The Debt Ratio and Sustainable Macroeconomic Policy

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Abstract

Neoclassical views on fiscal sustainability are based on several assumptions that are inconsistent with accounting and operational realities of the money system, including dangers of "bond vigilantes" in government debt markets and "printing money" is inherently inflationary. Combining these assumptions with the broader world view of monetary policy as the appropriate sole manager of the macroeconomy, neoclassicals essentially define fiscal sustainability as a policy mix in which fiscal policy "gets out of the way" of "monetary dominance", defined as the central bank's ability to independently pursue an "optimal" monetary policy. This paper presents an alternative view consistent with real-world accounting and monetary operations; a policy mix in which fiscal policy has an active role is shown to be a more sustainable one. Perhaps surprisingly, this turns out to also not be subject to the neoclassical fears or concerns of a policy regime of fiscal dominance.

Keywords: fiscal sustainability, interest rates, national debt, monetary dominance, fiscal dominance, sector financial balances, central bank operations, functional finance

JEL Codes: E63, E43, H63, H68

There are few issues of more theoretical, empirical, and political interest than fiscal sustainability. This is not surprising, since in addition to its own significance it is at the core of so many other fundamental debates, such as the ability to pay future entitlements, central bank independence, "printing money," and the appropriate role of government itself in the economy. The purpose of this paper is to unravel the various components of the neoclassical understanding of fiscal sustainability within the context of the operational realities of the monetary system, basic accounting, and Minskyan financial fragility, and then to consider some principles for building a more sustainable approach to the macroeconomic policy mix that is consistent with each of these. The neoclassical view is often explained in terms of a monetary dominance versus fiscal dominance dichotomy – the goal here is to transcend this dichotomy since it is overly simplistic and in important ways not consistent with real-world accounting and monetary operations.

The paper is organized into five sections, and then a conclusion. The first section of the paper defines the national debt, fiscal sustainability, and discusses the relative importance of primary budget balances and interest rates. The second section incorporates the monetary operations, monetary policy regimes, and sovereign currency issuing governments to understand the historical behavior of interest rates and debt service. The third section critiques standard neoclassical concepts such as "printing money" and Ricardian equivalence from within the context of real-world monetary operations; it explains that the core issue in the neoclassical aversion to so-called unsustainable fiscal policy is the role of debt service, not the central bank being "forced" to "print money" if the national debt or debt service becomes too high. The fourth section critiques the neoclassical preference for monetary dominance by showing that it does not account for interdependent financial flows between the private sector and the government sector and Minskyan financial fragility. The fifth section offers building blocks for a more sustainable policy mix, arguing that this may require the central bank's interest rate target be set below GDP growth; it also explains how a functional finance-based fiscal policy is consistent with both fiscal sustainability and traditional macroeconomic targets, as well as not necessarily interfering with central bank independence.

Preliminary Definitions and Concepts

In Table 1 are several measures of the national debt and the debt ratio as reported in the St. Louis Federal Reserve's Federal Reserve Economic Database. The measures are not mutually exclusive. Measure 1 (Total Public Debt) is the sum of measures 3 (Federal Debt Held by Private Investors), 4 (Federal Debt Held by Agencies and Trusts), and 5 (Federal Debt Held by Federal Reserve Banks); Measure 1 is alternatively the sum of Measures 2 (Federal Debt Held by the Public) and 4. Measure 6 (Federal Debt Held by International and Foreign Investors) is a subset of Measure 3, and thus also a subset of Measures 2 and 1.

Table 1 National Debt Measures as of March 2016

Measure	$US Trillion	Percent of GDP
1. Total Public Debt	18.922	104.2
2. Federal Debt Held by the Public	13.700	75.4
3. Federal Debt Held by Private Investors	11.211	61.7
4. Federal Debt Held by Agencies and Trusts	5.222	28.8
5. Federal Debt Held by Federal Reserve Banks	2.810	15.5
6. Federal Debt Held by International and Foreign Investors	6.166	33.9

While the Total Public Debt of $18.922 trillion and 104.2 percent of GDP is the common "headline" number for the national debt, it is misleading and not consistent with economic theory. Neoclassical economic theory of the intertemporal budget constraint is clear on which measure is the relevant one: the appropriate measure is that part of the national debt owned by the non-government sector. The rationale is to count only the debt that can have direct macroeconomic implications through default on private sector held debt or through transfers to the non-government sector as a result of debt service. This definition describes Measure 3 in Table 1, Federal Debt Held by Private Investors, at $11.211 trillion and 61.7 percent of GDP. Aside from a few technicalities that leave them roughly but not exactly equal, Measure 3 is essentially Measure 1 less Measures 4 (Federal Debt Held by Agencies and Trusts) and 5 (Federal Debt Held by Federal Reserve Banks).

Consistent with the definition provided by economic theory, there are important reasons for not including Measures 4 and 5. First, including Federal Debt Held by Agencies and Trusts – $5.222 trillion and 28.8 percent of GDP – in the national debt can be misleading and even internally inconsistent since this entire sum is simply owed by the national government to itself. Since the vast majority of Measure 4 includes the trust funds for entitlement programs – Social Security and Medicare – increases in Measure 4 raise the Total Public Debt but also raise the assets of the Federal Government by the same amount. This means that legally the trust funds for entitlement programs are "more solvent" the larger Measure 4 becomes. In other words, fully funding in the legal sense the entitlement programs – which the public and policy makers view as a good thing – *raises* the Total Public Debt, which the public and policy makers view as a bad thing. (This is not even to mention that these trust funds are also included in the national debt ceiling, further adding to the internal inconsistencies.) It clearly makes little sense to include as part of the national debt such trust funds that are a key legal source of funding for future entitlement programs and thus are important determinants of the Congressional Budget Office's (CBO) reports on the long-term fiscal position of the federal government (e.g., Congressional Budget Office, 2015). Despite significant flaws (discussed in a later section), the CBO's publications correctly omit balances held by agencies and trusts from its reported measures of the national debt.

Second, Federal Debt Held by Federal Reserve Banks – Measure 5 – is the offset of Fed open market operations to add reserve balances to the banking system. In neoclassical literature on the sustainability of government debt, this is "seigniorage," or "printing money." In the standard neoclassical government budget constraint models, governments have a choice of "financing" via issuing bonds or "printing money." In the latter case, if the "money printing" is the result of the central bank's purchase of government-issued securities then these securities would not count in the appropriate measure of the

national debt since there would be no difference from the government not having issued them in the first place. As such, even though "printing money" results in a liability of the central bank in the form of the monetary base, this is not something the government can default upon and is therefore not counted as part of the appropriate measure of the national debt. At present, one could reasonably argue in favor of including Treasury securities held by the Fed beyond the quantity of currency outstanding – roughly the traditional amount purchased to offset the public's demand for currency via open market operations – since there a rational expectation might be that the Fed will wind down its balance sheet at some point and thus reduce its holdings of Treasury securities by around $1.5 to $1.9 trillion. This would raise Measure 3 to around 70 percent of GDP.

Using the correct measure, the U. S. debt ratio is just below of 62 percent (or 70 percent, if one wants to include those Treasury securities held by the Fed that are greater than the currency outstanding), rather than just a bit above 100 percent as most report (including the famous "National Debt Clock" on Sixth Avenue in Manhattan). By neoclassical standards, the U. S. debt ratio is very modest, and is actually not far outside the European Monetary Union's Maastricht Criteria. By international standards, again the U. S. national debt ratio is not large.[1] Of course, the debt ratio is projected to rise, perhaps by a lot, which is the real concern of so many. CBO (2015, p. 3) projects a rise in the Federal Debt Held by the Public (Measure 2) to 103 percent of GDP (from the current 75.4 percent in Table 1) by 2040. If one assumes that the debt held by the Fed (Measure 5) falls near its historical average range of 3 to 5 percent of GDP, this would mean debt held by the private sector (Measure 3 – the appropriate measure) would be around 100 percent of GDP. The CBO's ten-year projections from March 2016 project a rise to 86 percent of GDP by 2026, which would likely bring debt held by the private sector over 80 percent of GDP (Congressional Budget Office, 2016, p. 15).

But why does the debt ratio matter? Or does it? Obviously, the debt ratio itself doesn't *do* anything – debt *service* is what ultimately will bring difficulties, such as inflation if the government services unbounded growth in interest obligations (given that a government can always "afford" to do so merely by crediting bank accounts in its own fiat currency), or default as a result of the desire to avoid inflation. Both are obviously ruinous. So, importantly the sustainability of the government's fiscal position is not about the government's ability to spend by crediting bank accounts – though this *is* very important for understanding why a government can always "afford" policy actions that enable a full employment economy and why it can never be forced into involuntary default via an inability to pay or service its debts – as much as it is about the size of the debt service relative to the size of the economy.

In order to keep debt service from rising without bound relative to the productive capacity of the economy, mathematically one of two things need to happen. The first is that the government's primary budget balance (that is, the budget position *before* adding debt service) can be sufficiently in surplus such that the government is not issuing new debt to pay all of its interest. How big the primary surplus must be depends on a number of things. For instance, begin with the following assumed starting points:

- End of fiscal year 2015 GDP of $17.81 trillion, according to CBO (2016, p. 15).
- End of fiscal year 2015 debt ratio using Measure 3 of $10.662 trillion or 60 percent of fiscal year 2015 GDP (both obtained from St. Louis Fed's Federal Reserve Economic Database).

Then make the following additional assumptions for future years:

- Average rate of nominal GDP growth of 4 percent annually.
- Average interest rate on the national debt of 5 percent.

[1] By Measure 3, Japan's debt ratio may not be well over 200 percent as usually reported; according to Weinstein (2015), Japan's debt ratio is closer to 132 percent even if one still includes government securities owned by the Bank of Japan, while Wakatabe (2015) then estimates that not including these securities (consistent with Measure 3 and economic theory) results in the appropriate debt ratio for Japan falling to about 80 percent of GDP. Wakatabe then also reports analysis by Japanese economist Hidetomi Tanaka, who, using Ministry of Finance figures available only in Japanese, puts these measures at about 80 percent and about 40 percent, respectively, at the end of 2014.

Accordingly, the primary budget balance after 2015 that will be required for debt service to remain at a level of 60 percent is a continuous surplus of 0.6 percent of GDP.

