CENTRAL BANK SUPPORT FOR GOVERNMENT DEBT IN A CURRENCY UNION

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ABSTRACT. The no-bailout prescription of the Maastricht Treaty aimed at a complete mutual independence of monetary and fiscal policies in the European Monetary Union. But without a Lender of Last Resort for government debt, multiple equilibria in bond markets may ensue where default may emerge also for non-fundamental reasons. The stabilizing power of central bank interventions generally does not rest on real debt depreciation via inflation, as this policy, if expected, would increase interest rates and thus might trigger, and not prevent, a debt crisis. A more successful monetary support for government finance can be achieved through an exchange of public bonds and central bank reserves. As the latter are default-free, they bear lower interest rates than government obligations. A formal model is able to demonstrate that central bank interventions on the bond market can prevent the emergence of expectation-driven debt crises. Budget constraints and balance sheet considerations do not necessarily pose severe restrictions for such a monetary backstop policy. However in EMU, the ECB is not authorized to support national fiscal policy. This institutional dilemma calls for a return to a no-bailout regime, as realized in the US, but this step requires large debt cuts in advance.

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Introduction

As can be seen from a comparison of GDP growth rates, the US fared much better after the financial crisis of 2008 than the eurozone. Contrary to the US, eurozone member countries suffered from an additional recession in 2012–13, which basically was caused by government default threats. The "euro crisis" thus is a distinct phenomenon, to be explained by a series of institutional deficiencies of European Monetary Union (EMU). The question of government debt sustainability is only one, albeit a most pressing item on the list of unsolved eurozone problems (Wyplosz, 2016). The irony here is that the rules laid down in the 1992 Maastricht Treaty once were designed to rule out severe fiscal instabilities by establishing an institutional setting where governments under no circumstances could rely on financial support from central banks; this threatening signal was expected to redirect fiscal policy in eurozone member countries towards a path of balanced budgets and debt sustainability.

On the other hand, by completing the separation of monetary and fiscal policy, one of the key motives of the foundation of EMU has been the aim of achieving the goal to central bank independence, which had been on the policy agenda for many years. But (also) in the eurozone, economic troubles gave rise to a practice of monetary policy whereby the central bank buys government securities in amounts inconceivable in former times. Even if this activity should not be meant as an element of public debt management, it tends to dissolve the demarcation lines between monetary and fiscal policy. The good intention to forestall monetisation of public debt and inflation now seems to have subverted policy norms that had been cultivated for decades.

The initial attempt to cut off governments' fallback to central bank support destabilized bond markets and triggered a financial crisis in the eurozone after the Lehman shock. The market for government bonds appeared to be unstable without a Lender of Last Resort (LLR). The announcement of Outright Monetary Transactions (OMT) in 2012 then rapidly curbed the government debt crisis in EMU, to be read off from shrinking interest rate differentials between national bonds. This finding seems to indicate that the expectation of central bank intervention in favor of troubled securities will prevent the outbreak of a debt crisis.

This view however has been questioned recently. For one thing, bond purchases increase the money supply, which can be expected to drive inflation; thus asset holders should adjust their portfolios when signals of fiscal stress crop up. On the other hand, against the background of a central bank budget constraint, observers doubt whether a sufficient amount of monetary resources can be generated in order to tame a debt crisis.

Finally, even when these doubts can be dispelled, and debt default thus is no longer an effective threat, governments in a monetary union might be enticed to overstretch their fiscal powers. The problem then is to find institutional provisions against moral hazard.

Thus the threefold program of the following paper is to ask,

(1) whether a central bank support is necessary to stabilize the market value of government bonds in times of non-fundamental stress,

(2) what are the economic mechanisms that lead a successful LLR activity, and,

(3) how should the interplay of monetary and fiscal policy be organized from an institutional point of view in the framework of a currency union.

The structure of the paper follows these three topics where the core theme is (2). The analysis of the role of monetary policy in a strategy of preserving the sustainability of government debt is first discussed in the framework of a standard closed economy. The application of this issue to the case of a monetary union follows in Section (3), but it is obvious that finding answers to all three questions is important for reforming EMU, which is a non-optimal currency area[1] on two accounts:

- Differences in prospective member countries' performance and competitive-ness were not used as exclusion criteria, but (following the "new" theory of optimal currency areas) rather as signs of a non yet exhausted potential of economic development. The project of catching-up however ended in balance-of-payment imbalances and government debt crises (Wagner, 2014).

- Coping with these challenges requires nation states to relinquish large doses of political autonomy, but citizens and politicians defend traditional institu-tions and policy styles. European economies seem to have become lost in a deadlock.

Given this background, it appears reasonable to doubt whether European policymakers will succeed to promote sufficient institutional reform apt to cope with current and future challenges; higher government debt might be the unavoidable consequence. Pressure on the European Central Bank (ECB) then will rise demanding financial and monetary aid, also to veneer problems that deserve a more fundamental treatment. Analyzing scope and limits of monetary policy when supporting government finance is thus a key issue.

1. The Euro as "Foreign Currency"

During the debate between the "coronation approach" and "monetarism," Sievert (1993: 14, 18) propagated a German minority view according to which political union should be located neither at the beginning nor at the

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end of European integration. The key point is to *preserve* the imbalance in power in the relationship between the common central bank and national fiscal authorities. "The history of money is the eventful history of the improper use of the right to issue money. [...] The crucial point is that in a currency union each national government has to pay its debt in units of a currency, which cannot be produced by government itself" [my translation].

The postulate of a foundation of public debt in terms of a non-national currency calls for a regime where governments may only tap funds from private sources without any backing from national central banks. The financial market here is seen as a kind of neutral constitutional supervising agency, which posits a reliable constraint for governments' financial demands and also casts a rating on the politico-economic state of a country.

The Delors Committee (1989: 20, cf. Emerson et al., 1990: 24) however, years before the Sievert proposal, had doubted that financial markets are able to take on such a task. Actually credit supply of private investors fluctuates in a pro-cyclical way. Hence easy credit terms lead public debtors to increase their indebtedness, but sudden stops may trigger financial crises later.[2]

> To some extent market forces can exert a disciplinary influence. [...] However, experience suggests that market perceptions do not necessarily provide strong and compelling signals and that access to a large capital market may for some time even facilitate the financing of economic imbalances. Rather than leading to a gradual adaptation of borrowing costs, market views about the creditworthiness of official borrowers tend to change abruptly and result in the closure of access to market financing. The constraints imposed by market forces might either be too slow and weak or too sudden and disruptive.

