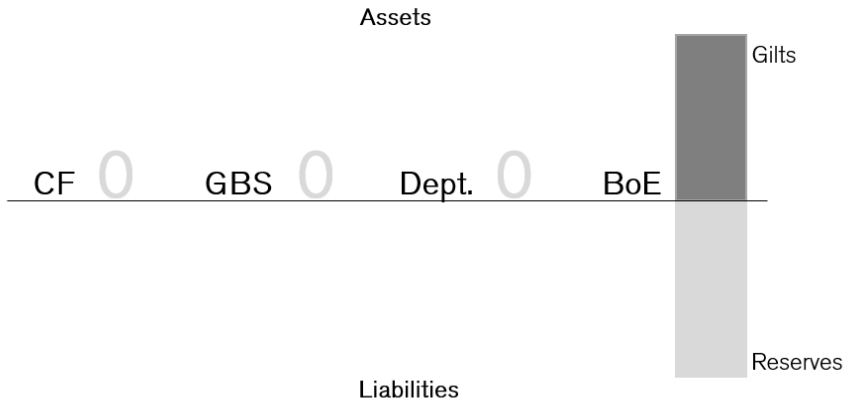
In Step 0 (Figure 3), all balances are shown as zero, with the exception of the bank, which has assets composed of government bonds and reserve liabilities with the commercial banking system. Step 1 shows an increase in liabilities on the CF's balance sheet following the request by HM Treasury, the approval of the Comptroller and Auditor General, and the creation of a matching Exchequer credit on the asset side of GBS. This asset held by GBS enables it to ledger credit deposits to the individual government departments according to their allowances defined in the Supply and Appropriation Act, shown by an increase in the asset side of Dept. matched by an increase in the liabilities of the GBS. Note that the CF does not need a prefunded balance in order to extend spending balances to the GBS.

⁷ For example, the BACS3 (Government Grade) payment clearing and settlement protocol directly substitutes Government Banking Service accounts for the commercial partner's reserve accounts as the pertinent settlement account for transactions.

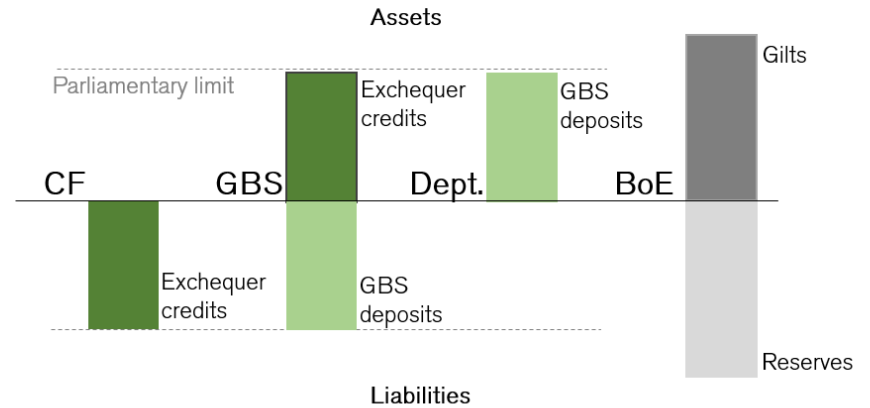
⁸ These credits are made primarily to the Drawing Account of HM Paymaster General for the purposes of facilitating the spending by most government departments. They may also be made to, among others, the General Account of the Commissioners of Inland Revenue and the General Account of the Commissioners of Customs and Excise for purposes relating to tax and National Insurance, e.g. for salaries.

Figure 3: Government spending in a balance sheet representation

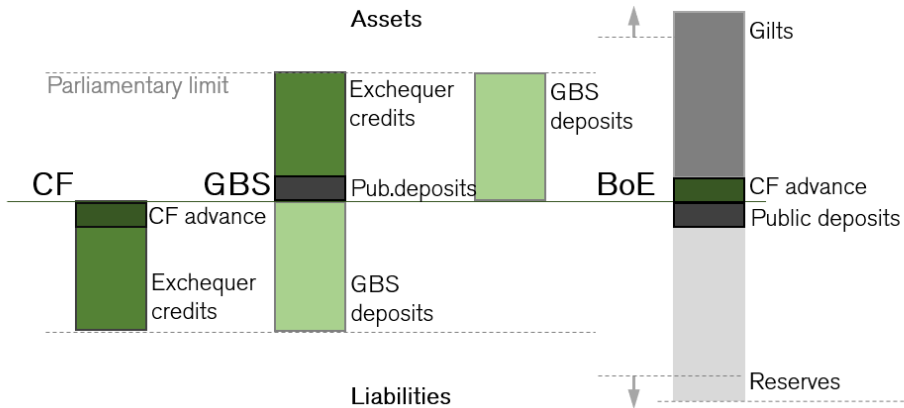
0. Starting balances



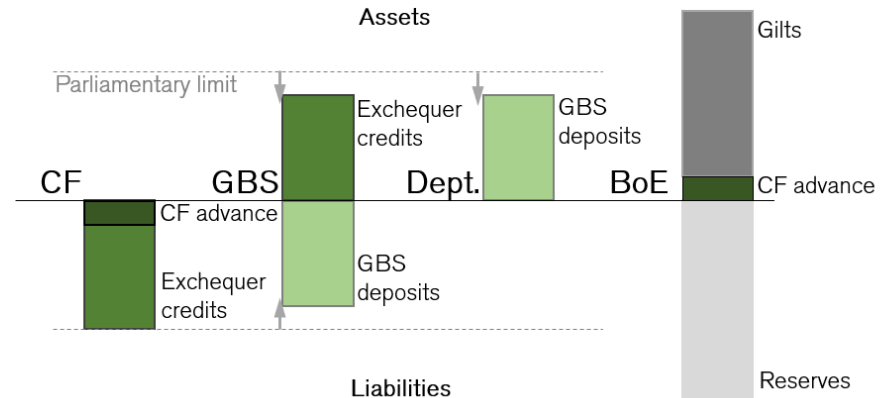
1. Treasury requisition (monthly)



2. Cash drawn from Consolidated Fund (daily)



3. Spending into banking system



Note: In order to make all balances balance assets and liabilities, one could add a negative net worth for the CF and a positive net worth for governmental departments (Dept). These are left out for graphical clarity.

In Step 2, money is drawn from the CF on a daily basis according to anticipated cash flows. This essentially involves GBS swapping some of its Exchequer credit assets for a spendable balance in its BoE account called the Paymaster General Supply Account (PMG) (an increase in the liabilities of the bank). Equally, the CF swaps a liability to GBS for a liability to the BoE, shown as 'CF advance'. Note that these government-held deposits at the BoE are not recognised within the sterling monetary framework as 'reserve' accounts at the BoE. Instead, they are labelled in step 3 as a 'public deposit' at the BoE.

In step 3, the public deposits held by GBS in the PMG are used to settle departmental payments into the banking system via the BoE reserve accounts of commercial banks. Notice that this reduces the public deposits at the BoE and increases its reserve liabilities. At this point, the Exchequer's balance sheet has contracted, effectively using up some of the Parliamentary credits granted, while the BoE (and the banking sector) has an expanded balance sheet in the same proportion. This is the final step of the spending process. At the end of the day, the BoE's intra-day advance to the CF left by the spending process is changed to a claim on the NLF as the Exchequer consolidates its balances (the Exchequer sweep). This claim is usually redeemed by the DMO during its end-of-day cash management operations.