This scenario is shown in the first row of numbers in Table 2 below. This enables the debt ratio to fall from the March 2016 level of 61.7 percent of GDP (in Table 1) and converge to the 60 percent level that it stood at the end of fiscal year 2015. Note that this would require the federal government to immediately contract its projected 2016 budget balance by 2.1 percent of GDP if CBO's March 2016 projections for the entire fiscal year of a 1.5 percent primary deficit are assumed to be correct.[2] If the primary budget balance in 2016 is below a surplus of 0.6 percent of GDP, then adjustments in the future would need to be still greater to eventually reach a debt ratio of 60 percent. As an important corollary, note that the total budget balance that is converged to is 2.3 percent of GDP annually. In other words, even from the perspective of the neoclassical model, a permanent budget deficit is sustainable. While most economists (should) understand this already, the public generally does not, so it is worth emphasizing.

On the other hand, the second row of numbers in Table 2 shows that even a modest primary deficit of 1 deficit of GDP leads to unbounded growth in the debt service, total budget deficit, and debt. In other words, a primary budget balance not at least as high as 0.6 percent of GDP on average would grow deficits, the national debt, and debt service all to the point that eventually paying the debt service would result in high and rising inflation. While this second row puts the convergence ratios at infinity for convenience, in fact at some point the increased debt service would simply pass through to inflation to raise nominal GDP in kind. Thus, CBO's regular practice of assuming a long run nominal GDP growth rates equal to the potential real GDP growth rate plus inflation at around 2 percent is inconsistent with its own projections of unbounded growth in debt service payments.

Table 2 Hypothetical Projections after 2015 Fiscal Year

NGDP Growth Rate	Interest Rate	Post 2015 Primary Balance as % of GDP	2016 Debt Service as % of GDP	2016 Total Budget Balance as % of GDP	2016 Debt Ratio	Convergence Debt Service Ratio	Convergence Total Budget Balance as % of GDP	Convergence Debt Ratio
4	5	0.6	2.9	-2.3	60	2.9	-2.3	60
4	5	-1.0	2.9	-3.9	61	∞	−∞	∞

Alternatively, the interest rate on the national debt could be low enough that a permanent primary *deficit* can be consistent with debt service that does not grow without bound relative to the capacity to produce goods and services. The first row of numbers in Table 3 shows that to converge at the 2015 level, the primary budget balance can be -0.6 percent of GDP forever if the interest rate on the national debt averages 3 percent rather than 5 percent with nominal GDP growth of 4 percent – that is, the rate on the national debt is smaller than the growth rate of GDP. In this case, debt service is 1.7 percent of GDP and the primary budget balance is again 2.3 percent of GDP. More generally, given an interest rate lower than GDP growth, *any*

[2] Since interest rates on the national debt currently average well below 5 percent, the improvement in the primary budget balance would not need to be this large, although if interest rates were to rise (as CBO projects they will), then this sort of adjustment would become necessary. The example here simply attempts to illustrate the mathematics of fiscal sustainability from current starting points, not to project the future path of interest rates.

primary budget deficit will eventually lead to convergence of the debt ratio – so, the second row of numbers in Table 3 shows that a primary budget balance of -1 percent will converge at a debt ratio of 104 percent and debt service ratio of 3 percent.

Table 3 Hypothetical Projections after 2015 Fiscal Year Assuming Nominal GDP Growth Is Less than the Interest Rate

NGDP Growth Rate	Interest Rate	Post 2015 Primary Balance as % of GDP	2016 Debt Service as % of GDP	2016 Total Budget Balance as % of GDP	2016 Debt Ratio	Convergence Debt Service as a Percent of GDP	Convergence Total Budget Balance as % of GDP	Convergence Debt Ratio
4.0	3.0	-0.6	1.7	-2.3	60	1.7	-2.3	60
4.0	3.0	-1.0	1.7	-2.7	60	3.0	-4.0	104

In the scenario for the second row of Table 3, there is convergence to a debt service ratio of 3 percent of GDP in 575 years. Quite obviously, the debt ratio and debt service ratio for, say, 30 and 75 years hence are far more relevant, and it is interesting to compare a 1 percent primary deficit where the interest rate is 5 percent in Table 2 versus 3 percent in Table 3 for the 30-year and 75-year hypothetical projections, which are shown in Table 4. For the 5 percent interest rate scenario, clearly the debt ratio and debt service increase rapidly and are at what would generally be considered high levels within 30 years, and far more so in 75 years. For the 3 percent interest rate scenario, however, even as the debt ratio grows and might be considered high by some, it remains well within the range of international experience while debt service remains modest and well below the post-World War II high of 3.5 percent of GDP reached in the U. S. in the 1980s.

Table 4 Hypothetical Projections for 30-Year and 75-Year Horizons for Different Interest Rates

NGDP Growth Rate	Interest Rate	Post 2015 Primary Balance as % of GDP	In 30 Years			In 75 Years		
			Debt Service Ratio	Total Budget Balance as % of GDP	Debt Ratio	Debt Service Ratio	Total Budget Balance as % of GDP	Debt Ratio
4.0	5.0	-1.0	5.4	-6.4	114	11	-12	232
4.0	3.0	-1.0	2.0	-3	71	2.4	-3.4	83

Table 5 Debt Service Ratios for Different Interest Rate and Primary Deficit Combinations Assumes Nominal GDP Growth = 4% and Starting Debt Ratio = 60%

Interest Rate (Percent)	Primary Balance as a Percent of GDP	Debt Service as a Percent of GDP in 30 Years	Debt Service as a Percent of GDP in 75 Years	Convergence Debt Service as a Percent of GDP and Year of Convergence	Debt as a Percent of GDP at Convergence
1.0	-1.0	0.44	0.36	0.33, Year 278	35
	-2.0	0.64	0.66	0.67, Year 130	69
	-3.0	0.83	0.95	1.0, Year 152	105
	-4.0	1.02	1.25	1.33, Year 155	138
	-5.0	1.21	1.54	1.67, Year 222	173
2.0	-1.0	1.11	1.04	1.0, Year 188	52
	-2.0	1.54	1.81	2.0, Year 264	104
	-3.0	1.97	2.57	3.0, Year 305	156
	-4.0	2.40	3.33	4.0, Year 328	208
	-5.0	2.83	4.09	5.0, Year 343	260
3.0	-1.0	2.08	2.40	3.0, Year 570	104
	-2.0	2.81	3.94	6.0, Year 699	208
	-3.0	3.55	5.47	9.0, Year 754	312
	-4.0	4.28	7.0	12.0, Year 790	416
	-5.0	5.01	8.53	15.0, Year 817	520

Table 5 shows how different rates of interest – all less than the assumed growth rate of GDP – are consistent with convergence of debt service and debt ratios for various levels of primary deficits as a percent of GDP run into perpetuity, even fairly large ones relative to GDP. Of course it is not necessarily the case that every one of these levels of debt service would not be inflationary – all of them could be, or none of them, depending on the state of the economy. Regardless, in terms of convergence or unbounded growth of the debt ratio any fixed primary deficits as a percent of GDP can converge – which is the neoclassical requirement for fiscal sustainability – if the interest rate is below the growth rate.

Deficits, Interest Rates, and Monetary Policy Regimes

While much of the focus in the previous section is on the interest rate relative to the growth rate of the economy, neoclassicals focus on the size of the primary deficit. The reason is their belief that the so-called "bond vigilantes" will attack if the national government does not "get its fiscal house in order" by reducing current and projected primary deficits. While interest rates are low now, they argue, bond markets could

rebel or China could sell its Treasuries and interest rates on the debt will grow without bound. And so the belief that bond vigilantes can raise interest rates on U. S. debt means the only point of focus should be on the current and (especially) expected primary deficits, which are the only guarantees of both mathematical and actual fiscal sustainability. As Robert Rubin, Peter Orszag, and Allen Sinai explain,

> "The adverse consequences of sustained large budget deficits may well be far larger and occur more suddenly than traditional analysis suggests, however. Substantial deficits projected far into the future can cause a fundamental shift in market expectations and a related loss of confidence both at home and abroad... This omission [by conventional analysis] is understandable and appropriate in the context of deficits that are small and temporary; it is increasingly untenable, however, in an environment with deficits that are large and permanent" (Rubin, Orszag, and Sinai, 2004, p. 1).

In a report that it regularly cites in subsequent reports on longer-term projections, CBO (2010) similarly notes the "greater chance of fiscal crisis" and "reduced ability to respond to domestic and international problems" as a result of potential bond market reactions to current and projected deficits as key reasons for action to reduce them. Laurence Ball and Gregory Mankiw (2005, p. 117) summarize the feelings of many policymakers and economists by arguing that "[w]e can only guess what level of debt will trigger a shift in investor confidence... If policymakers are prudent, they will not take the chance" of finding the precise tipping point that generates unbounded growth in debt service relative to the economy's capacity.

Assuming bond vigilantes can set or have the ability to suddenly raise interest rates on U. S. debt is problematic, however. Paul Krugman provides what he calls a "simple macro model" of the open economy to explain this point. In his explanation of the model's implications, he writes that,

> "As far as I know, none of the people issuing dire warnings have actually tried to write down a model of what an attack would look like. And there is, I suspect, a reason: it's quite hard to produce a model in which bond vigilantes have major effects on a country that retains a floating exchange rate" (Krugman, 2012, p. 1).

Much the same point has been made by many others for several years (e.g., Mosler, 1997; Bell and Henry, 2003; Mitchell and Mosler, 2005; Sardoni and Wray, 2007). The key point is that under flexible exchange rates, the central bank's target and thus interest on the national debt becomes a policy variable not set by markets. While the central bank might *choose* to follow a Taylor's rule or similar strategy in "normal" times, adjusting the rate to accommodate the whims of bond or currency market vigilantes would be a policy choice (and probably a particularly bad one at that).

The most common counter from those that are concerned about private markets rejecting the government's debt is that while the Fed sets a short-term rate, it does not set the long-term rate. Because of this, they argue, and the fact that the U. S. Treasury legally must issue debt rather than receive overdrafts in its account at the Fed, the bond markets still set the interest rate on the national debt. There are three responses to this – (a) the need to issue debt in the case of a deficit is a self-imposed constraint, not a market imposed constraint, (b) the constraint is not actually an economically significant constraint, and thus not really a constraint at all, and (c) historically short-term rates driven by monetary policy are the key drivers of long-term government rates.

Regarding (a), the overarching point is to recognize who sits at the top of the hierarchy of money for a given monetary regime – is it the "markets" or the government? Since under flexible exchange rates it is the currency-issuing government, self-imposed constraints are simply that – self-imposed and not operational. It is the very fact that such self-imposed constraints can be and have been overturned or otherwise disregarded in the past when deemed desirable that demonstrates it is the government at the top of the hierarchy.