The consequences of these unstable market constellations have been recognized very clearly. In its report *One Market – One Money*, the European Commission had addressed a threatening predicament of monetization of troubled government bonds:

> Even if monetary policy is formally insulated from Treasury pressures, the very fact that a monetary tightening could turn a difficult budgetary situation into a genuine financial crisis acts as a de facto constraint to the central bank. [...] Financial difficulties in one Member State would raise the issue of financial solidarity across the Community. At the extreme, this would take the form of pressures to bail out an insolvent government. But milder forms of solidarity can exist, e.g. through the purchase by EuroFed of a disproportionate share of public bonds from a specific country (which would be equivalent to a Community loan) or in the form of explicit transfers (Emerson et al., 1990: 107).

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Sims (1999, 2012) criticized the belief, expressed in the Maastricht Treaty, that a separation of traditional links between monetary and fiscal policy would ensure macroeconomic and financial stability; financial markets can hardly be expected to enforce fiscal discipline. When the Greek crisis broke out in 2010,[3] the German Council of Economic Advisers made plain that the realization of the Sievert proposal puts national government bonds into a very fragile market position:

> On account of their EMU membership, participating countries no longer can rely on central bank funding of their state budgets [...]. Hence member countries are exposed to a roll-over risk with regard to government securities that come due. Such an insolvency risk usually applies to sovereign states only if they have established an independent central bank that is not allowed to make funds available to the government, or if they incur debt in foreign currency. In the literature, such a constellation is named 'original sin' ('Erbsünde') as this makes a country subject to the imponderabilities of international financial markets (Sachverständigenrat, 2010: no. 134, my translation).

De Grauwe (2011a) then put forward a theory of financial market instability in case of bonds not guaranteed by any LLR.[4] As an example, he pointed to the unfavorable path of Spanish bond rates in comparison to UK rates, although fundamentals in the latter case were much worse. Stability of bond values that are denominated in terms of national currency is explained by three factors:
- After an adverse fiscal shock, capital flight results in a devaluation of the domestic currency and thus increases competitiveness and tax income.
- Capital flight is neutral with regard to the liquidity status of the national banking system (contrary to the case of a shift of money wealth from Spain into German financial assets).
- If need be, the domestic central bank can intervene in unlimited amounts on the national bond market; but in most cases this turns out to be unnecessary as speculation against this mighty player appears unpromising.

Not all market agents and politicians seem to have understood that precluding a gradual currency risk (by establishing a currency union) creates a massive default risk when investing in foreign bonds, because national governments are deprived of an important policy tool. Given the initial EMU rules, going into debt in terms of the common euro currency is tantamount to be indebted in foreign currency.[5]

De Grauwe shows that the equilibrium in the domestic bond market is unstable, without a belief in a monetary backing on the part of a central bank, depending on expectations and fiscal shocks (Figure 1). Benefits *B* of

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government default, resulting from avoided tax burden and its related welfare costs, increase with the size S of these shocks. Benefits are larger in case of expected, compared to unexpected, default ($B_E > B_U$), because averted interest costs here are larger. In addition, constant default costs C are assumed, which emerge from an expected (temporary) exclusion from the international credit market and higher interest costs (due to risk premia) when new debt can be incurred in the future.

Figure 1 Good and bad equilibria (De Grauwe 2011a: 14)
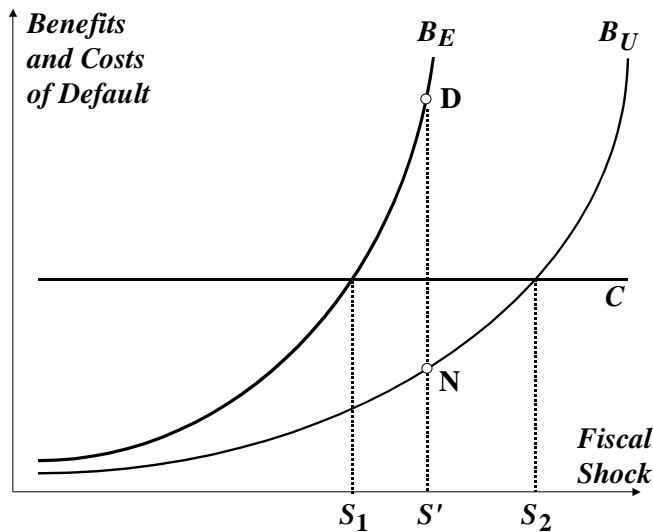
If shocks are small ($S < S_1$) obligations are serviced, if they are large ($S > S_2$) the choice is default. In an intermediate area (e.g. at S') multiple equilibria arise: if default is assessed an improbable event, expectations are confirmed (N). If market sentiments change for whatever reason, and risk premia are on the rise, government decides to default (D). An initial liquidity crisis mounts to become a severe solvency problem because rising interest costs cannot be covered, given the long-term government budget constraint.

This scenario emphasizes the importance of "positive" communication with respect to the state of public finance. However an institutional reform is even more preferable, where a LLR prevents temporary liquidity stress during the roll-over of debt tranches and thus blocks the emergence of market uncertainty. In the eurozone, this step was taken in 2012, by launching the European Stability Mechanism (ESM) and the OMT statement of the ECB. Initially Draghi (2012) pointed to the necessity to counter "bad" expectations:

> The assessment of the Governing Council is that we are in a situation now where you have large parts of the euro area in what we call a 'bad equilibrium,' namely an equilibrium where you may have self-fulfilling expectations that feed upon themselves and generate very adverse scenarios. So, there is a case for intervening, in a sense, to 'break' these expectations, which, by the way, do not concern only the specific countries, but the euro area as a whole. And this would justify the intervention of the central bank.

Shortly afterwards however, he signified that LLR activities should be seen as belonging to the standard policy tool box of a central bank: "Public debt is in aggregate not higher in the euro area than in the U.S. or Japan. It reflects the fact that the central bank in those countries could act and has acted as a backstop for government funding. This is an important reason why markets spared their fiscal authorities the loss of confidence that constrained many euro area governments' market access" (Draghi, 2014).

A currency union without a monetary safety net for government finance thus appears to be incomplete – from which it follows that OMT is a necessary element of advancement and stabilization of EMU.

