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Unconventional Monetary Policies and Central Bank Profits: Seigniorage as Fiscal Revenue in the Aftermath of the Global Financial Crisis

by

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ABSTRACT

This study investigates the evolution of central bank profits as fiscal revenue (or: seigniorage) before and in the aftermath of the global financial crisis of 2008–9, focusing on a select group of central banks—namely the Bank of England, the United States Federal Reserve System, the Bank of Japan, the Swiss National Bank, the European Central Bank, and the Eurosystem (specifically Deutsche Bundesbank, Banca d'Italia, and Banco de España)—and the impact of experimental monetary policies on central bank profits, profit distributions, and financial buffers, and the outlook for these measures going forward as monetary policies are seeing their gradual "normalization."

Seigniorage exposes the connections between currency issuance and public finances, and between monetary and fiscal policies. Central banks' financial independence rests on seigniorage, and in normal times seigniorage largely derives from the note issue supplemented by "own" resources. Essentially, the central bank's income-earning assets represent fiscal wealth, a national treasure hoard that supports its central banking functionality. This analysis sheds new light on the interdependencies between monetary and fiscal policies.

Just as the size and composition of central bank balance sheets experienced huge changes in the context of experimental monetary policies, this study's findings also indicate significant changes regarding central banks' profits, profit distributions, and financial buffers in the aftermath of the crisis, with considerable cross-country variation.

KEYWORDS: Central Bank Profits; Seigniorage; Financial Crisis; Unconventional Monetary Policy; Monetary and Fiscal Policy; Central Bank Capital; Helicopter Money; Cryptocurrencies; Bitcoin

JEL CLASSIFICATIONS: E41; E52; E58; E62; E65; G01

1. INTRODUCTION

In the aftermath of the global financial crisis (GFC), the complex interdependencies between monetary and fiscal policies have attracted some fresh attention. As fiscal policies in both the euro area and the United States prematurely reversed course toward austerity, central banks felt obliged to push conventional monetary policies to the limit and continue experimenting with nonstandard measures (such as "forward guidance" and "balance sheet policies") aimed at either "quantitative easing" (QE) and/or "credit easing," as well as negative interest rate policies (Borio and Disyatat 2010; Borio and Zabai 2016).

As a result, central banks' balance sheets have changed quite dramatically in terms of both their size and composition (see Pattipeilohy 2016); Ferguson, Schaab, and Schularick (2014) provide some historical context. In this way monetary policy operations have become closely intertwined with and quite similar to debt management operations (Goodhart 2010; Turner 2010), traditionally directed at financing the public debt at minimum cost over time. In fact, by actively reducing interest rates along the whole yield curve, central bank operations have significantly reduced the "interest burden on the public debt" as a byproduct, boosting fiscal space accordingly (whether or not governments have actually made constructive use of their so-enlarged scope for progrowth fiscal action). Furthermore, by nourishing economic recovery, experimental monetary policies have also more generally contributed to improving fiscal positions through the working of automatic fiscal stabilizers.

As one peculiar facet of the complex interrelationship between monetary and fiscal policies, which is closely related to the observed changes in the size and composition of central banks' balance sheets, the evolution of central bank profits in the aftermath of the GFC is of some interest in its own right. Traditionally referred to as "seigniorage," central bank profits arise from, broadly speaking, the issuance of the currency. As central banks are typically state-owned public institutions (although certain central banks continue to feature some residual and typically nominal private "ownership" as well), central bank profits therefore generally represent (potential) fiscal revenue (Buiter 2007). Monetary policy can thus also have more direct fiscal repercussions, above and beyond any fiscal savings in terms of the interest burden on the

national debt that may arise from reduced interest rate levels and improved public finances owing to economic recovery.

This paper investigates the evolution of central bank profits as fiscal revenue before and in the aftermath of the GFC. How did the experimental or nonstandard monetary policies impact central bank profits in recent years? Are there any related risks contained on their balance sheets today as a result of those policies? How do central banks account for those risks in determining their profit distribution to their respective treasuries or finance ministries? And what are the prospects for central bank profits and profit remittances going forward as, supposedly, monetary policies will be gradually "normalized" in future years?

This study focuses on a select group of central banks—the Bank of England, the United States the Federal Reserve System, the Bank of Japan, the Swiss National Bank, the European Central Bank, and the Eurosystem (specifically Deutsche Bundesbank, Banca d'Italia, and Banco de España)—that have engaged in experimental monetary policies in response to the GFC.

We first explore the analytics of how certain central bank policies impact their balance sheets and profits (sections 2 and 3), and then empirically investigate actual developments for the above group of central banks (sections 4 to 11). While balance sheet statistics are available at higher frequencies, the data sources focused on here are central bank annual reports featuring their year-end balance sheets and annual income statements. Section 12 briefly reflects on some related issues such as "helicopter money," "QE for the people," "sovereign money," and "cryptocurrencies." Section 13 concludes.

Findings indicate significant changes regarding central banks' profits, profit remittances, and financial buffers in the aftermath of the GFC, with considerable cross-country variation. This analysis sheds new light on the interdependencies between monetary and fiscal policies, particularly the evolution of seigniorage in the aftermath of the GFC, as well as in the future.

2. SEIGNIORAGE AND CENTRAL BANK PROFIT REMITTANCES: CONCEPTUAL AND PRACTICAL ISSUES

There are two principle ways for a government to issue its currency. One is to mint or print and to essentially spend the money into existence by buying goods and services (or paying employees, making transfers, etc.). The other is to have a (central) bank issue its monetary liabilities by buying assets or making loans. Either way, issuing money tends to be profitable. But the "mint/print and spend" (MPS) approach to currency issuance and the "banking approach" differ in important ways.

In the first case the profit from money issuance arises from any difference between what the new money buys and what it costs to mint or print it. In the second case the profit arises from the interest rate spread between earnings on the (central) bank's assets and payments on its monetary liabilities, apart from the operating expenses of the bank. The notion of seigniorage has come to broadly describe both forms of fiscal revenue from currency issuance. But even in modern times, when the note issue conventionally appears among the liabilities of a central bank's balance sheet, it is useful to keep strictly separate the two ways in which seigniorage as fiscal revenue can arise in practice.

As issuing money is a profitable activity, it is bound to attract competition and imitation. The historical origin of the notion of seigniorage lies in the sovereign's (seigneur's) power of using mintage to extract a difference between the face value of a coin and its cost of production. Officially a fee for providing a monetary instrument of certified monetary content and value—since without this certification traders had to use the services of a money changer to assay and value the coins being used—seigniorage may be seen as a form of fiscal rent extraction or tax. Early discussions of the risks associated with currency issuance centered on the temptation for overcharging on the part of the seigneur on the one hand, and competition (commercial or illicit) featuring either the provision of substitute monetary financial instruments or the counterfeiting (and "clipping") of official currency on the other.

Today, ignoring the ongoing "cryptocurrency" mania for a moment, only a few contemporary monetary economists continue to see special merit in the fact that a commodity money may face "natural" limits to its supply and hence "manipulation" by the issuer. In general, economists view the resource costs involved in the production of commodity money and the rigidity in its supply as compelling counterarguments: having a central bank as the guarantor of an "elastic currency" and as safeguard of the financial system built upon it wins that contest hands down.

Historically, moving on from commodity to paper or so-called "fiat" money amounts to maximizing the seigniorage profit margin in money issuance, as the marginal printing costs of bank notes are effectively zero. In line with the material lightness and technical ease of production, the move to fiat money may well also boost the temptation for overissuance on the part of the sovereign and heighten competition and financial ingenuity applied in providing equally fluid private substitutes for the banknotes that achieved monopoly and legal tender status at some point. Historical instances of official overissuance—government recourse to the legendary "printing press"—do exist. But the far more relevant issue is that for quite some time now private issuers have largely crowded out the sovereign and taken over the money business except for only a residual note issue accounted for as a central bank liability. In an important sense, however, private—albeit state-licensed—issuers of bank money feature partnerships between the state and bank shareholders, in which the former is usually taking the backseat (except during crises).

In terms of monetary theory, Keynes assumed already in his *Treatise on Money* that all money in the hands of the public was "bank money." Prior to the GFC, monetary realities accorded ever more closely to that model: contemporary money is predominantly provided by commercial banks, i.e., "monetary financial institutions" engaged in the "deposit-taking" business. Banks, as regulated financial institutions, may compete with other (un- or less regulated) financial institutions issuing near-money substitutes. Banknotes issued by central banks, and provided to the public through banks, are in fact a mere residual. The business of money issuance remains a contested market. Today, both bank deposits and banknotes are said to face fresh competition from new cryptocurrency forms that seem to offer certain advantages.

A broader notion of seigniorage as income from issuing money includes commercial banks. Bank deposits are created when banks make loans or buy ("monetize") assets. In other words, banks issue their monetary liabilities by buying assets and making loans. This neither means that monetary liabilities so created by some bank remain permanently tied to any specific loans or asset purchases from which they first originated nor that there is no limit to creating money "out of thin air." Issuance of monetary instruments is but one aspect of their commercial interests and the broader challenges of managing a bank's balance sheet features the need to accommodate clients' use of their monetary liabilities. The decision to make a loan or monetize an asset is based on the expectation of earning a profit on the transaction. Banks' provision of bank money is part of a broader banking business model that features payments and liquidity services provided to the public, among others. Banking profits, too, thus arise from more than just the business of money issuance and liquidity provision.

When focusing more narrowly on banking profits from money creation, it may be tempting to view the full monetary value of the assets monetized (or loans made) as the "profit" from money creation. And the control and power over any assets and claims acquired in the process of "monetization" does indeed come with manifest advantages. But the actual income gained therefrom consists, strictly speaking, only of the "yield spread" between what a bank earns on its assets and whatever it may pay on its monetary liabilities, augmented by any fees obtained in the process and reduced by its operating expenses. Risks are involved, too. The monetized assets may experience capital gains or losses. Loans may be repaid in full or only in part, on time or belated. Income streams from money provision may thus be volatile. Banks as money providers may even go under in the process.

Permitting and enabling the silent "privatization" of the money business, modern central banks have only retained a small residual, consisting largely in the form of any remaining demand for banknotes. Depending mainly on the preferences of the public and the efficiency of the retail payment system, the share of banknotes in broader monetary aggregates has fallen to very low levels in some advanced economies (Sweden, Norway, Denmark, the United Kingdom, and Korea, for instance). While day-to-day use of banknotes is still more common in some other countries, broad longer-term trends were all pointing in the same—declining—direction until the

GFC struck. The low interest environment this event heralded appears to have halted this trend, at least temporarily (Bech et al. 2018; Deutsche Bundesbank 2018; UBS 2018).

Trend declines in domestic currency banknotes apart, some currencies, especially the US dollar and euro banknotes, are also benefitting from widespread international use (Fischer 1982; Judson and Porter 1996; Jefferson 1998; Judson 2012; Bartzsch and Uhl 2017). Furthermore, some currencies, especially the euro and the Swiss franc, enjoy enhanced popularity in facilitating illegal activities, owing to their availability in the form of large-denomination banknotes.

Prior to the GFC, monetary liabilities of central banks other than banknotes had generally shrunk to very low levels. Few central banks have any private nonbank depositors. In many countries, even the official sector has moved its liquidity management away from its historical "house bank" and today mainly uses accounts and payment services provided by private banks. Moreover, while some countries have altogether abolished minimum reserve requirements, others have reduced such requirements to low levels. In any case, under normal conditions, central banks' banking clients tend(ed) to strictly economize on their deposits ("reserves") at the central bank, as the attractiveness of central bank deposits as a safe asset and the ultimate settlement asset in payments is weighed against their low yield.

Central banks, too,—as banks—issue their monetary liabilities by buying assets and making loans: the banking approach to currency issuance. Similar to private banks' money business, central banks' income and profits from money issuance primarily arise from the spread between the income earned on the assets that they chose to monetize and any interest they may pay on their monetary base. Similar to private banks, central banks' balance sheets and derived income and profit streams may encompass more than the monetary base and its asset counterparts, reflecting either central banking tasks and functions beyond the implementation of monetary policy and/or remnants of private ownership and retained earnings (as well as pension provisions on behalf of their own staff, for instance).

While central bank assets monetized in the process of implementing standard monetary policies (primarily either government debt securities or well-collateralized loans to banks) are generally

of low risk, central banks, too, can incur losses. Historically, central bank losses have arisen primarily from two sources: currency market interventions and emergency (bank rescue) operations that went foul.

As public institutions, which is the norm today, even as some central banks may continue to nominally feature remnants of private ownership, central bank profits and losses are commonly due to their treasury. Net interest income is typically the biggest source of any central bank profit. Net interest income arises from the fact that central banks earn interest income on their assets but pay no or little interest on their monetary liabilities. Net interest income thus depends on the size of the interest rate spread (earnings on assets over interest payments on liabilities) and the overall size of their balance sheet and monetary base. On the other hand, central banks' operating costs largely consist of employee remuneration plus other expenses arising from the administration of the central bank. Any cost related to currency provision itself, particularly banknote printing, are only a minor affair.

Capital gains and losses and the provisioning for risks complicate this otherwise straightforward matter somewhat, or, under special circumstances, greatly. In any case, accounting rules condition how much profit a central bank will actually book in any particular year and how much of it the central bank may remit to the treasury in the same year (or, typically, in the following year; see Archer and Moser Boehm [2013]; Bholat and Darbyshire [2016]; Bunea at al. [2016]). While realized capital gains and losses generally impact the profit account fully in the same year in which they arise, unrealized ("marked-to-market") gains and losses may be treated differently: while unrealized losses may reduce profit immediately, unrealized gains may instead be booked under a "revaluation account," thereby neutralizing its impact on current profit.

Furthermore, provisioning for risks related to the central bank's assets and operations will generally reduce profit in the year in which provisions are built up, but may effectively raise profit in later years when any risks provisioned for either actualize or not (while any provisioning for new or greater risks falls short of previous buildups released in the same year). Overall, provisioning for risks should have a smoothing effect on central bank profits, but not reduce them overall and over time.

Central bank laws and accounting rules for central bank capital and reserves determine whether central bank profits are remitted to the treasury in full in the year in which they arise or not. Typically, laws prescribe fairly low levels of central bank capital (in relation to their assets). In addition, a gradual buildup of reserves—supplementing central bank capital as an additional financial buffer in case of losses—may be foreseen, either up to some set amount or ratio, or without any specified limit.

During the phase of building up capital and/or reserves from retained earnings, profit remittances to the treasury get accordingly reduced. Once central bank capital and reserves have reached their statutory level, they can act as a buffer that may bolster profit remittances in years in which the central bank incurs unusually low profits or even losses. The same holds for revaluation accounts that neutralize any unrealized capital gains on profits during buildup. Overall, capital and reserves and other financial buffers like revaluation accounts should have a smoothing effect on profit remittances to the treasury. If no limits are specified, a central bank's capital and financial buffers may grow into a sizeable national treasure hoard—boosting the central banks' earnings on its "own" assets accordingly.

From an economic perspective, the particular level of central bank capital and reserves set by law is purely arbitrary. In principle, central banks may operate with any positive level of capital (and reserves), and equally with zero or even negative capital—up to a point. A central bank with negative capital has liabilities in excess of its assets. A commercial bank (or nonfinancial corporation) would be insolvent under such circumstances. For a central bank, the only immediate effect of a "hole" on the asset side of its balance sheet is that its income will be correspondingly smaller. Outside perceptions of its solidity may become a concern at some point. But, in principle, as long as the central bank can cover its operational expenses from its remaining net interest earnings (plus/minus any other net income) it cannot only continue to function without any outright (fiscal) support from the treasury/government, but also remain in a position to conduct its monetary policy affairs as usual.[1]

[1] On this somewhat controversial issue, see, Leone (1994), Stella (1997, 2005), Bindseil, Manzanares, and Weller (2004), Dzlobek and Dalton (2005), Buiter (2008), Ize and Qulidi (2009), Cukierman (2011), Archer and Moser Boehm (2013), Del Negro and Sims (2015), Hall and Reis (2015), and Goncharov, Ioannidov, and Schmalz (2017), for instance.

To illustrate this important point, consider the occurrence of losses on the part of a central bank. For instance, losses from currency market interventions may arise either if foreign exchange reserves acquired through interventions directed at containing pressures for currency appreciation get devalued at some later time, or if foreign currency loans taken up in the process of defending the domestic currency need to be repaid at some later time at a meanwhile revalued rate. In either case, there is a capital loss and corresponding "write-off" need that will reduce the current profit—and possibly central bank equity—accordingly. If central bank equity gets impaired, future earnings on its assets (reduced by losses) will be correspondingly lower, forever. Or, if rebuilding of capital from retained earnings is chosen instead, profit distributions would be lowered as a result, temporarily. Assuming currency market interventions are sterilized to offset any liquidity effects and maintain the given monetary policy stance, yield differentials between foreign and domestic assets would also affect the intervening central bank's earnings.

Consider next the case of losses on emergency loans. Typically, these will be loans made in the context of a bank rescue. (But it could also be loans made to the government, perhaps at no or reduced interest rates, that the government later choses to not repay.) Two aspects of such rescue operations are relevant. First, the liquidity provided by the central bank will benefit some particular party that is the subject of the (emergency/rescue) loan, be it a troubled bank (and its creditors) or the government.

Second, assuming that the central bank sets some positive operational interest rate target and supplies reserves endogenously, it will need to "mop up" the extra liquidity provided in the rescue in some way, either by selling some (interest-yielding) asset or by issuing some (interest-paying) nonmonetary central bank liability. In either case, the liquidity-absorbing operation will reduce its net interest earnings.

Of course the interest earned on the emergency operation may (more than) offset this income loss for as long as the rescue is successful. Bank rescues—and even financial crises—can boost central bank profits. If the central bank acts as lender of last resort (LOLR) in support of temporarily illiquid players or assets, it is likely to make a profit. By contrast, if any rescue loans do not get repaid, in a case of insolvency rather than illiquidity, the central bank would suffer a

permanent income loss from that time onward when servicing those loans fails. (Similarly, in case of a low-interest loan to the government, the central bank's income would be correspondingly lower forever.)

In principle, a central bank can suffer loan/capital losses and corresponding income losses without consequences to itself, at least up to the point that still allows it to cover its operating expenses; the financial consequences would fall solely on the treasury in the form of correspondingly reduced profit remittances. Once this limiting point is reached, the central bank, too, will be directly affected: it would become just like any other public authority that requires fiscal support for its own operations.

Alternatively, the central bank could adapt its monetary policy operations in such a way as to start covering its operational expenses (i.e., paying its staff) through direct central bank liquidity creation. Instead of acquiring assets that yield interest income and thus help to cover its future operational expenses, the central bank would have no asset to book as the counterpart for the liquidity created. Again, in principle, it might still be possible to operate and implement monetary policy with such a "purely monetary" balance sheet (i.e., with negative equity that is equal to the monetary base) since banknotes do not constitute a proper liability that might need to be redeemed into anything else—up to a point.

For once the liquidity created for its own administrative functioning (or anything else) exceeds the liquidity required from an operational point of view, the central bank would lose the ability to set a positive interest rate in money markets. Issuing nonmonetary liabilities to mop up excess liquidity in an operational framework that sets a floor to interest rates does not change this monetary constraint either, as interest payments (to banks) would further "crowd out" any available room for covering the central bank's own administrative expenses (or anything else); the higher the interest rate target, the more so. In other words, the central bank would find itself in a "Ponzi-like" position: only falling (including negative) interest rates might further sustain its vulnerable position. As a last resort, the central bank could try to charge higher "fees" on its services provided to banks or simply require banks to hold extra—non-interest-yielding!—

central bank liquidity (i.e., raised minimum reserve requirements). Illustrating the nature of seigniorage, the banks might well see this as a fiscal rather than a monetary policy measure.

Suffice to mention that a central bank in this position would lack any scope for conducting bank (or other) rescue operations. It would likely also be unable to borrow foreign exchange to defend the currency against depreciation (by assumption, it has not acquired any foreign reserves that it could sell with the aim of stemming currency depreciation anyway). In short, the "central bank" would not only be vulnerable but become increasingly ineffective and useless as a bank as well. In fact, from the government's perspective, the evolution depicted here constitutes a move away from the banking approach to currency issuance toward the MPS approach.

Therefore, to maintain a functional central bank, the government might well prefer to "recapitalize" the central bank long before any limiting point would otherwise be reached. Recapitalizing a central bank requires no more than simply handing over (income earning) public debt securities to its monetary agent. One may be tempted here to think of such a maneuver as fiscally costless, a "free lunch." As it appears, it is merely a "round-tripping" activity: the treasury pays interest on the debt—the asset that recapitalized the central bank—to the central bank, only for the central bank to then send back the interest earned on its "monetized" assets to the treasury as profit.

But that would assume that the central bank could actually cover its operating expenses without this measure. A central bank that has no other income will first deduct its own operating expenses before remitting back to the treasury any remaining income on the securities it was handed by its government. Seen in this way, the debt securities handed over to the central bank in a "recapitalization" operation are an alternative way to cover the central bank's operating expenses other than through normal governmental budgetary allocations on an ongoing basis.

More importantly, whatever the statutory level of its capital may be, the central bank's income-yielding assets provide a buffer the central bank can afford to lose in any rescue or policy operations without thereby losing control over monetary policy and constraining the scope for further risky operations in the future. Just as any seigniorage profit—naturally arising as a

byproduct of monetary policy operations—constitutes fiscal income, so does the asset counterpart to the monetary base as well as the central bank's equity capital constitute "fiscal wealth": like a special trust fund and national treasure stored in the central bank, an agent that fulfills various functions on behalf of the government.

The usefulness of a central bank as a powerful instrument of the state arises from the fact that it can create purchasing power at will, and it can do so instantly and in quantities that will usually impress other powerful financial market players. Without a central bank (or the ability to otherwise create purchasing power itself), the government would be left with its nonmonetary fiscal weapons alone: the ability to tax and issue debt. Especially under crisis conditions—when the need for rescue operations is most likely to arise, but the ability to issue debt in markets or raise tax revenue is most likely to be severely constrained—the lack of a central bank agent is bound to leave the state itself vulnerable.

Put differently, having a functional central bank at its disposal is a vital factor in rendering the state powerful, especially in crisis situations.

To summarize, from a strictly operational monetary policy perspective, the level of central bank equity may be arbitrary and meaningless. In principle, the central bank can make its operational interest rate target effective in money markets quite irrespective of the level of the central bank's equity, at least as long as its own operating expenses (or any other such pressures) do not become the primary driver of the central bank's liquidity creation.

When it comes to (potentially) loss-making emergency operations, a central bank's equity provides a buffer for any losses it can take without embarrassing the state in times of emergency. In practice, the central bank can lose significantly more than its current equity position. It can absorb losses up to the point where (much of) its monetary base no longer has any asset counterpart. Theoretically, it can absorb losses up to the point where its future liquidity creation will largely arise through paying for its own operating expenses rather than in the usual way of monetizing assets or making loans.

But even as the capacity to create money may seem limitless, there is a limit to the amount of liquidity a central bank can create while retaining its capacity to set positive interest rates and achieve its policy objectives. Hence there is also a limit to the losses a central bank can take and still remain operationally effective—since capital (and assets at its disposal) can only be lost (and sold) once.

At the limit, therefore, the central bank's negative equity is equal in size to the note issue. This would be equivalent to the treasury relying on the MPS approach to currency issuance in providing the public with cash, while perhaps another treasury department may offer settlement accounts to the banks. So the government would not lose the ability to issue currency as such—the demand for which ultimately arises from tax collection. But the currency would hardly be elastic—unless the treasury also houses another specialist LOLR department that flexibly (de-) monetizes assets and claims offered by banks on demand under specified conditions. Nor would there be any easy way to control interest rates—unless the treasury develops the necessary expertise in coordinating its note issue, banking, and debt management activities in appropriate ways.[2]

Administering these central banking functions in-house by the treasury itself—rather than outsourcing them to a central bank proper—would not be for free either. Part of the seigniorage profits from the note issue would still (at least implicitly) be "paying" for these treasury/central banking functions.

Alternatively, then, the treasury might consider setting up a specialist institution (a central bank) that can fulfill all of these functions on its behalf while operating like a bank—that is, by managing a balance sheet of income-yielding assets that, as a byproduct, provide cover of its operating expenses, and remitting only any residual seigniorage to the treasury. Essentially, the currency issuance choice remains one between an MPS authority that allows the government to

[2] Taking the MPS approach to currency issuance as the starting point, a central bank emerges as a fiscal expense, as argued by Eisenheis (see Whalen 2017): "We always like to remind people that the US Treasury issued the original $150 million in greenbacks directly into the market to help Abraham Lincoln fund the Civil War. The Fed is the Treasury's alter ego and is an expense to the government, which is subtracted from the earnings on the portfolio and then returned to the Treasury." However, the firepower and full functionality of a central bank can hardly be enjoyed for free.

directly spend money into existence covering budgetary expenses, and a bank that—like a public trust fund, independent of standard governmental budgetary processes—operates on the basis of its own net-interest earnings.

If the monetary base is the limit to a central bank's negative equity, can anything be said about any limit to central bank positive equity? Apart from any nominal seed capital, subsequent capital subscriptions, or recapitalizations, central bank equity is generally accumulated out of retained earnings (or: seigniorage profits not transferred to the treasury).

As a maximum one may therefore conceive of a central bank that never transfers any profit to its treasury but retains all its net earnings until perpetuity. The limit to its positive equity—given the central bank's policy objectives—will be driven by the demand for central bank liquidity and the interest rate spread of earnings on central bank assets over interest expenses on its liabilities, minus its operating expenses. Instead of boosting its resources without limit, the central bank may be tempted to boost its own expenses instead.

There would seem to be no good reason for any government to retain all seigniorage profits and accumulate and store rising "fiscal wealth" in its central bank until perpetuity. Generally speaking, it may be best to aim for steady transfers of seigniorage profits.

Not only may this be the best way to keep the government uninterested in the profits earned by its central bank agent at any particular time, it may also be appropriate for the central bank itself not to feel any pressures in this regard, thereby avoiding the risk of distraction from the pursuit of its policy mandate—supposedly some defined measure of the public good—without regard to the profitability of its mandate-driven operations.

None of this diminishes in any way the utmost importance of transparency and accountability in these and related matters. It is the government's duty to define the tasks, instruments, and objectives of the central bank, for the use and achievement of which the central bank must be held to account. While ultimate responsibility and accountability for economic policy inevitably

rests with the government, a high degree of transparency is required to identify and assign any policy mistakes that may arise.

3. CRISIS RESPONSE: "NONSTANDARD" MONETARY POLICIES AND POLICY "NORMALIZATION"

Under normal circumstances developments concerning a central bank's balance sheet and profitability tend to be rather boring. There will typically be some growth in the monetary base and the assets the central bank chooses to monetize in incrementally adding to its monetary liabilities. There may be some gradual changes in the structure of both its assets and liabilities over time. Normally a central bank can hardly fail to earn some profit in the process. Given that central banks have only retained a residual market share in the money business, central bank profits will normally not be spectacular; this is also because central bankers tend to be risk averse and hence focus on low-yielding assets. In general, central bank profits can be expected to move along with the business and interest rate cycle.