For (b), consider in the first place what it would look like in the interbank market if the Treasury were to spend via overdraft from the Fed. Figure 1 shows the interbank market (federal funds market in the U. S.)

prior to interest on reserves (IOR) being paid in October 2008. The demand for reserve balances was nearly vertical at the quantity of balances (RB*) banks desired to hold to meet reserve requirements and settle payments at the Fed's target rate ($i_{interbank}$*). In the case of the Treasury receiving overdrafts, shown in Figure 2, the increase in reserve balances would very quickly dwarf the very modest quantity (about $10 billion to $20 billion) banks typically demanded at the target rate. In order to achieve a positive interest rate target, the Fed would have to set IOR ($i_{remuneration}$) equal to the target rate (i*) or the interbank rate would fall to zero. This is basic supply and demand analysis with a quantity supplied far in excess of a highly inelastic demand curve. In other words, it is simply not operationally possible for the Treasury or the Fed to "print money" beyond banks' demand for reserve balances without either IOR at the target rate or an interbank rate of zero. This is the origins of Bell's (2000) (and then Tymoigne's (2014b)) argument – the operational purpose of issuing securities is not government finance for a government that already issues its own currency but rather to aid in achieving the central bank's target rate since without such issuance the central bank must pay IOR to support a positive target rate (or other similar methods, such as the reverse repurchase agreements currently in place). [3]

Figure 1 Interbank Market without Interest on Reserves

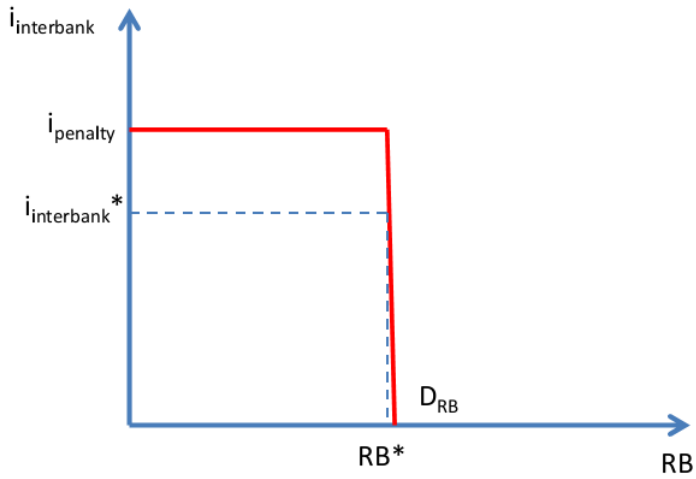
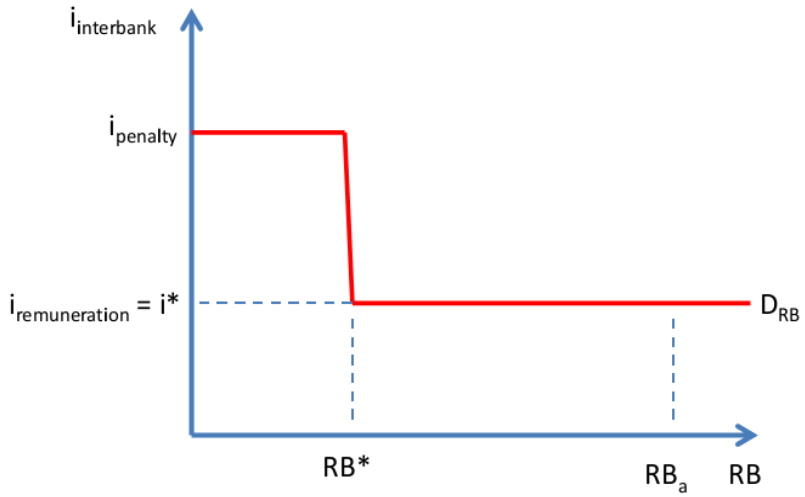


Figure 2 Interbank Market with Interest on Reserves and a Large Quantity of Excess Balances



[3] Tymoigne (2014b) discusses in detail the post-World War II history of interactions between the Fed and the Treasury, including those times in which the Fed was allowed to provide overdrafts to the Treasury. Thornton (2003) discussed the interactions of the Fed and the Treasury to forecast the flows into and out of the Treasury's account on a daily basis for the purpose of aiding the Fed's daily operations.

This payment of IOR at the target rate (or a zero interest rate target) cannot be avoided by simply printing currency and putting it into circulation through spending in lieu of spending via reserve balances. In a world of banks (that is, in the *real world*), the private sector cannot be forced to hold currency since it can costlessly convert undesired excess currency balances to bank deposits, and it can still further convert unwanted demand deposits to bank time deposits. Once currency is converted to deposits, banks holding excess vault cash beyond what customers are expected to withdraw will sell the excess cash balances to the Fed in return for reserve balances earning IOR at the target rate (or zero in the case of a zero target rate). In short, the quantity of currency circulating is demand determined, not supply determined, regardless of whether the government initially runs deficits via security sales, creation of central bank reserve balances, or creation of currency.

The implications of these operational realities for (b) are crucial for understanding interest on the national debt. First, aside from endogenous increases in currency in circulation (for which there is not debt service), the lowest rate the government would reasonably expect to pay on the national debt in the case of central bank overdrafts would be the Fed's target rate. With a positive target rate, the Fed necessarily pays IOR on the reserve balances created and its profits are reduced in kind; since the Fed credits almost all of its profits to the Treasury's account, reduced profits then reduce the transfer to the Treasury and is equivalent to the Treasury's deficit increasing by the amount of IOR paid. Second, if the Treasury issues T-bills instead of receiving overdrafts from the Fed, these will arbitrage with the Fed's target rate quite closely, leaving the interest on the national debt roughly the same as in the case of overdrafts. Third, if the Treasury wishes, it can issue securities at various maturities in addition to the T-bills; these will mostly arbitrage with the Fed's current and expected target rates.

In other words, suppose one is offered a choice – issuing debt at the Fed's target rate via an overdraft directly from the Fed, or issuing debt to the private sector at roughly the Fed's target rate. Is there reason to be concerned if the former option were subsequently withdrawn? No, because there is no economically significant difference between issuing debt at the Fed's target rate and issuing debt at roughly the Fed's target rate. The "constraint" is therefore merely a self-imposed one – and thus not applicable to household, business, or state/local government debt – and even at that its ultimate effect on the Treasury's debt operations is not macroeconomically significant.

The interest rate on the national debt for a currency-issuing government under flexible exchange rates is thus a policy variable, or at worst always can be. Even in the unlikely event that markets do reject the debt of such a government, there are always additional options – the government could require its central bank to provide it with overdrafts, or the central bank could (unilaterally or as a result of government action) purchase the government's bonds to keep interest on the national debt near its desired target rate. Understanding from the operational realities of the monetary system that interest on the national debt is a policy variable correctly predicts that large deficits should not have brought higher interest rates via bond market "vigilantes" in the U. S., Japan, and other currency issuing nations operating under flexible exchange rates. Moreover, this same paradigm correctly predicts the opposite in non-currency issuing nations such as Greece, Italy, and Spain (e.g., Bell, 2003), and correctly predicts that the process can be reversed if the European Central Bank (ECB) purchases their debt.

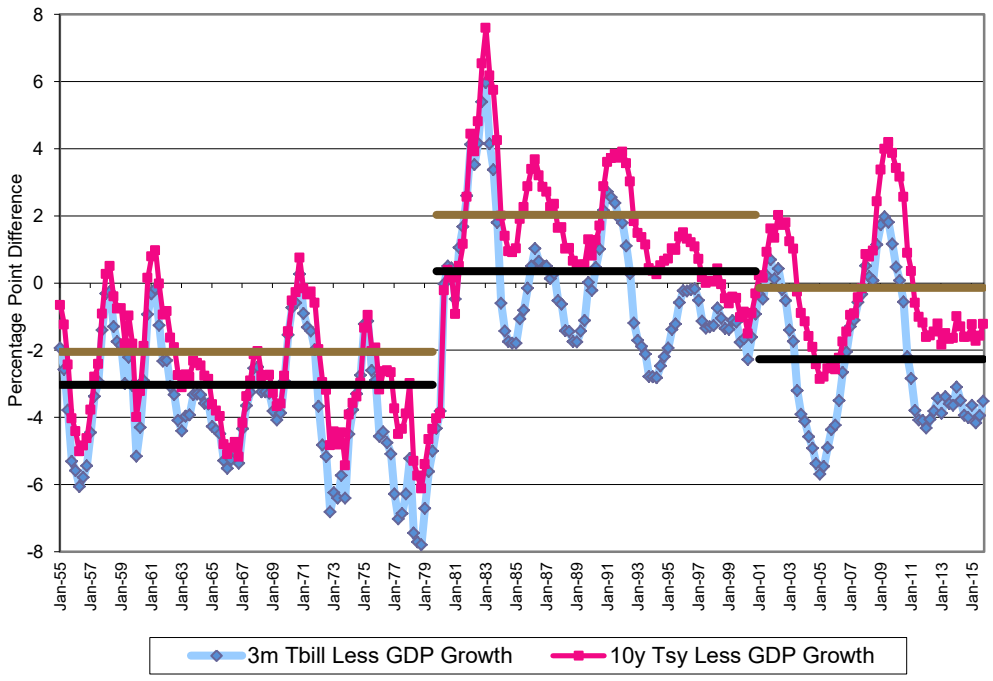
Regarding (c), if the 10-year rate follows monetary policy, or at least mostly does, then it should move largely in line with changes in the federal funds rate. The 3-month T-bill and the federal funds rate set by the Fed are statistically equivalent essentially – the 3-month rate is used here, though, because it represents a direct and significant part of the government's debt service. Figure 3 shows the 8-quarter moving average (to get rid of significant monthly and quarterly "noise") of the 10-year and 3-month Treasury rates less nominal GDP growth. Clearly from Figure 3 the two series move together. The simple correlation of the two series is 0.93 for the 8-quarter moving averages; the correlation for the quarterly rates (not moving averages) is also 0.93. The correlation of the first difference of the 8-quarter moving averages is 0.97; the correlation of the first difference of the quarterly rates (not moving averages) is 0.64 (in other words, the "noise" of not using moving averages shows up in the first differences).