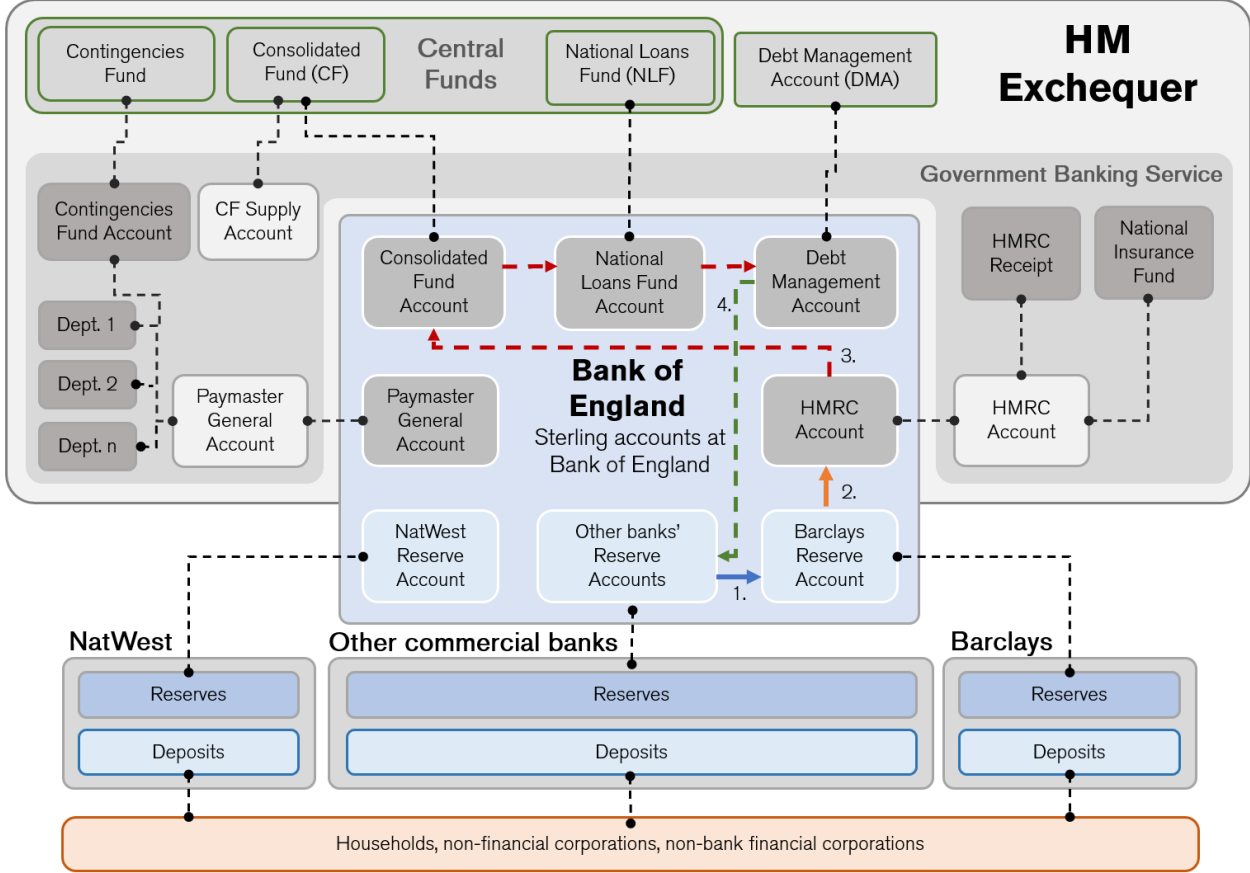
As indicated in Figure 3, a fundamental design feature of the modern-day Exchequer (the mechanics of which we explore in the next section) is that the CF starts every day with a zero balance, yet orders for issues out of the account are nevertheless made and fulfilled. As such, credits to the GBS arise as *newly created money* under order of the Treasury, but with ultimate provenance in Parliament. The terms under which the BoE issues money on behalf of Parliament pre-dates the 1866 Act and has never been dependent on the existence of a positive provisioning balance. Indeed, this feature is codified in legislation with a reference to the charges being made 'out of the growing produce of the Consolidated Fund' (Finance Act 1954, section 34, paragraph 3). This phrasing serves to connect issuances with 'all the revenues to be received in the future' (Brittain 1959, 16), thereby framing expenditure implicitly as a form of credit advanced on the security of future tax revenues. This aligns with the chartalist theory of money described in Section 2, which asserts that fiat currency has value in exchange because of the sovereign's tax raising power (Innes 1914; Keynes 1930; Ingham 2004; Knapp, [1905] 2013).

3.2 Government revenue collection

The 1866 Act also specifies that the gross revenue received by the Commissioners for Inland Revenue and the Commissioners for Customs and Excise should be surrendered to the CF. The Commissioners for Revenue and Customs Act 2005 combined the responsibilities of each into HM Revenue and Customs (HMRC), but reaffirmed the principle that receipts be transferred to the CF. As such, the CF represents the legally mandated, final destination for most of the Government's revenue. Following the establishment of the GBS and the current commercial banking partnerships, HMRC is supported in its revenue collection activities by Barclays Bank PLC. Government revenue accumulates in accounts at Barclays and is transferred to HMRC accounts at the BoE several times each day (Figure 4). All receipts are transferred into the Exchequer via the medium of public deposits on the central bank's balance sheet. Tax revenue is

not, ultimately, received in the form of commercial bank deposits (as is commonly believed) for the simple reason that the destination account(s) are held at the BoE and not commercial banks.

Figure 4: Public sector accounting of the taxation process in the UK



- ➔ 1. Tax payment
- ➔ 2. Settlement of tax receipts into Exchequer
- ➔ 3. Exchequer sweep (daily consolidation of balances)
- ➔ 4. DMO cash management

Note: The daily consolidation of public balances (Exchequer sweep) in step 3 is explained in Section 3.3 and illustrated in Figure 5. The cash management in Step 4 is explained in Section 4.1 and illustrated in Figure 6.

Each day, spending and revenue activities may cause the accumulation of positive or negative balances in the accounts held by GBS (PMG, HMRC) at the BoE, as well as in the accounts of the CF and NLF. The Exchequer undertakes an end-of-day process that seeks to rationalise all such cash balances held, with all positive and negative balances ‘swept’ into the NLF account, by way of permanent transfer or overnight lending. With all other accounts zeroed, the resulting balance on NLF represents the net position of the Exchequer for that day which, by accounting identity, also represents the inverse net position of the banking sector due to the Government’s activities (explored further in Section 4.1).

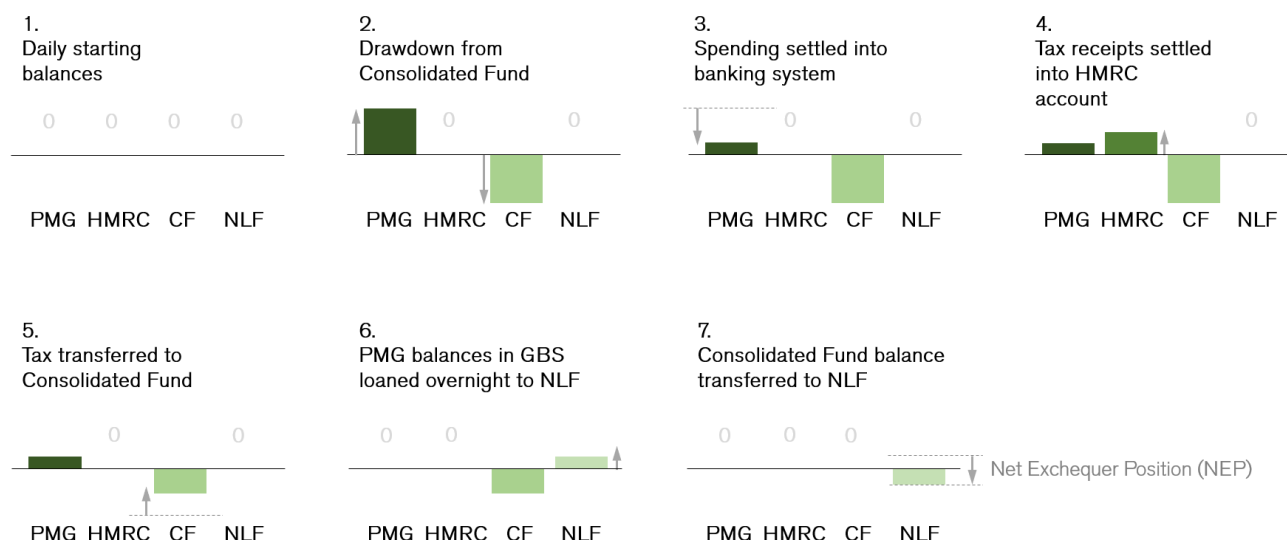
3.3 Consolidation of balances and Ways and Means