Things can be rather different, and far more spectacular, under unusual circumstances. Above we mentioned currency market interventions and financial crises featuring bank rescue operations as situations that can have a decisive short-term influence on central bank profits and losses. Historically, wars also need to be mentioned here. Furthermore, in view of the experience since the GFC of 2008–9 and subsequent euro crisis of 2010–16, experimental monetary policies need to be added to this list of factors that can have potentially large profit impacts.

For in response to recent crises, central banks have not only greatly expanded the size of their balance sheets, which should ceteris paribus tend to boost their contemporary profits accordingly; nonstandard policies have also significantly changed the composition of their asset portfolio, with correspondingly higher risks stored on their balance sheets today. Moreover, as the application of nonstandard policies has significantly impacted asset prices, exchange rates, and interest rate levels and spreads, these developments also concern central bank profits and

may come along with peculiar risks attached to them—risks that also concern policy "normalization."

It is of some interest that Keynes reflected upon these very issues in the 1930s, another postcrisis era that saw entrenched economic weaknesses and fragility, with contemporary questions abounding about the capacity of economies for self-healing and self-adjustment versus the effectiveness of policies. Keynes set his mind on designing experimental monetary policies that could lower interest rates along the whole yield curve. He also considered how the structure of monetary policy and the strength and financial position of the central bank might influence the conduct and effectiveness of monetary policy.

Keynes's investigations got crystalized in *The General Theory*, mainly in the form of his liquidity preference theory of interest and the notion of the "liquidity trap."

In an uncertain world, Keynes argues, the liquidity of markets and assets represents an attractive feature: staying liquid both offers safety and allows keeping one's options open. The precautionary motive for the demand for money (i.e., "liquidity par excellence" as provided by the banking system) captures these concerns. But liquidity can even be attractive as an object of speculation if other assets are expected to fall in price: the speculative motive for the demand for money, which is a bearish bet against the market. Regarding the effectiveness of monetary policy, Keynes ponders about the possibility of a liquidity trap as a situation in which the central bank fails to lower interest rates any further despite applying open market interventions.

There is a lot of confusion in the literature about the meaning of a Keynesian liquidity trap. One common interpretation has it that reaching a zero short-term (policy) interest rate would constitute a liquidity trap. This interpretation is closely related to the notion of a supposed "zero lower bound" to (nominal) interest rates (Eggertsson and Woodford 2003). This interpretation thus focuses on short-term interest rates, a view that was fundamentally challenged when some central bank smoothly transitioned from "zero interest rate policy" (ZIRP) to "negative interest rate policy" (NIRP). Discussion has since moved on to identifying some "effective lower bound" to short-term interest rates instead.

Keynes's reflections on the possibility of a liquidity trap actually concerned longer-term interest rates (or: the whole complex of interest rates other than the short-term rate conventionally controlled by the central bank anyway). Short-term interest rates were near zero in Britain in the early 1930s. In *The General Theory*, he also discusses Silvio Gesell's idea of establishing a negative short-term interest rate by essentially imposing a fee on banknotes. But Keynes's discussion concerns approaching a stationary-state economy—the Classics' vision for the long run and hence a permanent decline of interest rates to low or even negative levels.

By contrast, Keynes's practical concerns were about the short run and how far longer-term interest rates could be reduced *temporarily*. Conceivably, the expected revival of growth could undermine the effectiveness of expansionary monetary policy if the feared future monetary policy reversal drives banks into favoring liquidity today. This would be the speculative motive for the demand for money at work.

In general, Keynes argues, the banks would tend to support the monetary policy pursued by the authorities. It would normally pay for them to do so. The outsized influence of short-term interest rates on longer-term ones partly hinges on this factor. In general, the monetary authorities can also exert significant influence over longer-term interest rates by communicating their policies and guiding market expectations. But exceptional situations may arise where it would be helpful for central banks to engage in open-market operations in bond markets to exert a more direct and powerful influence.

The central bank's purchases (sales) would directly drive up (down) their price and lower (raise) their yields. For instance, in any given state of (heterogeneous) market expectations, open market interventions operate on the margin of the "bull-bear position": in the face of rising prices, pushed up by central bank purchases, some bulls will be switching sides to the bears' camp. But the authorities can also affect the state of expectations itself, through both words and actions: actions can underline their determination, and the sincerity of words may help to convince the markets and support the authorities in their endeavor. The more support from the banks (and other market players) the central bank can marshal, the less it may have to take on its own balance sheet (Bibow 2009b).

This does not mean that as soon as the central bank starts actively buying assets to push up prices and steer down yields that the system is in a liquidity trap. In fact, whenever the central bank goes out buying bonds in the open market, this will inevitably expand the liquidity in the system and the banks' reserves held at the central bank—unless the central bank simultaneously sells other assets or the banks pay off outstanding central bank debts. The question is whether the banks, watching the central bank "putting its money where her mouth is," will actively expand their balance sheet by buying other assets and extending loans, *thereby supporting the central bank in its efforts to ease financial conditions and revive the economy*.

Monetary policy hits a road block only if the banks, for fear of subsequent losses when policy reverses course, refuse to expand their balance sheets and instead start dumping assets on the market on a scale that more than offsets any upward price pressures stemming from the central bank's asset purchases. This kind of road block represents a proper Keynesian liquidity trap: the central bank fails to push interest rates lower as the banks (and market players more generally) bet sufficiently strongly against it. The central bank is pushing liquidity into the system. But this liquidity is like a "bottomless sink" that fails to stimulate anything—as interest rates refuse to decline further (or might even rise). Keynes considered this outcome conceivable but thought that skillful monetary management would go a long way to avoiding it.

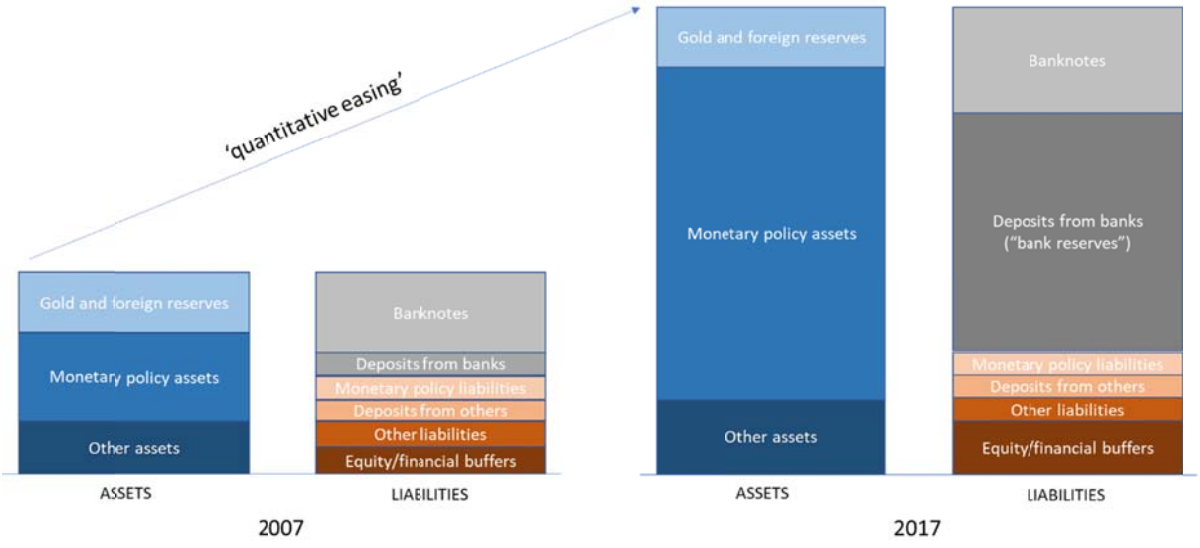
Arguably, the postcrisis experience has provided numerous examples of central banks that have indeed avoided this Keynesian liquidity trap outcome. The effectiveness of large-scale asset purchases may have declined over time and with rising purchase volumes, but not to the point where central banks were overpowered by market opposition and financial conditions started tightening against their intentions (see, for instance, Adrian and Shin [2010]; Borio and Disyatat [2010]; Gagnon et al. [2011]; Allen [2012]; Bowdler and Radia [2012]; Goodhart and Ashworth [2012]; Rogers, Scotti, and Wright [2014; and Borio and Zabei [2016]).

Avoiding liquidity traps in going in is one thing, policy normalization—withdrawing stimulus without market collapse—another.

Fear of the coming policy reversal, as inevitably implied by policy normalization, can lead banks and other players to dump bonds and assets on the market at any time, as the speculative motive for the demand for money takes over. Turning points in monetary policy and the interest rate cycle are always critical junctures. Accidents are particularly prone to happen at these times. What makes the current occasion so special is the fact that experimental monetary policies have pushed their course so far—probably further and longer than ever before. Monetary policy normalization will therefore be an exceptionally delicate affair.

The notion of "forward guidance" describes the communication of policy intentions beyond the immediate future, in this case with the aim of anchoring and aligning market expectations with the foreseen gradual path of policy normalization. Policy normalization—completing the full circle and exiting from experimental monetary policies to return to more standard ones—concerns both interest rates and central bank balance sheets. The essential challenge is to convince the banks and the markets that the normalization of interest rates will happen only very slowly and gradually. Extremely low running yields on debt securities offer little comfort in the face of feared capital losses.

Figure 1. Stylized Central Bank Balance Sheet



In terms of central bank balance sheets, completing the circle may be graphically illustrated as follows, beginning with figure 1, which shows a stylized precrisis central bank balance sheet and its postcrisis expansion through experimental monetary policies.

On the asset side are mainly foreign exchange reserves and domestic monetary policy assets, as well as other assets. Foreign exchange reserves represent a very sizeable part of some central banks' assets; in other countries they are held outside the central bank in a separate entity. In the former group there may or may not be some overlap with the portfolio of monetary policy assets that otherwise consist of domestic assets, primarily either government debt securities or secured loans to banks. Other assets include investments that are the counterpart to the central bank's capital and reserves, pension provisions, and government deposits held at the central bank, in particular.

On the liability side, the main items are the note issue and the banks' deposits (reserves) as well as the central bank's financial buffers. Any other liabilities may or may not be directly related to monetary policy. The central bank may issue nonmonetary liabilities to the banks to absorb liquidity. Government deposits may be used for the same purpose. Deposits from foreign central banks appear here. Pension provisions on behalf of central bank employees are most clearly outside the scope of monetary policy.

The experimental monetary policies pursued in response to the crisis typically greatly expanded the portfolio of domestic monetary policy assets. In the beginning, central banks put special emergency liquidity programs in place to support banks (or particular markets and nonbank financial intermediaries). Later they added large-scale asset purchase programs that either targeted government securities or particular private sector securities.

While the former represent more traditional "lending-of-last-resort" (LOLR) type measures, the latter are popularly referred to as "quantitative easing" (QE). They were "quantitative" in the sense that the authorities announced the planned volumes of their programs—and hence the liquidity these would create—at the outset. But the intended effect was to lower (benchmark) yields and indirectly ease market conditions more generally. Yet other measures more directly

target interest rate spreads and/or credit availability and are referred to as “credit easing” or “qualitative easing.” On the liability side, the impact of these policies was largely to expand bank reserves while the note issue continued its steady growth.

A priori the short-term impact of these balance sheet policies on central bank profits is ambivalent. The balance sheet expansion as such should tend to boost central bank profits, assuming that the central bank purchases income-yielding assets while paying little or nothing on its expanded monetary liabilities. But the lowering of yields and impact on spreads may come to offset this profit-boosting effect. Negative interest rate policies add further complexity. A central bank may acquire assets that pay zero or even negative interest, i.e., the central bank pays the borrower interest. At the same time, the central bank may “pay” negative interest on its liabilities (other than the note issue).

Capital gains and losses are likely to arise if the central bank’s measures have any degree of success. Realized capital gains may arise during the expansionary phase but will likely be limited, while unrealized capital gains may be neutralized (in an accounting sense) under revaluation accounts. As interest rates rise again, losses may arise during the unwinding (or: normalization) phase. Risk provisioning for potential future losses may smooth profits and profit remittances over time.

During the expansionary phase, the central bank’s monetary base and balance sheet expand at well-above trend speed; during the normalization phase they will grow at below-trend speed or even temporarily shrink. Any shrinkage may either result “naturally” (and passively) as debt instruments mature and get paid off. Or it may be achieved actively through outright sales in the market. Alternatively, absorbing market liquidity may also be achieved without shrinking the balance sheet by issuing nonmonetary liabilities (as an alternative to paying interest on “excess reserves”).

Figure 2. Stylized Postcrisis Central Bank Balance Sheet and Normalization

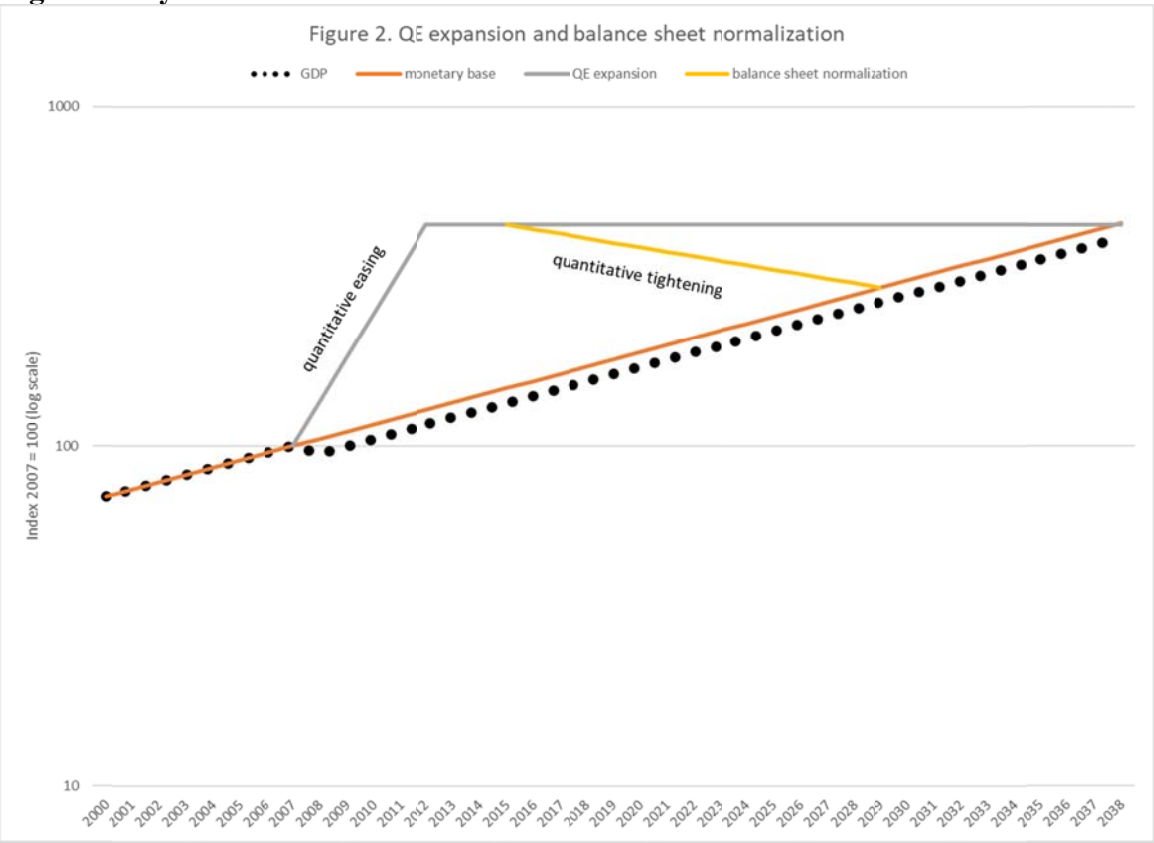


Figure 2 illustrates a full cycle of QE followed by balance sheet normalization (or: quantitative tightening). Normally growth of a central bank's balance sheet and monetary base are largely determined by the note issue, which may be expected to grow roughly in line with nominal GDP and private consumption. The above scenario assumes 5 percent trend growth for both nominal GDP and the monetary base (normalized at 2007 as the base year), except that GDP never makes up for the 2008 slump. It is an open issue at what speed—and hence over what time horizon—central banks might return to a balance sheet position resembling the precrisis situation, or perhaps establish a "new normal."[3] The above scenario assumes a five-year QE expansion phase that lifts the monetary base relative to GDP by roughly a factor of 4.5, while the normalization process (or return to trend) is depicted as more gradual (taking 16 years).

[3] There is some discussion that new bank liquidity regulations may have raised the banks' demand for liquidity in the form of central bank money, implying a permanently higher new normal (Greenwood et al. 2016; Quarles 2018). But there is also discussion that "cryptocurrencies" may crowd out the demand for banknotes, which could imply a permanently lower new normal. Cryptocurrencies and digital central bank money will be briefly discussed in section 12, below.

Assessing the likely evolution of central bank profits during the normalization phase is particularly tricky. In general, rising yields tend to boost central bank profits. But given maturity mismatches, yields on central bank assets may remain low for some time while interest expenses on liabilities normalize. *Income and/or capital losses are then likely to arise. These would be the kind of losses feared by banks that forced the central bank to "go all in" itself, with the aim of driving down interest rates nonetheless.*

Capital losses are only realized in case of outright sales. Alternatively, assets showing marked-to-market losses may stay on the balance sheet until maturity and hence capital losses remain unrealized. At least to some extent unrealized capital losses may simply reverse prior gains and perhaps shrink revaluation accounts accordingly. Transfers from risk provisions previously built up may help to buffer any impact of policy normalization on seigniorage income and profit distributions. Monetary policy normalization and seigniorage is one issue: the potential impact on the financial position of banks and other financial institutions another. But that is beyond the scope of this investigation.

Through their application of both standard and nonstandard monetary policies, central banks have impacted public finances in three broad ways since the crisis. First, by lowering the level of interest rates in the economy, central bank policies have generally lowered the interest burden on the public debt held by the public (or foreigners). This impact is visible and measurable in the form of correspondingly reduced interest service payments on the government's part and correspondingly reduced budget deficits. Second, by supporting the economy and boosting growth and employment as well as inflation, central bank policies lead to corresponding improvements in primary budget deficits via the working of the automatic stabilizers.

Finally, monetary policy operations have impacted central bank profits directly. The extent to which they have impacted profits, capital, and profit distributions since the crisis—and might do so going forward until policies and balance sheets get normalized—will be the focus of the analysis here. In the following we will discuss various case studies, beginning with the Bank of England.

4. THE BANK OF ENGLAND

The Bank of England (BoE) is the second-oldest central bank in the world (Capie et al. 1994). It was among the first to resort to "quantitative easing" in the context of the GFC. Figure 3 shows the BoE's total assets as a share of GDP almost since its inception in the late seventeenth century. The BoE's balance sheet reached an early peak of 20 percent of GDP within 30 years of its existence. This was followed by a trend decline until the GFC that was only interrupted twice: first in the first half of the 1800s and then again in the 1930s and 1940s, episodes and developments largely related to wars. Since the GFC, the BoE's (consolidated) balance sheet has surged from around 6 percent of GDP toward 30 percent of GDP.[4]

Figure 3. Bank of England: Total Assets as a Percent of GDP since 1700

[4] The BoE's latest round of QE measures was initiated in response to the BREXIT referendum outcome. On August 4, 2016, the Monetary Policy Committee (MPC) voted to introduce a package of measures to support the UK economy. The target for the stock of gilt purchases was raised by £60 billion, a term funding scheme (TFS) was introduced, and a new corporate bond purchase scheme (CBPS) set up.

The BoE, with its (more than) three-hundred-year history, provides a very instructive starting point for our investigation into central bank profits. The "Old Lady" fulfilled central banking functions for the City of London (and hence the global financial system) long before any modern conception of monetary policy even existed. Established in 1694 as the "government's banker," primarily with the objective (or business) of managing the public debt, the BoE remained a private institution until its eventual nationalization in 1946. But it was clear from WWI onwards that on all major monetary policy issues the BoE would remain under effective government control by the Chancellor of the Exchequer.

In *The End of Laissez-Faire*, Keynes ([1926] 1972) singles out the BoE as an example of a "semi-autonomous bodies within the State," serving solely the public good and being "subject in the last resort to the sovereignty of the democracy expressed through Parliament." Referring to a general tendency toward separation between ownership and control, he sees the BoE as an "extreme example," since it would be "almost true to say that there is no class of persons in the kingdom of whom the Governor of the Bank of England thinks less when he decides on his policy than of his shareholders" (Keynes [1926] 1972, 290; Bibow 2009b).

Mike Anson and Forrest Capie (2018) have recently undertaken a remarkable study tracing the BoE's profits, distribution, and capital over the Bank's whole history. Originally established with a (very generous) subscribed capital of £1.2 million, new subscriptions further raised the Bank's capital tenfold late in the eighteenth century. In this early period, the Bank's capital–asset ratio was generally north of 50 percent. This ratio would drop to just 1 percent by the time of its nationalization, at least when only the Bank's nominal "share capital" is considered. However, from the late eighteenth century onwards, undistributed profits became the source of the Bank's rising actual equity capital base, with retained earnings feeding its (disclosed) reserves, and unrealized capital appreciation of assets making for additional "hidden reserves."

In the first instance, retained earnings lifted the Bank's share capital to £14.5 million in 1816, the level at which it has been held ever since. By today, however, the Bank's "total equity attributable to shareholder," which includes retained earnings and other reserves apart from its share capital, has reached almost £5 billion (0.25 percent of GDP). The Bank's capital

accumulation was concentrated in certain periods, while at other times profits were distributed in full to its shareholders every six months. Throughout its history until nationalization, the BoE distributed dividends averaging 8 percent to 9 percent and ranging from 4.5 percent to 13.75 percent annually (Anson and Capie 2018).

Anson and Capie (2018) pay particular attention to the impact of financial crises and wars on the Bank's financial position. They find that, while losses from the failure of specific debtors may arise on occasion, the BoE's profits generally received a temporary boost during financial crises. Similarly, World War I produced a sharp increase in profits despite the fact that the larger part of the increase in the note issue—replacing gold coins withdrawn from circulation—was undertaken by HM Treasury itself (the so-called Bradburys, which were later in 1928 amalgamated with the Bank's note issue).

The rise in the size of the monetary base and balance sheet was only one factor boosting the central bank's profits though. The "dear money" war and surging interest earnings on the Bank's assets was the other. So much so that the Bank—like other corporations profiting from the war expansion—was charged a significant "excess profits duty" in those years (Anson and Capie 2018).

Monetary matters during World War II played out rather differently. To begin with, there were no more gold coins to be withdrawn from circulation to enlarge the note issue. Also, any profits of the Bank's "Issue Department" were by that time directly transferred to HM Treasury anyway. Furthermore, interest rates, which had fallen to very low levels in the 1930s, did not increase significantly during the war either. In fact, avoiding fighting another "5 percent war" was one of Keynes's—who once again became a central figure in managing Britain's war finances and economic policy more generally—main public finance concerns at the time. In "How to Pay for the War?," he advised fiscal restriction instead of tight money—in addition to his advice for very close cooperation between monetary and debt management policies, in line with his liquidity preference theory and aimed at sustained low interest rates (Keynes [1939] 1972; Bibow 2009b; Tily 2006; Turner 2010; Allen 2012).

Following WWII and the BoE's nationalization in 1946, another period began during which the Bank's reserves (built up from retained earnings and realized capital gains) grew substantially, as the Bank's profit distributions to HM Treasury were held steady at about £1.5 million per year for almost 40 years (roughly 10 percent of its nominal share capital). In 1984, a new agreement between the Bank and HM Treasury was reached whereby post-tax profits of the Bank's "Banking Department" were split evenly between the two institutions.

The historical evolution of the BoE and its peculiar institutional setup within the UK system of government provides the background and context to analyzing today's arrangements and more recent developments. A look at the case of the BoE is particularly illuminating for illustrating the profitability of central banking activities in our recent, unusual times.

Owing to the Bank Charter [Peel's] Act 1844, which divided the Bank into an Issue Department and a Banking Department, the BoE's accounts show the British central bank's note issue functions separately from its other functions and activities. The BoE's Banking Department's accounts may thus appear to encompass all other (central) "banking" functions and activities. But the "outsourcing" of specific activities into separate accounts or even subsidiaries run as separate legal entities does not end here.

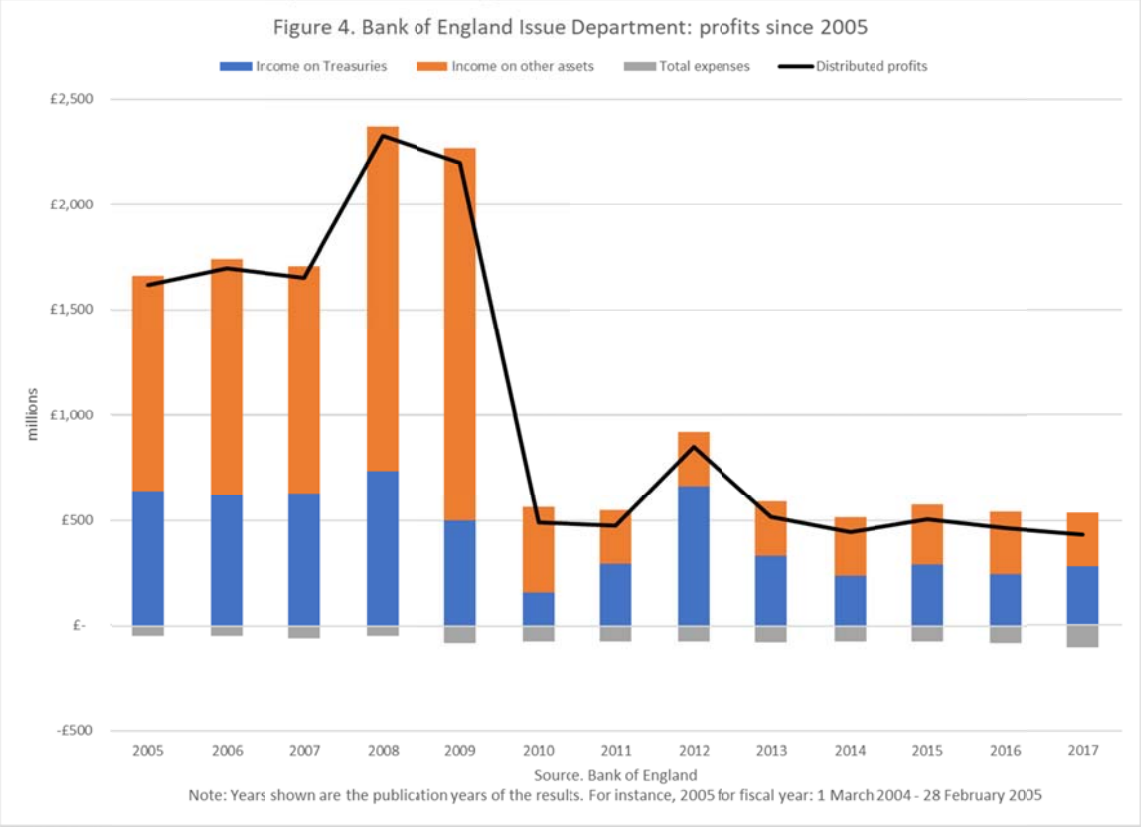
The United Kingdom's official foreign exchange reserves, too, have since the 1930s been largely held outside the central bank in an entity known as the "Exchange Equalisation Account," with the BoE merely acting as an agent on behalf of HM Treasury when it comes to currency market interventions.[5] It seems perfectly in line with this tradition that, when the BoE embarked on LOLR measures to ease credit market conditions and later applied QE monetary policies in the context of the GFC, these activities, too, have been channeled (i.e., booked) through separate sets of accounts: first the "special liquidity scheme" (SLS), set up in April 2008, and then the "Bank of England Asset Purchase Facility Fund Ltd." (BEAPFF). The latter was set up as a subsidiary and separate legal entity in January 2009.