The two horizontal bars represent the averages for 3-different periods for the two series, respectively – 1953q1-1979q3, 1979q4-2000q4, and 2001q1-2015q4 – with the lighter color, higher line

being the 10-year rate less GDP growth and the lower, darker line being the 3-month rate less GDP growth. Since the average maturity of Treasury issuance is always somewhere between these two, these should usually represent the high and low bounds for the average interest rate on the national debt relative to GDP growth; in other words, the average rate of interest on the national debt relative to GDP growth should fall between the two horizontal lines.

If interest on the national debt has been a policy variable, then the path of interest rates relative to GDP growth – key to the path of debt service in Table 4 – should have been related to monetary policy rather than primary deficits. Consistent with the movements of the 10-year rates with the 3-month rates, what's striking in Figure 3 is how the upper and lower bounds clearly shift in the three different periods. The Fed's shift to a higher interest rate policy stance in the 1979-2000 period is obviously the driver of higher 10-year rates during that period, and the lower interest rate policies after 2000 and before 1979 are equally clear. Again, in all cases, the 10-year rate does the same. Figure 3 also shows that the average interest rate on the national debt has been quite clearly below GDP growth aside from the 1979q4-2000q4 period.

Figure 3 8-Quarter Moving Average of Nominal 10-Year and 3-Month Treasury Rates Less Nominal GDP Growth, 1953 to 2015



Source: Federal Reserve Economic Database and author's calculations

Table 6 shows the averages for the three periods denoted by the horizontal lines in Figure 3, as well as the average for the entire 1953-2015 period. While it is true that for the entire period 10-year rates were close to GDP growth, averages within the sub-periods differed significantly from this for decades, and recall further that the average rate on the national debt would have been closer to the average of the 3-month rate and the 10-year rate, not the 10-year rate alone. The two rates less nominal GDP growth are averaged in the final column to the right in Table 6. Hence, on average during 1953-2015 the interest rate on the national debt was closer to -0.95 percent than to nominal GDP growth. The last row of Table 6 omits the date from the 4th quarter of 2008 and the 1st quarter of 2009 in calculations of averages, since nominal GDP growth was unusually negative (the lowest since 1958) while interest rates were not allowed to go below zero. This resulted in the sizable peak seen in Figure 3 in 2008-2009; one could argue that this biased the averages for this period.

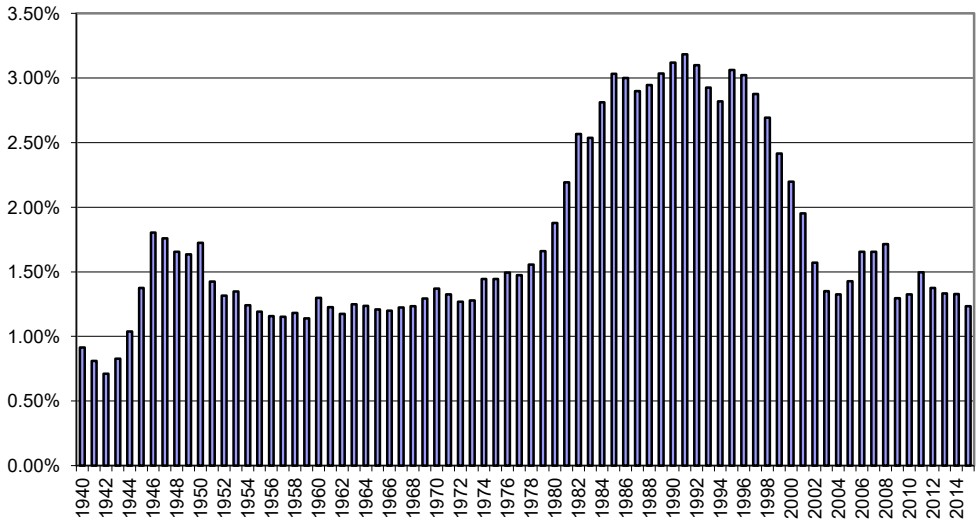
Table 6 Average GDP Growth and Interest Rates

Dates	Average Nominal GDP Growth Rate	Average Nominal 3-Month T-Bill Rate	Average Nominal 10-Year Treasury Note Rate		Average 3-Month Rate Less Average Nominal GDP Growth	Average 10-Year Rate Less Average Nominal GDP Growth	Average of 3-Month and 10-Year Rates Less Nominal GDP Growth
1953q1 to 2015q4	6.19	4.49	5.99		-1.70	-0.20	-0.95
1953q1 to 1979q3	7.37	4.34	5.32		-3.03	-2.05	-2.54
1979q4 to 2000q4	6.50	6.85	8.53		0.35	2.03	1.19
2001q1 to 2015q4	3.69	1.44	3.56		-2.25	-0.13	-1.19
2001q1 to 2015q4*	4.03	1.48	3.58		-2.55	-0.45	-1.50

*4th quarter of 2008 and 1st quarter of 2009 have been omitted from all averages calculated in the final row.

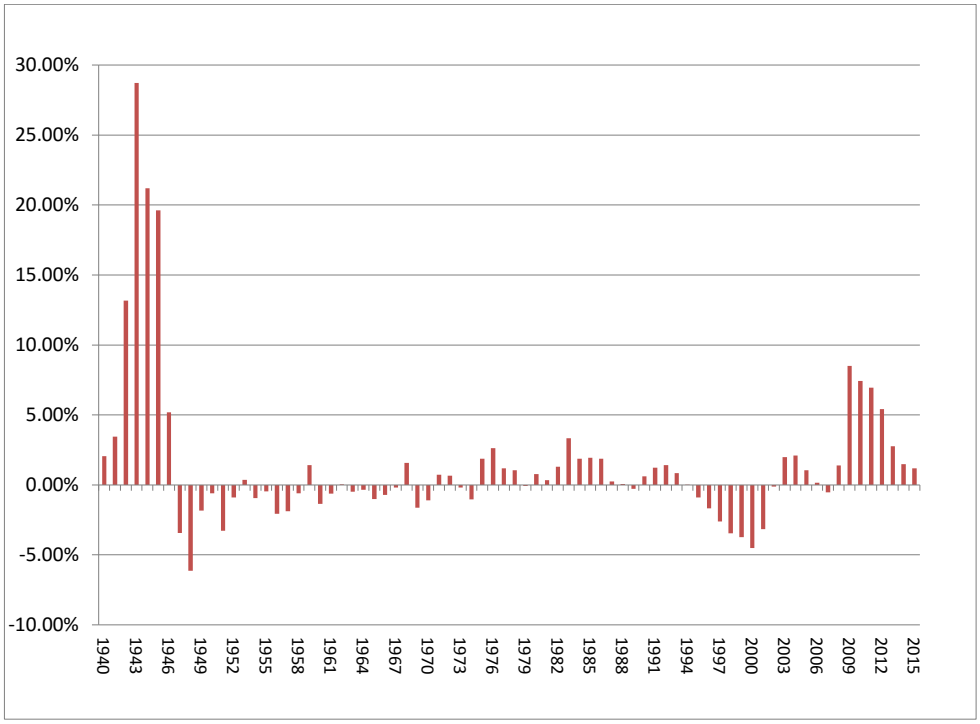
Figure 4 shows U. S. Treasury interest outlays on the national debt as a percent of GDP during 1940-2015. The debt service ratio follows the pattern of the average interest rate on the national debt relative to GDP growth in Figure 3 and Table 6, which itself was driven by changes in monetary policy approaches in 1979 and 2001. By contrast, the debt service ratio does not follow anywhere near as closely the pattern of primary balances, which is shown in Figure 5 in reverse (that is, a primary deficit is above the origin in Figure 5, while a primary surplus is below it) so that a high correlation of primary deficits relative to interest rates and debt service would mean that Figure 5 would follow the pattern seen in Figure 4. This is confirmed by correlations between the debt service ratio with the 2-year moving average of the T-Bill rate less GDP growth of 0.58 for 1955-2015) and with the 1-year moving average of the federal funds rate less GDP growth of 0.51 for 1955-2015), while the debt service ratio's correlations with the primary deficit ratio (1955-2015) and with the debt ratio (Measure 3 from Table 1, 1970-2015) were 0.27 and 0.10, respectively. For sure, the debt service ratio would be expected to have some correlation with measures of primary deficits and debt – as it does – but consistent with the evidence in Figure 3 and Table 6 it is significantly smaller than with the stance of monetary policy relative to GDP growth.

Figure 4 Interest on the National Debt as a Percent of GDP, 1940 to 2015



Source: Federal Reserve Economic Database

Figure 5 Inverse of the Primary Balance as a Percent of GDP, 1940 to 2015



Source: Federal Reserve Economic Database

Overall, the data presented in this section confirm that

1. The interest rate on the national debt relative to GDP growth has been more important than the size of the primary budget balance in understanding the path of the debt service ratio,
2. Interest rates on the national debt follow monetary policy, and
3. Interest rates on the national debt have *on average* been less than nominal GDP growth.

These are consistent with the arguments above that the difference between interest rates and GDP growth is driven by monetary policy – not the interactions of primary budget balances and actors in private bond markets who might suddenly turn into bond "vigilantes" – which then drives the debt service ratio for a sovereign-currency issuing government that operates under flexible exchange rates and does not issue debt in a foreign currency.[4] This is because, for such a government, the interest rate on its debt is a policy variable. Fiscal sustainability in this particular context is then really about the stance of fiscal policy relative to the stance of monetary policy and the economy's performance, not the stance of fiscal policy relative to the views and actions of the financial markets.

Monetary Dominance vs. the Operational Realities of the Monetary System

The desire to preserve central bank "independence" underpins the neoclassical position on fiscal sustainability. Given a worldview that inflation is controlled by the central bank, and in which management of the short-term interest rate and expectations of private sector actors with regard to output, inflation, and their trust in the central bank's commitment to a low inflation strategy drive the economy even in the short run, too much government debt undermines the central bank's ability to commit to its desired strategy or "rule" for adjusting its target rate and credibly managing private sector expectations. A macroeconomic policy mix

[4] Sharpe (2013) confirms these conclusions in an econometric study assessing whether deficits affect interest rates by separating currency-issuing governments under flexible exchange rates from non-currency issuing governments. Econometric analysis by Akram and Li (2016) likewise concludes that the Fed's interest rate target is the key driver of interest rates on long-term U. S. Treasuries. Akram and Das (2014, 2015) come to essentially the same conclusions for Japan and India, respectively – the interest rate target of the respective central banks has been the driver of interest rates on government debt issued in each country.

where the central bank has "independence" is characterized by "monetary dominance". Peter Praet from the ECB's Executive Board explains the relationship between the two in the following way:

> "[T[he independence that has been given to the ECB... is precisely to ensure that the central bank has full control over its balance sheet – that it cannot be forced by governments into monetising deficits or inflating away debts – and hence that monetary dominance is preserved" (Praet, 2015).