2. The Power of a Monetary Rescue Agency

2.1 Debt Depreciation via Inflation?
The hypothesis, put forward in the last Section, that holding debt in terms of domestic currency and trusting in central bank interventions in case of need can rule out government debt crises, cannot generally be true, given the historical record. In this context, Calvo (1988) once ventured the opinion that monetary policy rather is part of the problem than a factor contributing to a solution: buying securities implies a rise of money supply which is bound to produce inflation, according to monetarist beliefs. If expected, this drives inflation and risk premia in the level of nominal interest rates. Hence, debt costs may already be higher in "normal" times, which under unfavorable macro conditions makes monetization unavoidable. A central bank that cannot commit credibly to an inflation target, but defends its responsibility for maintaining bond price levels, involuntarily fuels a debt crisis. The rate of interest turns into a disturbing factor. "The nominal interest rate is not simply a passive reflection of people's inflationary expectations, but rather [...] one of the main determinants of inflation. Consequently, a credible anti-inflationary policy would have to implement rules to prevent nominal interest rates to become unduly high" (Calvo, 1988: 659).

Calvo's proposal of interest rate ceilings therefore makes sense: it is meant to signal to financial investors that the government budget will not be

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threatened by intolerable debt costs; then real devaluation of public bonds' value via inflation is ruled out, and expectations can be coordinated towards a stable market equilibrium. However, announcing interest rate ceilings may lack credibility, and their realization is at odds with inflation control. Calvo also suggested an indexation of public debt. This abolishes the incentive to monetize and thus might calm inflationary expectations, but politicians will hesitate to subordinate fiscal activities to a real budget constraint.

Recently, Calvo's contribution has been taken up by Corsetti and Dedola (2016), aiming to explore the distinction of conventional and unconventional monetary policy. They analyze a two-period model where government raises a credit B and decides about redemption later. The choice is default if the state of the economy is bad and real interest costs exceed an exogenous threshold Ψ (Figure 2; E indicates the expectation operator, R the gross nominal interest rate, π the rate of inflation). If investors expect default they demand a higher rate R_B, including a risk premium, if not, the risk-free rate R.

Figure 2 Self-fulfilling debt crisis (Corsetti, 2015: 31)
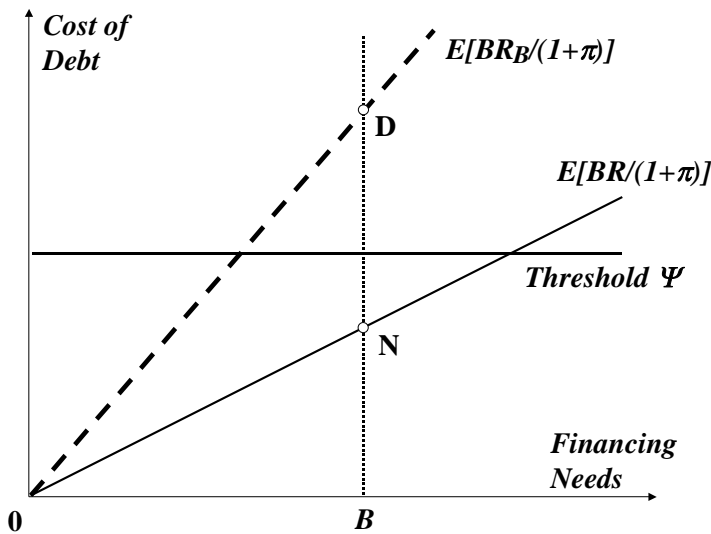
It is obvious that the default solution D might be self-fulfilling. The Graph also shows that resorting to inflation, if expected, offers no expedient: the interest cost line rotates from 0D towards 0N, but the Fisher effect will increase the nominal rate so that the "bad" equilibrium cannot be excluded.[6] Maybe monetary policy is able to establish lower or even negative real interest rates for some time (Blanchard et al., 2013), but inflation as a fiscal

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instrument does not really help to make government debt sustainable, and it violates typical monetary policy targets.

> Even when feasible, the ex-post bout of inflation must be welfare enhancing from the vantage point of the central bank. Given the economic and social costs of very high inflation, discretionary benevolent policymakers may not find it optimal to carry out the policy ex post. *Because of credibility issues, inflation debasement can hardly offer firm foundations to monetary backstops*. [...] The way a backstop works cannot be via a threat of prospective bout of inflation (Corsetti, 2015: 10, cf. Bacchetta et al., 2015).

This argument nevertheless may not be fully convincing. Compared to a threatening government bankruptcy with all its imponderable implications for financial market instability and wealth redistribution, it appears questionable that politicians continue to give much emphasis to gradual welfare losses caused by inflation. A wealth depreciation by inflation also differs in its public image from regular default, even if the latter comes in terms of a haircut.[7]

2.2 Central Bank Reserves as a New Policy Tool

In the aftermath of the financial crisis, central banks acquired large amounts of public securities, which was reflected in an increased holding of central bank reserves on the part of the private banking system. Inflation and inflationary expectations did not recover noticeably in EMU, although this – and not bringing some debt relief – was the communicated ratio of the Asset Purchase Program (APP). The link between monetizing public debt and inflation that figured prominently in traditional monetarist thought is not to be found in the data. The explanation put forward in the literature builds on a distinction between circulating central bank money (notes and coins) and (initially) interest bearing central bank reserves. Contrary to the issue of "helicopter money," the growth of reserves not necessarily drives a rising price level. "Q[uantitative] E[asing] is not monetary financing because it does not involve money but rather interest paying reserves. [...] There is [...] some truth to the claim that purchases of government bonds by the central bank can come with higher inflation and monetary financing of the deficit. But this only happens if these purchases are financed with issuing currency. QE uses instead interest-paying reserves" (Reis, 2016a: 25–6, cf. Sims, 2012).

The rigor of this distinction can be questioned. A process of inflation hypothetically can evolve without a growth of notes supply. Moreover, both reserves and cash, as an aggregate, emerge as a by-product of central banks' asset purchases. If reserve keeping is short-term, a switch between both parts of that aggregate is feasible at any time. In a microeconomic equilibrium, the

ratio of cash and reserves is determined by their rates of return, broadly defined (including transaction costs).[8]

Central bank reserves can be used to cut interest costs of government debt. They are hold by banks in a satiated money market as substitutes to other assets. Interest rates paid on reserves can be lower than bond yields because reserves carry no nominal default risk. Central banks always can exchange cash for reserves. Depending on the amount of bonds bought by the central bank, government's interest costs decline. The cost-of-debt line in Figure 2 rotates towards 0N; a market coordination on the "good" equilibrium thus can be realized. "When a central bank buys debt, it effectively swaps default-risky debt with default-free liabilities, lowering the overall costs of borrowing for the public sector. On a large scale, such a swap thus can provide an 'insurance' against adverse shift of market expectations across equilibria" (Corsetti, 2015: 12–3).

Market stabilization is possible already if central bank intervention is expected; risk premia might vanish without active purchase operations. Swapping bonds and reserves however gives no protection against fundamental insolvency.