There are a couple of aspects of this process that should be noted. First, spending and revenue are both anchored to the CF, but proceed during each day via separate accounts at the BoE (Exchequer and Audit Departments Act 1866). These accounts are only reconciled at the end of each day⁹ (National Audit Office 2009, HMRC 2021) and the CF can therefore only ever have a positive balance — by virtue of receiving a transfer over its initial zero starting position — at the *end* of each day. It follows that any and all expenditure from the CF occurs when the CF has a nil or negative balance, and there is never a situation whereby a deposit of tax revenue furnishes a balance that is subsequently used for spending. In this sense all spending arises as new money advanced as credit and not ‘from taxation’.

The end-of-day consolidation of all Exchequer accounts at the BoE is known as the Exchequer Pyramid sweep (or just Exchequer sweep) and results in all balances (positive or negative) being consolidated into the Central Funds and ultimately the NLF, which is used to assess the net Exchequer position and thus indicate how much liquidity the DMO should offset by selling/buying gilts with the private sector to neutralise the day's fiscal impact on reserves in the banking system. The Exchequer sweep is illustrated in Figure 5, which shows each relevant entity's balance vis-à-vis the BoE. Steps 1 to 3 correspond to the spending process illustrated in Figures 2 and 3, while step 4 adds a taxation flow into the HMRC as illustrated in Figure 4. Revenue collected through each day at Barclays is only guaranteed to be transferred to HMRC accounts at the BoE by close of business (HMRC 2021), after which it can be transferred to the CF. In step 5, at the end of the day the tax receipts are transferred to the CF as required by law and this has the effect of reducing the CF's debt to the BoE that has accumulated from the day's spending activities. In step 6, at the same time, any remaining cash balances held by the PMG are loaned overnight to the NLF. In the seventh and final step the CF balance is swept into the NLF too (National Audit Office 2009). The upshot is that the net Exchequer position (NEP) of the day is consolidated on the NLF, which at this point represents the overall position of the Exchequer with respect to the BoE. The NEP also accounts the net extent to which the Exchequer has spent into the banking system, which is subsequently transferred to the DMO, which is tasked with issuing/buying gilts to offset this net spending. This cash management process is detailed in Section 4.1.

⁹ National Audit Office 2009, appendix four, 11; National Audit Office. (2009). Government cash management. Stationery Office, London.

Figure 5: The Exchequer sweep



Note: All balances reflect each entity's position vis-à-vis the Bank of England. PMG: Paymaster General. HMRC: Her Majesty's Revenue & Customs. CF: Consolidated Fund. NLF: National Loans Fund. See also Figures 2 and 4 for each entity's position in the monetary system.

The second aspect to consider is the formal relationship between the BoE and the NLF for recording the end-of-day debt W&M account. Often construed in public discourse as the government's overdraft facility, the W&M account represents a form of government security which backs the Bank's money issuance. The logical consequence of the mechanisms set out in the 1866 Act is for spending — in the absence of any additional undertakings — to result in a W&M advance at the end of the day by default. Such an outcome is entirely within the discretion of HM Treasury and explains how and why *any* spending authorised by Parliament happens without constraint in all circumstances. Although the W&M account was used routinely in the past, since 2000 HM Treasury has sought to avoid this automatic outcome. This administrative objective is achieved via the practice known as 'cash management', which we address in the next section.

4. Debt management and the purpose of government debt issuance

4.1 The full funding rule, cash management and supporting monetary policy

Despite the fact that the institutional framework described in Section 4 makes it clear that spending is not linked to bond issuance, the annual UK Debt Management report (Debt Management Office 2021, 5) states that:

An overarching requirement of debt management policy is that the government fully finances its projected financing requirement each year through the sale of

debt. This is known as the 'full funding rule'. The government therefore issues sufficient wholesale and retail debt instruments, through gilts, Treasury bills (for debt financing purposes) and NS&I products, to enable it to meet its projected financing requirement in full.

The rationale for the full funding rule is, first, that '...the government believes that the principles of transparency and predictability are best met by the full funding of its financing requirement'; and, second, that, 'to avoid the perception that financial transactions of the public sector could affect monetary conditions, consistent with the institutional separation between monetary policy and debt management policy.' Furthermore, the overall debt management objective is 'to minimise, over the long term, the costs of meeting the government's financing needs, taking into account risk, while ensuring that debt management policy is consistent with the aims of monetary policy' (Debt Management Office 2021, 3).

The impact on monetary policy of spending and debt management merits further exploration. The daily accounting cycle described in Section 3.2 results in a net positive or negative monetary balance being held in the NLF, known as the net Exchequer position (NEP) (see figure 5). Under the current policy framework, this end-of-day position motivates reactive policy undertaken by the DMO known as 'cash management' (although it does not actually involve any physical cash). This involves the trading of government securities of different maturities with the private sector. The motivation for 'cash management activities' is that, by accounting identity, the NEP also represents a measure of the impact of the government's financial flows *on the banking sector*. Specifically, an end of day *positive* balance on the NLF account indicates that money has been drawn *out of* the banking sector overall, whereas an end of day *negative* balance indicates that money has been *added to* the banking sector.

Under the 'corridor' reserve management system (described in Section 2.2) which was in operation when the DMO was established, the impact of the Exchequer position on the banking sector would risk influencing the policy-targeted short-term interest rate in the inter-bank market and undermine the bank's monetary policy objectives. As such, the Exchequer aims to accumulate no cash balances or debt on its accounts at the BoE by the end of each day, as these would reflect an equal and opposite impact on the banking sector. The DMO's remit is, therefore, by the close of business each day, to drain any reserves which have been added to the banking system on days of net spending, or to return reserves which have been removed from the banking sector on days of net revenue. This is achieved by way of the trading of government securities in quantities which reflexively match the (anticipated) NEP.

The cash management process is illustrated in Figure 6, where the upper panel A shows a situation where the government has net spend into the economy during the day (fiscal deficit), while panel B displays a day with more taxation than spending (fiscal surplus). Step 1 shows the daily starting balance. Step 2 shows the impact of the day's spending and tax payments that are swept into the NLF in step 3, as detailed in figure 5. The DMO takes notice of the NLF balance and undertakes either sales or purchases of gilts with the banking sector, either to drain or inject the amount of reserves that would offset the liquidity impact of the net Exchequer position. As the

NLF balance is transferred to the DMO's account and the market activities clear, the DMA is brought back to its desired starting balance for the next day. This process clearly shows how gilts are issued ex-post of spending to avoid the liquidity impact of fiscal activities on the money market.