"Being forced" to abandon monetary dominance obviously can be a result of government decree, but – as above – it can also simply be because the primary budget balance is not sufficient such that the central bank's desired target rate would result in the opposite effect as intended: higher rates intended to slow down the economy would raise government spending on debt service and thus private sector incomes. Or, from the neoclassical perspective, markets anticipating large future primary deficits might reject the government's debt, again resulting in the abandonment of monetary dominance as it becomes necessary for the central bank to enter bond markets to avoid such a fate. This is referred to as a policy mix of "fiscal dominance".[5]

A strong preference for monetary dominance is not in and of itself countered by demonstrating that currency-issuing governments cannot be forced into default, interest rates are more significant than the debt ratio, or that interest rates on the national debt are policy variables. While those warning of dangers of high government debt ratios often reference largely erroneously the reactions of bond markets or forced default, such errors do not on their own undermine preference for monetary dominance. But the critique in this and following sections of such concerns in the neoclassical literature and policy circles over the debt ratio, bond vigilantes, and so forth, is quite different in that the argument relies on operations and accounting to illustrate that monetary vs. fiscal dominance is in fact not the appropriate dichotomy in the first place.

Praet's argument – representative of neoclassicals in general – is in fact inconsistent with the basic operational realities of the monetary system. The view that deficits run via "money printing" are more inflationary and thus greater threats to central bank independence and monetary dominance in managing the economy than traditional government deficits in which bonds are sold is incorrect. From Figures 1 and 2 in the previous section, it is not operationally possible to "monetize deficits" or otherwise spend via direct creation of central bank reserve balances without pushing the quantity of reserve balances well beyond the demand for reserve balances. In that case, the interbank rate falls to zero (which becomes the central bank's de facto target rate) or the central bank pays IOR at its target rate (or issues its own time deposits or securities) to achieve a target rate above zero. Any IOR payments by the central bank reduce the government's budget balance by the same amount, and so there is no meaningful macroeconomic difference from if the government had issued securities or they had not been subsequently monetized. Instead of "being forced" to monetize deficits, what in fact occurs is the central bank replaces a government liability earning (roughly) the central bank's target rate for a liability of the central bank (which in most cases is an agency of the government at any rate) also earning the target rate.

Further, because there is no such thing as forcing the private sector to hold "cash" – as the previous section explained – there is therefore no such thing as a central bank being forced to "print" cash, either. It is not possible to monetize deficits or otherwise spend via physical money such that the private sector would not be able to convert any cash balances beyond those they desired to hold into bank liabilities.[6] As banks would in turn convert any excess vault cash into central bank reserve balances, only desired currency holdings would remain just as with direct creation of reserve balances or deficit finance via securities sales, while the rest would remain as reserve balances earning IOR at the central bank's target rate or the interbank rate would fall to zero.

Neoclassicals roundly agree that these two outcomes from spending or "monetization" of previous deficits via direct creation of reserve balances or "cash" – interest rates at the zero bound or the central bank

[5] The terms "monetary dominance" and "fiscal dominance" are usually attributed to Leeper (1991). For a Post Keynesian view of these in regard to literatures on fiscal sustainability and the fiscal theory of the price level, see Tcherneva (2009).
[6] Government securities exist and settle electronically on central bank payments systems at any rate – there is no such thing as central banks purchasing government securities with "cash".

paying interest on the excess balances – mean that the method of financing the deficit becomes irrelevant. For instance, regarding the zero bound, Olivier Blanchard (quoted in Evans-Pritchard (2016)) recently confirmed the neoclassical view that "[i]t makes little difference whether spending is paid for with money or bonds when interest rates are zero." New York Fed economists Todd Keister and James McAndrews (2009) likewise confirm the often repeated view that an excess of reserve balances earning IOR at the target rate is not inflationary since "banks never face an opportunity cost for holding reserves and the money multiplier does not come into play" (p. 1).[7] Former Minneapolis Fed President Narayana Kocherlakota (2016) is one of the very few to recognize that both types of financing ("cash" and reserve balances earning IOR) are the only other possibilities besides traditional security sales, thereby agreeing that "money and bonds are equivalent forms of finance in a world in which banks perceive themselves to be flush with liquidity for any time horizon of interest."[8]

This is an extremely important point. If using the monetary base (whether reserve balances or currency) to finance government deficits is no different from issuing securities, then one of the key concerns of defenders of monetary dominance relative to fiscal sustainability is in fact irrelevant. Fiscal sustainability still matters, since there is still the possibility of a perverse effect of manipulating the central bank's target rate on government debt service, but it is this effect, not excessive "money printing" to create seigniorage income, that is at issue. Indeed, seigniorage income cannot be created by "money printing" because the quantity of currency left circulating will always be endogenously determined by the private sector's own portfolio preferences, not by whether or not deficits are created or later monetized by "printing money."[9]

There are two additional arguments from neoclassicals making the same point – that deficits financed via "monetization" are more simulative than if financed by security sales – from the opposite angle of the supposedly less stimulative nature of security sales: Ricardian equivalence and crowding out. The Ricardian equivalence position is that "monetization" leads to a permanent increase in "money" but not bonds, which do not need to be repaid, while a deficit via security sales ultimately requires repayment and thus is necessarily temporary. Because the private sector will recognize the temporary nature of a deficit run via security sales, it will save the additional income resulting from the deficit rather than spending it in anticipation of higher taxes or less spending later. From the basic mathematics of fiscal sustainability, it is true that to maintain or return to the current debt ratio any worsening in the current primary balance must be offset by improvements in future primary budget balances that are equal in present value. However, this does not mean that current deficits are ever repaid – a future improvement in the primary balance does not negate the possibility of permanent deficits for the total budget (as shown in Table 2), and without a surplus on the total budget there is no debt repayment. Further, if the future debt ratio target is higher than the current one, then future improvements in the primary budget balance need not be equal in present value terms to the current worsening in the primary balance. For instance, starting from the current debt ratio of approximately 62 percent and using the same assumptions as in Table 2, a primary deficit of 1 percent of GDP will not require future adjustments to primary surpluses if the debt ratio is allowed to increase to approximately 64 percent of GDP. For higher allowable debt ratios, there would actually need to be still more future primary deficits to reach the targeted ratio. If interest rates on the national debt are less than the growth rate of GDP (as they have been in the post-World War II era for the U. S.), then (as shown in Table 3) future primary balances can be permanently negative even without raising the debt ratio in the future.

[7] Fullwiler (2013b) and Lavoie (2010) explain from an endogenous money perspective that IOR is not relevant to understanding why large quantities of excess reserve balances did not stimulate bank lending. Nonetheless, the point in the text is that neoclassicals believe it does, and the Keister and McAndrews publication is representative of the neoclassical perspective that a deficit financed with more reserve balances is not inflationary.

[8] Fullwiler (2010, 2013a, 2013c) and Fullwiler and Kelton (2013) detailed this same argument.

[9] What *does* occur if the central bank "monetizes deficits" is that its outlays on interest rise as a result of the IOR payments, which could eventually reduce the central bank's equity below zero. Though this is not an operational problem – a central bank that creates reserve balances when it spends is in no danger of being forced by "markets" into default – it can be a political problem if monetary policy makers were to face more scrutiny from legislative and/or executive branches. Political pressure on central banks to not have low or negative equity would be extraordinary hypocritical – the only reason central bank equity could fall to that level in the first place is because it sends nearly all of its profits to the government. The Fed would be the best capitalized institution in the world if it had been allowed to retain its profits.

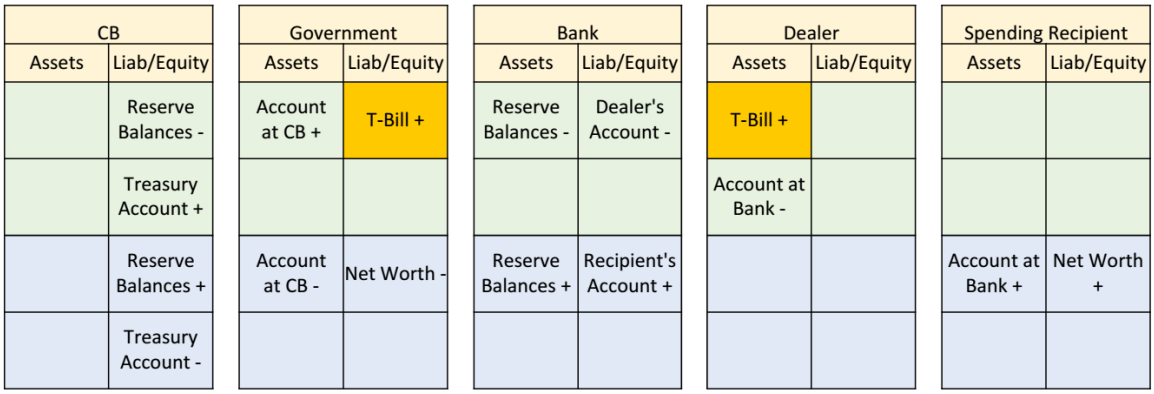
Regarding the operational realities of the monetary system, the Ricardian equivalence argument is again inconsistent with how debt financing actually works. Even in the most stringent case of returning to the current debt ratio and the interest rate on the national debt being higher than GDP growth, "monetization" again simply exchanges reserve balances earning IOR at the central bank's target rate for government securities earning roughly the central bank's target rate. As such, "monetization" brings the same debt service as security sales, and will thus also require improvements in future primary budget balances equal to the present value of current "monetized" deficits for mathematical conditions of fiscal sustainability to be met. Yet again, there is no such thing as "monetization" that is different in relation to the concepts of fiscal sustainability and monetary dominance from deficits run via security sales.