Corsetti and Dedola (2016) show the positive, albeit limited contribution of monetary policy in a framework of a complex two-period model. Agents are confronted with exogenous shifts in macro constellations that might come with a severe burden for the government budget. Comparing the costs of additional taxes and of declaring default, politicians then decide on a redemption rate between zero and one. The central bank pursues an inflation target and can choose to buy some share of the bond issue. The model shows, firstly, that a traditional strategy of lowering the real value of debt via higher inflation has only minor repercussions on the location of (often multiple) financial market equilibria that emerge in different macro constellations. Secondly however, the unconventional policy of bond purchases accompanied by a growth of reserves represses the frequency of non-fundamental default. If macro conditions are good there is no risk of a speculative crisis. A high share ω of bond issue held by the central bank limits the emergence of "bad" equilibria also in more unfavorable macro states (Figure 3). A fundamental debt crisis however cannot be ruled out by monetary operations.

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Figure 3 Debt regimes with rising share of central bank bond holding
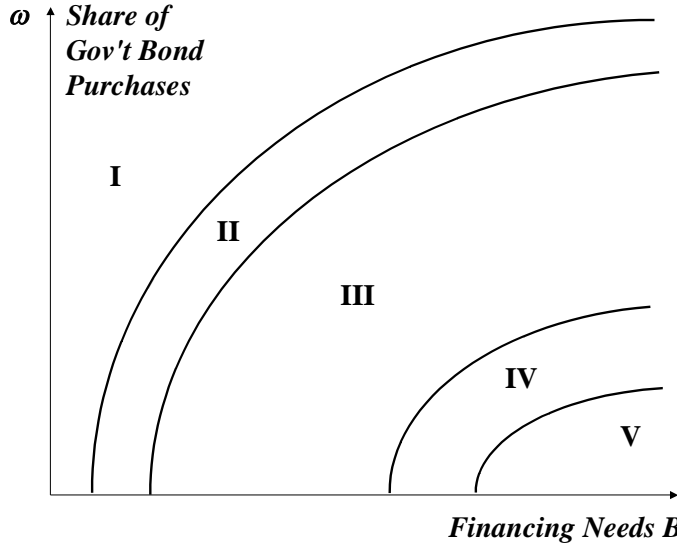
I: no default, II and III: possible or certain default in bad macro state, respectively, IV: certain default in bad state and possible default under average conditions, V: certain default in bad and average state (stylized graph adapted from Corsetti, 2015: 34)

2.3 The Budget Constraint of the Central Bank

An important side condition of a successful monetary backstop is that the fiscal authority compensates for all adverse on costs of unconventional monetary policy. They accrue from paying interest on reserves, and from a fall in value of purchased securities. A steady flow of net interest payments to the banking system impacts on the changing balance (budget constraint) of the central bank (where K = refinancing credits to the banking system, B = securities, N = notes, R = reserves, C = capital):

$$\Delta K + \Delta B = \Delta N + \Delta R + \Delta C \qquad [1]$$

Central bank profit results from the difference between nominal yields of its assets, i_K and i_B, and the remuneration of deposits i_R:

$$Q = i_K\,K + i_B\,B - i_R\,R \qquad [2]$$

Central bank capital varies with the difference between its profit and the dividend T transferred to the government (fiscal seigniorage), and with bond depreciation D (which also lowers B):

$$\Delta C = Q - T - D \qquad [3]$$

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A central bank loss implies $\Delta R = -\Delta C$. With a constant value of balance sheet assets, capital and central bank money ($N + R$) do not change if the transfer to the government alters its sign:

$$T = i_K\, K + i_B\, B - i_R\, R < 0 \qquad\qquad [4]$$

If however T does not react as in [4], a more than proportional growth of R threatens monetary stability. An involuntary and unrestricted increase of private money wealth might produce a spillover to consumption demand. "The exploding liabilities of the central bank violate the private sector's transversality condition. [...] Private individuals, finding their assets growing so rapidly, would try to turn those assets into consumption goods" (Del Negro and Sims, 2015: 5).

Hence, according to the monetarist view, rising inflation cannot be avoided, which does not follow from monetization of public debt but from central bank's interest income flows (Reis, 2013b). Absent fiscal backing on the part of the Treasury, a central bank cannot pursue its primary task of controlling inflation. In the framework of the Corsetti-Dedola model, the government, when pondering whether to service or deny its debt, ought to take into account the welfare costs of inflation that is no longer controlled by the central bank. Model results then depend also on the government's preference for a stable value of money; and an autonomous monetary authority will consider ex ante whether to embark on a path of bond market interventions. If then rational expectations in the non-bank sector are added to the picture, the whole approach of a monetary LLR may loose its credibility.

These far-reaching pessimistic conclusions are unfounded however without a solid estimation of the magnitude of all these effects. Theoretical writings sometimes tend to dramatize matters. Here it is only a short step from a rise in reserves to the suspicion of a central bank's fraudulent behavior with regard to money creation, to a rejection of money holding, to hyperinflation and central bank insolvency:

> A central bank can always meet its obligation to deliver the mandated dividend to the government because it has the unlimited power to borrow from commercial banks by issuing reserves. But a central bank cannot continue as a functioning financial institution independent of the government if it appears to be on a path of issuing an exploding volume of reserves. In that case, a central bank would be engaging in a Ponzi scheme. [...] If private agents refuse to hold its liabilities, the central bank can no longer operate and is effectively insolvent. [...] Insolvency is an off-equilibrium outcome of a central bank that has a payout requirement [...] that is sufficiently in excess of its income from seignorage and bond

> interest so that its reserves rise without limit (Hall and Reis, 2015:
> 3, 10–1, cf. Reis, 2015).

From an empirical point of view, it is far from clear to what extent a rise of R will lower central bank profits Q. If interest paid on reserves i_R is increased on account of rising inflation, i_K and i_B in [2] will follow. Hall and Reis (2015) assess these quantitative risks as manageable. The "exploding liabilities" in Del Negro and Sims (2015: 5) grow "at approximately the interest rate" in the most unfavorable case. Moreover it is dubious to assume that households will modify their intertemporal consumption plans, just on account of higher reserves in the banking system. Even if demand inflation on the goods market gets momentum, this does not necessarily go along with a breakdown of money demand. Hyperinflation finally does not mean central bank insolvency but a switch of central bank "obligations," $\Delta N = -\Delta R$.