[5] The Exchange Equalization Account was established in 1932 following sterling's departure from gold in September 1931. The fund's foreign exchange assets are largely financed through the National Loans Fund, which is the government's main borrowing and lending account.

In the following we will first look at these separate central banking entities or departments before reflecting on the implications of recent developments on the consolidated balance sheet and income accounts of the BoE and its relation to HM Treasury. We will focus on the period since 2005.

Beginning with the Issue Department's accounts, these are very simple. The note issue (in circulation), which defines this department, is literally the only item appearing on the liability side of the (fictitious) entity's balance sheet. The asset side shows essentially three items: 1) securities issued or guaranteed by the British government, including "ways and means advances" to the National Loans Fund, 2) reverse repurchase agreements, and 3) deposits with the BoE's Banking Department, which is by far the largest position. There is thus no equity capital position for the Issue Department. Profits are fully distributed to the government.

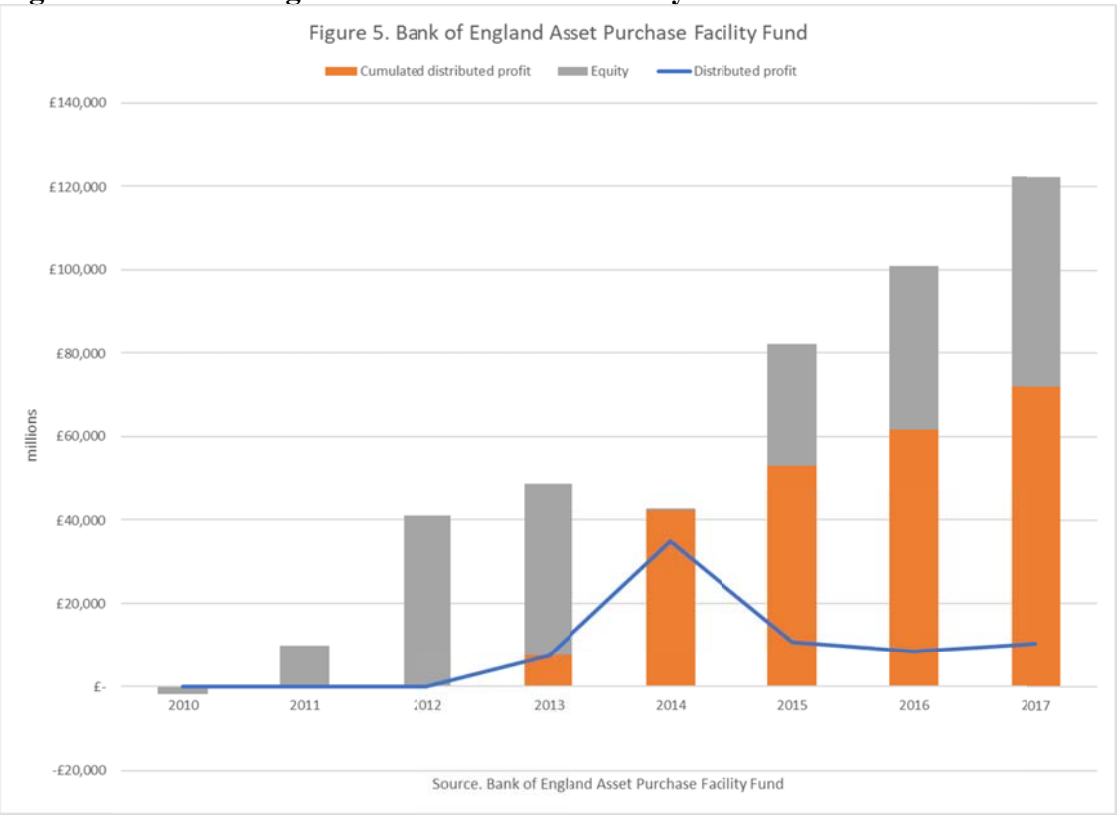
Figure 4. Bank of England Issue Department: Profits since 2005



Income arises essentially from interest on assets booked under the Issue Department, while expenses arise from the production of banknotes as well as the costs incurred and charged by the Banking Department in relation to the note issue. Any net income (seigniorage profit) is paid directly to the National Loans Fund. Revaluation gains on securities are included in income, while a "deficit is not taken against income but is settled by a transfer from the National Loans Fund" (BoE "Annual Report 2017," 138). Supposedly such a deficit may arise from revaluation losses on securities, extraordinarily high operating costs, and/or negative interest rates "earned" on assets. As figure 4 shows, the Issue Department's profits slumped together with interest rates.

The assets acquired as part of the BoE's QE program and the TFS are accounted for in the BEAPFF, defining this entity with a market value of £550 billion (by year end 2017). The liability side of the BEAPFF mainly shows loans advanced by the BoE, with interest charged at bank rate. The notes to the accounts explain that "from 6 March 2009 to 4 February 2010 and from 7 October 2011 advances on this loan were financed by the issuance of central bank reserves. Prior to 6 March 2009 and from 4 February to 6 October 2011 advances on this loan were financed by a loan from the DMO [the UK Debt Management Office]" (BoE "Annual Report 2017," 132).

Figure 5. Bank of England Asset Purchase Facility Fund



Importantly, by agreement with HM Treasury, the BEAPFF's operations are "fully indemnified for loss by HM Treasury and any surplus for these operations is due to HM Treasury" (BoE, "Annual Report 2017," 132). From its inception until February 2017, the BEAPFF has paid £72 billion over to HM Treasury. The unpaid surplus position, titled "due to HM Treasury under indemnity," amounted to £50.3 billion by February 2017 and may be considered as the equity capital of the BEAPFF (wholly accumulated from retained earnings and/or capital gains/losses; see figure 5).[6]

Turning now to the BoE's Banking Department, this entity accounts for the core of domestic and international (central) banking activities. In this regard, normally the key positions on the asset side are: (1) deposits with other central banks, (2) lending to banks and other financial institutions, and (3) securities. Other (noncore activity) assets include property and retirement

[6] The BEAPFF's official equity capital comprises 100 £1 ordinary shares, which are held by the Governor and Company of the BoE.

benefit assets, for instance. The by far biggest position, "other loans and advances," features the Bank's loans to the BEAPFF, which have surged to nearly £500 billion since 2011.

Correspondingly, on the liabilities side, the key positions are: (1) deposits from central banks, which are by far greater than the Bank's deposits with other central banks, and (2) deposits from banks and other financial institutions, which have greatly expanded as the product of QE monetary policies. Deposits by the Issue Department, the foremost counterpart to the note issue, are recorded under "other deposits." Other liabilities include retirement benefit liabilities and foreign currency bonds in issue, for instance.

As noted earlier, the equity capital of the Banking Department as an accounting unit comprises a nominal share capital of £14,553,000 that was issued by 1816. As the ultimate owner of the BoE and its subsidiaries and based on the profit-sharing agreement of 1984, HM Treasury receives payment of half the post-tax profits (unless the BoE and HM Treasury agree otherwise). One 25 percent portion is paid in early April, and the second portion in early October. These payments are in addition to the taxes the BoE is paying on its central bank business. The unpaid half of the Bank's after-tax profit thus accumulates as the "retained earning" item and augments the Bank's equity capital base accordingly. No limit is set.

The Banking Department's core income arises from net interest and fees charged on various (banking) services provided (including to the government). Its operating expenses distinguish infrastructure costs, administration and general costs, and staff costs. Historically, the banks' balances held at the BoE were non-interest bearing, which provided an important source of income to the Bank. Today, deposits repayable on demand held by banks and building societies in their reserves accounts at the BoE are remunerated at bank rate as part of its monetary policy operating procedure (providing a floor to market rates). In addition, under the cash deposit ratio (CDR) scheme, institutions also place non-interest-bearing deposits at the BoE, which are providing a new substitute source of income intended to fund the costs of the Bank's monetary policy and financial stability operations. HM Treasury sets and may adjust the specific requirements for the CDRs. The accounts also show more comprehensive income measures that include unrealized capital gains/losses and other adjustments.

Figure 6. Bank of England Banking Department: Capital and Distributed Profits since 2005

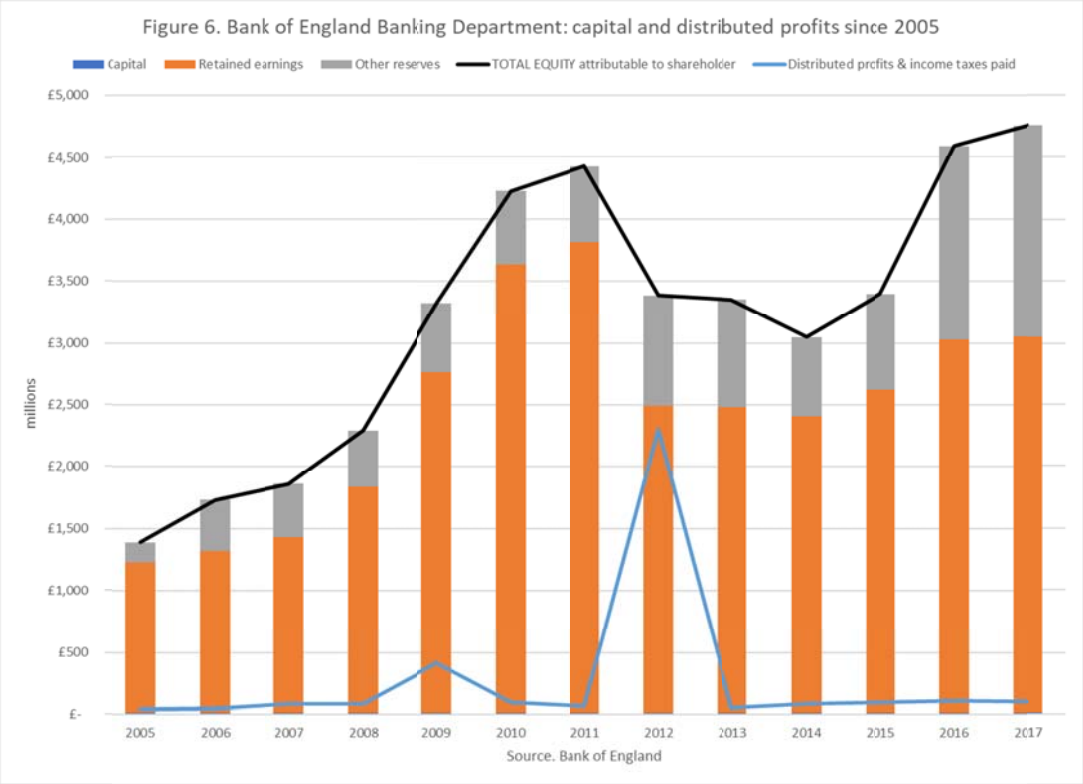


Figure 6 reflects the impact of the financial crisis on the Banking Department's capital and distributed profits. The fivefold increase in profit in the fiscal year ending February 28, 2009 compared to previous years only captures part of the Bank's initial crisis response. In particular, it excludes the SLS that was launched in April 2008 to improve the liquidity in the banking system. Since it was conducted under an indemnity from HM Treasury, the surplus (profit) earned under the scheme was not recognized in the income statement but initially recorded as retained earnings in the "Statement of Changes of Equity." Only when the scheme came to an end in January 2012 was the profit of £2.3 billion distributed to HM Treasury "in lieu of dividend" in April 2012. The Banking Department's total equity capital was £4,754 million at the end of February 2017 (when the fiscal year ends).

Viewed on a consolidated basis, the financial crisis has greatly impacted not only the BoE's balance sheet size and composition but also its profits. While seigniorage profits derived from the note issue and recorded under the Issue Department slumped, the Bank's initial extraordinary

LOLR liquidity measures boosted the results of the Banking Department, with the profits earned under the SLS being passed on to HM Treasury only with a few years delay. The bulk of the profit boost derived from the Bank's QE program (and to a lesser extent the TFS) and was from the start recorded under a separate legal entity, the BEAPFF. The profit boost under the BEAPFF was in the ballpark of £120 billion by the end of February 2017 (close to 6 percent of 2017 GDP), of which £72 billion (3.5 percent) were distributed to HM Treasury by that time. BoE profit distributions (Issue and Banking Departments combined) during more normal times are in the ballpark of £2 billion annually (or 0.1 percent of GDP).

Going forward, the path of the Bank's monetary policy rate (bank rate), the path of the BEAPFF's portfolio shrinkage (i.e., pace of balance sheet normalization), and how policy might affect financial conditions will ultimately determine the overall financial consequences. The Bank has even made a spreadsheet available on its website (developed by a BoE researcher; see McLaren and Smith [2013]) that can be used to model different scenarios. Losses under the BEAPFF are possible in future years. Whatever the final outcome may be, HM Treasury will pick up the tab *directly*, since it fully indemnified the BoE for operations on its special crisis schemes. The same essentially holds on any profits recorded under the Bank's Issue Department, which will increase in line with interest rates. As to the Bank's Banking Department, profits derived from the spread earned on the loans to the BEAPFF—the loans earn bank rate while the banks' excess reserves are remunerated at the floor rate of the operational standing facilities ("OSF deposits")—should gradually shrink as the BEAPFF's portfolio shrinks and the loans get paid off accordingly.

5. THE UNITED STATES FEDERAL RESERVE SYSTEM

The US Federal Reserve (the Fed) was only set up a little over one hundred years ago. The primary objective was to provide for an "elastic currency" and a more stable banking system. The underlying concern was establishing a mechanism that would prevent the kinds of financial crises that had repeatedly occurred, most recently in 1907 (Capie et al. 1994; see also Todd

2015). The original Federal Reserve Act of 1913 laid down that the privately owned[7] Federal Reserve's regional banks' net earnings (after covering their expenses and paying stipulated dividends of 6 percent to their member banks) "shall be paid to the United States as a franchise tax, except that one-half of such net earnings shall be paid into a surplus fund until it shall amount to forty per centum of the paid-in capital stock of such bank" (Federal Reserve Act, Section 7: Division of Earnings).

In 1933, as a one-off measure, Congress appropriated all the Federal Reserve Banks' capital surplus reserves accumulated from retained earnings as partial funding of the Federal Deposit Insurance Corporation, for which the Fed thereby provided the seed capital. In return, however, the franchise tax on the Federal Reserve Banks' net earnings was abolished, which meant that it could from now accumulate its net earnings in full (Toma 1982; Goodfriend 2014).

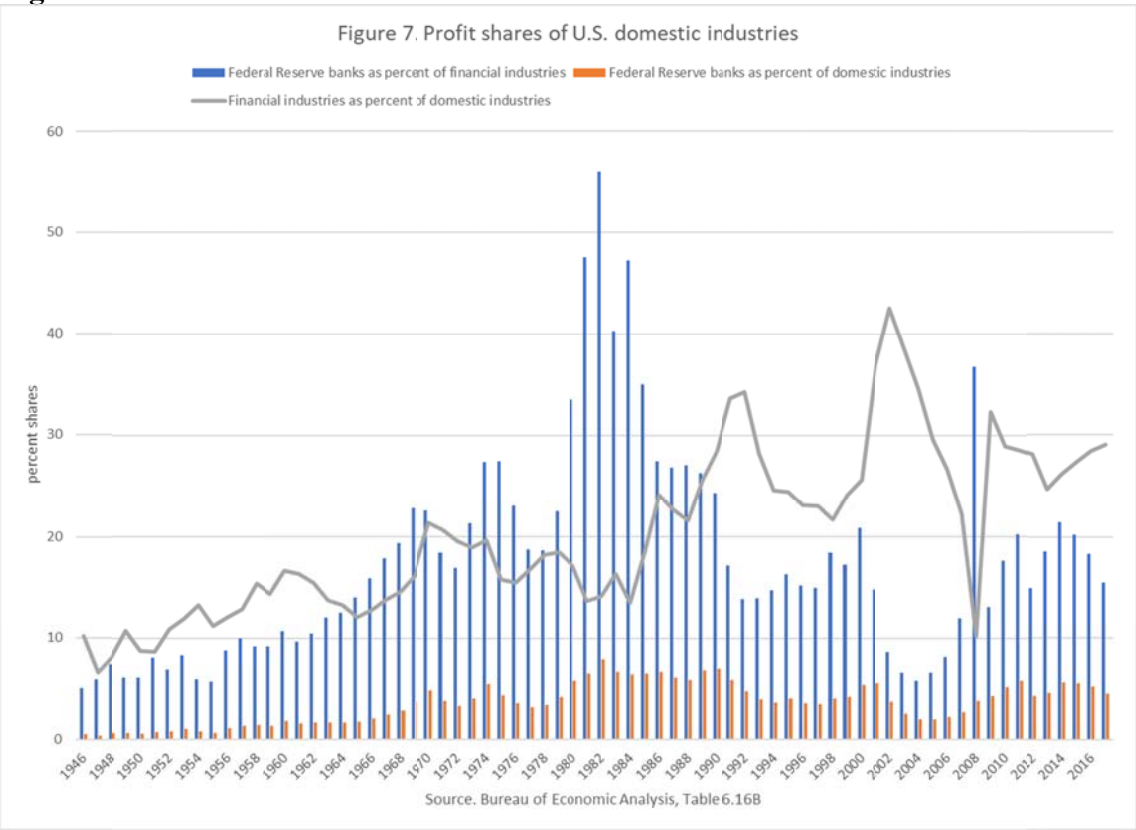
The new arrangement caused some embarrassment during WWII when the Fed's balance sheet and earnings increased substantially. The Fed started to make "voluntary transfers" of 90 percent of its net earnings to the Treasury in 1947, apparently after striking a deal with the Treasury that gave the Fed more leeway regarding its bill rate policy (Toma 1982). Until 2015, the distribution of profits and buildup of reserves from retained earnings was based on Board of Governors' policies rather than the law. On several occasions Congress came to repeat the appropriation exercise of the capital surplus reserves first practiced in 1933, generally capping the surplus at the size of the paid-in capital.

While there is little doubt that the Federal Reserve System is part of the US system of government, the US national accounts still treat the Fed as part of the corporate sector. Except for any (incremental) increases in the Fed's capital surplus account, this would seem to make the Federal Reserve's profit distributions to the Treasury a (near) 100 percent tax on its corporate

[7] At the Fed's origin, the Federal Reserve Banks were viewed as private corporations, though chartered through an act of Congress and therefore quasi-governmental institutions. The Federal Reserve's ownership question remains somewhat obscure and nebulous until today. The Federal Reserve Board of Governors' website reads: "The Federal Reserve System is not 'owned' by anyone. Although parts of the Federal Reserve System share some characteristics with private-sector entities, the Federal Reserve was established to serve the public interest. … Commercial banks that are members of the Federal Reserve System hold stock in their District's Reserve Bank. However, owning Reserve Bank stock is quite different from owning stock in a private company. The Reserve Banks are not operated for profit, and ownership of a certain amount of stock is, by law, a condition of membership in the System."

profits, despite the fact that the US central bank is officially exempted from tax (except property taxes). The capital surplus account stores the system's de facto capital reserves, built up from retained earnings and supposedly augmenting its "paid-in capital" held by the member banks, which itself is a function of its member banks' capital base and currently set at 50 percent of their "subscribed capital."

Figure 7. Profit Shares of US Domestic Industries



The Federal Reserve System's profits peaked as a share of the financial industries' corporate profits in the early 1980s at over 50 percent (see figure 7; see also Barro [1982]). This occurred in an environment of very high short-term interest rates and a double-dip recession ("Volcker shock"). Thereafter the Fed's share in the financial industries' profits saw a trend decline that lasted until the GFC of 2008–9 (albeit against the background of a rising financial industries' share in all domestic industries' profits, from around 10 percent after WWII to around 30 percent by the mid-1990s, and also today). Since the crisis, the Fed's profit share has surged back from just over 5 percent to just over 20 percent in 2014, before starting to decline again. In recent

years the Fed's profits of $70 billion to over $100 billion (see figure 10) were in the same ballpark as the combined profits of the ten largest US financial institutions. They amounted to around 0.5 percent of GDP and around 2 percent of (general government) tax revenues. By compassion, Apple's annual profits are around $40 billion. In short, the Federal Reserve is a highly profitable "corporation" that is de facto government owned (Ford and Todd 2010).

The Fed's income and profits are almost exclusively driven by net interest income (see Bukhari et al. 2013). Non-interest income is a minor item on the income statement ("combined statement of operations"). Total operating expenses were about 10 percent of net interest income in recent years. Until 2015, earnings remittances to the Treasury appeared under the heading "interest on Federal Reserve notes," a legal artifice to justify the transfer. As it is estimated that over half of the US dollar note issue circulates outside of the United States, the same may be said about the actual geographical basis from which Fed's profit distributions to the Treasury are derived (Judson 2012). One might expect the Federal Reserve note issue and profits to broadly grow in line with nominal GDP. This may be boosted by stronger rising international use of US dollar banknotes.

Figure 8. Impact of QE on Federal Reserve Balance Sheet and Profits

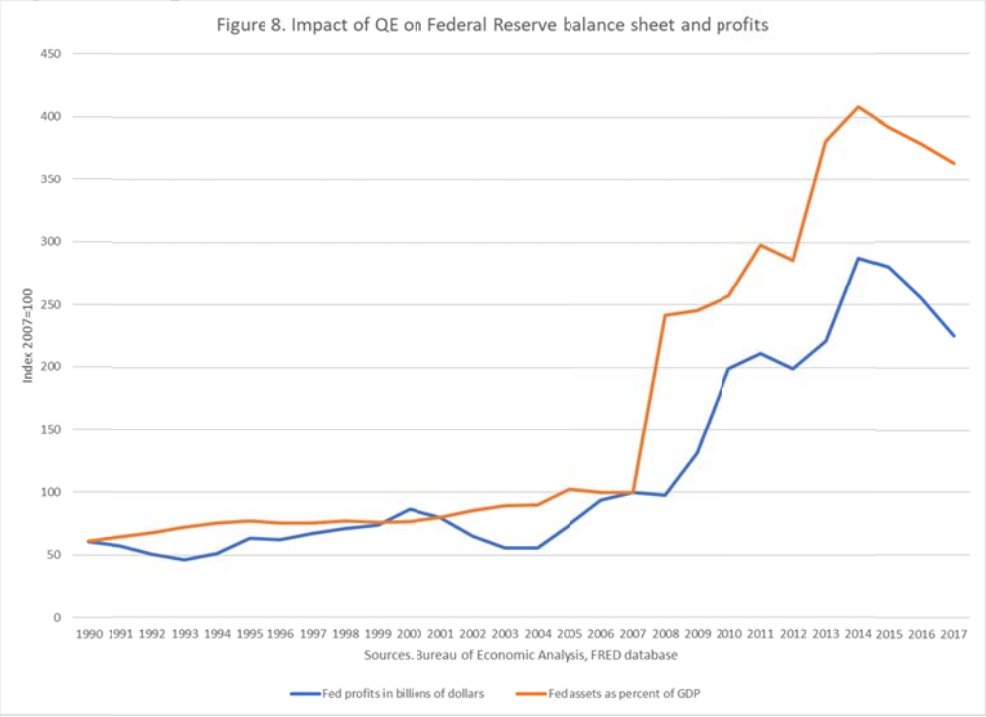
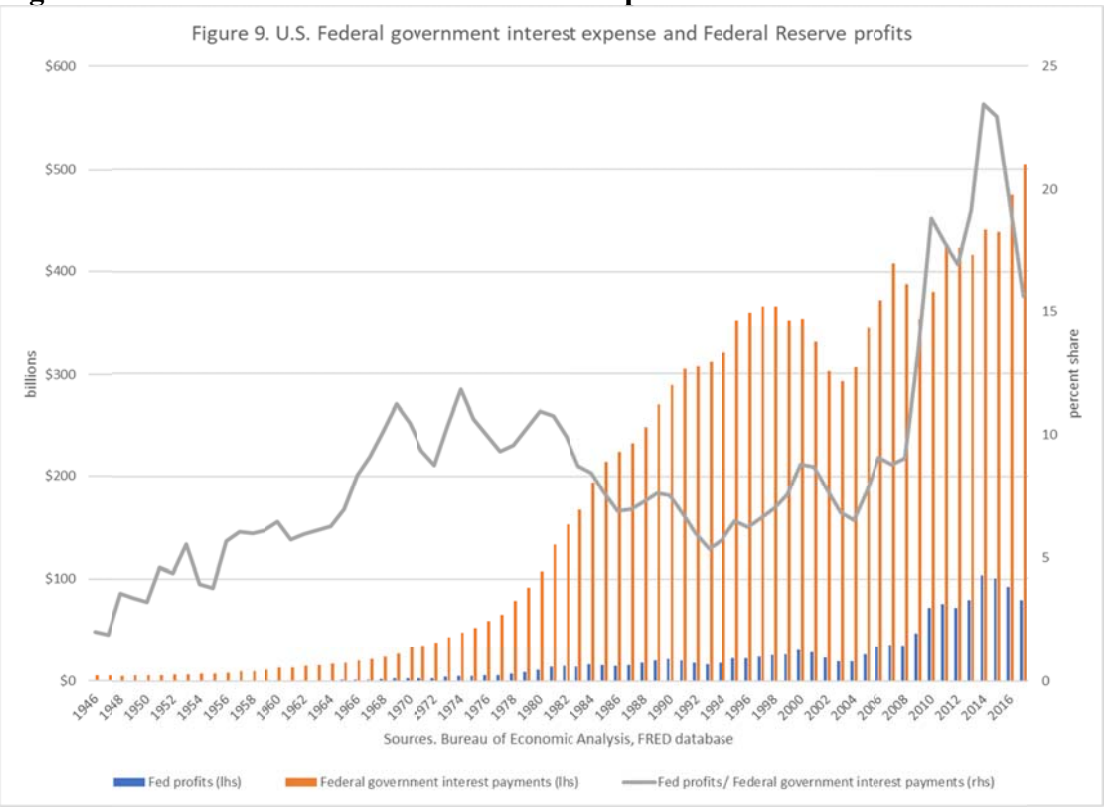


Figure 8 highlights the impact of QE on the Federal Reserve's balance sheet and profits. Indexed to 2007 as the base year, the Fed's balance sheet as a percent of GDP rose by a factor of almost 4.5 (and by a factor of five in absolute terms, rising from $900 billion prior to the Lehman debacle to $4.5 trillion by the end of QE3). In addition to QE, the index for Fed profits also reflects the interest rate cycle, with 2007 representing a cyclical peak. The index then surged alongside QE and peaked in 2014 at a value of close to 300. (Given that the level of interest rates declined significantly after 2007, one would expect profits to increase proportionately less than the size of the balance sheet.)