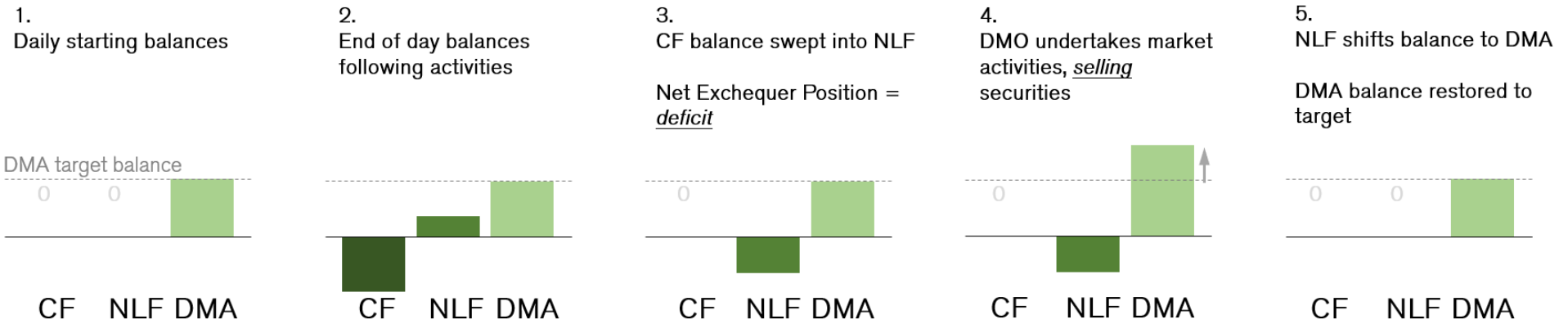
The notion that security issuance is ultimately motivated by monetary policy is consistent with official procedures prior to the establishment of the DMO, as indicated by a Parliamentary Select Committee report which explained that, 'Although Treasury bills are a government debt instrument, the Bank's monetary considerations determine the level of the weekly tender' (Treasury Select Committee 2000, paragraph 38). It also aligns with studies of the US described in Section 2, which emphasise the role of public debt issuance in offsetting the increase in reserves created by government (money-creating) expenditure to support the central bank in achieving its targeted interest rate (Bell 2000; Tymoigne 2014).

However, this motivation is no longer applicable in the UK case as in 2009 the BoE switched its monetary policy regime from a corridor system to a supply-dominated 'floor' system following the Monetary Policy Committee's decision to purchase assets through the creation of reserves, commonly known as quantitative easing (QE) (Clews and Salmon 2010).¹⁰ In such a 'floor' system, there is an excess of reserves in the inter-bank market, which pushes the inter-bank lending rate down to the level paid by the central bank on the commercial banks' holdings of reserves. This policy rate functions as a floor for the market rate, since it would be unprofitable to lend away reserves at a lower rate. The price floor renders the actual quantity of reserves in the inter-bank market largely irrelevant to the achievement of the short-term interest rate target and, as such, any necessary operational link between quantities of debt issued and the net balance of the Exchequer's spending and taxation flows is broken.

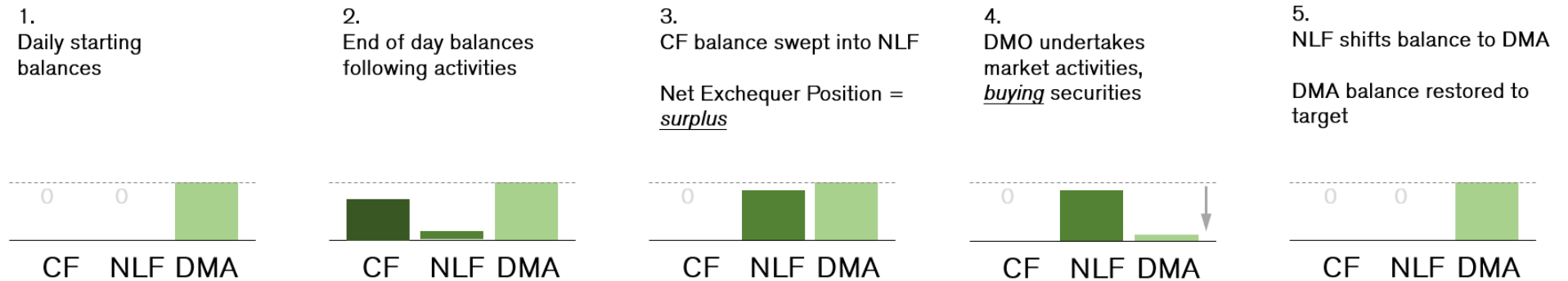
¹⁰ At the time of writing, the bank has created £875 billion worth of central bank reserves and used them predominantly to buy government securities.

Figure 6: Cash management with daily fiscal deficit and surplus

A. Net Exchequer deficit position



B. Net Exchequer surplus position



Note: All balances reflect each entity's position vis-à-vis the Bank of England. CF: Consolidated Fund. NLF: National Loans Fund. DMA: Debt Management Account controlled by the Debt Management Office (DMO).

QE was implemented after the policy rate of interest had reached the effective lower bound. The policy instead targeted longer-term interest rates by purchasing government bonds (and to a smaller extent private debt securities) in large quantities. In the UK case, this was mainly from the non-bank private sector. By withdrawing such assets from the market, the central bank pushes up their price and inversely pushes down yields on these longer-dated assets.¹¹ Public debt issuance can therefore be viewed as a prerequisite for easing monetary policy at the zero lower bound by providing the stock of target assets necessary for the re-injection of reserves. However, under the floor system there is no longer any justification for reflexively matching quantities of securities issued with the size of the government's deficit under the full funding principles. Indeed, QE and the DMO's debt and cash management activities are likely to be countering each other's effect on financial markets. The system appears unnecessarily complicated in comparison to the system wherein the central authorities managed the Exchequer's cash flow and monetary policy as a single operation prior to 2000 (see Bank of England 1963, 1964, 1966, 1982). And since public debt is issued to influence financial conditions, it would make sense either to increase coordination between the BoE and DMO or revert back to using only one authority to issue and withdraw public debt to/from financial markets.

The current arrangements also raise questions around the economic efficiency of these operations given the involvement of financial intermediaries (the primary dealers — mainly commercial and investment banks), which profit from handling transactions involving the emission of new government bonds and market-making for the wider financial sector. Of the Government's £413 billion debt issuance between March 2020 and July 2021, 99.5% was matched by BoE gilt purchases (van Lerven et al. 2021), which implies significant windfall profits for the private intermediaries involved.

To truly minimise the cost to the government of debt management, a more sensible approach would be to adopt a monetary policy stance that the natural rate of interest is zero and allow higher rates to be determined by private financial markets (as discussed in Section 2.2) (Forstater and Mosler 2005). This raises the question of whether public debt instruments should even be issued, especially at long maturities that increase the interest cost to the government. Higher rates could be achieved by raising the floor policy rate, if deemed desirable. So while debt issuance (and withdrawal via QE) does have financial market impacts, we argue that monetary policy implementation is no longer the primary role played by public debt issuance. Rather, public debt issuance has a more important function in terms of its role as a safe store of value and source of collateral.

4.2 The safe store of value and collateral function of public debt

Given the provisions in legislation which anchor the other Central Funds (and the DMA) to the CF (see Section 3.2),¹² all UK government debt instruments can be understood as claims against the CF. Such debt instruments are held and circulate within the economy, exhibiting the money-like

¹¹ For discussion of the UK's QE's design, operation and impact see Joyce et al (2011).

¹² National Loans Fund: National Loans Act (1968), Section 19. Debt Management Account: National Loans Act (1968), Schedule 5A, Section 11(1). Contingencies Fund: Miscellaneous Financial Provisions Act (1946), Section 3.

properties of a safe store of value based on the supreme creditworthiness that is inherent in claims on the state.

Some claims on the Central Funds are non-negotiable and are therefore specifically useful as a secure store of value. For example, National Savings & Investments (NS&I) is an Executive Agency of HM Treasury which offers personal savings facilities to households and offers a highly secure way for individual savers to deposit money with the NLF (including a currently over-subscribed index-linked product). Furthermore, HM Treasury holds an 'unquantifiable' contingent liability to the Financial Services Compensation Scheme for the provision of commercial bank deposit insurance (HM Treasury 2021, 379). This effectively associates bank deposits up to a value of £85,000 per person with a claim on the NLF and the creditworthiness inherent therein due to its connection to the CF. Balances in excess of this threshold amount are therefore vulnerable to the risk of bank failure. Larger institutional investors, such as pension funds and insurance companies, are not eligible for NS&I products and therefore tend to hold negotiable government securities, particularly gilts, for this purpose. In this sense, gilts represent a saving instrument of the same creditworthiness as central bank reserves, but can be held in large quantities by households and non-banking institutions.