A second problem arises from depreciation risk that is associated with bond holding. It lowers central bank capital, but does not entail additional pay-offs. Thus, contrary to the belief held by Corsetti and Dedola (2016), inflation is no key issue, but insolvency (due to $D > C$) is widely taken as a red flag that for constitutional reasons involves the demand for immediate recapitalization on the part of the Treasury. But from a monetary policy point of view, this step is not compulsory. To begin with, the issue of how to book changes of asset values (market or expectational values?) hints to wide discretion. Negative central bank capital is not always an obstacle to a currency's reputation,[9] at least if cumulative current deficits can be avoided. "A central bank can survive indefinitely with negative net worth at market value, so long as the interest income from its assets exceeds its payment obligations on interest-bearing liabilities" (Sims, 2016: 13, cf. Jordan, 2011).

Discussing the budget constraint and the balance sheet of a central bank means to enter a difficult terrain. On the one side, a perception of monetary policy can be found according to which central bankers act beyond the sphere of economic restrictions and thus are able to purchase assets at will; running the printing press helps to prevent any default risk. Orphanides (2016: 1) states that bailout operations prove "the ability of central banks to generate rapidly the equivalent of *fiscal* resources, through the creation of high-powered money."

The opposite pole is represented by a branch of modern macro theory that aims to abolish the "mystery of the printing press" (Corsetti and Dedola, 2016), and to analyze central banks like other market agents. As a basic principal, they all have to obey to a budget constraint, and to look for funds that finance their expenditure. "The central bank [...] must raise new funds, [...] in order to: (i) pay for the outstanding special liabilities and

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interest-bearing liabilities, [...] (ii) expand the balance sheet by buying new assets [...] in excess of the gross return on last period's assets [...], and (iii) pay dividends" (Reis, 2013a: 136).

This kind of wording almost makes money creation disappear from sight; it is described as a step of borrowing that has to precede spending of funds. This sequence is also emphasized in the context of unconventional monetary policy where the central bank is seen as an agent engaged in intermediation services. "To conduct credit policy, the central bank issues government debt to households that pays the riskless rate [...] and then [!?] lends the funds to non-financial firms at the market lending rate" (Gertler and Karadi, 2011: 22).

Central bank losses that arise from a negative interest rate spread ought to be covered by a subsequent borrowing from commercial banks. "If the Treasury refuses to make a transfer in that amount, then [!?] the central bank must borrow the amount of this loss via extra reserves" (Reis, 2015: 22).

The description of this transaction too is misleading. Paying net interest income to private banks does not require any additional fund raising; both bookkeeping entries emerge uno actu.

All this textual evidence obviously expresses the wish of the writers to dissociate themselves from a "mystical" view according to which central banks operate beyond an ordinary budget constraint. The authors stress that monetary authorities are unable to produce resources, i.e. income in terms of macro theory.[10] Corsetti and Dedola argue by resorting to an improvement in asset market efficiency, within a given resource constraint. But they emphasize that the lowering of interest costs results from market agents *believing* in a "mystery of the printing press," i.e. in central bank "obliga-tions" that do not bear any risk of default. Looking at the central bank's budget constraint cannot capture its essential role in a monetary economy: issuing a means of payment that is accepted by market agents as a kind of a "public good."

2.4 The Monetary Authority as a Bank?
A bookkeeping view is hardly adequate to understand the essence of central banking. In economic history, the function of money devolved on commercial bank obligations, later a two-tier banking system emerged; but the logic of a market economy does not require that the monetary authority is organized as a bank and applies a balance-sheet type recording of its transactions. "Balance sheets of central banks show the central bank's issue of notes and deposits as a liability. However, this is an anachronism, a bookkeeping convention, which hides the fact that the central bank's note issue does not involve any obligation to the acquirers of the notes" (Hellwig, 2014: 10).

The "banking view" has implanted elements of business thought in economic policy. Finance ministers feel entitled to spend profit transfers

received from the national central bank because these funds are regarded as "generated" income, although size and financing of government spending ought to be chosen on account of macroeconomic criteria. Also central bank interest rates are not stipulated following fiscal considerations.

Friedman's "helicopter" (1969) represents the logical status of a monetary authority more clearly as it underscores that monetary policy decisions are made "outside" of the market system. Money supply provided by the helicopter is a one-sided transfer of wealth. It is possible, but not obligatory to create base money by purchasing and booking market assets. Therefore any change in the value of assets held by a central bank is irrelevant from a macroeconomic point of view – as long as a bewildered "market psychology" does not challenge the acceptance of the domestic currency.

This also renders obsolete the Wallace Neutrality: it says that monetary policy is unable to unburden an economy from asset risks because, in case of realization, the central bank has to repair its capital, which makes additional taxation unavoidable.[11] The Wallace Hypothesis however depends on a series of critical assumptions with regard to market constellations (Benigno and Nisticò, 2015); and it is based on the inappropriate imputation that efficient central banking requires the monetary authority to keep to the principles of private balance sheet bookkeeping. It is true that, in a historical perspective, the institutional shape of a monetary authority as a bank imposed constraints for monetary policy decisions (Spahn, 2001). This kind of commitment has often been useful, and sometimes less useful, but it is neither necessary nor sufficient for maintaining monetary stability.

Similar to Friedman, also in Woodford's scenario of a cashless economy the monetary authority is no ordinary central bank. In his basic new Keynesian model, working balances held at the central bank are accepted as means of payment. The market for these balances can be organized by employing a "floor system" where interest rates of refinancing and deposit facilities are identical. Interest rate policy works through arbitrage: if the central bank offers deposits with higher yields, bond sales induce also market rates to rise. Conversely, market rates fall if refinancing credits are offered at a rate below the market level; bond purchases then make bond prices rise. Quantity and price of this base money can be fixed independently.[12] Woodford (2003: 36n) dissociates himself from the principle that a central bank should obey to a budget constraint, and he opposes explicitly the widely shared view (De Grauwe and Costa, 2001; Reis, 2013a; Sims, 2013) according to which central bank assets have to be sold in order to be able to pay out deposits that commercial banks do not want to hold any more: "This neglects that fact that the definition of the U.S. dollar allows the Fed to honor a commitment to pay a certain number of dollars to account holders [...] by simply crediting them with an account of that size at the Fed – there is no possibility of

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demanding payment in terms of some other asset valued more highly by the market."

Hence, the statement of Reis (2013a: 135), reserves should pay the "safe market return," is wrong. This holds in equilibrium, but the central bank is free to change the level of interest rates. The substantial lowering of nominal rates on securities markets in recent years to a large extent is caused by massive bond purchases on part of central banks, which in turn drove the growth of poorly, or even negatively, remunerated reserves (Andrade et al., 2016). This finding supports the Corsetti-Dedola model: costs of public debt not only shrink through the swap of securities with and without nominal default risk, in addition, they can actively be lowered by manipulating interest rates on refinancing credits and central bank deposits. Of course, central bankers have to respect the restriction that low interest rates do not endanger macro stability.