Another issue is that the rise in the balance sheet did not primarily reflect the growth in the non-interest-bearing note issue, but in (excess) bank reserves, which, since October 2008, have been remunerated by the Federal Reserve. Given the (near) zero interest rate policy environment over much of this period, this issue has not made too much of a difference until recently—but is becoming more of a factor today with the monetary policy normalization process well under way in the United States. We will return to this issue shortly.

Figure 9. US Federal Government Interest Expense and Federal Reserve Profits



Recall here that QE monetary policies impact public finances in three main ways: first, by affecting the economy and, hence, the primary budget through automatic fiscal stabilizers; second, by affecting the interest burden on the public debt; and third, by affecting central bank profits. The latter two channels are clearly visible in figure 9. Despite the fact that the federal debt has roughly doubled since 2007, the federal government's interest payments increased only a little until 2015. Moreover, the share of that interest expense that gets effectively returned to the Treasury in the form of elevated Fed profits surged from under 10 percent in 2007 to almost 25 percent at its peak in 2014.

The case of the Fed thus illustrates the connection between monetary policy and public finances particularly well. Similar to arrangements in the United Kingdom, the United States' official foreign exchange reserves are largely held off the Fed's balance sheet, with the central bank merely acting as fiscal agent.[8] Prior to the crisis, the size of the Fed's balance sheet was largely driven by the (endogenous) note issue and profits by the interest earnings on the asset counterpart. Since the crisis, the size of the Federal Reserve's balance was largely driven by its QE monetary policies, i.e., asset purchases that expanded bank reserves accordingly. The interest rate spread between interest earned on QE assets and interest paid on (excess) bank reserves and reverse repos[9] has now become a most prominent factor in determining Fed profits.

[8] The non-gold reserves are mainly held in an entity called the Exchange Stabilization Fund, while gold is mainly held by the Treasury's mint.

[9] The Fed's current operational framework relies on interest on reserves as the instrument that provides the ceiling and reverse repo operations as the instrument that provides the floor to the interest rate corridor established for making the federal funds rate target (range) effective in overnight money markets.

Figure 10. Federal Reserve Capital and Profits since 2005

Since the GFC of 2008–9, two changes enacted by Congress had a significant impact on the Federal Reserve's financial position. First, in 2010, the Dodd-Frank (Wall Street Reform and Consumer Protection) Act established the Consumer Financial Protection Bureau and directed the Fed to fund the new bureau under its roof (appearing under "assessments" in the Fed's income statement alongside currency costs and Board of Governors' operating expenses). Second, in 2015, the Fixing America's Surface Transportation Act (FAST Act) amended the Federal Reserve Act regarding both the payment of dividends to member banks as well as the Federal Reserve's surplus.

While smaller member banks continue to receive the annual 6 percent dividend rate on the paid-in capital stock, effective January 1, 2016, member banks with more than $10 billion of consolidated assets receive the smaller of 6 percent or a rate equal to the high yield of the 10-year Treasury note auctioned at the last auction held prior to the payment of the dividend. This measure reduced the member banks' share in seigniorage earnings in favor of the Federal

Reserve (and Treasury), offsetting the rise in the member banks' seigniorage share that has arisen through the remuneration of reserves (Bassetto and Messer 2013).

The FAST Act also directly captured part of the Federal Reserve's capital surplus for the purpose of financing federal highway spending. This followed several years of stalemate over raising the gas tax for said purpose and was done through capping the Federal Reserve's "surplus" at $10 billion (see figure 10). Previously the surplus had changed in lockstep with the Fed's paid-in capital. Both stood at close to $29 billion. The newly imposed cap released a one-off $19 billion fiscal contribution by the Federal Reserve in late 2015.

Thereby the FAST Act has made a "negative equity" event more likely to arise or, more precisely, a potential impairment through losses of the surplus that in March 2018 was further reduced to $7.5 billion and which would appear to be the de facto equity capital of the Federal Reserve (as the member banks' capital seems to be untouchable).[10] In case of an earnings shortfall,[11] a "deferred asset" is created in the balance sheet as a kind of (interest-free) loan from the Treasury that the affected Federal Reserve (Bank) will have to pay off out of future net earnings.[12]

In view of the ongoing "normalization" process of monetary policy by the Fed higher attention to the possibility of earnings shortfalls and negative equity events appears rather timely.

Monetary policy normalization includes two elements: first, raising policy rates and, second, shrinking the balance sheet. The Federal Reserve enacted its "lift-off" in policy rates from (near) zero in December 2015. Five additional hikes took the federal funds rate target range to 1.5–1.75

[10] Alternatively, as the surplus does not actually get reduced in case of a loss, it may be seen as a random number that could equally be zero or anything else, as the de facto equity capital of the Federal Reserve is really "unlimited," or whatever the Treasury is willing and able to back its central bank with.

[11] "Under the FAST Act, if earnings during the year are not sufficient to provide for the costs of operations, payments of dividends, and maintaining surplus at an amount equal to the Bank's allocated portion of the $10 billion aggregate surplus limitation, remittances to the Treasury are suspended. This decrease in earnings remittances to the Treasury results in recording a deferred asset that represents the amount of net earnings a Reserve Bank will need to realize before remittances to the Treasury resume" (Federal Reserve, "Annual Report 2017," 374).

[12] Apportioned their respective shares in the Federal Reserve System's $7.5 billion aggregate surplus in line with their paid-in capital shares, the individual Federal Reserve Banks are treated as separate units of the system that do not automatically bail each other out.

percent by March 2018. Three further hikes are expected for 2018, which would bring the target to about 2.5 percent. Federal Open Market Committee members currently see the "longer run" fed funds rate target at 2.8 percent.

Balance sheet shrinkage was initiated in October 2017, at an initially slow but over time accelerating pace. Shrinkage happens naturally as QE securities in the Federal Reserve's System Open Market Account (SOMA) portfolio mature (or prepay in the case of mortgage-backed securities [MBS]). Until recently, the Federal Reserve fully offset any maturing securities through new purchases. But now this only happens at capped volumes. Indications are that the Federal Reserve plans to rely on this gradual process of natural atrophy and not engage in outright sales until its balance sheet gradually reverts to its "normal" size and composition. This strategy would avoid realizing capital losses, which would directly hit its income. But the shifting balance between interest earnings and payments remains an issue anyhow, and equally so if enlarged reverse repos were used to accelerate the draining of liquidity instead.

What exactly the Fed's "new normal" might look like, whether it means reversion to the lean precrisis balance sheet of minimal reserve balances or convergence to a permanently somewhat enlarged one, remains subject to debate. The process will likely take between five and ten years, which means that the outcome also remains subject to uncertainties regarding economic developments and policy adjustments over this extended horizon.

What seems clear however is that the bumper years of Federal Reserve profits are over and Fed profits, too, will normalize going forward. While the profits effectively earned on the note issue would normally rise together with interest rates as assets in the Federal Reserve's portfolio get "rolled over" at higher rates, this effect will be diminished in this cycle due to the fact that reinvestments (at rising rates) will gradually shrink to low levels over the next few years. That said, the fact that the note issue is significantly larger today than prior to the crisis will continue to bolster Fed profits. At the same time, however, the spread effectively earned in recent years on excess bank reserves will get squeezed as policy rates continue to rise while the QE assets held in the Fed's portfolio continue to pay the same very low yields at which they were purchased.

The Federal Reserve Bank's Combined Financial Statement shows that by the end of 2017 assets included $1.1 trillion in Treasury securities that will mature in one to five years. An additional $0.9 trillion in Treasuries had remaining maturities of over five years, two-thirds of which had remaining maturities of over ten years. And then there were also $1.7 trillion federal agency and government-sponsored-entity mortgage-backed securities with an estimated weighted-average life of approximately seven years. It is to be reckoned that the bulk of these securities were purchased at yields between 1.5 percent and 4.5 percent. The average interest yield appears to be around 3 percent.

Back-of-the-envelope calculations suggest that Fed profits will shrink to $30–50 billion (or 0.15–0.25 percent of GDP) over the next few years if things go according to plan. In case of a more severe rise in interest rates to 4 percent or more, higher losses would be likely in my view, even without outright sales of securities.[13] Technically, losses would not represent any problem for the Fed's conduct of monetary policy. A "deferred asset" recorded on the asset side of the Fed's balance sheet would merely indicate for how long the Treasury is to miss out on profit distributions from the Fed.

Politically, the situation might well be more challenging—judged by the standard of attacks the Fed was facing from members of Congress in the aftermath of the GFC. Facing this threat might, in turn, influence the Federal Reserve's approach to policy normalization. In this respect the Federal Reserve is not in as comfortable a position as the BoE.

[13] Carpenter et al. (2013) provided early estimates studying various exit scenarios. The exit scenario that appears to be unfolding today is significantly different from their simulations. Ferris et al. (2017) and Cavallo et al. (2018) offer more recent simulations that show only low probabilities of losses under benign scenarios; see also Christensen, Lopez, and Rudebusch (2015). Much depends on how fast interest rates will rise, whether the demand for notes stays as strong as over the past ten years, and what the level of reserve balances will ultimately be after normalization. It is important to bear in mind that unrealized capital losses are not reflected in the balance sheet and do not impact the income statement and hence would not lead to a deferred asset either. This is because the SOMA portfolio is recorded on an amortized cost basis rather than at a fair value (or: marking-to-market basis). The Federal Reserve does however reveal unrealized capital gains and losses in its "Federal Reserve Banks Combined Quarterly Financial Reports," available at: http://www.federalreserve.gov/monetarypolicy/bst_fedfinancials.htm#quarterly and in the audited "Annual Financial Statements of the Federal Reserve System," available at: https://www.federalreserve.gov/aboutthefed/audited-annual-financial-statements.htm. At the end of 2017 sizeable cumulative unrealized capital gains ($80 billion) were shown.

6. JAPAN'S NIPPON GINKŌ (BANK OF JAPAN)

Nippon Ginkō was established in 1882 with a focus on unifying note issue (Capie et al. 1994). Even today 40 percent of its (tiny) capital of ¥100 million (roughly US$1 million) is subscribed to by private individuals and another 5 percent by the financial industry; the state only holds the remaining 55 percent. As Japan's central bank highlights on its website, it is neither a joint-stock company, nor does it hold shareholder meetings. Yet the Bank of Japan (BoJ) is subject to corporate income tax and other taxes, while its private "contributories" receive a maximum annual dividend of 5 percent on paid-up capital, amounting to the trivial sum of roughly US$50,000 per year.

Since the beginning of the GFC, the BoJ's balance sheet has expanded by about a factor of five, reaching over $5 trillion in 2017 (which roughly equals Japan's annual GDP and exceeds the size of the Fed's balance sheet). The BoJ's foreign reserve holdings are relatively small, since the bulk of Japan's huge ($1.25 trillion) foreign exchange reserves are held outside the central bank. If called upon, the BoJ conducts foreign exchange interventions on behalf of the government, based on instructions from the minister of finance.

The BoJ was the first major central bank to implement a zero interest rate policy in 1999 (when consumer price inflation fell into negative territory) while announcing that it intended to keep its policy in place until deflation was crushed ("forward guidance"). The BoJ's nonstandard measures undertaken in response to the crisis included purchasing exchange-traded funds (ETFs) and Japan real estate investment trusts (J-REITs), as well as commercial paper and corporate bonds. Even before, in the 2000s, the BoJ had explored purchasing stocks and asset-backed securities. Its QE purchases of government bonds, too, reach back to the early 2000s (followed by unwinding measures in the second half of the 2000s when the 15-year deflation appeared to abate; see Werner [2003]), but in 2013 the BoJ initiated a profound policy revamp.

To begin with, it reformed and lifted its price stability goal, starting to set a "price stability target" of 2 percent in terms of the year-on-year rate of change in the consumer price index. It expanded its loan support program and greatly boosted its purchases of government bonds,

growing its balance sheet at an annual rate of 30–40 percent for three years (by ¥60–70 trillion per year; see Kuroda [2013]).

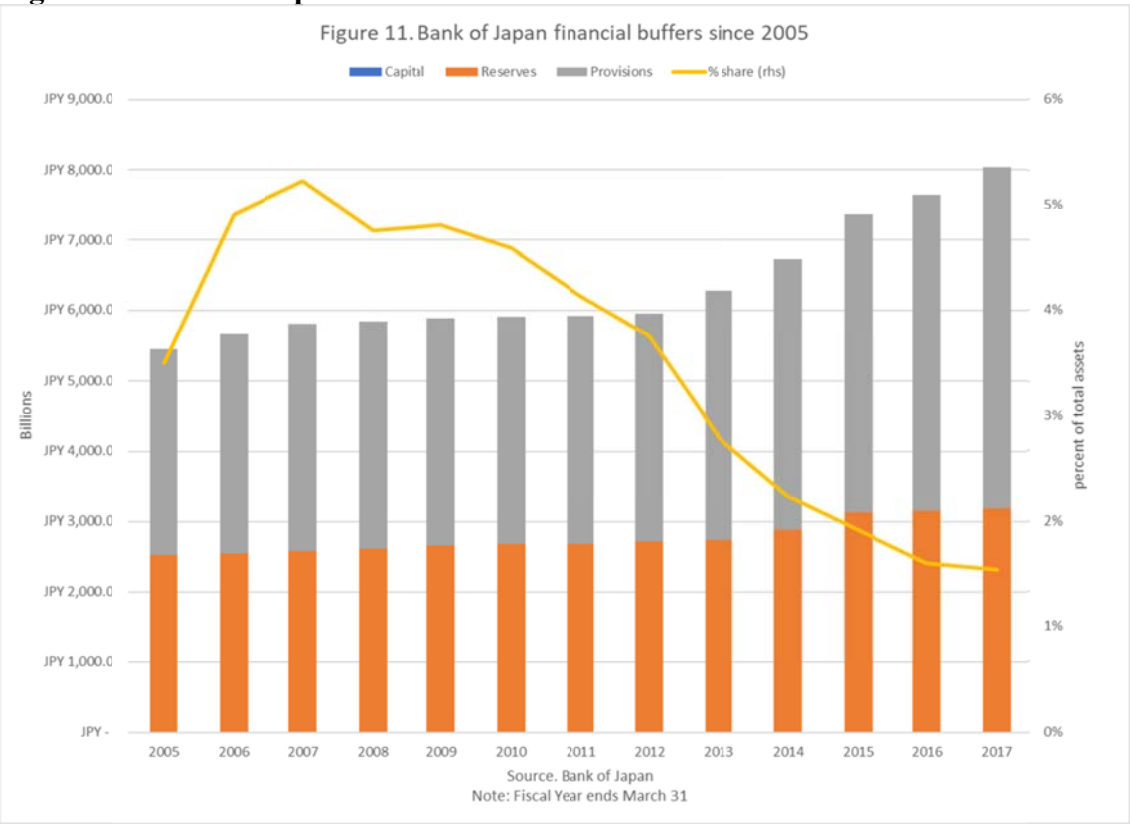
Since early 2016, the BoJ applies a negative interest rate of minus 0.1 percent to the policy-rate balances in current accounts held by financial institutions at the Bank, but pays interest on excess reserve balances under the complementary deposit facility. On net, the negative interest policy results in a significant interest expense.

In September 2016, the BoJ also introduced "yield curve control" targeting the yield on 10-year Japanese government bonds (JGBs) ("quantitative and qualitative monetary easing with yield curve control"). It announced that it would purchase JGBs so that 10-year JGB yields would remain at around zero percent. By setting a price target for the 10-year interest rate on safe bonds, the quantity of its bond purchases was left market driven (endogenous), which, in the course of 2017, actually resulted in a de facto tapering of the Bank's QE purchases.[14] At any rate, today over 90 percent of the BoJ's assets consist of government debt.

The picture is equally simple on the liability side: the note issue's share of total liabilities was over 50 percent in 2005. In absolute terms the note issue has grown steadily since then, by about 35 percent overall. But its share has declined to 20 percent today. By contrast, bank reserves only made up about 20 percent of total liabilities in 2005, but have exploded since then to over 70 percent today.

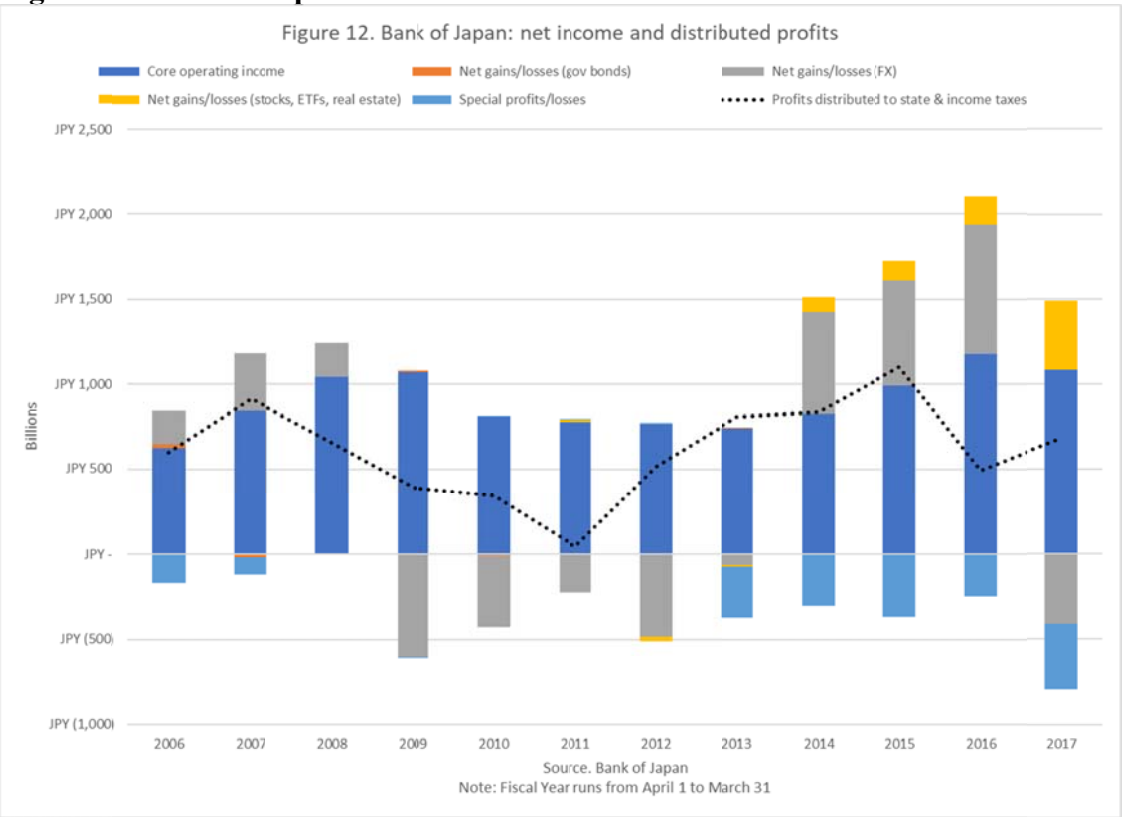
[14] In *The General Theory*, Keynes also discusses the possibility of the central bank acting as market maker along the yield curve: "Perhaps a complex offer by the central bank to buy and sell at stated prices gilt-edged bonds of all maturities, in place of the single bank rate for short-term bills, is the most important practical improvement which can be made in the technique of monetary management" (Keynes [1936] 1973, 206).

Figure 11. Bank of Japan Financial Buffers since 2005



The central bank's unchanged capital of ¥100 million is too tiny to be visible in figure 11. In recent years, reserves were boosted by about 25 percent and provisions by about 65 percent. Overall, the BoJ's financial buffers were quite small to begin with and have clearly not expanded in line with its balance sheet since the GFC and the nonstandard policies undertaken in response.

Figure 12. Bank of Japan: Net Income and Distributed Profits



Neither have the BoJ's profit distributions (plus income taxes payments) experienced any marked increase. The fivefold balance sheet expansion and other nonstandard policies have significantly impacted the Bank's earnings and expenses though (see figure 12).

Rather than rising fivefold in line with the balance sheet, interest income on government debt has merely doubled since 2012, climbing from a share of 40 percent to over 70 percent of operating income in the fiscal year ending March 31, 2017. On the other hand, interest payments on excess reserve balances have become a weighty offsetting factor in recent years. Moreover, in fiscal year 2016–17, negative interest policy turned interest income on commercial paper holdings into an expense, while the interest expense on payables under repo agreement was transformed into an income source.

The items "net gains/losses on foreign reserves" and "special profits/losses" are seen as far more volatile in figure 12. The former captures revaluation gains and losses, the latter net transfers

to/from risk provisions. Both impact net income and profit distributions contemporaneously. In particular, there were sizeable net transfers to provisions for possible losses related to foreign reserves in the fiscal years 2012–13 until 2014–15. This was followed by net transfers from provisions for such risks in the fiscal years 2015–16 and 2016–17, which partly offset large net transfers to provisions for possible losses on bond transactions in these years: "to compensate for possible fluctuation in net income arising from the implementation of" the Bank's nonstandard policies (BoJ "Annual Report 2017," 57).[15] Overall, the buildup of risk provisions for possible losses on bond transactions has significantly contained the BoJ's profit distributions (plus income tax payments) to the Treasury.

The BoJ has a huge balance sheet similar in size to the country's GDP but its annual profit distributions (plus income tax payments) to the Treasury of around $5–10 billion (0.1 percent–0.2 percent of GDP) are more in sync with the country's protracted near-zero interest rate environment. Suffice to mention that while Japan's gross public debt may be in excess of 200 percent of GDP, its net debt interest payments are among the lowest debt burdens in the world.

7. THE SWISS NATIONAL BANK

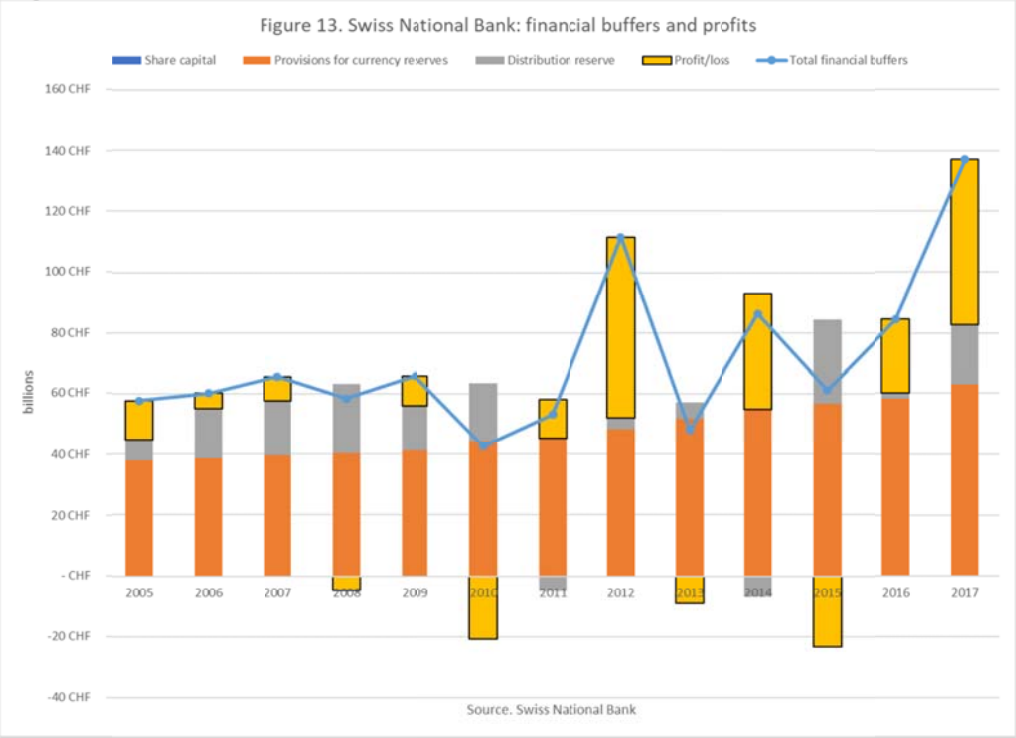
The Swiss National Bank (SNB), established in 1907, is a special-statute joint-stock company (Capie et al. 1994; SNB 2017). Its share capital is CHF 25 million (100,000 shares with a nominal value of CHF 250).[16] Private shareholders make up just over 25 percent, while 75 percent of the shares are held by the public sector. In particular, the Swiss cantons hold 55 percent of the shares. A maximum dividend of 6 percent is paid annually on the share capital. One-third of any remaining net profit accrues to the Confederation and two-thirds to the cantons. In calculating its net profit, the National Bank Act stipulates that the SNB should "set up provisions permitting it to maintain currency reserves at the level which is necessary for monetary policy" (SNB website, "Profit and distribution of profits"). The SNB's "currency reserves" have exploded in the context of recent crises.

[15] On March 31, 2017, the Bank's securities holdings' market value exceeded its book value.
[16] SNB shares are tradable and, giving rise to some puzzlement, their market valuation has surged in 2017.

Owing to the Swiss franc's safe haven status, the SNB's monetary policy since the GFC has been shaped by exchange rate concerns. The SNB has stalwartly intervened in currency markets to contain appreciation pressures and the growth of its balance sheet expansion was driven by its reserve accumulation on a massive scale. In particular, the SNB temporarily set a minimum exchange rate against the euro, which was introduced on September 6, 2011. In December 2014, it also introduced negative interest on sight deposits held by banks and other financial market participants at the SNB.