Furthermore, the safe nature of government bonds facilitates the functioning of exchange in financial markets. A fundamental feature of government debt instruments such as gilts and Treasury bills, which are issued from the NLF and the DMA respectively, is that they are negotiable and are thus widely traded in wholesale money markets. Such instruments with varying maturities are central to repo markets, which have become increasingly important to the functioning of the financial system over the last few decades, acting as key high-quality collateral for many different forms of non-bank financial intermediaries as part of the general shift towards 'market-based' or 'shadow-bank' finance (Gabor 2016; Gabor and Ban 2016; Dutta 2020).

Indeed, the centrality of government debt as a source of collateral in repo markets that are systemic to the financial system provides one explanation as to why central banks embarked on such large government debt purchase programmes during the spring of 2020, just after the emergence of the COVID pandemic. The aim was to bring down sovereign debt yields that had shot up as collateral and margin calls were made on repo-ed government debt instruments held by mutual funds and hedge funds (Sissoko 2020; Vissing-Jorgensen 2021).

Given these functions, there is an inherent demand for public debt instruments — from households, non-bank financial intermediaries and banks, including the central bank — much as there is a demand for bank deposits, banknotes and coins. We should therefore think twice before adopting policies aiming to reduce public debt. The reduction or elimination of government debt would have detrimental implications for private sector exchange and financial stability, though these consequences are rarely referenced by proponents of public debt reduction.

Yet it does not follow that public debt issuance should be structured according to current practice. Since short-term debt tracks the monetary policy rate, it is generally advisable to issue short maturity debt to reduce interest payments on a spread reflecting the uncertainty of future short-term interest rates. The safe nature of the claims on government could also be accentuated by designing them more like time deposits with an additional policy rate of interest. While central banks are increasingly discussing the merits of implementing central bank digital currencies (CBDC) to facilitate exchange instead of bank money and crypto assets (Auer et al. 2020), this analysis suggests CBDC debates should put at least as much emphasis on the store-of-value function of money as the means of exchange aspect. An alternative way for the government to bestow a secure store-of-value property on the monetary system would be to guarantee 100% of commercial bank deposits rather than the current mixed system of partial deposit insurance and the issuance of tradable securities.

5. Discussion

5.1 Constraints on government spending

In the light of the analysis presented in Sections 3 and 4, what conclusions can we draw in relation to some of the constraints commonly portrayed as limiting the UK Government's (and other governments') financial activities? These include liquidity risk, default risk and market risk (or bond market discipline). We can also examine how our analysis relates to the existing theoretical perspectives on public finance laid out in Section 2.

Firstly, in regard to the sequencing of public financing and liquidity risk, the analysis in Section 3 shows there is no requirement for a provisioning of money balances through taxation and 'borrowing' activities to occur *before* government spending can be undertaken. As such, there are no circumstances whereby it can be said that the government has 'insufficient money' for expenditure to be able to take place or that the government is at risk of 'running out of money'. Indeed, one of the fundamental organising principles of the UK Exchequer is for the accumulation of cash balances to be minimised. Instead, all spending arises via the creation of new monetary assets and this process is *independent* of tax and securities dealing activities. The upshot, which HM Treasury (2020) acknowledges, is that there is no aspect of the government's banking arrangements which can prevent government expenditure from being realised once it has been authorised by Parliament. The mainstream 'three sources' view of public financing outlined in Section 2 is therefore not inapplicable to the UK.

Another commonly perceived constraint is default risk. However, the uninhibited discharge of UK Government expenditure extends to the payment of principal and interest on government 'borrowing', which is permanently authorised by Parliament by the National Loans Act 1968. As such, default on national debt repayments, for example those associated with maturing gilts and Treasury bills, or NS&I withdrawals, can only occur with an express or implied repeal by Parliament of the relevant legislation. Neither the Government nor the BoE has any discretion in this matter. From this perspective, government securities already function somewhat analogously to time-deposits, representing an interest-earning, secure alternative to other forms of money for a fixed or discretionary duration before reverting seamlessly to sterling (Mosler 2010, 108).

Equally, sales of negotiable securities — typically required to meet end of day 'offsetting' objectives — do not present some of the challenges to HM Treasury that are commonly believed. In this context it is often claimed that the Government is at the behest of an investor market — 'bond market vigilantes' — which may refuse to purchase the Government's securities or otherwise demand punitive terms. However, as explained by the BoE (1964) half a century ago, the banking sector will purchase, by the end of each day, any securities which need to be sold in accordance with policy requirements. That is, because banks are *already* holding excess central bank reserves that have been injected into the banking system during the day by virtue of the Exchequer's net spending. The quantity of the balances added during the day exactly matches the DMO's offsetting remit — by definition — and the banks will reflexively switch these excess balances for something of the same creditworthiness, but a higher rate of return. In the current

floor system, the banks are permanently in a state with collective excess reserves, which further establishes a 'seller's market' when it comes to government bond issuance.

The DMO is not, therefore, faced with a market holding scarce funds and seeking to bid up the prices charged to the Government. Instead, as the monopoly issuer of sterling safe assets, the DMO needs only to offer terms that are infinitesimally greater than that earned on the excess central bank reserves the banks already hold (Fullwiler 2020, 20). As such, short-term rates on government securities converge to the BoE's policy rate, rather than being determined by market forces in the hypothetical market for loanable funds, which much of neoclassical economics rests upon (Akram and Li 2020; Storm 2020). Given the role of government securities in the functioning of monetary policy (including QE), interest payments on government debt can be seen simply as an expression of the interest rate-targeting monetary framework. Sales of government securities are not at the discretion of markets, in the sense that the demand for gilts by primary dealers in auctions is generated as a routine feature of the functioning of the Exchequer and the sterling monetary framework.

In summary, the institutional realities of the Exchequer described in this paper demonstrate that the UK Government is not exposed to the alleged risks of 'running out of money', defaulting on debt obligations, the sentiments of bond markets or a need to reduce levels of government debt below those demanded by the economy. Instead, the functioning of the Exchequer, in particular the daily accounting cycle and trading activities, was developed with the maintenance of monetary policy in mind. Under the current 'floor regime', where there is excess liquidity in the market, it would appear the issuance of government debt serves mainly to support secure store-of-value and source-of-collateral functions for the private sector.

5.2 Central bank independence and fiscal-monetary coordination

As noted in Section 2, there is a currently a lively debate around the relative independence of modern central banks vis-à-vis fiscal policy, a debate made more prescient in the light of the enormous fiscal expansions that have accompanied the COVID-19 pandemic (Bartsch et al. 2020; Blanchard et al. 2020). In the UK case, there has been an official House of Lords Economic Affairs Select Committee investigation into QE, which specifically examined accusations that the BoE had engaged in deficit financing (House of Lords 2021: 25-27). The report concludes that, 'We are concerned that scepticism of the bank's stated reasons for QE grew significantly during the COVID-19 pandemic, when many market participants said that they believed the Bank of England had used QE primarily to finance the Government's deficit spending' (ibid, p59; see also Stubbington and Giles 2021). Some post-Keynesian scholars have also criticised the neo-chartalist 'consolidated public sector balance sheet' hypothesis for neglecting the role of independent central banks in limiting spending (Lavoie 2013; Palley 2015).

Our analysis suggests that, when applied to the UK case, these discussions lack a grounding in the institutional reality of the primacy of the CF and government debt securities in the monetary system. The BoE is never independent in the sense that it can decide not to facilitate public expenditure.

First, and most straightforwardly, the government requires the BoE to advance public deposits by virtue of the 1866 Act. Under these provisions the BoE has no discretion over whether to extend credit (and accept the intra-governmental, non-negotiable counterpart debt asset, see Figure 3). It is thus not in a position to limit government spending. It is notable that this status was not changed by the Bank of England Act 1998, which granted operational authority for monetary policy to the BoE.