2.5 A Digression: The Fiscal Theory of the Price Level

If the monetary authority is seen as a bank, with its balance sheet depending on a fiscal support from the Treasury, the task of maintaining price stability cannot be fulfilled without a cooperative government. A much more radical view is put forward by the Fiscal Theory of the Price Level (FTPL). Contrary to the Quantity Theory, the level of prices is derived from the state of public finance, i.e. from the condition of intertemporal sustainability of government debt. Here, the real value of current debt B_t should be equal to the discounted sum of all future real budget surpluses X_t.

$$\frac{B_t}{P_t} = \sum_{j=1}^{\infty} \frac{X_{t+j}}{\left(1 + i_{t+j}\right)^j} \tag{5}$$

Analogously to the one-equation approach of the Quantity Theory, the price level P_t is taken as the "final" endogenous variable, which suggests its determination through the other terms of the equation. A fiscal shock that increases the current budget deficit and the nominal stock of debt "requires" higher prices today if the whole future surplus is unchanged.[13]

Is this more than an "accounting gimmickry without substantive interest" (Christiano and Fitzgerald, 2000: 8)? Contrary to the *Unpleasant Monetarist Arithmetic* of Sargent and Wallace (1981), FTPL at first does not assume that the central bank increases money supply and prices, aiming to make real public debt sustainable; also there is no expected monetization. How then do the variables in [5] match? The equation "can be satisfied as long as *P* jumps [!?]. This is what FTPL advocates expect would happen. [...] The market [!?] will generate a value of *P* to guarantee debt is not excessive. [...] The

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market-clearing mechanism moves the price level, *P*, to restore equality" (Christiano and Fitzgerald, 2000: 7, 3).

Taking the price level as a jump variable (beyond an endowment model) contradicts empirical findings and analytical traditions. But the key problem is to give an explanation of price increases. They do not simply reflect fiscal excess demand; it is also hard to find a wealth effect that would trigger additional private consumption. Rather, the idea seems to be that agents scale up prices because the alternative – an unchecked growth of real public debt – is unconceivable and unwanted.

But why should we see private agents repairing the government budget constraint by way of raising prices, thus depreciating their own money wealth, if they do not expect monetary impulses on the part of a central bank? It is hardly comprehensible to regard the price level P_t as a risk-adjusting parameter of bond prices. It is more obvious that market agents try to sell these bonds so that equation [5] is met by a direct depreciation of B_t. "The government's intertemporal budget constraint becomes a pricing kernel for the public debt, determining the *effective* value of the public debt and overriding its *notional* or *contractual* value" (Buiter, 2002: 461).

On account of this muddle, a modern view on FTPL is that it builds implicitly on the assumption of an institutional agent who precludes a government bankruptcy (Bassetto, 2008). The postulate of a constant nominal value of B_t in FTPL highlights an important distinction to the Corsetti-Dedola model where it is exactly the risk difference between bonds and reserves which causes an interest rate effect that stabilizes the market position of government securities.[14]

3. National Government Debt in a Currency Union

3.1 Monetary Rescue Operations
The need for and the scope of a future bailout of single member states in EMU have been assessed very differently. Dornbusch (1997) did not believe in such a step, on account of an independent ECB. Italian debt would remain to be an Italian problem. A country-specific pattern of risk premia, modifying bond yields, would evolve so that every country would be interested in a state of sound finance. Therefore rules and restrictions for national fiscal policy are dispensable. Also Eichengreen and Hagen (1996) considered limits for budget deficits unnecessary and counterproductive, because stipulating constraints for national debt finance would increase demand for fiscal transfers from central European institutions.

Many years later, Cooper et al. (2008) described a scenario where regional governments try to shift the costs of national public goods onto other regions of a currency union. They run high budget deficits, betting on a bailout on part of a central agency. This governmental institution might comply, aiming to maintain a balanced economic development in all regions, particularly if regional bonds are widely dispersed in the whole union. However, such a constellation was rated to be typical for Argentina at most, but not in EMU where no institution exists that could offer a bailout; therefore rules for limiting budget deficits were seen to be superfluous. More recently, Cooper et al. (2014) argued that national economies within a currency union could not preserve any insulation from other member countries' fiscal problems; but no common monetary policy strategy exists to counter these contagion effects.

Interestingly, the European Commission shortly before the conclusion of the Maastricht Treaty did not appreciate the idea that financial markets alone should provide surveillance of national fiscal policy; ruling out collective rescue operations were said to be not credible – given the increased belief in the European "project" on the part of the people. "Markets cannot be expected to behave as if solidarity across Community Member States were completely ruled out, since concerns for solidarity are integral to the philosophy of the Community" (Emerson et al., 1990: 100).

The sense of community that had been invoked time and again might create political pressure in favor of fiscal redistribution in EMU (Hutchison and Kletzer, 1995). Economists also envisioned the risk of an oncoming scenario of time inconsistency: national governments might enlarge fiscal deficits aiming for higher employment, thus assuming that the common central bank would depreciate non-sustainable debt via inflation. This view made the case for restrictive fiscal rules and a strong commitment of monetary policy (Chari and Kehoe, 2007, 2008; Cooper et al., 2010).

All these scenarios are noticeable for three misjudgments:
- Still government was seen as driving force of excess demand although, at this date, it had become evident that GIPS countries' debt grew due to private sector activities.
- Belief in the normative power of behavioral rules imposed on fiscal authorities appeared to be undaunted in spite of converse experience.
- All writers share the belief that the salvation of debt-ridden states will come from inflation, provoked by the common central bank.

The significance of the Corsetti-Dedola contribution stems from the demonstration of a monetary backstop for public debt that works without real depreciation through inflation. By exchanging interest-bearing reserves against some share of government bonds, or by prompting corresponding market

expectations, interest costs of public debt shrink. This marks a (marginal) change of relative benefits and drawbacks when deciding on government default. This event then is less probable so that market risk premia fall. Government finance to a large extent still is provided by the market, and moral hazard is no imminent threat: rather, by offering protection against speculative crises, government is motivated to maintain its solvency by its own efforts. "Backstops may actually strengthen the incentives for a government to undertake costly actions that improve economic resilience to fiscal stress – the opposite of the 'moral hazard' consequences of a bailout [...]. This is because, without a backstop, the possibility of belief-driven crises tends to reduce the expected future benefits from these actions" (Corsetti and Dedola, 2016: 1360–1).