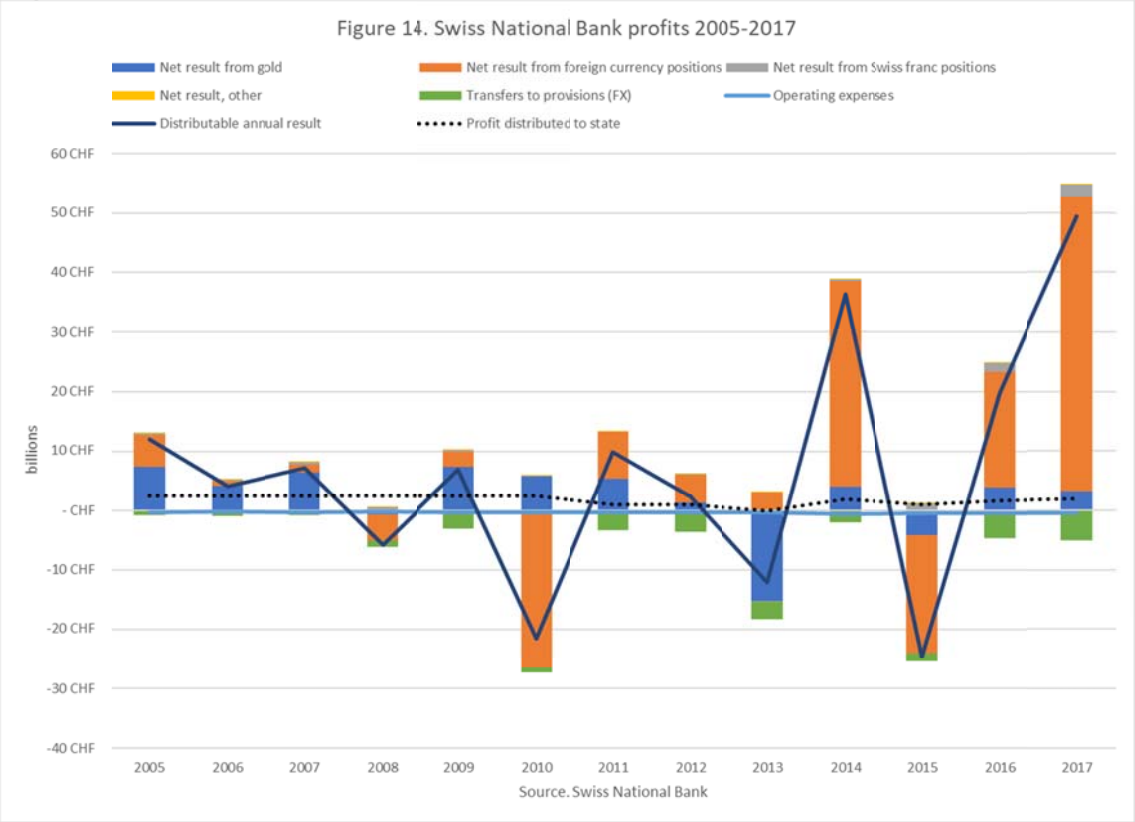
The SNB's balance sheet has expanded by a factor of 7.5 over the past ten years, exceeding the size of Switzerland's GDP by some 30 percent today. The SNB's assets consist of 94 percent foreign reserves; they are now in the same ballpark as the Eurosystem's foreign reserves. On the liability side, the note issue has doubled in size over the same period and makes up 9 percent of total assets/liabilities, while Swiss banks' reserves have also surged and make up about 55 percent today. The SNB's financial buffers, consisting of its tiny capital plus reserves and provisions, are rather generous at almost CHF 140 billion or 16 percent of total assets at the end of 2017 (see figure 13).

Figure 13. Swiss National Bank: Financial Buffers and Profits



In general, the SNB's dividend payments to its shareholders and its (residual) profit distributions to the Confederation and the cantons have been kept steady for extended periods of time. Dividend payouts over the whole period reviewed here (2005–17) were held constant at CHF 1.5 million (or 6 percent) per year except for the year 2013, when no dividend was paid. Annual profit distributions to the Confederation and cantons amounted to CHF 2.5 billion until 2010 but were reduced in subsequent years to only CHF 1 billion. They were even cut to zero in 2013, for the first time in the SNB's history. Payouts of CHF 2 billion or less were made in the years since (about 0.3 percent of GDP). Overall, payouts were held steady in most years despite the fact that the SNB's "distributable annual results" have become extremely volatile since the crisis.[17]

Figure 14. Swiss National Bank Profits, 2005–07



[17] "In 2011, allocation to the provisions was increased to double the average nominal economic growth rate and, in 2016, a minimum allocation of 8 percent of the level of provisions at the end of the previous year was introduced. … In accordance with the agreement for the financial years 2016–2020, the Confederation and the cantons receive an annual total of CHF 1 billion, provided the distribution reserve is not rendered negative as a result. If the distribution reserve allows it, omitted or reduced distributions are compensated for in subsequent years. If the distribution reserve exceeds CHF 20 billion, the distribution amount is raised to a maximum of CHF 2 billion" (SNB 2017, 37–8).

The SNB's income statements distinguish four sources of net income: gold, foreign currency positions, Swiss franc positions, and other. In line with the evolution of the SNB's balance sheet, net results from gold and especially foreign currency positions have gained in importance since the crisis and, driven by exchange rate developments, have become very capricious (see figure 14). The trend decline in payouts since the crisis, despite the explosion of the SNB's balance sheet, reflected increased provisions for foreign exchange risks in particular, while the Bank's operating expenses held steady (at about 10 percent of its precrisis profit distributions to the Confederation and cantons).

The SNB experienced sizeable operating losses in 2008 and 2010, related to currency market interventions "in support" of the Swiss franc. Then the change in the price of gold delivered a huge blow in 2013, when all payouts were halted for the year.[18] Exchange rate developments took over again in subsequent years, with huge gains in 2014, 2016, and 2017, interrupted by another huge loss in 2015 when the minimum exchange rate against the euro was dropped. Regarding this step, Fritz Zurbrügg, SNB Governing Board member, explains that when pressure on the franc increased dramatically this forced the SNB's hand in 2015[19]:

[18] This was despite the fact that the SNB realized a gain of approximately $3.7 billion on the "stabilization fund" in 2013, apart from earning about $1.7 billion in interest. The SNB "Annual Report 2013" states: "As part of the package of measures aimed at strengthening the Swiss financial system introduced in autumn 2008, the SNB granted the stabilization fund a secured loan. The loan was paid down through partial repayments and, on 15 August 2013, was repaid in full. Earnings components (interest income and currency translation effects) are stated under net result from foreign currency positions" (SNB "Annual Report 2013," 155).

[19] The SNB's move was heavily criticized by Buiter (2015), for instance. Amador et al. (2016) model this episode as a "reverse speculative attack" that convinced the SNB to limit its exposure to rising currency risks. The public controversies sparked by the zero-profit distribution for 2013 may well be seen as supporting this interpretation. An alternative interpretation is that, while competitiveness concerns were best met by the euro peg initially, the policy divergence between the US Federal Reserve and the ECB in 2015 and concerns about Switzerland as a financial center made a "euro-dollar basket orientation" more convenient at that point.

> It became clear that a minimum exchange rate of CHF 1.20 per euro was no longer tenable. Only sustained currency market interventions of rapidly increasing magnitude would have allowed the SNB to uphold the policy. Faced with these fundamental changes in international conditions, we came to the conclusion that the minimum exchange rate could only have been maintained through an uncontrollable expansion of the balance sheet, potentially even to a level several times higher than Swiss GDP. The risks associated with such a balance sheet expansion would have been out of all proportion to the benefits for the economy. An uncontrollable expansion of the balance sheet would have severely impaired the SNB's ability to conduct monetary policy in the future and jeopardised the fulfilment of its mandate in the long term. On the one hand, the future use of currency interventions would have been severely constrained. On the other hand, reabsorbing this huge volume of liquidity once monetary policy began to normalise would have been very difficult and extremely costly. (Zurbrügg 2015)

One might be tempted to say that the GFC has transformed the SNB into a sovereign wealth fund or currency hedge fund of sorts. Significant swings in the Swiss franc exchange rate will deliver correspondingly huge swings in the SNB's results, and 2017 turned out to be a true bumper year. While payouts are held steady, the SNB's results show a huge profit. SNB shares, too, surged in 2017, perhaps signifying a central bank bubble as the SNB's financial buffers got inflated by another CHF 50 billion in paper profits. The SNB will have to wait for the right occasion to actually sell off some of its "currency reserves" and realize any profits, should the Swiss franc ever come under excessive weakening pressures—which would then "embarrass" the SNB with huge realized profits.

8. THE PECULIAR CASE OF THE EUROPEAN CENTRAL BANK AND EUROSYSTEM

The European Central Bank (ECB) was primarily established as the central command over the European System of Central Banks (ESCB) or, more precisely, for as long as the euro is not the common currency of all European Union (EU) member countries, the Eurosystem. In contrast to the Federal Reserve Board of Governors, which commands the US Federal Reserve System, the ECB was established as a proper (central) bank, with its own balance sheet and empowered to operate in financial markets on its own (Dyson and Featherstone 1999; Padoa-Schioppa 2004; James 2012).

The ECB is owned by the national central banks (NCBs) that are complementing the eurozone's central banking system. The NCBs' capital shares are calculated using a key that reflects the respective country's share in the total population and GDP of the EU ("ECB capital key"). While the ECB's current capital amounts to €10.8 billion, only the euro area NCBs were required to fully pay up their subscriptions of a total of €7.6 billion. By contrast, the non–euro area NCBs' contributions only come to 3.75 percent of their total share in the subscribed capital (amounting to €120 million), which is presented as their contribution to the operational costs incurred by the ECB in relation to their participation in the ESCB. The non–euro area NCBs are not entitled to receive any share of the distributable profits of the ECB, nor are they liable to cover any loss of the ECB. The total ECB capital paid up by euro area and non–euro area NCBs amounts to €7.7 billion.

The net profits of the ECB are allocated among the euro area NCBs according to the ECB capital key after an amount (which is determined by the Governing Council, but capped at 20 percent of the net profit) is transferred to the general reserve fund (itself subject to a limit equal to 100 percent of the ECB's capital). Any losses incurred by the ECB are, first of all, offset against the ECB's general reserve fund and, if necessary, following a decision by the Governing Council, against the "monetary income" as allocated to the NCBs in the relevant financial year (ECB website, "Capital subscription").

Approximating seigniorage, monetary income is the annual income derived from the (earmarked) asset counterpart to the system's monetary liability base, net of any interest paid on these liabilities.[20] The Eurosystem pools and shares its monetary income based on the ECB capital key.

[20] For each NCB, the monetary liability base mainly consists of: (1) banknotes in circulation; (2) liabilities to euro area credit institutions relating to monetary policy operations denominated in euros; (3) net intra-Eurosystem liabilities resulting from TARGET2 transactions; and (4) net intra-Eurosystem liabilities relating to the allocation of euro banknotes within the Eurosystem. The NCBs' (counterpart) earmarkable assets comprise mainly: (1) lending to euro area credit institutions relating to monetary policy operations; (2) securities held for monetary policy purposes; (3) intra-Eurosystem claims arising from the transfer of reserves to the ECB; (d) net intra-Eurosystem claims resulting from TARGET2 transactions; (4) (net) intra-Eurosystem claims relating to the allocation of euro banknotes within the Eurosystem; and (5) a limited amount of gold holdings and gold receivables in proportion to each NCB's subscribed capital key.

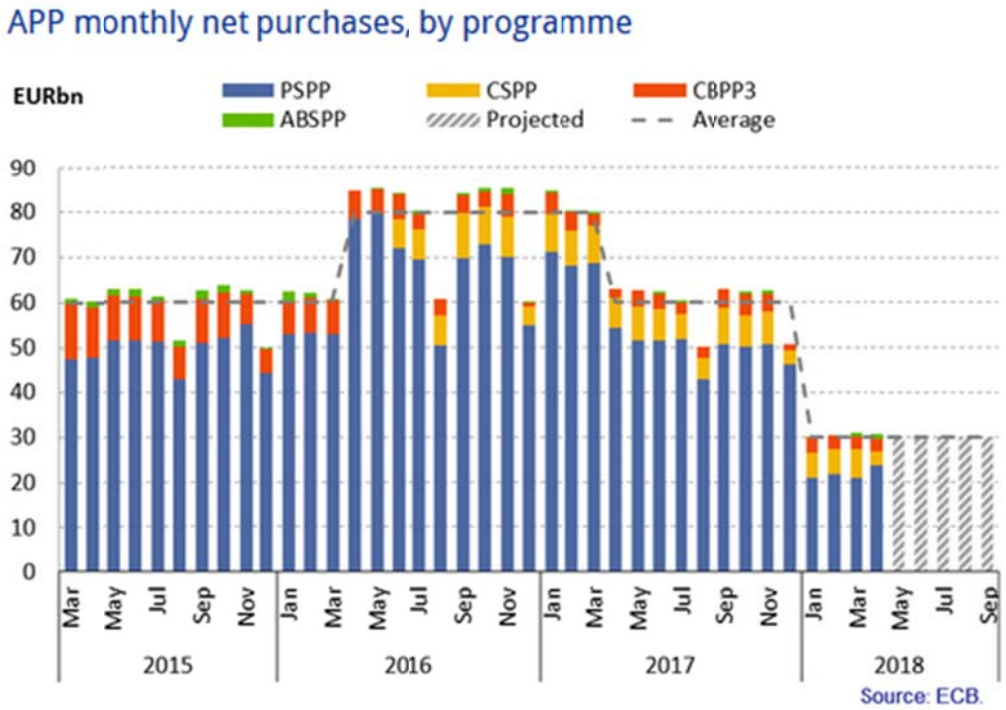
The ECB has been allocated a share of 8 percent of the total value of euro banknotes in circulation. A corresponding claim on the NCBs appears on the asset side of its balance sheet, which bears interest at the rate of the main refinancing operations (currently zero). Similarly, each of the NCBs will not only show "banknotes in circulation" among its liabilities, but another peculiar item titled "net claims relating to the allocation of euro banknotes within the Eurosystem" that captures any discrepancies between the respective NCB's cumulative banknotes issued and their allocated shares (based on the ECB's capital key applied to the remaining 92 percent of the note issue). The NCBs' income statements will show an item titled "net result of the pooling of monetary income."

Other peculiar intra-Eurosystem claims and liabilities relate to the transfer of foreign reserves (15 percent in gold, 85 percent in foreign exchange) by the NCBs to the ECB at the start of the European Monetary Union (EMU) on the one hand, and to the individual NCBs' net position vis-à-vis the Eurosystem arising from the operation of the TARGET2[21] system, on the other.

The Eurosystem's balance sheet expansion since the GFC saw two phases.[22] The early phase was primarily driven by longer-term liquidity operations meeting the banks' enlarged emergency liquidity needs. This was complemented by a special program supporting sovereign debt securities of euro crisis countries (securities markets programme [SMP]) and two covered bond purchase programs (CBPP and CBPP2). This first phase peaked in the summer of 2012, after which the Eurosystem's consolidated balance sheet gradually declined as banks repaid their central bank loans.

[21] Trans-European Automated Real-time Gross Settlement Express Transfer System
[22] Vergote et al. (2010) review the main drivers of the ECB financial accounts and ECB financial strength until 2009.

Figure 15. The Eurosystem's Delayed Quantitative Easing Initiative

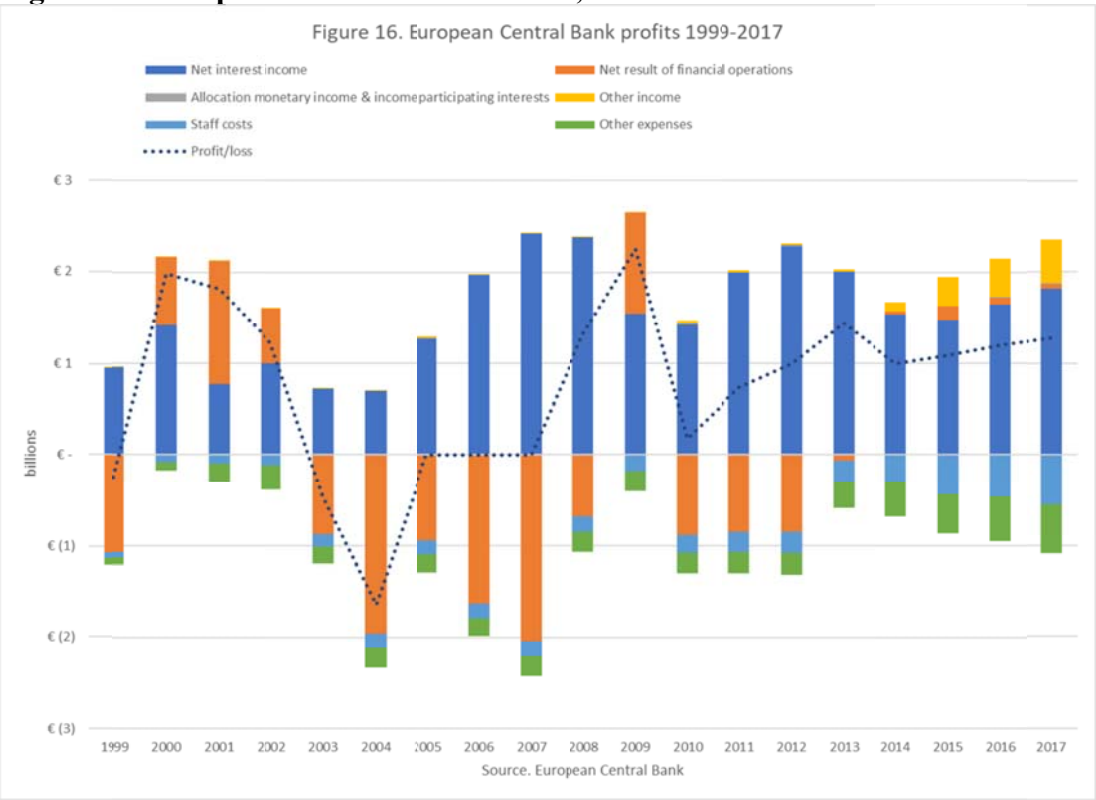


The later, still-ongoing phase of balance sheet expansion started in the fourth quarter of 2014. At first it was driven by the acquisition of securities under the third covered bond purchase program (CBPP3) and the asset-backed securities purchase program (ABSPP). Balance sheet expansion accelerated decisively in 2015 as the asset purchase program (APP) was expanded to also include the large-scale acquisition of sovereign debt under the public-sector purchase program (PSPP) (see figure 15). Two rounds of new targeted long-term financing operations in support of banks' lending to the real economy (TLTROs) have complemented the Eurosystem's much-belated QE initiative. Monthly purchases initially amounting to €60 billion in 2015 were raised to €80 billion in 2016 and continued at that pace until April 2017, when they were reduced back to €60 billion. Monthly purchase volumes were further reduced to €30 billion starting in January 2018 and are currently scheduled to run at that pace at least until September 2018. While the portfolio of securities held for monetary policy purposes under the APP continues rising—which was further expanded to also include corporate bonds (the corporate sector purchase program [CSPP]), holdings under the previous CBPP1, CBPP2, and SMP are shrinking due to redemptions.

Additionally, the ECB initiated a negative interest rate policy (NIRP) in the summer of 2014. As a result, the Eurosystem's banking clients are paying interest (at the rate of the deposit facility) on their voluminous (excess) reserves. To offset this "penalty" on the banks' reserves, the ECB pays a premium (of equal size) to banks for borrowing (and above-target on lending) under the TLTRO II program. Since NIRP was effective in shifting down the whole yield curve, sovereign debt securities issued by the higher-rated euro area member states started trading at negative yields, at one point for maturities of up to ten years in the German case. Faced with the prospect of fast running out of market material available for purchase, the ECB decided in January 2017 to even include bonds with yields below the interest rate "paid" on the deposit facility.

One might therefore suspect that the ECB's nonstandard monetary policies, even if initiated with a lengthy delay compared to the other central banks reviewed above, have also already left their mark on the Eurosystem's seigniorage. It turns out that there is some significant diversity in outcomes within the peculiar central bank system issuing Europe's common currency.

Figure 16. European Central Bank Profits, 1999–2017



Beginning with the ECB itself,[23] figure 16 shows summaries of the ECB's annual income statements featuring its profits since the euro's inception in 1999 until 2017. The evolution of its net interest income reflects both the interest rate cycle and the volume (balance sheet size) effects arising during the two balance sheet expansion phases, first in 2007–12, and then starting again in earnest in 2015.

The item "net result of financial operations"—which includes capital gains and losses, write-downs, and (transfers to or from) general risk provisions—is the major swing factor. Prior to 2007, these related primarily to gold price and exchange rate developments, and/or large realized gains in 2000–2 followed by large write-downs in 2003–7, for instance. Sizeable losses and write-downs bestowed a first loss on the ECB in 1999. The loss was covered by a withdrawal from the general reserve fund, a transfer from monetary income pooled, and a direct charge on

[23] Recall that the Federal Reserve Board, which does not have its own income-earning assets and balance sheet, only appears as a charge under assessments (reflecting the Board's operating expenses) in the Federal Reserve System's income statement.

NCBs (apportioned in accordance with the ECB's capital key). Larger losses mainly stemming from US dollar weakness and write-downs on foreign reserves followed in 2003 and 2004. The ECB withheld all its income from the note issue. Its small reserves were depleted. Transfers from the pooled monetary income covered the remainder.

In 2005, the Governing Council decided to establish a provision for foreign exchange rate, interest rate, and gold price risks, which, following the establishment of the CBPP1 in 2009, were extended to also cover credit risk. Between 2005 and 2012, the ECB significantly bolstered its general risk provisions, which depressed its profits in these years accordingly—in fact, to zero in the years 2005–7. Once the general reserve fund reached the size of the ECB's paid-in capital (which it cannot exceed), no further significant increases occurred.

In 2009, the ECB realized sizeable gains from security sales and the sale of gold that, for once, actually boosted its net interest income. For the next three years, transfers to general risk provisions (in line with the increase in its paid-in capital) once again dominated the net result of financial operations. Income and expenses related to the ECB's supervisory tasks as part of the Single Supervisory Mechanism have featured in the accounts under "other income" and "other expenses" since 2014. Overall, the ECB's profits have been fairly stable (around €1 billion over the past six years), showing a mildly rising trend, and were fully distributed to the NCBs. Given the magnitude of increase in its balance sheet in recent years, the rise in its profits seems remarkably small.

Figure 17. European Central Bank Capital, 1999–2107

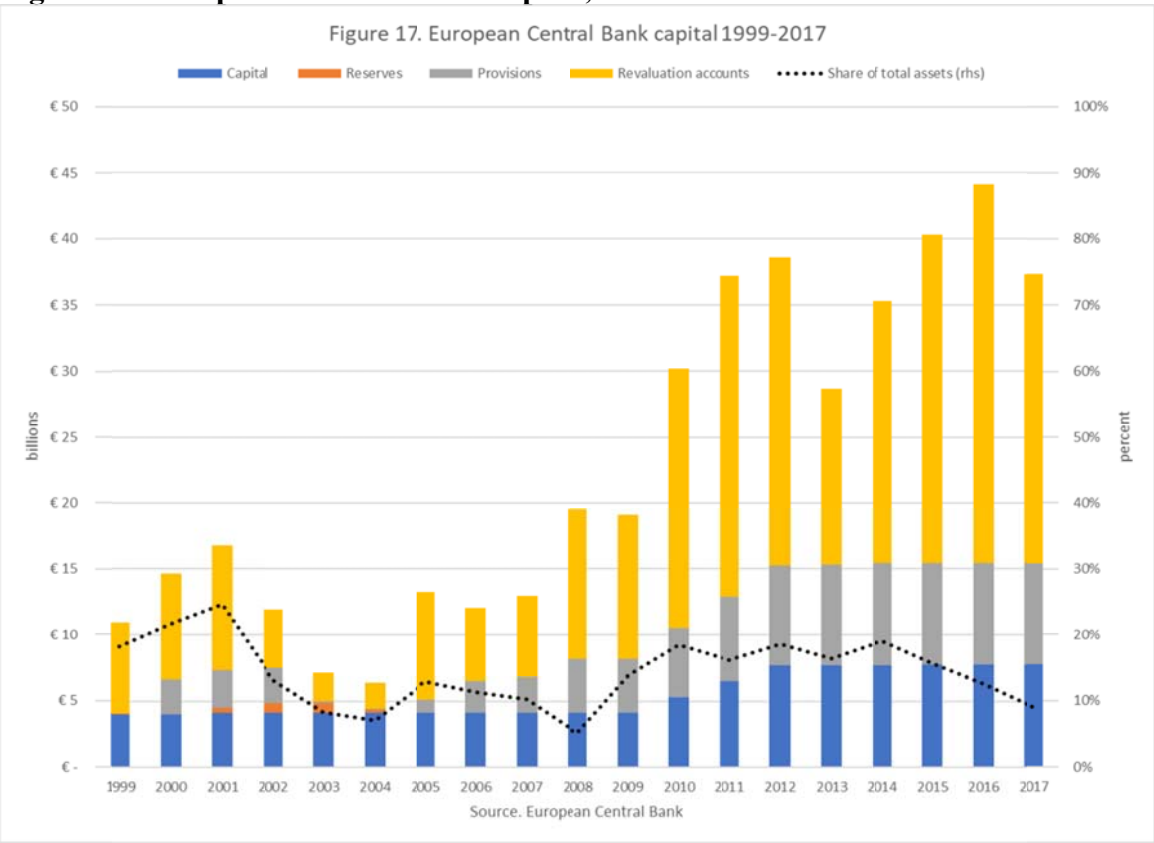
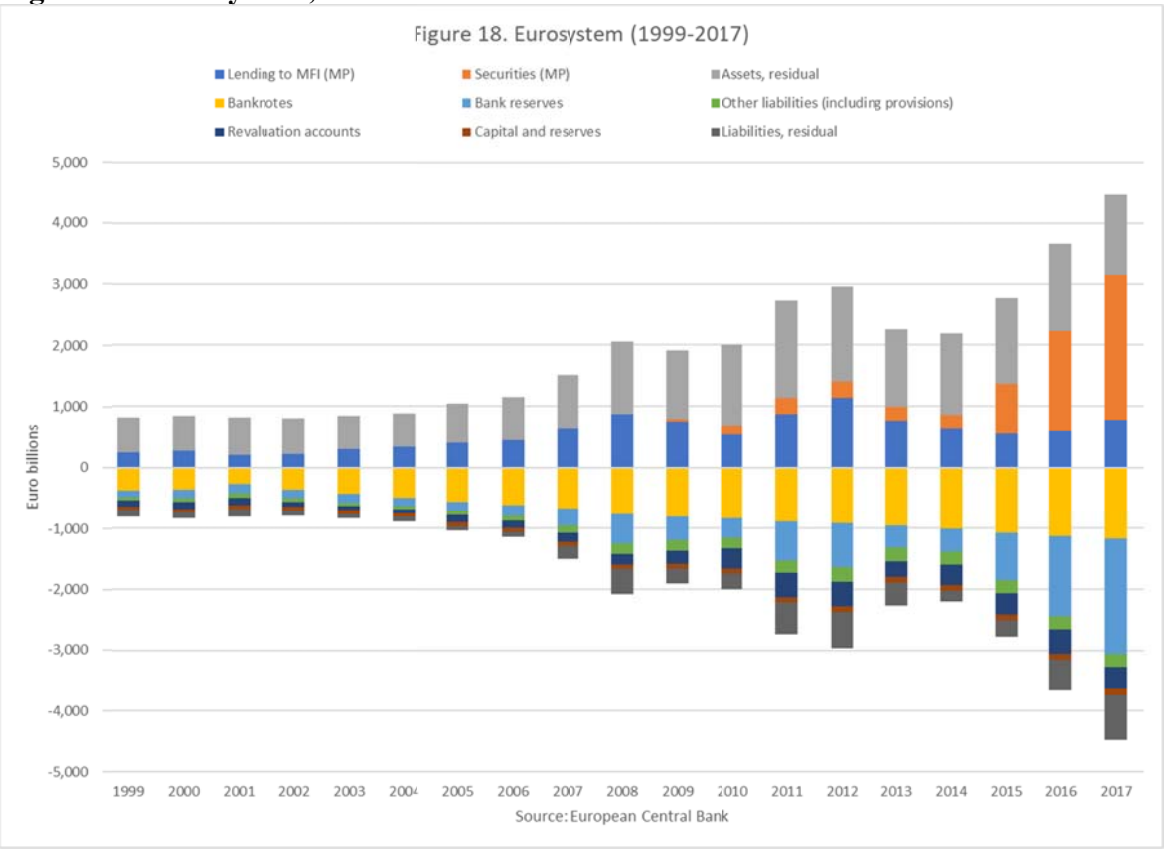


Figure 17 shows, however, a strong build-up in the ECB's financial buffers since the crises. The ECB's subscribed (paid-in) capital was increased by €5 billion (€3.5 billion) in three increments in the years 2010–12. By 2012, its general risk provisions (the general risk fund) again equaled the ECB's raised paid-in capital. The revaluation accounts too show large increases largely reflecting the price of gold. As a share of total assets, the ECB's financial buffers declined from almost 20 percent in 2014 to a still-generous 10 percent in 2017 (related to the APP). They amount to just over 0.3 percent of annual euro area GDP.