The core insight of the analysis is that the UK Government spends by issuing reserves, which is directly financed by BoE claims on the CF. Although the intra-governmental accounting underpinning the spending process in the UK is complicated, it is not a complex system. The government issues sterling as it spends and issues debt instruments subsequently. Before 2009 this was mainly to support monetary policy implementation under the corridor system and, afterwards, due to convention. We therefore do not consider the 'full funding rule' to impose any constraints on public spending that need to be 'finessed', as suggested by Pantelopoulos and Watts (2021), since the spending is financed by a BoE claim on the CF.

This paper thus provides support to the argument that the public financing process can be significantly simplified in countries that require pre-funding of government spending accounts, without changing the economic impact. By removing non-binding constraints such as the full funding rule, public finance transparency reform would make clear that public financing works according to the one-source view of public financing (Figure 1). Speculating as to why such a reform has not happened is beyond the scope of this paper. However, we suspect the political impact of transparent government self-financing would be significant.

Second, the creditworthiness of the BoE — which manages the currency — derives from the financial security inherent in the government. The UK Government is the only entity within the UK economy which can compel the payment of taxes. This privilege gives the Government, uniquely, a guaranteed claim over the economic resources of the country and as such makes the government the most creditworthy agent in the economy. This creditability can be discerned from the various ways in which the Government supports the banking sector. First and foremost, by requiring taxes to be settled in BoE liabilities, the government ensures that reserves, notes and coin function as monetary assets.

Also, the BoE's policies for implementing monetary policy rely on the supreme creditworthiness of the Government. Almost the entirety of the BoE's assets are represented by government securities or by private loans collateralised by public debt, and therefore the cash and central bank reserves, collectively known as 'base money', are underpinned by liabilities of the Government. Moreover, there are provisions in law for ensuring that the Government reflexively provides such securities to back the banknote issue (National Loans Act 1968, Section 9(3)) and additional injections of capital or granting of indemnities to support the bank's business more generally are also provided by HM Treasury (HM Treasury 2018, 2020, 118).

Equally, HM Treasury stands ready to provide financial assistance for the purposes of economic stability in the event of commercial bank failure. Such stabilisation powers include the transfer of banking entities into public ownership and the provision of deposit insurance, both of which featured in the response to the Global Financial Crisis from 2008 (Financial Services and Markets

Act 2000, part XV; Banking Act 2009). As the only entity within the economy which is in a position to extend such support, it is clear that the financial security of the Government surpasses even that of the banking system, which creates the bank deposits that firms and households typically consider to be money. From this perspective it is no mystery why the banking sector would be satisfied to receive claims on the Government, even without explicit compulsion.

Taxes thus *do* allow the UK Government to spend, but they do not mechanically enable it in the way that is usually implied in political discourse. Instead, the guaranteed claim over national resources that the imposition of taxes provides generates the creditworthiness that enables the government to leverage the monetary system for its own purposes, if it wishes to do so. This notion is enshrined in UK law with the provision that expenditure from the CF is charged ‘...on the growing produce of the Consolidated Fund’, mentioned several times in the still active Exchequer and Audit Departments Act (1866), thereby explicitly linking *current* spending to *future* tax revenue. This does not imply a mechanical 1:1 dependency between spending and taxation over a given period of time, but rather that taxation creates an unsurpassed creditworthiness in government’s liabilities which makes them valuable for the private sector to hold and net-save.

Overall, these insights broadly favour the neo-chartalist description and understanding of the modern public financing regime. The Government spends via money creation and not from pre-existing funds, and it does so autonomously of the central bank which is legally obliged to support expenditure sanctioned by Parliament. But while the existing neo-chartalist position emphasises the need for the central bank to accommodate Government spending via actions in the money market that circumvent self-imposed constraints in the financing process (Tymoigne 2014; Pantelopoulos and Watts 2021), in the UK case there is a well-functioning system wherein the Government directly finances its own expenditures without any need for accommodatory activity or finessing of self-imposed rules.

6. Conclusion

It is commonly claimed that the UK Government has no agency to create money and must instead obtain funding from taxpayers or lenders; to put it in the currently favoured political parlance: ‘There is no magic money tree.’¹³ The antagonism informed by mainstream economics towards monetary financing (defined as the purchase of government bonds on the primary market or overdrafts) reflected in the Maastricht Treaty from 1992 and in the shift towards central bank independence has further re-enforced the perception that the government cannot independently finance its own spending. These views are informed by the three-sources view of public spending (Figure 1), which portrays monetary financing as an inflationary alternative to prudent tax finance and risky bond finance.

In this paper we have shown that this theory does not accord with the institutional reality in the UK. In fact, the UK Government is fundamental to the sterling monetary system, including the

¹³ The term has been used by successive Conservative governments since David Cameron’s speech in 2013 featured in the opening quotation of the article; most recently by the current Prime Minister and Chancellor in an article for the *Sunday Times* (Johnson and Sunak 2022).

creation and issuance of monetary instruments and guarantees that underpin the entire public-private monetary framework.

At the heart of the government spending mechanism is the CF. This is best understood as a line of sovereign credit that the government, via permission from Parliament, draws on, backed solely by the ability to raise taxes in the future. When spending occurs, Exchequer credits are allocated to the GBS and shifted on to the BoE's balance sheet as public deposits. This, in turn, creates deposits at the commercial bank accounts of government departments, thereby enabling spending. The process is legally mandated and cannot be challenged by the central bank or any other government department. We find the one-source view on public spending (Figure 1) reflects institutional reality, where all spending is financed by money creation.

The primary economic function of government debt issuance, in the context of the 'floor' reserve management system that the UK has today, is to support the desire of the non-bank financial sector for a secure store value and source of collateral. However, the BoE's purchases of gilts withdraws the bonds back on to a public sector balance sheet and thus partly neutralises this function. This inconsistency among the DMO and the BoE in terms of government debt dynamics suggests that the UK monetary system could be simplified.

Whatever reforms do or do not take place, it should be made clear that the UK Government spends by issuing new money, destroys money when it taxes, and issues debt securities to provide non-banks with a safe store of value and to affect interest rates in financial markets. Doing so is necessary to improve public discourse and discussion in economic policy and research communities, and would enhance political accountability and democratic scrutiny of macroeconomic policy.

From a policy perspective, the findings of this paper suggest that the UK should consider reforming its fiscal policy and debt management frameworks to improve the ability to address public purposes. This could include, amongst other objectives, the active use of fiscal policy to support a rate of spending in the economy commensurate with full employment and price stability, for example via a job-guarantee scheme to stabilise demand (Minsky 2008; Mitchell 1998; Tcherneva 2020; Voldsgaard and Højmark 2021) or supporting a fiscally-led green transition programme to decarbonise the economy in line with the Paris Climate Change Agreement (Nersisyan and Wray 2021; Kedward and Ryan-Collins 2022).

Price stability should be the primary concern when the UK Government assesses the constraints on fiscal policy. As recent events have demonstrated, the causes of inflation can have very little to do with government expenditure, but more administrative efforts should be dedicated to analysing the various inflationary and deflationary impacts of policy proposals in order to assess the need for relevant offsetting measures, and less to concerns over 'debt sustainability'.

Ultimately, from an institutional and economic perspective, there *is* a magic money tree, though it should be understood as a legislative money tree represented by the CF with recourse to Parliament. The true limits on the Government's spending power are the productive capacity of the UK economy, the political will of Government and the consent of Parliament.