All these considerations however have to be modified in case of a monetary union. Here, the "inflation solution" comes up again. Even if monetizing public debt of a single member country should have an inflationary effect, it has only a minor impact on average EMU inflation, thus interests of all participating agents in the policy game point to this solution in case of severe fiscal troubles. However, single national governments exert only a small impact on ECB decisions so that central bank intervention is uncertain (Bacchetta et al., 2015, Blanchard et al., 2013).

A strategy of swapping bonds and reserves might strain the ECB balance sheet. Rules for rebuilding its capital in case of heavy shocks do exist, but there is no procedure of fiscal backing aiming to cover current losses in the Bank's income account. In the framework of the Corsetti-Dedola model, this implies an inflationary tendency. The readiness to provide fiscal backing is weak, given the feature of eurozone inflation as a "public good;" thus single national governments pass on indirect inflationary consequences of their fiscal troubles to the community (Corsetti and Dedola, 2016; Sims, 1999).

Maybe as a kind of deterrent, the ECB tied the activation of its OMT program to the troubled country's agreement to reforms imposed by the ESM; but this is a one-sided commitment, not laid down in a generally ratified contract, therefore the condition can be ignored in case of an actual fiscal crisis. The already active APP is not linked to such constraints, and thus undermines all countries' willingness to engage in policy reforms.

OMT is suited to affect bond prices of single countries. This feature marks its strength, which is correctly described in the Corsetti-Dedola model. Many economists thus regard the ECB as the "natural" LLR agency (De Grauwe, 2011b; Buiter and Rahbari, 2012). But it can hardly be denied that the ECB, not least because of the structure of its decision-making body, is not politically authorized to go for monetary support of single EMU member states: basically this implies fiscal redistribution and, in the final analysis, a control of EMU membership.[15] Devolving monetary policy decisions to a body of

experts (Eichengreen and Wyplosz, 2016) does not solve, but rather accent, this constitutional problem. Because of the questionable political status of the ECB when engaging in rescue operations, some uncertainty remains whether, and to what extent, interventions will occur in a future fiscal crisis (Whelan, 2013; De Grauwe and Ji, 2016).

3.2 Institutional Alternatives

Most probably, the Bundesbank never would start market interventions in favor of single federal states in Germany, but, if at all, in favor of central government bonds. Accordingly, also the ECB might engage in supporting a European public debt. However, a fiscal and debt union cannot be recommended due to different allocative and distributional preferences in European countries (Spolaore, 2013; Eichengreen and Wyplosz, 2016).

It is more obvious to charge the ESM alone with the task of repairing fiscal troubles in EMU member countries. This institution is similar to the IMF (provision of emergency credits under the condition of undertaking structural reforms). The efficacy of the ESM in taming fiscal crises is questionable however. Its financial powers are limited;[16] tight links to reform programs might let national governments hesitate to ask for help; and national parliaments of other countries have a veto right. This hints to a threatening bailment risk of EMU states that contradicts the no-bailout principle of the Maastricht Treaty. Contrary to the IMF case, salvaging lender countries and fiscally troubled states have close economic and political links. This creates a kind of prejudice in ESM decisions. Within a European risk-sharing community, strong countries cannot expect compensation for their services; but they are interested to avoid negative spillover effects from fiscal crises in their neighbor economies. The ESM thus remains a fragile institution (Cooper, 2012; Tirole, 2015; Tabellini, 2016).

Accountability and power to control should be closely linked, particularly in a non-optimal monetary union lacking a common formation of political will. This constitutional principle however provides no protection against speculative fiscal crises and cross-border contagion effects (Feld et al., 2015). Without any LLR agency, EMU is an even more "hard-nosed" regime compared to the gold standard because, in the latter, member countries were able to leave temporarily (but were expected to re-enter later, according to the unwritten Restoration Rule, at the same nominal exchange rate). There are a number of proposals aiming to improve the management of government debt crises (Deutsche Bundesbank, 2016):

- Lengthening the duration of public bonds, or a conversion in growth-indexed securities, gives more time in crisis management, but might entail an ex ante increase of yields.

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- Splitting the stock of debt into tranches bearing different default risk will not lower total interest costs and might complicate the placement of the high-risk segment.
- The same consideration applies to the proposal to use national securities as backing for the central issue of senior and junior bonds. Only the latter tranche carries a default risk, whereas the former is designed as safe (European Safe Assets). This project is not meant as a tool for fighting a debt crisis, but aims at the creation of an homogenous safe bond that can be used in bank and central bank transactions. These "ESBies" might enhance liquidity and stability of the European financial market (Brunnermeier et al., 2016).

Like in Germany, the Fed in the US "currency union" does not intervene in favor of federal state bonds. A precondition for this rule is a low stock of debt. Accordingly, also in EMU debt ratios ought to be reduced substantially, if a return to a no-bailout system is envisaged (Eichengreen and Wyplosz, 2016; Feld et al., 2016). But a large stock of debt cannot efficiently be reduced by austerity policies; this takes a long time where growth is hampered. Given the historical evidence, a strategy of maintaining a large fiscal surplus over longer periods is an unrealistic policy option (Eichengreen and Panizza, 2016). Following the German proposal of a Debt Redemption Pact (Sachverständigenrat, 2012: no. 194–5), Corsetti et al. (2015) suggest a debt buy-back through a new European agency, which in the long run is amortized basically by future national fiscal revenues. The suggested 95% target value of the debt ratio however is still much too high. Moreover, further critical points are welfare losses due to future relative tax increases, and the question whether finance ministers today can credibly commit to a long-run amortization schedule. A more efficient solution from a macro-economic point of view is debt relief covered by a capital levy.

> In addition to the typical consolidation measures and potentially improving debt sustainability through privatizations, a one-off capital levy could also be considered when assessing debt sustain-ability and deciding how to reconcile the interests of the parties. This would be in line with the principle of the member states' individual responsibility that is anchored in the governance framework of the EMU, because responsibility for and the making of fiscal policy decisions lies at the national level (Deutsche Bun-desbank, 2016: 56, cf. Eichengreen, 1989).

Conclusions

The foundation of a European currency union has delivered, as an "un-planned" experiment, the finding that an explicit removal of a LLR might destabilize national bond markets after fiscal shocks, even if government debt

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ratios are relatively low. Pessimistic expectations can quickly coordinate on a "bad" equilibrium where due to high interest costs a government default becomes an imminent threat. Reversely, one might conjecture that a strong position of bonds denominated in domestic currency in the post-war era, also in high-debt countries, rested on the tacit assumption that national central banks would intervene at least in times of temporary liquidity stress.