Figure 18. Eurosystem, 1999–2017



Turning now to the consolidated balance sheet of the Eurosystem, which includes the ECB, figure 18 shows that it has almost quadrupled since 2006. Lending to banks was the driver of balance sheet expansion until 2012, while it was driven by purchases of securities since 2015. Bank reserves saw corresponding expansions in each case, while the note issue has grown steadily, almost doubling since 2006, and more than tripling since 1999. By year-end 2017, the Eurosystem's aggregate capital and reserves reached €102 billion, up by over 50 percent since 2006. The revaluation accounts show €358 billion for 2017 for the system as a whole, more than tripling since 2006. The consolidated statistics provide no aggregate amount for the provisions of the Eurosystem. They seem to be included the €226 billion "other liabilities," which have almost tripled since 2006.

Overall, the Eurosystem's financial buffers appear to be in the 5–6 percent of GDP ballpark, which would be quite sizeable buffers indeed, of which the ECB's share represents about 6 percent. Yet, one should not be under any illusion that these could all be easily mobilized other

than gradually and in matching limited losses as they might arise over time. For instance, if the Eurosystem were to dump its huge gold holdings on the market all at once, no doubt much of the "paper gains" recorded in the system's revaluation accounts would evaporate just as fast.

In the following we will now take a closer look at some of the euro area NCBs, beginning with Germany's famous Deutsche Bundesbank.

While some of the developments identified here for the ECB will be similarly reflected in NCBs' accounts, significant differences among the NCBs will be seen. These partly relate to differences in the histories and responsibilities of NCBs.[24] And, as far as NCB profits are concerned, they also relate to significant interest rate spreads prevailing within Europe's peculiar currency union.

The latter factor has become more pronounced in recent years for the fact that the design of the PSPP has NCBs focus their purchases on debt securities issued by their respective sovereign. In contrast to monetary policy operations in general, income and risks from these PSPP purchases undertaken by the NCBs are not pooled and shared, but remain national—similar to national "emergency liquidity assistance" programs and purchases under the earlier CBPP1 and CBPP2. The normal risk sharing system (based on the ECB capital key) applies—indirectly—to all the securities purchased by the ECB for monetary policy purposes, given that the NCBs hold its capital. It also applies to the risks relating to public securities issued by European institutions that are part of the NCBs' purchases.

9. THE DEUTSCHE BUNDESBANK

Arguably, the Bundesbank (and hence the German public, the German media, the German body politic, and the German Constitutional Court) was the main reason why the ECB only embarked on large-scale purchases of public securities with such a long delay. That was for alleged risks to

[24] Significant differences exist, for instance, regarding national holdings of gold and foreign reserves, deposits of the public sector at the central bank, and NCBs' capital and reserves (also related to their ownership structures). The Eurosystem has an "Agreement on Net Financial Assets" (ANFA), which sets rules and limits that NCBs must follow to ensure that purchases of financial assets connected with their national functions—and not directly related to monetary policy—do not interfere with the conduct of the single monetary policy.

central bank independence and fiscal discipline, and the ever-present threat of hyperinflation. Painstakingly kept-alive memories of the Weimar hyperinflation cast a long shadow over Germany and, by extension, the euro (Bibow 2017a, 2017b). It is therefore in order to focus our assessment of the Bundesbank not on the euro era alone, but to actually begin our analysis of the German case at the "zero hour" after World War II. Bundesbank history offers some revealing lessons about central banking and seigniorage.

Hitler's "Total War" had ended in total defeat. Germany, its government, and currency had collapsed; the "Deutsche Reich" got divided into four pieces and was governed by the occupation forces. In due course, American influence led to the establishment of a decentralized central banking system that replaced the former (centralized) Reichsbank in the three Western occupation zones. In preparation for the currency reform of June 20, 1948, the "Bank deutscher Länder" (BdL) was established in March 1948. These events preceded the establishment of the Federal Republic of Germany and the election of the first federal government in the fall of 1949 (see Adler 1949; Wandel 1980; Horstmann 1985; Buchheim 1998; Diestel 2003; Bibow 2009a, 2010).

The BdL was formally owned by the "Landeszentralbanken" (LZB) that the (West) German state governments had established in their respective territories under the guidance of the occupation forces. In connection with the currency reform of June 1948, the BdL and LZBs received "equalization claims" ("Ausgleichsforderungen") on public authorities amounting to 6.1 billion and 2.6 billion "deutsche mark" (DM), respectively (Deutsche Bundesbank 1995). These were later registered in the federal debt registry as claims against the federal government. The commercial banks and other financial institutions, too, were granted equalization claims, amounting to DM 13.5 billion. The equalization claims yielded below-market interest rates and were not tradable.

While the central banking system's equalization claims were the asset counterpart to the currency newly issued in June 1948, in the case of financial institutions they were means of recapitalization by the government. In the aftermath of the war, West Germany's financial institutions held large amounts of nonperforming assets. As part of the currency reform, claims

on the Reich, for instance, had been cancelled. Subsequently part of the BdL's (and later the Bundesbank's) profits were earmarked to redeem these special government debts held by the financial system. This was done through a special "purchase fund" ("Fonds zum Ankauf von Ausgleichsforderungen"), which had the legal status of an agency of the Bundesbank. By 1995, all equalization claims held by financial institutions were redeemed. Following the Maastricht Treaty, the German government committed to redeeming the remaining "Ausgleichsforderungen" on the Bundesbank's balance sheet related to the 1948 currency reform by way of ten annual payments starting in 2024.

One could say that the DM started its highly acclaimed 50-year life as "QE for the people" (see section 12, below): worthless pieces of paper were replaced by what was to become the new legal tender of the new (West) Germany. The new currency notes were booked as a liability of the central bank. But the central bank would have had no asset counterpart to these "liabilities." Accordingly, the central bank would not have earned any income on (nonexisting) assets providing the "cover" of the note issue. The central bank's finances would have had to be part of the normal governmental budgetary processes. In other words, the central bank would not have been a proper bank. Equipped with a purely monetary balance sheet and no income of its own, it would have been financially dependent on the government.

Granting the central bank equalization claims made its balance sheet whole and endowed it with an original source of interest income. Initially, this was indeed the BdL's foremost source of income, which thereby made it financially independent. Seen from another angle, the central bank had "monetized" government debt (the equalization claims), and the government had used the proceeds to hand out "helicopter drops"—in reference to Milton Friedman's famous parable to which we will return in section 12—to the public at the DM's "zero hour." The monetary gifts were supplemented by governmental debt gifts that simultaneously recapitalized the broken financial system.

Later on, the government began applying part of the central bank's seigniorage profits toward paying off the currency reform debts it had originally gifted to financial institutions—a process that was finally completed in 1995. And by 2034, the government will also have completed the

"demonetization" of the currency reform debts it had gifted to the central bank agent in return for the original currency helicopter drops discharged to the public at the zero hour. At that point the final legacy of the Currency Reform of 1948, still resting on the Bundesbank's balance sheet today, will fall prey to "monetary financing in reverse"—as a tribute to the purity of Maastricht dogma and the ghost of Weimar.

It will not really matter much. The Bundesbank has long since built up a balance sheet and capital base that secure its financial independence from the government under normal circumstances. It will happily replace the redeemed (and demonetized) government debts by monetizing higher-yielding private debts instead. Unless the Bundesbank boosts its expenses correspondingly, the government's seigniorage revenues will go up, too.

Figure 19. Growth and Composition of the Bundesbank's Assets

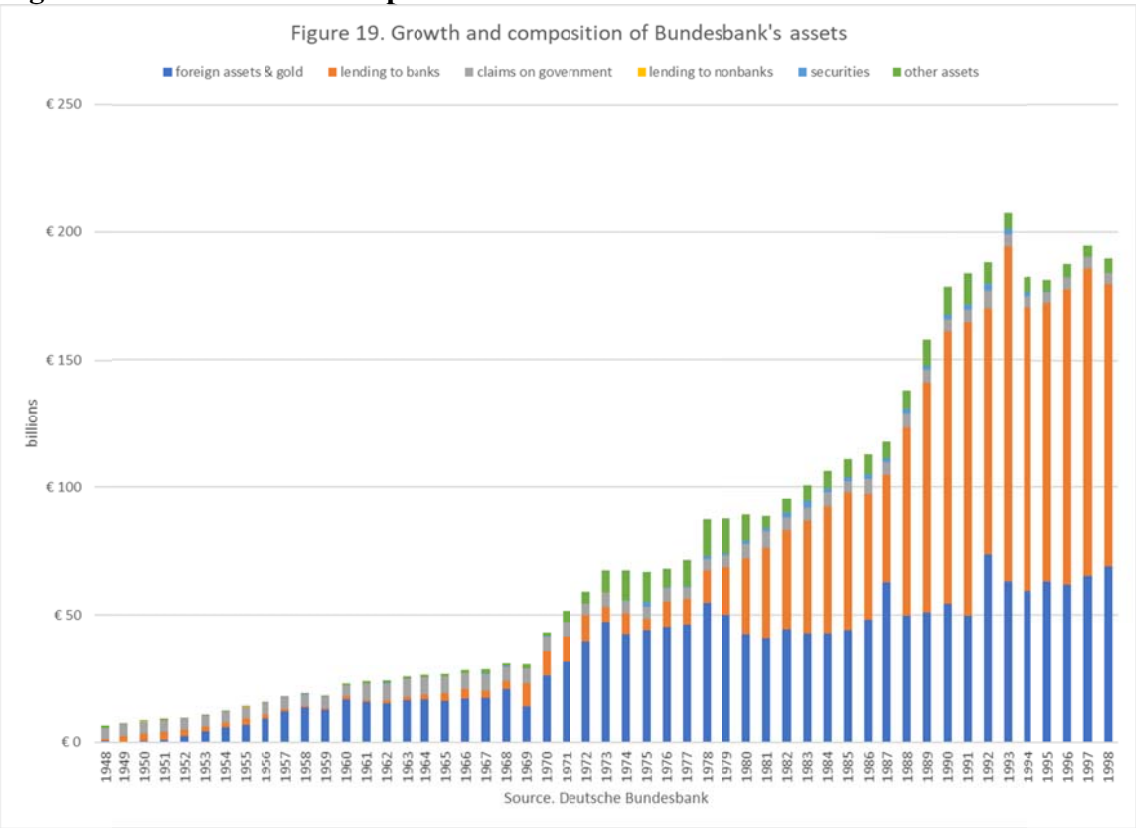
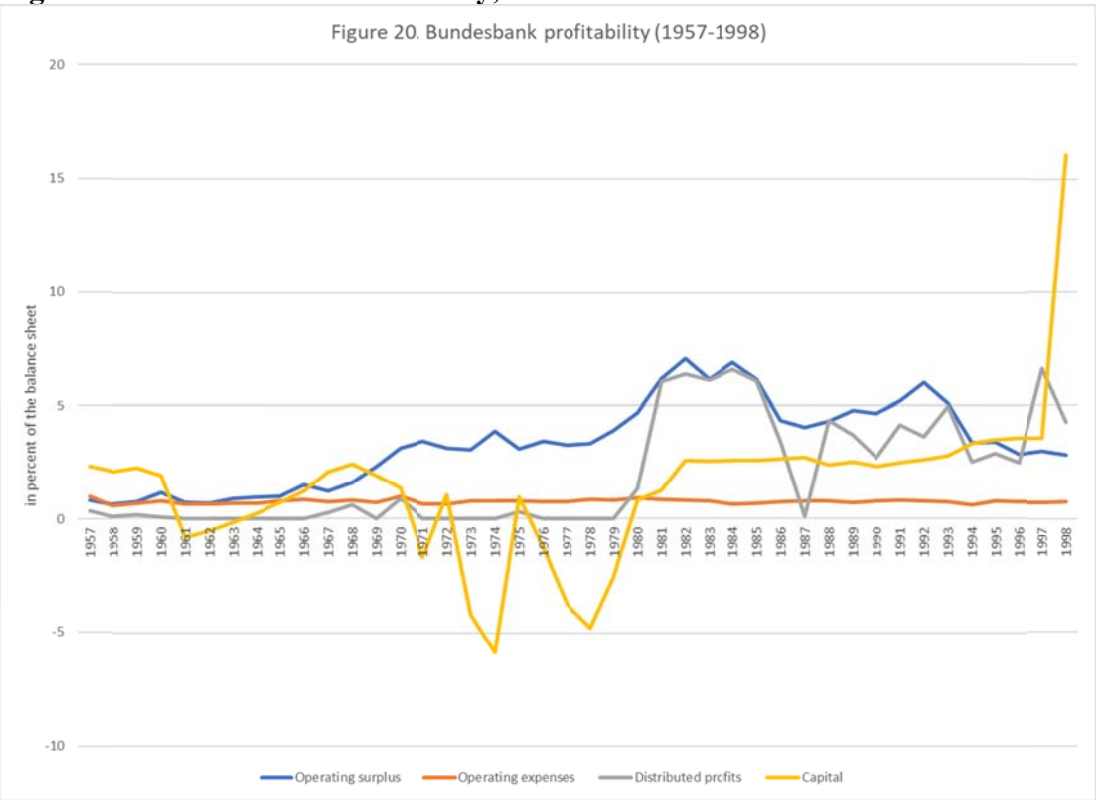


Figure 19 shows the growth and composition of the Bundesbank's (and formerly the BdL's and LZB's) assets from 1948 until 1998. At the end of 1948, equalization claims constituted roughly two-thirds of the central bank system's assets. Held constant at €4.25 billion ever since, this asset position gradually shrank in relative importance over time. Instead, following the early balance-of-payments crisis of 1950–51 and subsequent adoption of West Germany's mercantilist tradition under the Bretton Woods system (Bibow 2017), gold and other foreign reserves surged beyond €15 billion and reached a 70 percent share of the Bundesbank's assets (amounting to over 10 percent of GDP) in the late 1950s/early 1960s. In agreement with the government, the equalization claims were partly "mobilized" as a means to absorb money market liquidity (which was expanding fast due to the monetization of foreign exchange reserves). Government deposits at the central bank, and later also raised minimum reserve requirements, were used for the same purpose, as West Germany's foreign reserves came to significantly exceed the note issue.

In fact, as the Bretton Woods system collapsed in the early 1970s, the Bundesbank's foreign reserves surged further toward €50 billion and remained the predominant asset position on the Bundesbank's balance sheet until the late 1970s. It is only since the 1980s that lending to banks became the main channel of meeting the West German economy's growing liquidity needs. The monetization of domestic private assets thus increasingly became the asset base from which the government's seigniorage earnings were derived.

Figure 20. Bundesbank Profitability, 1957–98



Naturally, the prominence of foreign reserves on the Bundesbank's balance sheet left the central bank exposed to heightened currency risk. Figure 20 shows that the Bundesbank's operating expenses (in percent of its assets) from 1957[25] until 1998 were rather steady, at around three-quarters of 1 percent of the central bank's assets (or 0.1 percent of GDP). The evolution of its operating surpluses (net interest income minus operating expenses, in percent of its assets) reflects the interest rate cycle. Distributed profits were small until the late 1970s, but surged in the 1980s. Currency risk—(largely unrealized valuation) losses on the Bundesbank's foreign reserves—is prominently reflected in a declining or even negative central bank capital base in figure 20.

The first such occasion arose in 1961 when on March 3, the DM was revalued against the US dollar by 5 percent (from 4.20 to 4). As one side effect, the Bundesbank took a hit on its gold and

[25] Prior to 1957, West Germany's central bank system published separate profit-and-loss accounts for the BdL and the LZB. The BdL started with a small profit of about a quarter of a million euros for 1949 and distributed profits to the federal government of between €25–60 million annually for the years 1950–56 (apart from paying a 6 percent dividend to its LZB owners).

foreign reserves of roughly €0.8 billion. The loss was partly covered by a drawdown on reserves, but mainly through simply adding a (zero interest) claim on the government as an asset on the Bundesbank's balance sheet. The special debt owed to the government was to be paid off out of future central bank profits.[26] Up until 1960, the central bank had distributed profits to the government of between €15–60mn annually. No profits were distributed for the years 1961–66, as the central bank was rebuilding its negative equity capital (close to negative €200 million in 1961), and finally paying off the special debt in 1967.

The government had only enjoyed two profit distributions for the years 1967 and 1968 when another DM revaluation and next round of valuation losses hit the Bundesbank in 1969. This was followed by further bursts of DM appreciation (and corresponding valuation losses on the Bundesbank's gold and foreign reserves) in the course of the 1970s. In fact, for much of the 1970s the Bundesbank operated with a negative equity capital base (of up to negative €4 billion) and distributed no profits to the government (except for the year 1975 [Deutsche Bundesbank 2017]). Nor did any redemptions of equalization claims happen in these years. In contrast to the DM revaluation in 1961, no (negative) asset (debt owed to the government) was added on the Bundesbank's balance sheet. Instead, the central bank's negative equity only appeared implicitly in the accounts as "loss carried forward."

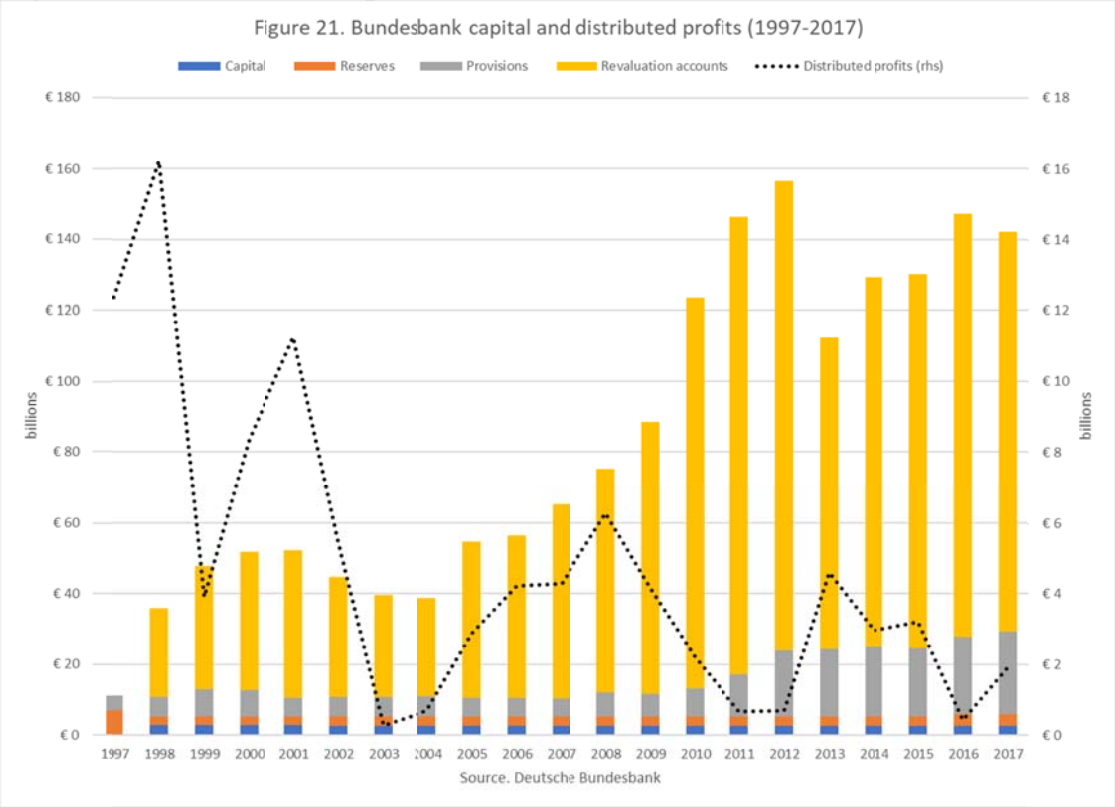
Sizeable valuation losses on its gold and foreign reserves again occurred in 1986–87 and in the first half of the 1990s. On these occasions the Bundesbank's operating surpluses (thanks to elevated net interest earnings in the high-interest environment at the time) provided a sufficient buffer to take the blow without reducing the central bank's equity capital base.

One might say that on all these occasions (West) Germany's monetary mercantilism was taking its toll on the government's seigniorage earnings. Foreign reserve accumulation to stem DM appreciation in support of German (net) exports eventually resulted in reduced seigniorage earnings—as an alternative to explicit export subsidies administered through standard budgetary procedures ("QE for Germany's export industries," through implicit and intricate channels, would be another way of putting it; see section 12 below).

[26] Effectively this amounts to the "deferred asset" accounting approach laid down for the US Federal Reserve.

The transition to the euro brought important changes that were also reflected in the surge in the Bundesbank's disclosed financial buffers in 1998. On the one hand, the Bundesbank's capital and legal reserves were restructured at the time, in effect reduced to DM 10 billion (just over €5 billion), which also had the result of boosting the distributed profit for 1998.[27] On the other hand, the Bundesbank's "hidden reserves," particularly on its sizeable gold holdings, were laid open for the first time as the Eurosystem accounting rules require the valuation of assets at market prices (rather than historical costs).

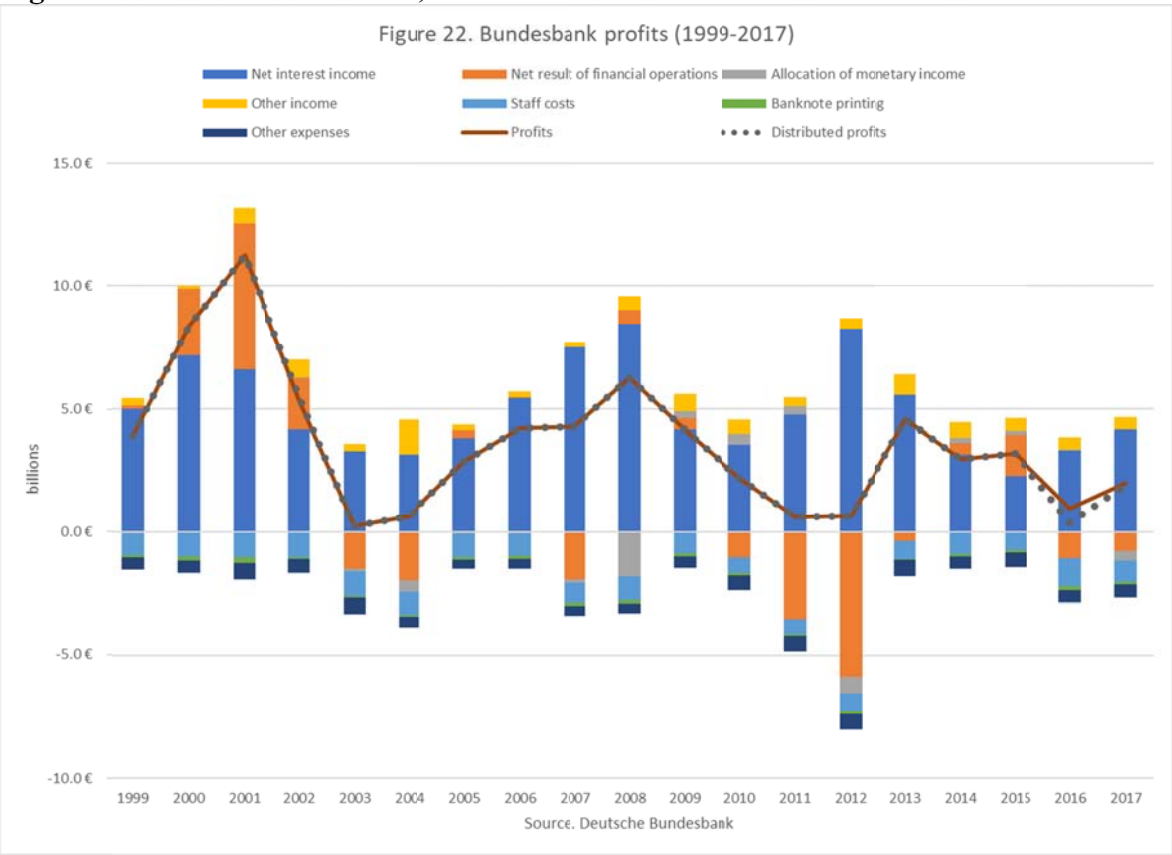
Figure 21. Bundesbank Capital and Distributed Profits, 1997–2017



[27] Note that there is some resemblance here between the restructuring of the Bundesbank's capital and the cap placed on the Fed's "surplus" in 2015: both measures released resources to the government. Some may see here a possible connection between this event and the attempt by the infamous fiscal hawk Theo Waigel (helped by the infamous monetary hawk, Jürgen Stark, in his capacity as state secretary in the finance ministry at the time) to "lift the Bundesbank's gold treasure" (see Ummen 1997)—which instead showed up unimpaired in the revaluation accounts of the Bundesbank's opening balance sheet under the euro.

This accounting change itself did not result in any profit distribution though. The Eurosystem's accounting rules require that unrealized capital gains are booked (and offset) in a "revaluation account" instead. The offset for gold in the revaluation account amounted to over €20 billion as Germany transitioned to the euro, also transferring part of its gold and foreign exchange reserves to the ECB on that occasion. The revaluation account constitutes part of the central bank's de facto equity capital base. While today's Eurosystem statistics are transparent on this matter, the Bundesbank's statistics up to 1998 (and as shown in figure 20, above) did not reveal the central bank's financial buffers in full. As figure 21 shows, the Bundesbank's financial buffers—consisting of capital, reserves, general risk provisions, and revaluation accounts—have expanded greatly under the euro, especially the revaluation accounts (mainly reflecting the rise in the gold price).