References

- Akram, T. and Li, H. (2020). *The Empirics of UK Gilts' Yields*. Levy Economics Institute Working Papers.
- Auer, R., Cornelli, G. and Frost, J. (2020). *Rise of the central bank digital currencies: drivers, approaches and technologies*. BIS Working Papers, no 880, 24 August 2020. Available at: <https://www.bis.org/publ/work880.htm>
- Bank of England (1982). The role of the Bank of England in the money market. *Quarterly Bulletin*. Q3. Available at: <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/1982/the-role-of-the-boe-in-the-money-market.pdf?la=en&hash=A57288F41D630264B34C77C179AD87CFD5DC4807>.
- Bank of England (1966). Exchequer and central government finance. *Quarterly Bulletin* 29–36.
- Bank of England (1964). The Treasury Bill. *Quarterly Bulletin*. Q3, 186-193, 1 September 1964. Available at: <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/1964/the-treasury-bill.pdf?la=en&hash=35B4A02E0BBEE382CC10D49A6E1A32EB61135FA>
- Bank of England (1963). The management of money day by day. *Quarterly Bulletin* 15–21.
- Banking Act (2009). Available at: https://www.legislation.gov.uk/ukpga/2009/1/pdfs/ukpga_20090001_en.pdf.
- Bartsch, E., Bénassy-Quéré, A., Corsetti, G. and Debrun, X. (2020). It's all in the Mix. How Monetary and Fiscal Policies can Work or Fail *Together*. Geneva ICMB International Center for Monetary and Banking Studies., ISBN: 978-1-912179-39-8.
- Bell, S. (2001). The role of the state and the hierarchy of money. *Cambridge Journal of Economics* 25, 149–163. <https://doi.org/10.1093/cje/25.2.149>.
- Bell, S. (2000). Do Taxes and Bonds Finance Government Spending? *Journal of Economic Issues* 34, 603–620. <https://doi.org/10.1080/00213624.2000.11506296>.
- Bell, S. and Wray, L.R. (2002). Fiscal effects on reserves and the independence of the Fed. *Journal of Post Keynesian Economics* 25, 263–271. <https://doi.org/10.1080/01603477.2002.11051356>.
- Berkeley, A., Tye, R. and Wilson, N. (2021). An Accounting Model of the UK Exchequer, 2nd Ed. <http://gimms.org.uk/wp-content/uploads/2021/02/An-Accounting-Model-of-the-UK-Exchequer-2nd-edition.pdf>.
- Blanchard, O. (2019). Public Debt and Low Interest Rates. *American Economic Review* 109, 1197–1229. <https://doi.org/10.1257/aer.109.4.1197>.
- Blanchard, O. and Galí, J. (2007). Real Wage Rigidities and the New Keynesian Model. *Journal of Money, Credit and Banking* 39, 35–65. <https://doi.org/10.1111/j.1538-4616.2007.00015.x>.
- Blanchard, O., Philippon, T. and Pisani-Ferry, J. (2020). A new policy toolkit is needed as countries exit COVID-19 lockdowns, *Policy Contribution*. Bruegel.
- Blanchard, O. and Pisani-Ferry, J. (2020). Monetisation: Do not panic. VoxEU.org. Available at <https://voxeu.org/article/monetisation-do-not-panic> (accessed 26 October 2021).
- Brand, C., Bielecki, M. and Penalver, A. (2018). The natural rate of interest: estimates, drivers, and challenges to monetary policy. *ECB Occasional Paper*, (217).
- Brittain, H. (1959). *The British Budgetary System*. Allen & Unwin, London.
- Cameron, D. (2013). Economy speech delivered by David Cameron. <https://www.gov.uk/government/speeches/economy-speech-delivered-by-david-cameron> (accessed 15 October 2021).
- Cesaratto, S. (2016). The state spends first: Logic, facts, fictions, open questions. *Journal of Post Keynesian Economics* 39, 44–71. Available at: <https://doi.org/10.1080/01603477.2016.1147333>
- Chugh, S.K. (2015). *Modern Macroeconomics*. MIT Press, Cambridge, MA.
- Clews, R. and Salmon, C. (2010). The Bank's money market framework. *Quarterly Bulletin* 2010, 292–301.
- Debt Management Office (2021). Debt management report 2021 to 2022. HM Government, London.
- Deutsche Bundesbank (2017). Die Rolle von Banken, Nichtbanken und Zentralbank im Geldschöpfungsprozess (No. 15), Deutsche Bundesbank Monatsbricht. Deutsche Bundesbank, Frankfurt.

- Exchequer and Audit Departments Act, (1866). Statute Law Database. Available at <https://www.legislation.gov.uk/ukpga/Vict/29-30/39>.
- Felipe, J., and Fullwiler, S. (2021). How 'monetization' really works—examples from three Asian nations' responses to COVID-19. *Review of Political Economy*, 1-23.
- Fiebigler, B. (2012). *Modern Money Theory and the 'Real-World' Accounting of 1-1 < 0: The U.S. Treasury Does Not Spend as per a Bank*. UMASS PERI Working Paper Series 279, 1–17.
- Finance Act (1954). Statute Law Database. Available at <https://www.legislation.gov.uk/ukpga/Eliz2/2-3/44/section/35>.
- Financial Services and Markets Act (2000). Available at <https://www.legislation.gov.uk/ukpga/2000/8/contents>.
- Fischer, S. and Easterly, W. (1990). The Economics of the Government Budget Constraint. *The World Bank Research Observer* 5, 127–142.
- Forstater, M. and Mosler, W.B. (2005). The Natural Rate of Interest Is Zero. *Journal of Economic Issues* 39, 535–542. <https://doi.org/10.1080/00213624.2005.11506832>.
- Fullwiler, S.T. (2020). When the Interest Rate on the National Debt Is a Policy Variable (and "Printing Money" Does Not Apply). *Public Budgeting & Finance*. <https://doi.org/10.1111/pbaf.12249>
- Fullwiler, S.T. (2017). Modern Central Bank Operations – The General Principles, in: Rochon, L.P., Rossi, S. (Eds.), *Advances in Endogenous Money Analysis*. Edward Elgar, Cheltenham, pp. 50–87. <https://doi.org/10.4337/9781783472246.00011>.
- Furman, J. and Summers, L. (2020). *A Reconsideration of Fiscal Policy in the Era of Low Interest Rates*. Brookings institute, unpublished manuscript
- Galí, J. (2020). Helicopter money: The time is now. VoxEU.org. Available at <https://voxeu.org/article/helicopter-money-time-now> (accessed 10.26.21).
- Gabor, D. (2016). The (impossible) repo trinity: the political economy of repo markets. *Review of international political economy*, 23(6), 967-1000.
- Gabor, D. and Ban, C. (2016). Banking on bonds: The new links between states and markets. *JCMS: Journal of Common Market Studies*, 54(3), 617-635.
- Goodfriend, M. (2007). How the World Achieved Consensus on Monetary Policy. *The Journal of Economic Perspectives* 21, 47–68.
- Goodhart, Charles A.E. (1998). The two concepts of money: implications for the analysis of optimal currency areas. *European Journal of Political Economy* 14, 3: 40-432.
- He, Zengping, and Genliang Jia. (2020). An Institutional Analysis of China's Reform of Their Monetary Policy Framework. *Journal of Economic Issues* 54, no. 3: 838-854.
- Hills, J.W. and Fellowes, E.A. (1932). *British government finance*. Columbia University Press: Columbia
- HM Treasury (2021). Consolidated Fund Account 2020-21, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1018479/CCS0921300720-001_HMT_Consolidated_Fund_CF_Web_Accessible.pdf
- HM Treasury (2020a). Reply to the Freedom of Information Act 2000 request on accounting practices by Andrew Berkeley on 1 February 2020.
- HM Treasury (2020b). HM Treasury Annual Report and Accounts 2019-20, available at <https://www.gov.uk/government/publications/hm-treasury-annual-report-and-accounts-2019-to-2020>.
- HM Treasury (2018). Financial relationship between HM Treasury and the Bank of England: memorandum of understanding, available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718481/The_Financial_Relationship_between_the_Treasury_and_the_Bank_of_England_-_MoU_web.pdf.
- HMRC (2021). Reply to the Freedom of Information Act 2000 request. Transfers from the General Account of the Commissioners of Inland Revenue to the Consolidated Fund at the Bank of England by Richard Tye.
- House of Lords (2021). House of Lords – Quantitative easing: a dangerous addiction? – Economic Affairs Committee [Online]. House of Lords. [Accessed 13 March 2022]. Available from: <https://publications.parliament.uk/pa/ld5802/ldselect/ldeconaf/42/4209.htm>.