Crowding out also argues that issuing bonds is less stimulative then "money-financed" deficits by arguing, contrary to Ricardian equivalence, that deficits *reduce* private saving available to finance private spending and thereby raise interest rates, as well. The crowding out argument fails on many levels. From basic operations and historical data discussed in the previous section, interest rates on the national debt are a policy variable, not set in a loanable funds market directly affected by government security issuance. But the crowding out view is also inconsistent with basic accounting and monetary operations. Figure 6 shows t-accounts for a government deficit with a bond sale. The bond sale is the first transaction, with a dealer – the marginal purchaser of government debt – whose account at the bank is debited while the T-bill is ultimately settled via debiting the reserve balances of the dealer's bank and the Treasury's account is credited. For this transaction, there has been no reduction in "saving". Saving – which is a flow relative to income – in the economy has remained unchanged. The dealer has simply converted its deposit into a security. While it is commonly argued that the deficit will comprise nothing more than a transfer of the deposit to another once the deficit occurs, this misses that neither primary dealers nor banks need the deposits (or reserve balances, either, in the case of banks) as financing in the first place. Neither has seen any reduction in its abilities to expand its respective balance sheet – the dealer can use the security to borrow in the repurchase agreement market to add to its securities portfolio, while the bank can still create loans and deposits simultaneously and borrow in the federal funds market to meet reserve requirements or settle customer withdrawals. Funding for both types of institutions at the margin is assured by the Fed's support of the payments system via its interest rate target in the federal funds market that it defends through operations in the repurchase agreement market.[10]

The deficit is the second transaction in Figure 6. The recipient's net worth has increased as a result of the additional income from the government's spending. Because there was no reduction in private saving when the government issued the security – nor, more importantly, the ability of the financial system to finance private spending – the combination of the security sale and the deficit in fact *increases* private saving. Further, this outcome is *exactly the same* as if instead the deficit had been incurred by "printing money," which would be the second transaction in Figure 6 alone (except for the addition of an overdraft in the Treasury's account at the Fed instead of the Treasury selling a security, which also means that the reserve balances will not be drained). The financial system's ability to finance productive capacity is not enhanced by "money-financed" deficits, nor is it reduced by deficits financed by security sales, while, yet again, with a "money-financed" deficit the reserve balances created earn IOR, which is roughly the same as the Treasury would pay if issuing securities (particularly T-Bills).

[10] This is a version of the endogenous money view of Post Keynesians, though the history of the Fed's role in backstopping banks and dealers is explained in Mehrling (2011). One could add that the Fed also supports the payments system through provision of substantial intraday credit for banks, though this has diminished significantly since 2008 with the increase in reserve balances resulting from the various rounds of quantitative easing. See, for instance, Bech, Martin, and McAndrews (2012).

Figure 6 T-Accounts for Government Bond Sale and Deficit Spending



In every instance and angle considered the financing of deficits via "monetization" has no macroeconomically significant difference from deficits financed with security sales, while in both cases the central bank retains full control over its interest rate target (including setting it at zero if it so desires). Therefore, the significance of fiscal sustainability for monetary dominance is whether the government's deficit position – whether as a result of debt service or otherwise – is too large for the capacity of the economy and thereby potentially inflationary relative to the stance of monetary policy. The neoclassical view that the macroeconomy in the short run and inflation in the long run are driven by the central bank's adjustment of its target rate leads naturally to the view that fiscal policy's role is largely to "stay out of the way" of monetary policy. The alternative view developed below is that monetary vs. fiscal dominance is a false dichotomy, and is based upon consideration of actual real-world accounting and operations to better understand how fiscal and monetary policies interact within an modern monetary economy.

Debt Interdependence, Minsky, and Macroeconomic Policy

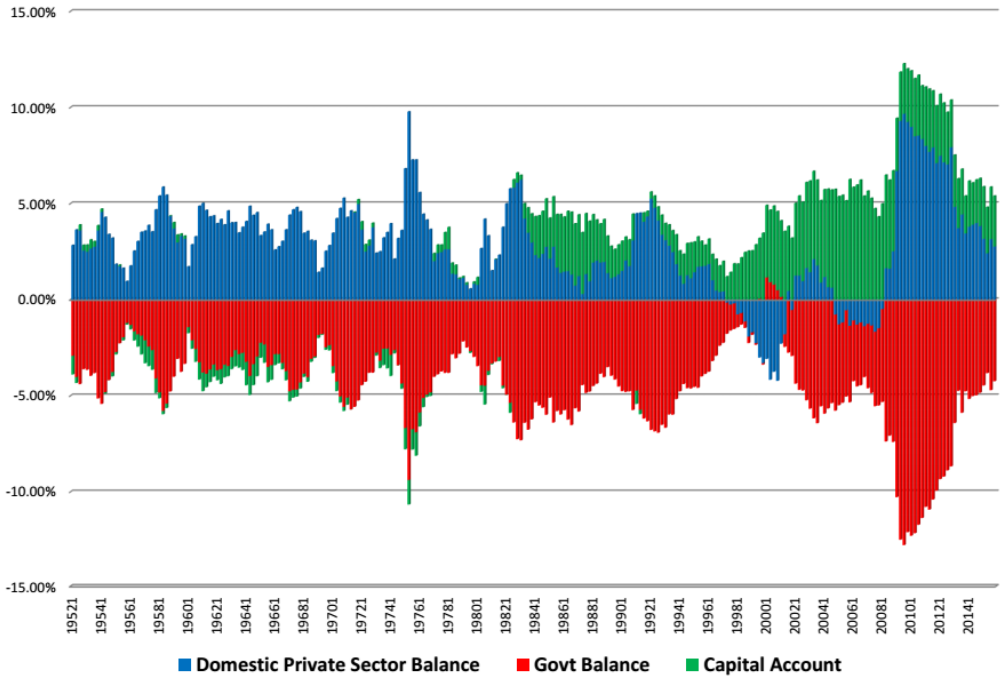
A more generally applicable approach than the monetary versus fiscal dominance dichotomy not only recognizes the role that government debt and debt service have on the effectiveness of monetary policy, but also the interactions of both fiscal and monetary policies with the debt of the private sector. Consider the sector financial balances popularized by Wynne Godley (e.g., Godley, 1999). From basic flow of funds accounting, the net of all flows among all sectors must add to zero. A common approach is to divide the economy into three sectors – private sector (household, non-financial business, financial), government sector, and capital account (since it is the rest of the world's current account balance with the country under consideration) – the sum of which must be zero. Written as an accounting identity,

$$0 \equiv \text{Private Sector Balance} + \text{Government Sector Balance} + \text{Capital Account}.$$

Accounting on its own is not economic theory, but it does set the parameters for how to maintain records of transactions and for which transactions are possible. For example, just as not all countries can run trade surpluses simultaneously, it is from basic accounting necessarily the case that if one sector of the economy has a positive balance at least one other sector must have a negative balance.

The U. S. sector financial balances during 1952-2015 are in Figure 7, presented as a percent of GDP. Clearly the norm has been for the government sector to be in a negative balance position and for the private sector to have a positive balance; since the late 1970s, the capital account has been in surplus as well, and so equivalently the current account has been in deficit. Significant for a nation like the U. S. that tends to run current account deficits (capital account surpluses), then, is that by accounting identity either the government sector or the private sector (or both) will necessarily have a negative balance. In more general terms, given that by accounting definition not every country can run a current account surplus, those nations with current account deficits will have one or both of the private and government sectors with a negative balance.

Figure 7 Sector Financial Balances as a Percent of GDP, 1952 to 2015



Source: Flow of Funds Accounts and author's calculations

Unlike a currency-issuing government, the private sector is not a currency issuer and *can* be forced into default. It is not surprising, then, that the private sector regularly runs a positive sector financial balance, in the U. S. averaging 2.74 percent since 1952. Since 1976 when current account deficits became essentially permanent, the private sector balance has averaged 2.14 percent of GDP. Given an average current account deficit of 2.3 percent of GDP during this period, the government balance consequently averaged well below -4 percent of GDP.

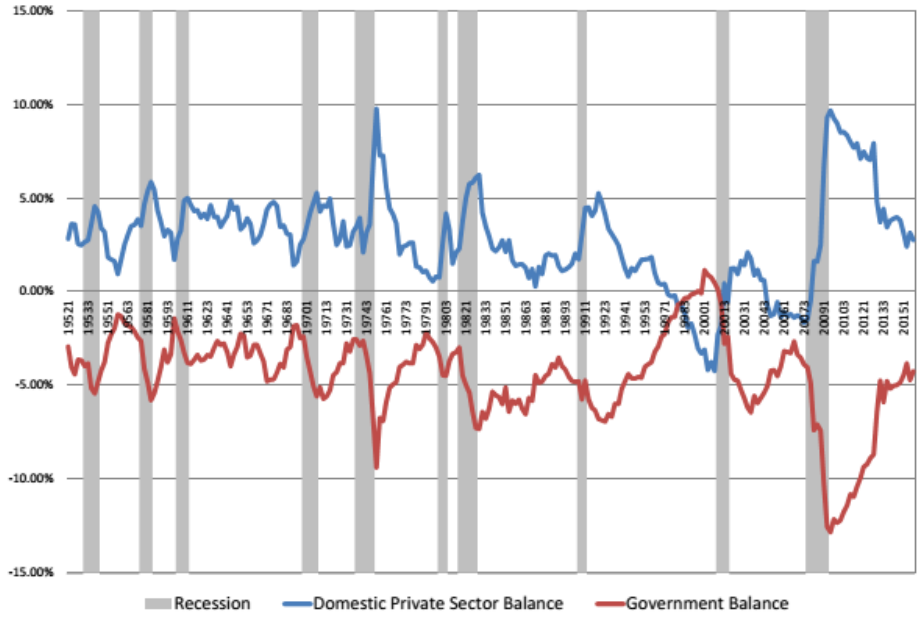
From a Minskyan perspective (e.g., Minsky, 1982), the private sector's financial balance should directly affect financial fragility. In Minsky's well-known taxonomy of financial positions – hedge, speculative, and Ponzi – a higher concentration of hedge finance (able to meet principle and interest payments out of expected cash flows) means there is greater capacity to take on debt and remain at a low level of private sector financial fragility. The opposite is true when financial positions are more heavily weighted toward speculative (expected cash flows are able to meet required payments for interest and some principle, but refinance of some principle will be required) or Ponzi (will require refinance of all principle and at least some interest) positions. Minsky's taxonomy suggests that a significant decline or an outright negative financial balance for the private sector is related to a move toward greater concentrations of speculative and Ponzi financial positions.

Minsky's taxonomy of financial positions applies to moves from less to more financially fragile states in the economy both within cycles and across them. Figure 8 illustrates this by showing only the government and private sector balances, but also including recessions. The near mirror image of the two sector balances is again clear, but of additional significance is their cyclical pattern. The private sector balance declines during expansions and rises during recessions – in essence, the improvement during the recession *is* the recession, as households and firms scale back on spending relative to incomes, and its decline *is* the expansion. The government balance counters the procyclicality of the private sector balance with its own countercyclicality, often largely via automatic stabilizers.