Figure 22. Bundesbank Profits, 1999–2017



The Bundesbank went through a period of downsizing since the 1990s and its operating expenses gradually declined with its staff until 2015. Along with the Eurosystem's new supervisory responsibilities, this trend has reversed more recently. There appears to have been no corresponding increase in fee incomes (see figure 22).

Naturally the Bundesbank's net interest income reflects the interest rate cycle as well as a trend decline under the euro. However, since 2016, net interest income increased again somewhat despite further declines in interest rates driven by the ECB's belated QE program, and the distributed profit for 2017 came to €1.9 billion (0.06 percent of GDP). The volatility in the Bundesbank's profits mainly stems from the "net result of financial operations," which includes capital gains/losses, write-downs, and general risk provisions. This item essentially accounts for any realized capital gains and losses, marked-to-market losses, and assessed (probable) future capital and/or income losses. The item "allocation of monetary income and income from participating interests" captures the seigniorage sharing arrangements in place for the Eurosystem: net interest income on the monetary base is shared among member central banks in line with their (paid-in) capital. This item, too, is volatile but of small magnitude. In addition, it includes income from participating interests and hence also any profits the ECB may distribute to its member central bank owners.[28]

Since the ECB embarked very late on the QE path previously trodden by other leading central banks, any impact on central bank profits, too, has only been felt since 2015. QE's immediate effect on profits features the usual countervailing forces: the rise in the size of the balance sheet by itself tends to boost profits while declining interest rates tend to reduce it. The Bundesbank is a peculiar case in this regard though, as the results for 2016 and 2017 have clearly brought to light.

The Bundesbank's income statement for 2016 shows that the central bank's net interest income now primarily derives from negative interest earnings on its liabilities while income earnings on its assets have declined to near zero. The remaining Greek public debt securities acquired under

[28] Further sources of income on participating interests include the Bank for International Settlement (BIS) and (until 2015) the Liquiditäts-Konsortialbank.

the SMP still provide lavish interest income, but the quantitatively far more important German debt securities acquired under the APP ever less so, especially the German public debt securities purchased since 2015 that were acquired at near-zero or even below-zero yields. While the remaining pool of high-yield Greek debts is shrinking fast, a significant part of the near-zero-yield German debts have long remaining maturities. This crisis legacy will make for an interesting income future for the Bundesbank: the yield on the bulk of the Bundesbank's securities holdings will remain near zero for many years to come, even as short-term policy interest rates will supposedly be "normalized" (i.e., increased) at some point. At that point the current atypical income source derived from negative interest rates on liabilities will turn into an interest expense. Net interest income, central banks' main income source, will likely turn negative for the Bundesbank at that point.[29]

It would not help to sell securities (and shrink the Bundesbank's balance sheet) instead. As short-term policy rates get normalized, longer-term interest rates will likely rise, too, implying capital losses. Small coupons and long maturities imply high duration, that is, high interest sensitivity of the Bundesbank's securities portfolio. Potential capital losses are very sizeable. But only realized losses would directly hit the Bundesbank's income and distributable profits. As long as the securities are not sold but kept on the balance sheet, the amortized cost instead of marked-to-market accounting (as decided by the ECB for the monetary policy portfolio in 2014) would prevent this outcome. But negative net interest income might still plague the Bundesbank for many years to come—and so the Bundesbank started interest rate risk provisioning in 2016.

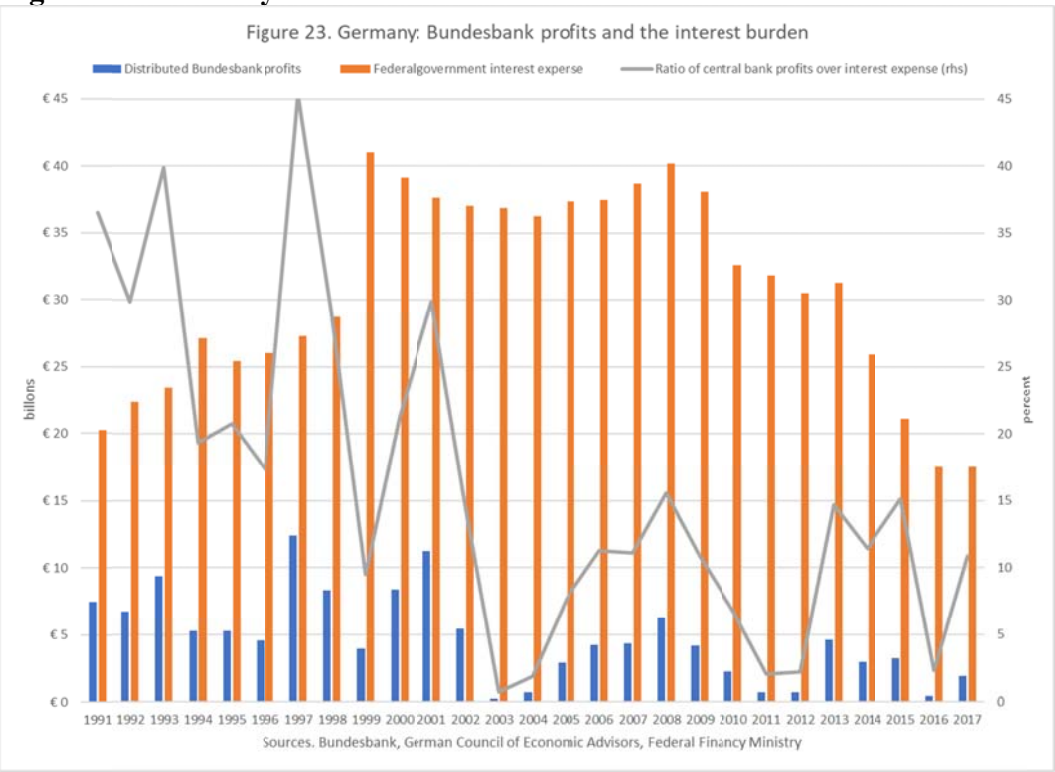
As Bundesbank President Jens Weidmann explained at the press conference on February 23, 2017, which accompanied the publication of the 2016 results regarding the interest rate risk provisions that lowered the distributed profits for 2016 (see figure 22), the Bundesbank's interest rate risk assessments take the ECB's forward guidance into account (which implies that interest rates will likely only start rising in mid-2019) and are not particularly conservative compared to other member central banks. The Bundesbank followed through and made additional interest rate

[29] As Jens Weidmann acknowledged at the press conference on February 23, 2017, securities purchased at (negative) yields below the (negative) interest rate on the deposit facility imply a position that shows immediate income losses.

risk provisions for 2017 as the "continuation of the asset purchases has driven up the Bank's interest rate risk," Mr. Weidmann observed at a press conference on February 27, 2018.

The Bundesbank's situation is peculiar among central banks that embarked on nonstandard monetary policies in the aftermath of the crisis. The point is that the ECB initiated its negative-interest and QE policies at a very late stage when especially German interest rates were already very low. Arguably, German resistance was the main force that long prevented a more timely policy response. The fact that German interest rates have declined to especially low levels reflects Germany's "safe haven" status (by market convention) and, ultimately, design flaws in the euro regime: namely, the absence of a common safe asset and joint fiscal capacity that would allow lower national public debt levels (Bibow 2015). Arguably, both the euro regime's design flaws and the intra-eurozone imbalances that provided German public debt securities such a prominent role as safe (haven) assets in recent crisis times, too, were mainly Germany's own responsibilities. This should be borne in mind when assessments of the roots of future Bundesbank losses are made.

Figure 23. Germany: Bundesbank Profits and the Interest Burden



Just as the fact that the Bundesbank's profits (and likely future losses) are only one among several consequences of the ECB's nonstandard monetary policies, Germany would have suffered calamitous consequences of a collapse of the currency union. And Germany has no doubt significantly benefited from the gradual recovery in the eurozone that the ECB's policies lent important support to. Last but not least, the ECB's policies have greatly reduced the interest burden on Germany's public debt—a critical factor behind Dr. Schäuble's[30] "black zero" victories in recent years (see figure 23). It is dishonest to celebrate these supposed successes of German discipline, but blame the ECB for the exploitation of German savers and German banks. These outcomes are but two sides of the same (euro) coin that the ECB has prevented from breaking up—at least for now.

We will next look at the cases of Banca d'Italia and Banco de España—central banks of euro crisis countries—and the main counterparts to the Bundesbank's TARGET2 balances (Bibow 2012; Cecchetti, McCauley, and McGuire 2012), which constitute more than 50 percent of the German central bank's assets (and not far from 30 percent of GDP) today.

10. BANCA D'ITALIA

After national unification in 1861, Italy had a single currency—the Italian lira—but continued to be hampered with fragmented banknote circulation until the Banca d'Italia was established in 1893 as a private banking corporation, issuing national banknotes under public concession. Gradually developing a broader public role as Italy's central bank, Banca d'Italia was brought under public control with the Banking Law of 1936—while continuing to be a nominally privately owned corporation (primarily by the financial industry) until today (Capie et al. 1994; Banca d'Italia 2018).

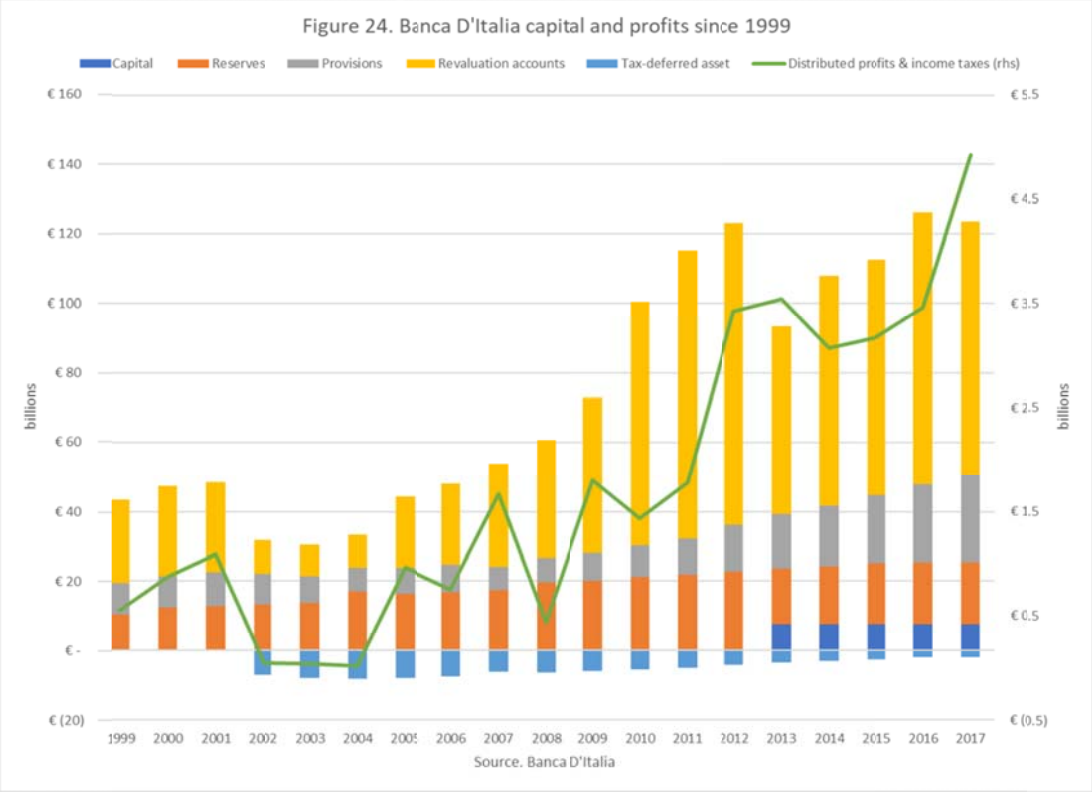
An investigation into the evolution of the Bank's balance sheet and profit and loss account in the euro era reveals certain peculiarities. To begin with, as a private corporation, the Bank's profits are subject to income tax and its tax payments have at times exceeded its distributed (after-tax)

[30] Germany's finance minister, 2009–17

profits to the state. We will therefore add its income tax payments to its profit distributions to the state to provide a more accurate measure of the fiscal revenues from currency issuance by Italy's privately owned central bank. Next, while annual dividend payments to its private owners were quite low if not trivial in the recent past, the Bank has generally retained a significant part of its (post-tax) profits and built up a sizeable capital reserve position from it.

Banca d'Italia's ownership and capital structure were finally reformed in 2014. Prior to the reform the Bank's nominal share capital was only a tiny €156,000. The reform transformed part of the Bank's reserves into its current €7.5 billion share capital and also changed the method of calculating shareholders' annual dividends. Post-reform dividend payouts of €340–380 million (roughly a 5 percent yield) have exceeded their pre-reform standard by a factor of five or so. They are capped by law at 6 percent (€450 million). The reform also introduced a 3 percent ownership share cap, presumably to reduce concentration of ownership.

Figure 24. Banca D'Italia Capital and Profits since 1999



As figure 24 shows, the Bank's financial buffers—consisting of capital, reserves, general risk provisions, and revaluation accounts—shrunk in the early 2000s. In 2002, a huge loss of almost €21 billion resulted from the conversion of old government debts held on the Bank's balance sheet (like Germany's equalization claims yielding below-market interest rates). This was partly met by a withdrawal from the gold revaluation account and partly by means of a €7.2 billion "deferred tax asset" recorded under sundry assets. In the following two years, write-downs on US dollar foreign reserve assets caused additional damage.

In 2005, the Bank's financial position then started to strengthen again. Not only has the deferred tax asset, effectively an interest-free loan from the government, been gradually paid off by what amounts to a tax surcharge; the Bank has also rebuilt and strengthened its reserves from sizeable retained earnings. The biggest boost occurred in the revaluation accounts and primarily reflects the rise in the price of gold though. Furthermore, since 2010 and related to the ECB's nonstandard monetary policy programs, Banca d'Italia's distributed profits (including income tax payments) surged despite the sizeable buildup of provisions for general risks.

Figure 25. Banca D'Italia Profits, 1999–2017

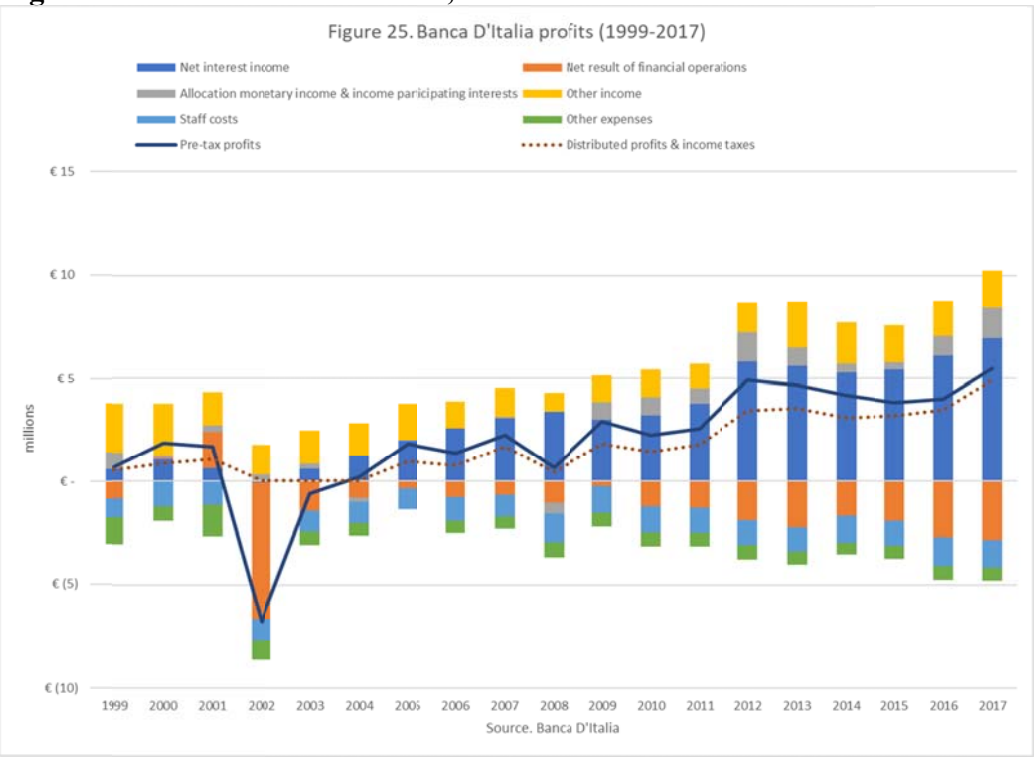


Figure 25 shows the evolution of the Bank's income in the euro era in some more detail. It highlights the sizeable (pre-tax) loss recorded for 2002 that also had sharply reduced provisions and left a (negative) deferred tax asset as its consequence. Two more things are particularly noteworthy here. First, the Bank's net interest income was quite small in the early years compared to "other income," which largely consists of investment income on the (asset counterpart to the) Bank's reserves and provisions. In 2002, net interest income even briefly turned negative. Banca d'Italia remunerates the banks' required reserves and pays a generous yield on the government's deposits held at the central bank (Treasury payments account). But with the rise in policy interest rates starting in 2004 and the expansion of assets related to nonstandard monetary policy programs starting in 2008, the Bank's net interest income has greatly increased and in recent years by far exceeded other income (which largely consists of investment income on assets that are the counterpart to its capital reserves and provisions).

Second, the "net result of financial operations," which also includes write-downs and general risk provisions, has been a persistent drag on Banca d'Italia's profits. The latter item accounts for any realized capital gains and losses, marked-to-market losses, and assessed (probable) future capital and/or income losses. It primarily reflects the rebuilding (following the crunch in the early 2000s) and further enlargement of general risk provisions, most recently related to the PSPP. In fact, the Bank's "Annual Report 2016" states that financial risks in 2016 were assessed as greater than at the end of 2015, which would be mainly attributable to credit risk, "specifically the greater exposure to sovereign risk arising from the purchase of government securities under the PSPP" (Banca d'Italia, "Annual Report 2016," 21). In addition, in 2016, a new balance sheet item or special reserve (of €40 million) that serves to stabilize dividends was introduced.

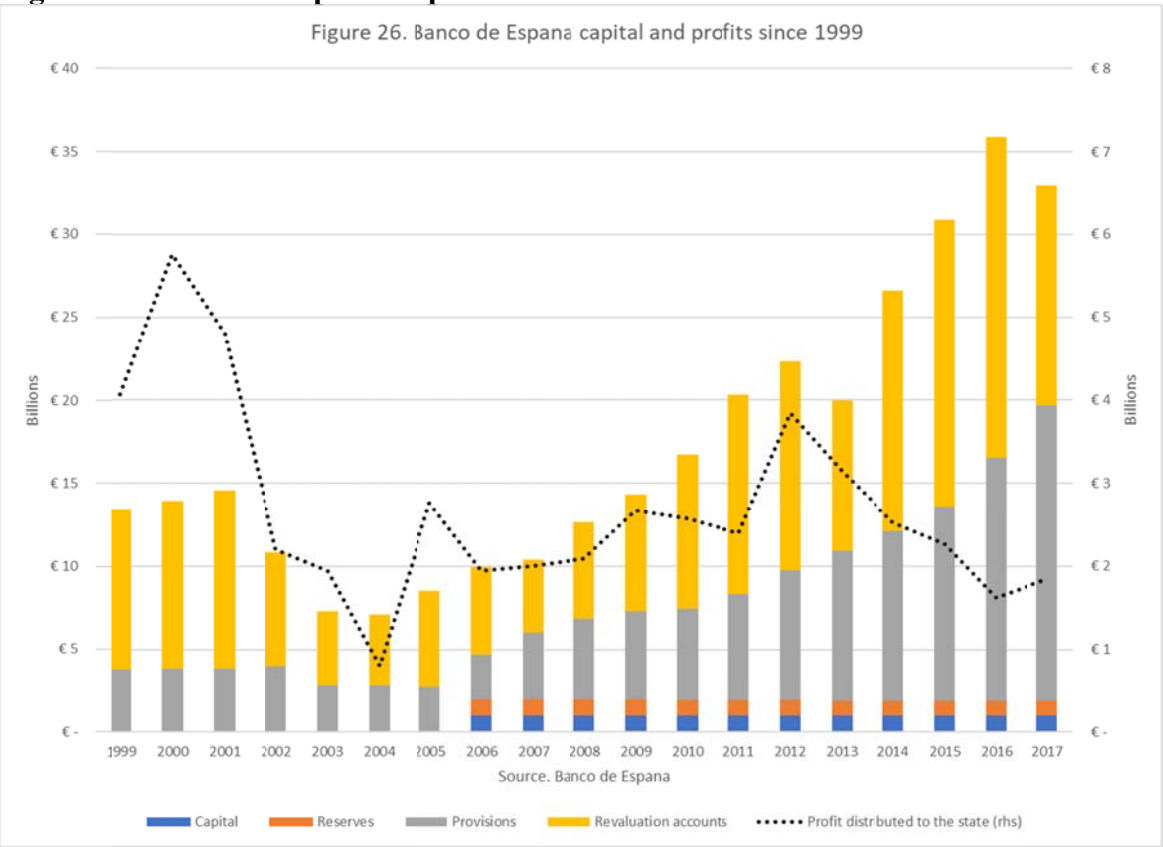
Whereas the Bundesbank highlights interest rate risks related to the PSPP, Banca d'Italia flags sovereign risk. Apart from TARGET2 imbalances, the two central banks' positions are markedly different in other respects, too. While the Bundesbank's net interest income was only €4.2 billion in 2017, Banca d'Italia's was €6.9 billion, and while the Bundesbank's other income is generally negligible, Banca d'Italia showed an additional €1.8 billion net income from financial assets relating to the investment of reserves and provisions. Italy's Treasury received close to €5 billion (0.29 percent of GDP) from its central bank in 2017 compared to under €2 billion (0.06 percent

of GDP) in Germany's case. That is despite the fact that the Bundesbank's note issue exceeds Banca d'Italia's by about 50 percent, and its balance sheet is about twice the size of Banca d'Italia's. The two central banks' financial buffers are of similar size overall, but gold features more prominently in the Bundesbank's case compared to income-earning assets in Banca d'Italia's case. More importantly, Italy's significantly higher level of interest rates compared to Germany's depressed "safe haven" asset yields shows up here. One can take it for granted though that Italy's finance minister would much prefer to pay German interest rates on Italy's public debt. Banca d'Italia's greater profits provide only limited pain relief.

11. BANCO DE ESPAÑA

The historical roots of central banking in Spain reach back to the late eighteenth century (Capie et al. 1994). In the aftermath of the Spanish Civil War (1936–39), Banco de España found itself firmly under the control of the federal finance ministry—a situation that only changed again in the context of the Masstricht Treaty and Europe's EMU. Banco de España is fully owned by the government and its profits are generally distributed in full to the government. Until 2005, Banco de España only had minimal capital and reserves (under €5 million). In 2006, retaining part of the 2005 and 2006 profits, they were each raised to €1 billion. (Reserves were slightly lowered again subsequently to bolster specific provisions.)

Figure 26. Banco de España Capital and Profits since 1999



While its capital and reserves were only minimal, Banco de España had sizeable financial buffers in the form of provisions and revaluation accounts when the euro was launched in 1999. The latter increased further until 2001, even as gold and foreign reserves were sold. The picture changed decidedly when the euro began to appreciate in 2002 and foreign exchange holdings lost value accordingly. However, starting in 2007, Banco de España's financial buffers again increased strongly as both provisions and revaluation accounts showed significant growth (see figure 26). Growth in the revaluation accounts stemmed primarily from the rise in the price of gold. In 2017, the balance of revaluation accounts declined quite markedly, largely reflecting the depreciation of the US dollar against the euro. Mounting general risk provisions since 2011 are essentially retained earnings set aside for assessed financial risks (encompassing exchange rate, interest rate, and credit risks). Transfers to provisions were especially large in the past two years.

So the growing size of Banco de España's balance sheet did not see any commensurate surge in profits (and profit distributions). In fact, the year 2000 marked the peak in central bank profits,

which reflected both the interest rate cycle as well as sizeable realized gains on the sale of US dollar reserves (in support of the euro).

Figure 27. Banco de España Profits since 1999

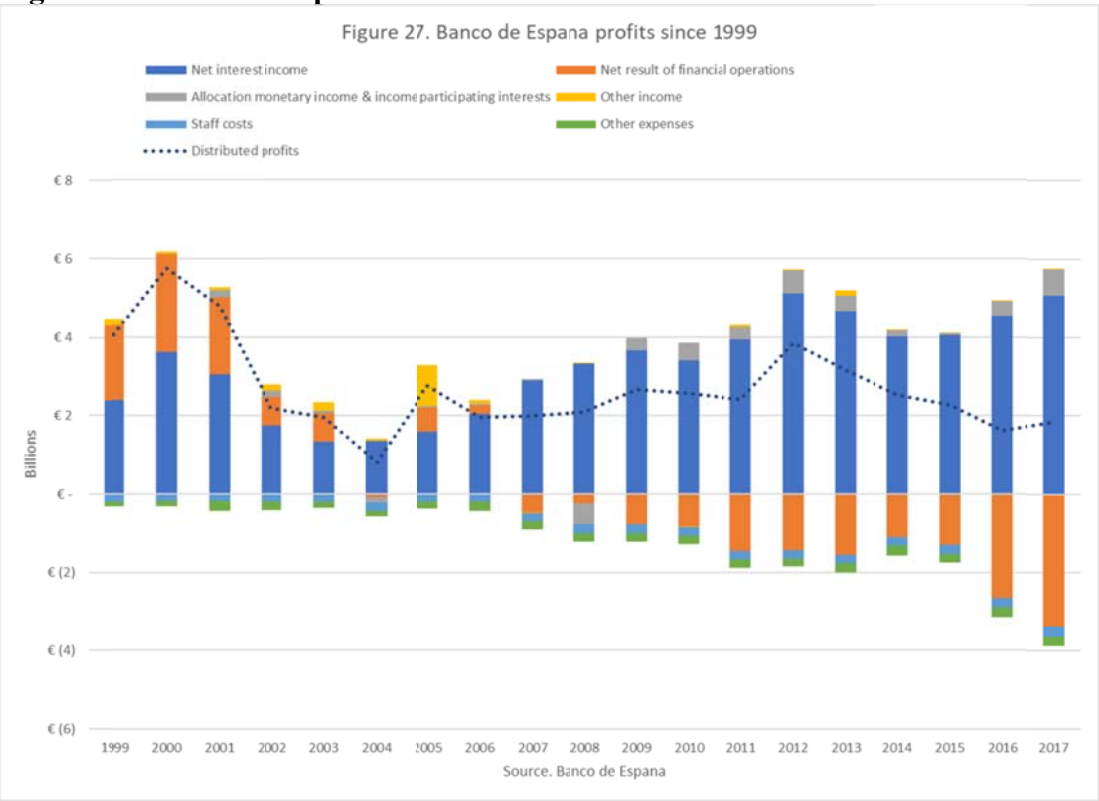


Figure 27 sheds some further light on the evolution of profits and their sources. Net interest income increased quite strongly after interest rates troughed in 2003–4. But the net result of financial operations, including realized gains/losses, write-downs, and transfers to or from provisions affected profits very differently prior to 2006 and thereafter. In the first period, realized gains on the sale of both gold and US dollar reserves bolstered profits.[31] Since the crisis, write-downs and transfers to provisions have largely offset the rise in net interest income. That is to say, the impact of the ECB's nonstandard monetary policy programs on Banco de España's profits was more or less sterilized or offset by enlarged transfers to provisions for financial risks. In 2016 alone provisions were boosted by €2.8 billion. The notes in the 2016 Banco de España's Annual Accounts state that: "In this connection, on 25 January 2017 the Executive Commission

[31] In 2005, a one-off profit was recorded for peseta banknotes that had not been exchanged into euros. The reductions in reserves by €50 million each in 2010 and 2013 occurred to build provisions for late peseta exchanges.

approved a change in the methodology used for calculating the financial risks and the provision recorded for such risks. As a result of this and of the higher risks owing to the substantial increase in monetary policy portfolio investments, the Executive Commission approved net provisioning for financial risks of €2,800.92 million" (Banco de España, "Annual Accounts 2016," 33). Provisions were boosted by a further €3.1 billion for the same reason in 2017 and distributed profits increased by over €200 billion to €1,850 billion (0.16 percent of annual GDP), which is well-below half their peak level in 2000 when realized capital gains bolstered profits.