The obvious explanation that central banks could have realized market stabilization by (perhaps indirectly) communicating the option of monetization, i.e. by depreciating the real value of public debt via inflation, is hardly convincing. This expectation would have motivated financial investors to claim a precautionary risk premium, making public debt more expensive. Activating this option on the part of governments and central banks is no straightforward choice as the gains from default, i.e. avoiding large tax increases, have to be weighed against welfare costs of inflation.

An alternative explanation builds on the view that market agents (particularly banks) regard base money funds that emerge from bond purchases as additional financial assets – but not as unwanted means of payment that are spent on the goods market. As reserves are not subject to a nominal default risk, they bear a lower interest rate compared to government bonds. Swapping bonds and reserves thus lowers interest costs of public debt. Already the expectation of this transaction is capable to preclude speculative debt crises. It provides no protection against fundamental insolvency.

The limits of such a monetary backstop can be seen in its impact on the central bank balance sheet: depreciation of the stock of bonds, and interest rates paid on reserves may bring about capital losses. The growth of reserves in the latter case points to a more gradual process, which hardly causes a severe inflation problem. In the former case, there is much leeway in valuing balance sheet assets. Moreover, the traditional postulate requiring a central bank to obey to a budget constraint and to follow business-economics balance sheet norms is not convincing. The institutional form of a monetary authority as a bank is an historical relict that often proved to be useful for maintaining monetary policy discipline, but taken as such it is neither necessary nor sufficient for that aim. Wallace Neutrality and the Fiscal Theory of the Price Level derive their results from logical exercises with poor realistic content.

Central banks thus are able to deliver a substantial contribution for the stability of public finance, but they should not interfere in national debt affairs in federal societies, because they are not authorized to decide on fiscal redistribution topics. The ECB's scheduled and realized securities programs are successful with regard to bond prices, but this undermines the willingness to develop a sustainable system of national public finance in EMU. A return to a no-bailout system (oriented at the example of the US) requires a

substantial reduction of debt ratios that should be accomplished by stock adjustments.

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NOTES

1. Optimal currency unions hardly exist. Efficient entities actually are nation states (e.g., Germany in the DM era, the US, and Argentina); it is a matter of convention whether these federal societies should be named currency unions.

2. This does not imply that financial markets are "irrational." Rather, such an unstable investment behaviour may reflect an individual risk assessment that appears reasonable from a microeconomic point of view.

3. The onset of the euro crisis should be attributed to the year 2008 when private capital export to the current-account deficit countries stopped.

4. His views were widely shared (Whelan, 2013; Krugman, 2014; Baldwin and Giavazzi, 2015). A more general analysis of government debt sustainability is given, e.g., by Collard et al. (2015).

5. Sims (2013: 569) names indebtedness in domestic currency "nominal," where default is rare, whereas indebtedness in foreign currency is "real." He concludes: "It is clearly not a good approximation to model the US economy as if debt were real, even though a considerable part of the literature on optimal fiscal policy does so. The southern countries in the euro area are now reckoning with the consequences of their having, by joining the euro, made their sovereign debt real."

6. A variant of this scenario in a longer term perspective is a "slow moving debt crisis" (Lorenzoni and Werning, 2013): it emerges from investors' pessimistic expectations, but with good macroeconomic conditions government will stick to its promise. Persistent high interest costs however enforce debt restructuring later.

7. "Economists and journalists sometimes treat inflation as a form of default, but it is not. Default is a situation where the contracted payments cannot be delivered, and the contract does not specify what happens in that eventuality" (Sims, 2013: 569).

8. This portfolio view however fails to make clear that banks as a group cannot lower the volume of their central bank reserves by switching to bonds bought on the capital market. Reserves can only be reduced by exchange into cash or statutory minimum reserves, i.e. via credit and deposit creation. This is an analogy to Tobin's (1963) view on "money creation" in the commercial banking system: the size and structure of deposits that arise as bookkeeping entries together with credit creation initially do not conform to non-bank preferences. But the process of deposit re-allocation triggers an adjustment of income, prices and interest rates that finally confirms the post-Keynesian view of deposits, evolving endogenously from credit extension (Disyatat, 2011).

9. The Bundesbank after 1948 for many years operated with artificial "balancing claims" in its balance sheet, while the D-mark rose in market agents' estimation, at

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home and abroad. Currently, in spite of large foreign exchange holdings with size-able depreciation risks, nobody is dubious about the strength of the Swiss franc.

10. Reis (2015) compares the central bank with the Department of Transportation that also needs allocation of funds from the Treasury in order to stay solvent.

11. Reis (2016a: 20) therefore asserts a neutrality of an exchange of government bonds and central bank reserves. "QE provides no fiscal relief. [...] QE can alter the size of the default per bond, but not its total size."

12. With respect to practical monetary stabilisation policy, some economists now propose to maintain a large volume of reserves also in future "normal" times so that the quantity of money and the rate of interest can be used as two monetary policy tools. If reserves are supplied in different maturities, also the term structure of market interest rates can be manipulated (Reis, 2016b).

13. When arguing in terms of an intertemporal budget constraint (which also is popular in balance-of-payment economics) the perspective of infinite periods is identical to a two-period model, from a pure logical point of view. But in practice, the implications are different. With two periods, consequences of current decisions cannot be avoided tomorrow. With an infinity of periods, agents today might feel unconcerned when observing a current deficit, because they do not know whether at some date $t + j$ a balancing policy will occur; rational agents will assess consequences within their relevant time span only. Thus model results are somewhat vague. Economic theory however gives more rigorous results with the help of artificial "representative" agents who – in the words of Angus Deaton – are distinguished by two features: "They know too much, and they live too long" (quoted from Athreya, 2013: 173).

14. Sims (2016), one of the early protagonists of FTPL, now adheres to a more moderate view according to which interest rate policy, and tax and spending policies jointly determine the price level. Interest rate policy alone is said to be counter-productive when fighting inflation because this increases interest costs, the budget deficit, public debt and – via [5] – prices (Sims 2012, 2013). This cost-push argument against the efficacy of monetary policy however is misplaced as it ignores the restrictive impact on private goods demand.

15. Orphanides (2016) confirms this objection indirectly, by criticising a "discriminatory" ECB practice during the euro crisis: a rejection of specific countries' national bonds as collateral in refinancing operations is regarded as discretionary fiscal policy, and thus not tolerable in a democratic currency union. On the other hand, Sims (2012) argues that the ECB should have stayed away from accepting government bonds as collateral, in order to prevent banks from accumulating large stocks of these securities. Following this suggestion however would have raised the costs of public debt much earlier.

16. Monetary backing provided by the ECB would offer an expedient, but then monetary policy again is entangled in financing of EMU member states.

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