In addition, though, there is a secular pattern, particularly in the 1990s and 2000s, as the private sector's balance still exhibited the cyclical patterns mentioned but also trended lower, with the cyclical highs and lows being lower than previous periods. By the end of the 1990s expansion, and again during the 2000s expansion, the private sector balance turned negative, the only times this occurred in the post-World War II

era. The two periods obviously correspond to the 1990s stock market bubble and the 2000s housing bubble, both historically large, and from a Minskyan perspective represent cyclical fragility in the private sector ultimately compounded by a secular trend toward fragility.[11] Likewise, the large spike in the private sector's balance during 2008-2009 and its sluggish decline thereafter was to be expected, as the private sector would need to significantly reduce spending relative to income to correct both cyclical and secular trends.[12]

Figure 8 Business Cycles and Financial Sector Balances, 1952-2015

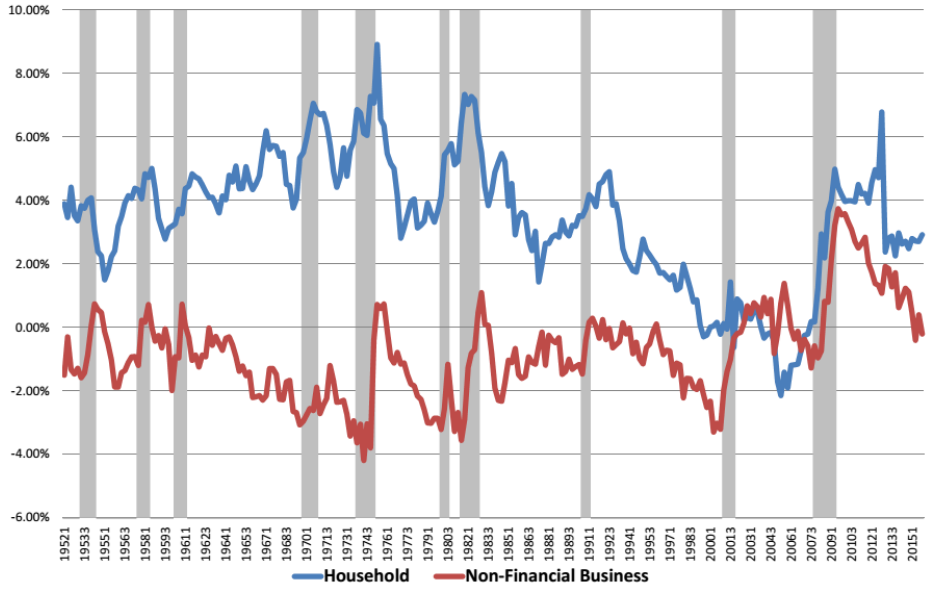


Source: Flow of Funds Accounts and author's calculations

Figure 9 shows the financial balances of the household and non-financial business sectors, which together with the financial sector's balance comprise the private sector balance. Interpreting the figure, the household sector appears to be the hedge sector on average, with its balance prior to the late 1990s being consistently positive even as there were cyclical trends like those in the broader private sector balance. During 1980-2008, households trended away from hedge finance, particularly during the early 1990s to 2008. The non-financial business sector has more regularly moved from hedge to speculative/Ponzi within business cycles with its cyclical routine of positive balances during recessions that move negative as the expansion continues, and then reversing again. Interestingly, the post-2001 non-financial business sector balance has shifted to a higher percent of GDP than previously on average even as the cyclical pattern largely continued, falling to levels merely slightly below zero percent of GDP only at the end of the 2000s expansion and again in late 2015; this suggests at least in general terms reduced Minskyan fragility in the sector as a whole following the stock market bubble's collapse at the end of the 1990s.[13]

[11] Warnings of high degrees of financial fragility in the private sector from a blended Minskyan/sector balances perspective were common during both periods. See, for instance, Godley (1999); Godley and Wray (1999); Wray (2000); Papadimitriou, Chilcote, and Zezza (2006); Parenteau (2006); and Tymoigne (2007).
[12] This is similar to Richard Koo's (2008) "balance sheet recession" explanation of the slow recovery from both the U. S.'s and Japan's recessions following asset price bubbles, as the private sector repaired its collective balance sheet rather than spending.
[13] It must be stressed that the sector financial balances are simply one of many possible indicators for financial fragility, and is a quite general, "big picture" one at that. More precise diagnosis would likely want to have corroboration from more indicators (e.g., Tymoigne 2014a). At the same time, the logic of falling and particularly negative sector balances being consistent with Minsky's model of financial fragility is clear (see the literature cited in note 11 for examples).

Figure 9 Household and Non-Financial Business Sector Balances as a Percent of GDP, 1952-2015



Source: Flow of Funds Accounts and author's calculations

Understanding the sector financial balances suggests that a paradigm expecting or requiring permanently small government deficits or (especially) surpluses – such as the European Monetary Union's Maastricht Criteria of deficits below 3 percent of GDP – is overly simplistic if the private sector balance is to be on average positive (if not significantly so). If manageable levels of private sector financial fragility require on average permanent and non-trivial private sector surpluses, then from basic flow of funds accounting of the inter-relationship of government and private sector balances the desired fiscal stance of the government cannot be considered in isolation. Fiscal surpluses, even on average over time, may be quite possible where current account surpluses are significant on average over time as well. There are historical examples – such as Canada in the mid-1990s – where improvements in the current account balance enabled fiscal surpluses while the private sector balance remained in surplus. But from basic accounting identities such circumstances cannot apply universally, and thus cannot be a legitimate basis for a one-size-fits-all approach to fiscal sustainability. Certainly, given the U. S.'s reserve currency status, its de facto role as so-called importer of last resort, and the current sluggish state of the world economy, expecting fiscal surpluses in the U. S. from basic accounting requires a significant decline in the private sector balance – essentially a return to the greater financial fragility and instability seen in the late 1990s and in the 2000s.

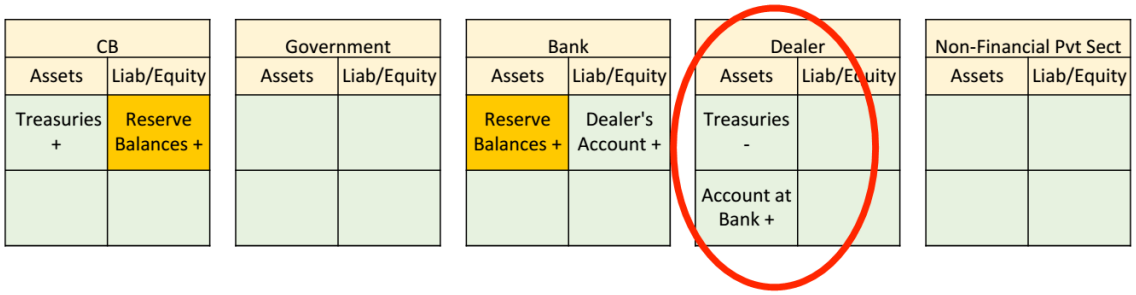
An additional and related consideration is the crucial, largely unrecognized, distinction between monetary and fiscal policies. Both are generally seen in neoclassical economics to directly affect aggregate demand, monetary policy through the "money" supply and fiscal policy through deficits. Recall from the t-accounts in Figure 6 that the government deficit has created equity or net worth for spending recipients while reducing its own. This t-account representation of fiscal policy is equivalent to the sector balances explanation of government deficits raising the private sector financial balance; as noted in the earlier discussion of Figure 6, in contrast to the incorrect crowding out view, government deficits directly raise private sector's saving, and thereby also raise the private sector balance. This means that fiscal policy "works" by raising directly the incomes of the private sector, which may then itself spend more out of the increased income.

Monetary policy does not "work" this way. While, for the sake of argument, monetary policy may operate through the "money" supply, this is a commonly misunderstood term. "Money" is not income, it is an asset. There are two ways that monetary policy can increase the quantity of "money" – first by lowering interest rates, and the second through open market operations as in quantitative easing. It is obvious how monetary policy "works" in the first case – lower interest rates stimulate more loan and deposit creation to finance private spending. Note, though, that this is the opposite effect of fiscal policy: instead of encouraging

the private sector to spend out of *more* income, stimulating loan creation requires more spending out of *existing* income to "work". Open market operations work similarly, as the t-accounts in Figure 10 show. There is no increase in the private sector's equity unlike with fiscal policy. The seller of the security – in this case a bond dealer, as it would actually occur since central banks do not purchase bonds from households, for instance – now has more deposits. But if the dealer or–again, for the sake of argument – a household that has just sold bonds to the Fed chooses to spend, it will likewise be spending more out of its *existing* income (though it will not incur debt as it would if it instead borrowed, obviously) since the bond sale was not an increase in income but an asset swap (highlighted in Figure 10 by the red circle).

The sector balance effects of monetary policy are a bit more complicated to work through, but the net effect is a decline. Borrowing or spending "money" balances that were previously bonds reduces the sector balance of households. While the businesses that are the recipients of increased household spending will contribute to a rise in the business sector's financial balance, the change for the two sectors then nets to zero. Ultimately, though, the increased spending and incomes will be taxed and social safety net spending will fall, both of which will contribute to a net reduction in the private sector's balance.[14]

Figure 10 Central Bank Open Market Purchase of Securities



While the private sector financial balance will generally decline during economic expansion and rise in a recession, the effects of monetary and fiscal policies in mitigating the recession have entirely opposite effects on the private sector's financial position – fiscal policy will raise the private sector balance further, while monetary policy will reduce it. For instance, a financially fragile private sector may not desire to spend more out of existing income, and in that case monetary policy could be the wrong tool. Instead of fiscal policy's role being to run primary surpluses and essentially "get out of the way" in order to preserve monetary policy's dominance and independence, both monetary and fiscal policies must be understood to operate within a more complex, interdependent system of public and private debt. If government deficits improve the private sector's financial balance, monetary stimulus worsens the private sector's finance balance, and a falling or negative private sector financial balance is normally consistent with rising private sector financial fragility, then the appropriate role of fiscal policy is more complex than simply "get out of the way."

Some Principles for Building a Sustainable Macroeconomic Policy Mix

The "no Ponzi" condition for the government's budget deficit in neoclassical models – that is, the government maintains a stable debt and debt service ratio – is internally consistent within the context of a preference for monetary dominance and the government's debt service not interfering with monetary policy makers carrying out their desired strategy.[15] However, these same models curiously ignore the possibility of private debt problems associated with rising financial fragility. Faust and Leeper (2015, p. 8) acknowledge that the household debt ratio "played no important role in standard models" while "there was never a clear case stated for why this was irrelevant for understanding business cycle dynamics." This frankly understates the

[14] In the case of private sector borrowing, this will also raise the fee and net interest income of the financial sector, which will also be taxed.