Banco de España's financial buffers are only a quarter the size of Banca d'Italia's (which are similar in size to the Bundesbank's). This may help explain why the former put even more emphasis on bolstering its buffers in the wake of rising net interest income, which had the effect of stabilizing profit distributions. In other words, while the Italian Treasury has benefited from a significant increase in seigniorage profits since 2012, the ECB's nonstandard monetary policies have so far boosted Banco de España's financial buffers rather than its profit distributions.

Before summarizing the findings of this investigation, we will briefly turn to some related issues.

12. *EXCURSE*: REFLECTIONS ON SOME RELATED ISSUES

In the context of the recent financial crises and experimental monetary policies pursued in response proposals for so-called "helicopter money" and "QE for the people" featured in academic and popular debates (see, for instance, Buiter [2014a]; Muehlbauer [2014]; Fullwiler [2015]), including the recent Swiss "sovereign money" initiative, we will now briefly discuss how they relate to the analysis presented in this study. Thereafter, we will also offer some brief reflections on "digital currencies" and the future of money and seigniorage.

12.1. Of "Helicopter Money" and "QE for the People"

In discussing the notions of "helicopter money" and "QE for the people" it is helpful to recall our distinction between the MPS approach to currency issuance versus the banking approach. The latter approach is tied to monetary policy implementation and merely features seigniorage (fiscal) side effects. The former is more properly considered as part of fiscal policy.

It is quite ironic that Milton Friedman introduced his helicopter money parable to highlight the power of monetary policy. In his famous parable, a helicopter drops banknotes on an unsuspecting public, which, Friedman (1969) suggests, would obviously pick up the money and spend it, smoothly adjusting to their newfound wealth.[32] Be that as it may, Friedman's helicopter is quite obviously not a central bank—issuing its monetary liabilities by buying assets or making loans. Friedman's helicopter is a MPS authority that hands out (fiscal) gifts to the public instead of spending it itself—the sovereign foregoes alternative seigniorage uses.

Actually, Keynes tells quite a similar story in *The General Theory* when he suggests that the treasury could fill up bottles with banknotes, hide them underground, and then let the public go and dig them up again:

[32] "In our hypothetical world in which paper money is the only medium of circulation, consider first a stationary situation in which the quantity of money has been constant for a long time, and so have other conditions. Individual members of the community are subject to enough uncertainty that they find cash balances useful to cope with unanticipated discrepancies between receipts and expenditures. … Under those circumstances, it is clear that the price level is determined by how much money there is—how many pieces of paper of various denominations. If the quantity of money had settled at half the assumed level, every dollar price would be halved; at double the assumed level, every price would be doubled. … Let us suppose, then, that one day a helicopter flies over our hypothetical long-stationary community and drops additional money from the sky equal to the amount already in circulation. … The money will, of course, be hastily collected by members of the community. … If everyone simply decided to hold on to the extra cash, nothing more would happen. … But people do not behave in that way. … It is easy to see what the final position will be. People's attempts to spend more than they receive will be frustrated, but in the process these attempts will bid up the nominal value of goods and services. The additional pieces of paper do not alter the basic conditions of the community. They make no additional productive capacity available. … Hence, the final equilibrium will be a nominal income [that has doubled] … with precisely the same flow of real goods and services as before" (Friedman 1969, 4).

> If the Treasury were to fill old bottles with banknotes, bury them at suitable depths in disused coalmines which are then filled up to the surface with town rubbish, and leave it to private enterprise on well-tried principles of laissez-faire to dig the notes up again (the right to do so being obtained, of course, by tendering for leases of the note-bearing territory), there need be no more unemployment and, with the help of the repercussions, the real income of the community, and its capital wealth also, would probably become a good deal greater than it actually is. It would, indeed, be more sensible to build houses and the like; but if there are political and practical difficulties in the way of this, the above would be better than nothing. (Keynes [1936] 1973, 129)

A couple of points are noteworthy here though. First, Keynes refers to the treasury rather than the central bank in providing the stimulus to economic activity. In contrast to Friedman, Keynes makes it clear that the issue at hand is a case of fiscal policy. Second, and philosophically rather interesting, while Friedman refers to "money for nothing" raining from the sky, Keynes refers to private enterprise and of laissez-faire in his analogy. Finally, Keynes did indeed perceive of much better ways of creating employment by means of a fiscal stimulus than digging holes in the ground and filling them up again (Bibow 2015).

The more recently popularized notion and proposal of "QE for the people" is a variation on Friedman's helicopter parable. The proposal is that the central bank should make payments (gifts) directly into peoples' bank accounts instead of handing the money over to bankers. As the general public is considered to be needier than bankers, QE for the people is held to be a more effective (and also a fairer) stimulus.

And that may very well be the case. The point is that QE for the people proposals, just like Friedman's original helicopter parable, confuse monetary and fiscal policies. If the treasury and the central bank were really just one "consolidated" government institution, as much of macroeconomics assumes, this would seem to not matter very much. It would of course be strangely at odds with the notion of central bank independence. More importantly, it would also be at odds with Minsky's (1975 [2008]) critique of neoclassical macroeconomics as abstracting from cash flows and financial structures. Whether "independent" or not, the central bank plays a unique role within the financial system. Abstracting from its functionality also makes the difference between the MPS and banking approaches to money issuance. To illustrate the point, let us consider how QE for the people would work out in the case of the BoE and the BEAPFF.

In the expansionary or winding phase, the BEAPFF would have used the proceeds from the BoE loan to make transfers (the payment gifts) to households instead of acquiring assets. Instead of acquiring and temporarily holding an expanded portfolio of income-earning assets, as under the banking principles of QE, QE for the people follows "mint and print principles" and means temporarily expanding the government's monetary liabilities without a corresponding asset counterpart.

The BoE/Treasury would thus not earn any income (seigniorage) on the program. Instead, at least in a positive interest environment, the Treasury would pay interest on the loan to the BoE, part of which the Bank would transfer back as profit to the Treasury.

In the contractionary or unwinding phase of the program, assuming that QE for the people—just like QE for bankers—would see central bank balance sheet normalization at some point, the Treasury would issue bonds in the market to pay off the BEAPFF's loan from the BoE. After temporarily expanding the government's monetary liabilities (without a corresponding asset counterpart) in the expansionary phase, these later get replaced by debt liabilities in the unwinding phase. The future interest expense on these debts represents the (future) seigniorage income (lost) that was effectively brought forward in time when the QE for the people payment gifts were sent out in the winding phase.

In essence, QE for the people is a program of fiscal transfers that brings forward future seigniorage earnings. Typically governments have the freedom to make such intertemporal choices. There is no need to use the central bank's balance sheet for the purposes of fiscal policy though. The treasury itself could be sending out the payment gifts to the people while the central bank engages in purchases of government bonds on the market (which get issued in correspondingly greater volume by the treasury). This arrangement would supposedly constitute "QE for the bankers," but in macroeconomic terms it is quite equivalent to QE for the people. Recall also the case of the Bundesbank acquiring foreign reserves to contain DM appreciation in support of German export industries—foreign assets on which it later sustained losses that left the government without profit distributions from its central bank for many years. Instead of

facilitating export subsidies through normal budgetary procedures, the central banks' balance sheet was used to bring seigniorage forward in time: QE for Germany's export industries.

Of course, instead of issuing debts to mop up any excessive liquidity created through QE for the people, the treasury could also ask the central bank to sell off assets from its own national treasure hoard, which represents an alternative way to absorb liquidity in the unwinding phase of QE for the people. At the limit, recourse to QE for the people would then leave the "central bank" without any assets left as the counterpart to its monetary liabilities, turning the central bank into an MPS authority.

This once again underlines that money creation by the central bank, be it QE the monetary policy way or QE the fiscal policy way (i.e., QE for the people), is only a proper free lunch to the extent that it helps to mobilize otherwise underutilized national resources. This is indeed a free lunch naturally available in economies with underutilized resources, and typically monetary policy will have to play its part in mobilizing resources and cashing in on this free lunch one way or another. But it does not follow that using the central bank as a quasi-fiscal authority is necessarily an appropriate approach to the matter (Bibow 2015, 2016; see also Borio, Disyatat, and Zabai 2016).

12.2 The Swiss "Sovereign Money" Initiative

The Swiss "sovereign money" initiative (Vollgeld-Initiative 2018; Jordan 2018), which was put to a vote in a national referendum on June 10, 2018, is taking issue with the fact that money as we know it consists largely of (private) bank money rather than central bank money, and gets created as banks make loans or buy assets. The proponents behind sovereign money want to separate the creation of money from the granting of loans, as they see this connection as the ultimate source of financial instability and high debt burdens on citizens (echoing older "100 percent money" ideas; see Fisher [1935]).

In the proposed sovereign money system, banks would have to fund any loans by longer-term liabilities, as sight deposits are to be held not as liabilities of banks but in "sovereign money accounts." The sovereign money balances filling these special accounts are supposed to arise as a

product of "debt-free" payments—paid out directly by the SNB as a variant of the "QE for the people" idea.

The following quotation by Thomas Jordan (2018), chairman of the SNB's governing board, explains the distinction between the MPS and banking approaches to money issuance highlighted in this study:

> In the current system, the SNB creates money by purchasing foreign currency and investing it, or by granting banks loans. Every franc of central bank money which enters circulation in the economy in this way therefore has a countervalue that yields profit over time. The SNB takes stock at the end of each year and distributes part of these profits to the Confederation and the cantons. If the SNB had to pay out money "debt-free," as called for by the initiative, it would be giving money away without receiving an equivalent amount in return. However, the SNB would not be able to earn income on the money it gives away. In a system with "debt-free" payments, we would therefore be unable to make an annual distribution to the Confederation and the cantons. It is important to recognise that economically speaking, the two approaches are ultimately equivalent. We can distribute the profits on our investments every year, or we can give newly created money away, but then no longer pay out any profits. In other words: Under established practice today we distribute the interest on our capital, while under a sovereign money system we would be selling off the family silver, as it were. "Debt-free" payments would not make our country any richer.

In other words, "sovereign money" would transform the SNB from a (central) banking into an MPS authority. Needless to say, the SNB chairman believes that sovereign money would end up making Swiss citizens poorer rather than "debt free" or any richer.

Jordan identifies two essential advantages of the banking approach to money issuance. First, it enables the central bank to operate by setting the price of money while enjoying flexibility with regard to its balance sheet, which is especially handy in crisis situations, including severe foreign exchange market pressures. It clearly worries Jordan (2018) that "interventions in the foreign exchange market, which have played a central role in combating the overvaluation of the Swiss franc, would not actually be allowed under a sovereign money system. When we intervene in the foreign exchange market, we exchange new Swiss francs for foreign currency instead of giving them away. The creation of money in the context of foreign exchange market interventions is thus not 'debt-free.'"

Second, sovereign money would see the SNB take on a more directive role in the (market) economy which, Mr. Jordan fears, would make it also subject to greater political pressures and control. In this regard, Switzerland's central bank is more in line with the country's (libertarian) cryptocurrency community—another reaction to the GFC of ten years ago. To what extent cryptocurrencies may also pose a challenge of another sort to central banks will be discussed next. Jordan confirms that central banks see operating with their own balance sheet—with a national treasure hoard of income-earning assets—as a great advantage, and cherish their so-secured financial independence.

In view of the outsized role of two large banks in the Swiss economy and the experience of their near collapse in 2008–9, it seems quite understandable that Swiss citizens may be concerned about risks to financial stability and their own prosperity, even if the Swiss government and SNB ended up making a significant profit on their UBS rescue. The "sovereign money" initiative is an expression of such fears. Given the role that balance sheet flexibility and foreign exchange market interventions have played in Switzerland since 2008, it is also quite understandable that Swiss central bankers may be concerned about the supposed advantages of reduced balance sheet flexibility. Sovereign money would not only get rid of bank money and the banking approach to money issuance as we know it; as a variant of QE for the people, it would also get rid of central banking and monetary policy as we know it.

In response to the GFC, central bankers have taken a plunge into the unchartered waters of QE the monetary policy way. They seem to be far more scared of QE the fiscal policy way—as that would make them either superfluous or at least potentially subject to more serious challenges to their own position (see also Goodhart 2010).

12.3 Digital Currencies and Distributed Ledger Technology

The current hype and speculative mania about cryptocurrencies such as Bitcoin will not concern us here. Their propagators and some observers seem to see these financial innovations as potential threats to existing national currencies: as substitutes for either current banknotes and/or bank deposits (or other near-monies issued by nonbanks). To begin with, it is quite wrong to refer to these private financial innovations as "currencies." Prices expressed in these instruments

are far too volatile to not undermine their supposed functionality as currencies. They are more appropriately seen as speculative objects (tulips) with a (energy-guzzling) payments technology attached to them. To be sure, those who successfully issue (or: "mine"/"coin"/"mint") these products may end up earning significant profit. It is highly questionable that such products will ever replace central bank money and dethrone central banks and their monetary powers.

Concerns about any potential displacement of the demand for central bank money as undermining the effectiveness of monetary policy would certainly not arise for the first time. Such worries are a recurrent theme in monetary economics. Previous versions of "electronic money" triggered the same kind of alarm and debate in the late 1990s, for instance (see Friedman 1999; Goodhart 2000). Experiences since then have provided more evidence that the size of the monetary base, in normal times endogenously provided by the central bank (at a price), is less vital a factor in determining monetary policy effectiveness than it might appear at first.

On the other hand, those who see the displacement of banknotes as an opportunity to empower the central bank with enlarged scope for negative interest policy (see Rogoff 2016) should be careful what they wish for: strengthening beliefs in the almightiness of central banks, convenient as this may seem as a way to weaken the state vis-à-vis the market, might further overburden monetary policy as a stabilization policy instrument and ultimately undermine political support for central bank independence—if the emperor is found to have no clothes, or at least not at all pretty ones.

The real question is whether digital currencies, and specifically "distributed ledger technology," may have the potential to make payments systems more efficient if such products *denominated in existing national currencies* were to be issued by either central banks, banks, or nonbanks (Bech and Garratt 2017; BIS 2018).

Issuing central bank digital currencies without distributed ledger technology to the public would basically allow the public to directly bank with the central bank (instead of standard bank accounts or money market funds). This might reverse historical trends showing declining central bank shares in the money business. The financial industry might not be amused. On the other

hand, as digital currencies based on distributed ledger technology issued by private issuers can replicate the anonymity features of banknotes, they might lead to the opposite kind of developments and further shrink central banks' share in the money business—unless central banks decide to step in as issuers.

Central bank digital currency issuance would thus also provide a straightforward way to implement "QE for the people." Bypassing the banks, the central bank could open digital currency "accounts" ("wallets") for citizens and fill them up when such a need arises, to be used as a "helicopter" stimulus to private spending. Meanwhile the central bank issuer would book a "deferred asset" on its balance sheet—to be redeemed out of future seigniorage earnings. Technically this may be a simple matter. Politically having an independent central bank both decide and implement fiscal policy is far from simple (Bibow 2002, 2004; Buiter 2014b, 2016; Tucker 2018).

Without pursuing this matter here in any length or detail, the most important issues appear to be the potential creation of new financial stability risks on the one hand, and the potential impact on central banks' seigniorage income on the other.

Central banks tend to associate their financial independence—based on their seigniorage income, only a residual of which gets passed on to the treasury—with their policy effectiveness. If digital currencies threaten to shrink the demand for banknotes (and hence seigniorage), they will be tempted to position themselves as issuers. Leaving the profitable business of digital currency issuance wholly to private players would be particularly unattractive, from a central bank perspective, if this came along with enlarged backstop (LOLR) responsibilities, but without oversight powers and adequate remuneration (seigniorage sharing). Ultimately, the money business has always been a contested field and the future of seigniorage will remain somewhat uncertain—except that governments, in principle, have the sovereign power to always claim their stake.

13. SUMMARY OF (PRELIMINARY) FINDINGS AND OUTLOOK

The case studies discussed above clearly show that the nonstandard policy measures implemented in response to the GFC significantly impacted not only the size and composition of central bank balance sheets, but also their profits, financial buffers, and profit remittances. Seigniorage connects currency issuance and public finances, and monetary and fiscal policies. The findings presented here are preliminary in the sense that a final assessment of the recent bout of experimental monetary policies will only be possible after the completion of the policy normalization process, which is still some five to fifteen years away.

The case of the BoE allows for differentiating between various policy measures and distinct influences on central bank profits. Results for the Issue Department confirm that declining interest rates, brought about through both standard and nonstandard measures, reduce central banks' seigniorage profits, more narrowly defined as arising from (the investment returns on the asset counterpart of) the note issue. Profits booked under the BoE's Banking Department capture the extraordinary profits of LOLR measures undertaken at the peak of the crisis and only remitted to HM Treasury with a few years' delay, confirming earlier historical evidence that financial crises tend to temporarily lift central bank profits. Finally, the BoE's QE program was from the beginning accounted for under yet another separate entity, the BEAPFF, so that both profits and losses would be directly passed through to HM Treasury rather than the BoE. So far HM Treasury has booked a very sizeable extraordinary seigniorage profit on the Bank's QE program (6 percent of GDP). But, going forward, losses are conceivable during the unwinding process of the BEAPFF that would reduce this gain. The Bank's own profits, half of which are generally retained, will continue to receive a small boost from the loan to BEAPFF.

The Federal Reserve, too, has seen a very sizeable boost to its profits from its QE program. These extraordinary profits were almost fully remitted to the Treasury as they arose. Prior to the crisis, the Fed's profits were essentially derived from investment income on the asset counterpart of its note issue, about half of which is held outside the United States. Since the crisis, the expansion of its portfolio of monetary policy assets has primarily boosted the banks' (excess)

reserves. With the interest rate paid on reserves stuck close to zero for years, the Fed's profits surged accordingly.

But the spread earned on this part of the monetary base is changing as the federal funds rate target is being lifted. At some point in the policy normalization process the spread may turn against the Fed. As a result, and despite the fact that the note issue has roughly doubled over the past ten years, it is conceivable that the Fed's net interest income might turn negative should policy rates rise sufficiently.

In contrast to some other central banks, the Fed's financial buffers are rather small. To begin with, the member banks' capital subscriptions do not seem to represent buffers at all; they are just nominal ownership claims. The Fed's history shows episodes of gradual accumulation of own capital reserves from retained earnings—interrupted by one-off appropriations of accumulated reserves by Congress for federal budgetary purposes. In this way, the Fed's capital reserves were reduced to $10 billion in 2015 when Congress appropriated the greater part of the surplus, which the Fed had previously accumulated from retained earnings (since the last time Congress made a similar move). The surplus was reduced further to only $7.5 billion in March 2018.

One could even argue that the Fed currently has no capital at all. For even in case of an earnings shortfall, the surplus would not actually be reduced. Presumably the reason for the Fed's lack of capital is the composition of its balance sheet in normal times and the absence of loss-making years in its history. Traditionally, the Fed's balance sheet largely consists of the safe assets accumulated—in the conduct of monetary policy—as the counterpart to the note issue. As risky assets such as foreign reserves are largely held outside the central bank, the Fed is guaranteed to make a profit in a normal (positive-interest) environment.

In any case, should any operating losses occur at the Fed in coming years, which would be a novum in their history, as monetary policy and the Fed's bloated balance sheet get normalized, this would not present them with any operational problem, but merely interrupt any profit distributions to the Treasury. Profit distributions would halt until the "deferred asset" booked in

such a case on the Fed's balance sheet is paid off from future retained earnings. New political controversies may be sparked thereby however.

The BoJ is quite similar to the Fed in certain respects. The larger part of Japan's huge foreign reserves is held outside the central bank and the BoJ's financial buffers are fairly small today considering the vast expansion of its balance sheet. While the BoJ's foreign reserves are still large enough to cause some volatility in its annual results, the large-scale asset purchases (largely but not exclusively JGBs) undertaken in recent years have—in contrast to the Fed—not boosted the Bank's profits as greatly. Once interest rates are already very low, continued purchases tend to have correspondingly less to add to the central bank's bottom line. It is easily conceivable for the BoJ to experience negative net interest income and/or capital losses going forward should nominal GDP growth and interest rates and the BoJ's balance sheet ever begin to normalize.

While the Fed's assets as a percent of GDP have surged from 5 percent to over 20 percent, the BoE's from 6 to almost 30 percent, and the BoJ's to roughly 100 percent, the SNB is in a league of its own: at roughly 130 percent of GDP, its balance sheet has expanded the most by far. As the SNB's assets largely consist of foreign reserves today, its profits have become extremely volatile since the crisis. The SNB's generous financial buffers, which have expanded along with its balance sheet, support the Bank's generally steady profit distributions, which have actually declined along with interest rates compared to the precrisis situation. The SNB's earnings should recover and perhaps steady somewhat with rising interest rates going forward, but any balance sheet normalization and realization of "paper profits" booked under its financial buffers will have to wait for an opportune time of excessive Swiss franc weakness.

Belatedly, the Eurosystem's assets, too, have surged in recent years, from 13 percent to over 40 percent of GDP. The ECB and Eurosystem are peculiar in a number of ways. Much in contrast to the Fed, the euro area's central banks have accumulated considerable financial buffers. Historically, this may be mainly due to the role that gold and foreign exchange reserves, largely stored on their balance sheets, have traditionally played. But since the crisis these central banks have also further boosted their capital reserves and provisions from retained earnings.

Accordingly, and again much in contrast to the Fed (and also the BoE), profit distributions to national treasuries have generally seen much less of a boost in recent years.

The ECB itself, which is owned by the NCBs, experienced losses in some early years of its existence, but has since 2005 rebuilt and bolstered its financial buffers, while annual profit distributions to NCBs stabilized in the €1 billion ballpark in recent years.

Experiences among the NCBs are diverse. To a significant degree, and especially in the case of the Deutsche Bundesbank, the absence of a significant boost to seigniorage profits owes to the fact that the ECB only embarked on QE at a very late stage in the game, when interest rates, especially German interest rates, were already very low. The Bundesbank's history reveals more peculiarities. In particular, on numerous occasions in its pre-euro history, the Bundesbank operated with negative equity and made no profit distributions to the government. These episodes relate to Germany's mercantilist tradition and losses suffered on foreign reserves accumulated to keep the DM (über-)competitive. Going forward, the Bundesbank is on track to see its net interest income turn negative when interest rates get normalized in coming years. This may (or may not) be politically harmless in the case of other countries, but in Germany future spells of public excitement (and more) about the euro's travails and German "hardship" supposedly arising from it are bound to arise.

The situation in the euro "periphery" is somewhat different, as the cases of the Banca d'Italia and Banco de España exemplify. But of these two as well, only the former has seen rising seigniorage leading to rising profit distributions (and tax payments) whereas the latter only boosted its financial buffers instead. The unique histories of the NCBs play some role here. But to an important extent, these national differences inside Europe's peculiar currency union reflect design flaws in the euro regime. In more than one way, the absence of a common fiscal capacity and common safe asset have complicated or even undermined the effectiveness of the ECB's policies. Sizeable interest rate spreads inside the currency union continue to shape euro member countries' varying interest burdens on their respective public debt. In this respect, Germany is reaping an unjustifiable benefit that would not arise in any properly designed currency union. Representing the other side of the same (euro) coin, matters work out the opposite way when it

comes to seigniorage: at only 0.06 percent of Germany's 2017 GDP, the Bundesbank's latest seigniorage profit distribution comes out at the low end of the scale that shows the Federal Reserve's annual postcrisis—QE-boosted—seigniorage profit distributions in the ballpark of 0.5 percent of GDP (and booked profits on the BEAPFF in the UK's case in excess of that), with Banca d'Italia (0.29 percent) and Banco de España (0.16 percent) somewhere in between.

As the peculiar financial outlook for the Bundesbank risks fresh—unfounded!—controversies in Germany, one can only hope that the German public will ever learn to appreciate that by shoring up the debt legacies of a euro crisis that was more than anything else "made in Germany," the ECB has been Germany's best friend (Bibow 2012, 2017a, 2017b).

Arguably, in an ideal world neither the monetary nor the fiscal authorities should be overly interested in seigniorage, but squarely focus on their respective mandate and real goals instead. Also, in a currency union any seigniorage profit from issuing the common currency provides an ideal common income source. As reports prior to the Maastricht Treaty had recommended and as the European Commission has only recently proposed once again (Khan and Brunsden 2018; Khan 2018), seigniorage profits should support the EU budget (earmarked for euro area member states for the time being). This would be but one aspect of complementing monetary union by fiscal union.

Going forward, the money [issuance] business will remain a contested market, as ever. Central banks' financial independence rests on seigniorage, and in normal times seigniorage largely derives from the note issue supplemented by "own" resources. Essentially, the central bank's (income-earning) assets represent fiscal wealth, a national treasure hoard that supports its central banking functionality. Like any wealth, it can only be sold or lost once. If central bank digital currency were to be issued "for free," as featuring in the Swiss "sovereign money" initiative (which is a variation on other "helicopter money" or "QE for the people" proposals), this would set the central bank on a path of turning itself from a banking into a MPS authority. If backstopping the liquidity of the financial system and controlling financial conditions beyond the interest rate on central bank digital currency units remain issues, central "banking"—its modus operandus and financial/fiscal backing—may have to reinvent itself, too.

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