- Ingham, G.K. (2004). *The Nature of Money*. Polity, Cambridge, UK ; Malden, MA.
- Innes, A.M. (1914). The Credit Theory of Money. *Banking Law Journal* 151–168.
- 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 12.
- Johnson, B. and Sunak, R. (2022). We must stick to our recovery plan — tax will rise to pay for it. *Sunday Times*, 29 January 2022. Available at <https://www.thetimes.co.uk/article/we-must-stick-to-our-recovery-plan-tax-will-rise-to-pay-for-it-zhk8v7rcv>.
- Joyce, M., Tong, M. and Woods, R. (2011). The United Kingdom's quantitative easing policy: design, operation and impact. *Bank of England Quarterly Bulletin*.
- Kedward, K. and Ryan-Collins, J. (2022). A Green New Deal: Opportunities and Constraints, in: Arestis, P., Sawyer, M. (Eds.), *Economic Policies for Sustainability and Resilience: International Papers in Political Economy*. Palgrave Macmillan, Cham.
- Keynes, J.M. (1930). *A Treatise on Money*. Harcourt, New York.
- Kiguel, M.A. (1989). Budget deficits, stability, and the monetary dynamics of hyperinflation. *Journal of Money, Credit and Banking* 21, 148–157.
- Knapp, G.F. (2013). *The State Theory of Money*. Martino Fine Books, Mansfield Centre, CT.
- Lavoie, M. (2013). The Monetary and Fiscal Nexus of Neo-Chartalism: A Friendly Critique. *Journal of Economic Issues*. <https://doi.org/10.2753/JEI0021-3624470101>
- Lavoie, M. (1984). The endogenous flow of credit and the post Keynesian theory of money. *Journal of Economic Issues* 18, 771–797.
- Leone, A. (1991). *Effectiveness and Implications of Limits on Central Bank Credit to the Government. The Evolving Role of Central Banks*, IMF 363–413.
- Lerner, A.P. (1943). Functional finance and the federal debt. *Social Research* 10, 38–51.
- McLeay, M., Radia, A. and Thomas, R. (2014). Money creation in the modern economy. *Bank of England Quarterly Bulletin* 54.
- Mehrling, P. (2012). The Inherent Hierarchy of Money, in: *Social Fairness and Economics*. Routledge.
- Minsky, H. (2008). *Stabilizing an Unstable Economy*. McGraw-Hill Education, New York, NY.
- Miscellaneous Financial Provisions Act (1946). Statute Law Database. Available at <https://www.legislation.gov.uk/ukpga/Geo6/9-10/40/contents>.
- Mitchell, W.F. (1998). The Buffer Stock Employment Model and the NAIRU: The Path to Full Employment. *Journal of Economic Issues* 32, 547–555. <https://doi.org/10.1080/00213624.1998.11506063>.
- Moore, B.J. (1983). Unpacking the post Keynesian black box: bank lending and the money supply. *Journal of Post Keynesian Economics* 5, 537–556.
- Mosler, Warren. (2004) *Revisiting the Liberal Agenda*. C-FEPS Special Report 04/02, Kansas City, Mo.: Center for Full Employment and Price Stability.
- Mosler, W. (2010). Seven deadly innocent frauds of economic policy. Valance, St. Croix, U.S.V.I.
- National Audit Office. (2009). Government cash management. Stationery Office, London.
- National Loans Act (1968). National Loans Act. Statute Law Database.
- Nersisyan, Y and Wray, L.R. (2021). Can we afford the Green New Deal? *Journal of Post Keynesian Economics* 44, 68–88. <https://doi.org/10.1080/01603477.2020.1835499>.
- Palley, T.I. (2015). Money, Fiscal Policy, and Interest Rates: A Critique of Modern Monetary Theory. null 27, 1–23. <https://doi.org/10.1080/09538259.2014.957466>
- Pantelopoulous, G. and Watts, M. (2021). Voluntary and Involuntary Constraints on the Conduct of Macroeconomic Policy: An Application to the UK. *Journal of Economic Issues* 55, 225–245. <https://doi.org/10.1080/00213624.2021.1877040>
- Rochon, L.-P. (1999). The creation and circulation of endogenous money: a circuit dynamique approach. *Journal of Economic Issues* 33, 1–21.

- Romer, D. (2019). *Advanced Macroeconomics*, Fifth Edition. ed, The McGraw-Hill series in economics. McGraw-Hill Education, Dubuque.
- Ryan-Collins, J., Greenham, T., Werner, R. and Jackson, A. (2012). *Where Does Money Come From?*, 2nd edition. ed. New Economics Foundation, London.
- Sargent, T.J. and Wallace, N. (1981). Some unpleasant monetarist arithmetic. *Quarterly Review* 5.
- Sargent, T.J. and Wallace, N. (1973). Rational expectations and the dynamics of hyperinflation. *International Economic Review* 14, 328–350.
- Sissoko, C. (2020). The Collateral Supply Effect on Central Bank Policy (21 August 2020). Available at SSRN: <https://ssrn.com/abstract=3545546>.
- Smithin, J. (2000). *What is Money?* Routledge, Oxford.
- Storm, S. (2020). Secular stagnation, loanable funds and demography: why the zero lower bound is not the problem, in: *Economic Growth and Macroeconomic Stabilization Policies in Post-Keynesian Economics*. Edward Elgar Publishing, pp. 90–106. <https://doi.org/10.4337/9781786439574.00014>
- Tcherneva, P.R. (2020). *The Case for a Job Guarantee*, 1st Edition. ed. Polity.
- Treasury Select Committee (2000). House of Commons – Treasury, Minutes of Evidence. URL: <https://publications.parliament.uk/pa/cm199900/cmselect/cmtreasy/154/cor15402.htm> (accessed 3.4.22).
- Tymoigne, E. (2014). Modern Money Theory and Interrelations Between the Treasury and Central Bank: The Case of the United States. *Journal of Economic Issues* 48, 641–662. <https://doi.org/10.2753/JEI0021-3624480303>.
- Tymoigne, E. (2016). Government monetary and fiscal operations: generalising the endogenous money approach. *Cambridge Journal of Economics* 40, 1317–1332. <https://doi.org/10.1093/cje/bew012>.
- Tymoigne, E. and Wray, L.R. (2015). Modern Money Theory: A Reply to Palley. *Review of Political Economy* 27, 24–44. <https://doi.org/10.1080/09538259.2014.957471>.
- Voldsgaard, A. and Højmark, E. (2021). Jobgaranti-reform: Potentialer og udfordringer i en dansk kontekst. *Samfundsøkonomen*, 62–77.
- Vissing-Jorgensen, A. (2021). The treasury market in spring 2020 and the response of the federal reserve. *Journal of Monetary Economics*, 124, 19-47.
- van Lerven, F., Stirling, A. and Prieg, L. (2021). Calling time: Replacing the fiscal rules with fiscal referees [Online]. New Economics Foundation. [Accessed 14 March 2022]. Available from: <https://neweconomics.org/2021/10/calling-time>.
- Werner, R.A. (2014). Can banks individually create money out of nothing? The theories and the empirical evidence. *International Review of Financial Analysis* 36, 1–19.
- Wray, L.R. ed. (2004). *Credit and State Theories of Money: The Contributions of A. Mitchell Innes*. Edward Elgar, Cheltenham, UK; Northampton, MA, USA.
- Wray, L.R. (1998). *Understanding Modern Money*. Edward Elgar Publishing.

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