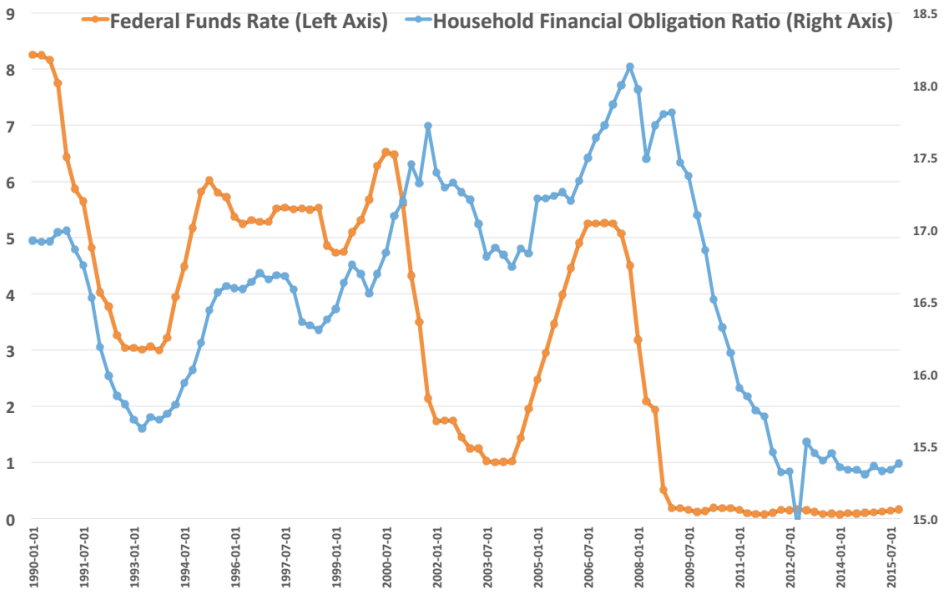
[15] This interpretation of the "no Ponzi" condition for the government's intertemporal budget constraint is in fact too generous, but made for the sake of argument. The actual "no Ponzi" condition in these models is intended to prevent the government from repaying its debt via seigniorage or "printing money." From an earlier section, this is inconsistent with actual operations – "money" financing is not different from security financing. The more generous interpretation granted here is that avoiding "money" financing via the "no Ponzi" condition is consistent with avoiding unbounded growth in debt service.

role of private sector debt in neoclassical models. In Jordi Gali's popular graduate monetary economics textbook, the standard New Keynesian model built to begin the book states that "it is assumed that the household is subject to a solvency constraint that prevents it from engaging in Ponzi schemes" (2008, p. 16). Again, even this significantly understates, since the "constraint" is the assumption that household debt is always repaid and there is never default. But if there is never default, then there is no reason to be concerned with private debt or the private sector balance in the first place, and no reason to worry about the differing effects of monetary and fiscal policy on them, either. From there it is relatively straightforward to construct a policy framework in which monetary policy dominates and fiscal policy "gets out of the way".

Instead of the monetary dominance vs. fiscal dominance dichotomy, the more real-world based framework recognizes government deficits exist within the context of financial flows to and from other sectors in the economy. Constraining the government's budget position in the belief that this is necessary for it to not interfere with monetary policy can in fact be what is *unsustainable* in a world in which private sector financial positions can become increasingly fragile. Excluding the private sector's financial position – or worse, excluding it due to the assumption that its financial position is never fragile in any macroeconomically significant way – and its interaction with government sector in core models (both theoretical and empirical) used regularly to inform policy makers about the macroeconomy and effects of policy likely promotes an inherently unstable policy mix.

It is obvious, or should be, that the rate of interest set by the central bank affects directly the debt and debt service of the private sector, and thus also the sector's financial position. Indeed, Figure 11 shows that the the Fed's measure of household financial obligations has moved fairly much in line with the Fed's target rate since the 1990s. No account of this interaction is made in standard approaches to interest rate target rules such as Taylor's Rule, even though it is understood that an important channel of transmission for the interest rate target is through incentives to borrow and lend.[16] It is more than a bit odd that the core neoclassical model warns perhaps even excessively about the potentially deleterious interactions of government debt and debt service on monetary policy, but then essentially ignores the potential interactions of monetary policy and private sector debt and debt service.

Figure 11 Federal Funds Rate and the Fed's Household Financial Obligation Ratio



Source – Federal Reserve Economic Database

[16] This is a bit unfair in that some of the "credit view" literature regarding monetary policy transmission does explicitly concern itself with fragile balance sheets in the private sector. This literature is not widely integrated into standard models, however.

In Minsky's framework, on the other hand, interest rates are directly linked to the financial positions of the private sector. A given level or change in interest rates has a different effect on borrowing, spending, and financial fragility depending on how private financial positions are concentrated across hedge, speculative, or Ponzi categories. A higher concentration of hedge finance means there is greater capacity to take on more debt and service it out of current cash flows. Lower interest rates should be more effective and their effects on private sector leverage less concerning when hedge finance dominates. The opposite is more likely to be true when speculative and Ponzi positions dominate, where the best possible outcome might be to use the lower rates to refinance debts (if possible) and thereby reduce debt service instead of new borrowing. Higher interest rates may reduce borrowing when hedge finance dominates much like in a simple neoclassical macroeconomic model. But when speculative and Ponzi finance dominate higher rates are not likely to offset the accelerated pace of anticipated cash flows, speculative profits, or financial innovations that can decouple debt service from interest rate policy at least temporarily (such as with the 2/28 mortgages that had no interest for the first two years with a steep rise thereafter). Rising interest rates raise refinance costs for business working capital (thus possibly *raising* inflation, at least temporarily), while the path to slowing an economy tilted toward speculative/Ponzi financial positions can instead occur via increased defaults (from the inability to refinance debts at rates that are consistent with current cash flows, or the inability to refinance them at all) and possibly even debt deflation (e.g., Wray, 1993). Surely the latter is more consistent with the events of 2007-2009.

Both the interactions of government and private sector debt and the effects of interest rates on debt and debt service of both sectors provide some rationale for the central bank's interest rate target remaining on average below the growth rate of GDP. If one of either the government's balance or the private sector balance will always be in a deficit position – which will be, by accounting definition, true if there is a current account deficit, and probably true if there is not a sizeable current account surplus. The relationship of the interest rate target to growth is even more important for the private sector, which will borrow at interest rates that require a premium relative to the rates on the national debt. Indeed setting interest rates above the economy's growth rate might be another unsustainable monetary policy strategy.

Even in the standard neoclassical models, if the private sector desires to save more at all levels of GDP, the interest rate should be lower to bring spending into balance with potential output. What is missing, though, is recognition that the lower rate may or may not be intended for stimulating private sector borrowing or (at the least) a reduced propensity to save, which is more appropriately determined within the context of an assessment of private sector financial positions. Indeed, if the private sector wants to have a significantly positive financial balance *on average*, the lower interest rate consistent with this should be intended to stabilize government debt service as it accommodates the private sector via a reduced primary budget balance, not necessarily to encourage a smaller private sector balance. This is actually consistent with the mathematics of fiscal sustainability – a lower interest rate means smaller future primary surpluses are required to sustain the same debt service ratio. This also parallels the earlier critique of Ricardian equivalence – a reduction in today's primary surplus need not require identical-sized offsetting increases in future primary surpluses to keep the debt service ratio from rising if interest rates on the national debt are also reduced.

While interest rates on the national debt have on average been below GDP growth in the post-World War II era, neoclassicals generally believe the opposite is the "normal" case. As Blanchard, et al., (1990, p. 15) put it, "there is general agreement that the condition of an excess of the interest rate over the growth rate probably holds, if not always, at least in the medium and long run." The projections of both CBO and the Trustees of Social Security and Medicare take this same view, assuming interest rates on the national debt will be greater than growth in the future. CBO's forecasts are presented in Table 7. The top portion of the table shows forecasts from CBO's 10-year projections made annually during 2000 to 2016; the forecasts are for the latter five years of the 10-year projections, since those are unrelated to the state of the business cycle at the time of publication. For all of the forecasts, the 10-year rate is projected to be higher than the growth rate except for the most recent forecast in January 2016 in which the two are equal. The 3-month rate is higher or equal to GDP growth in 9 of the 17 years, and not more than 0.5 percent lower than GDP growth except for forecasts made in 2012, 2015, and 2016. Compared to Table 6 above, CBO's

projections made during 2000-2010 for interest rates relative to GDP growth were consistently wrong by a wide margin. Only CBO's projections in 2012, 2015, and 2016 (shaded) have average interest rates on the national debt below GDP growth. The last several rows of Table 7 show CBO's longer-term projections published since 2009 (again starting with CBO's projections five years ahead). Here again, CBO continues to project interest rates on the national debt (for these forecasts, there is only one interest rate reported that is the average rate on the debt) higher than GDP growth rate for the next 65-plus years even as the opposite was the case for the last 65-plus years.

Table 7 CBO's Forecasts for GDP Growth and Interest Rates on the National Debt

From 10-Year Projections Publications					
Date of Forecast	Forecasted Period	GDP Growth	3-Month T-Bill Rate	10-Year T-Note Rate	Average of 3-Month and 10-Year Rates
January 2000	2006 to 2010	4.5	4.8	5.7	5.25
January 2001	2007 to 2011	5.0	4.9	5.8	5.35
January 2002	2008 to 2011	5.2	4.9	5.8	5.35
January 2003	2009 to 2013	5.0	4.9	5.8	5.35
January 2004	2010 to 2014	4.5	4.6	5.5	5.05
January 2005	2011 to 2015	4.5	4.6	5.5	5.05
January 2006	2012 to 2016	4.4	4.4	5.2	4.8
January 2007	2013 to 2017	4.3	4.4	5.2	4.8
January 2008	2014 to 2018	4.4	4.7	5.2	4.95
January 2009	2015 to 2019	4.3	4.7	5.4	5.05
January 2010	2016 to 2020	4.1	4.6	5.7	5.15
January 2011	2017 to 2021	4.4	4.4	5.4	4.9
January 2012	2018 to 2022	4.5	3.7	5.0	4.35
February 2013	2019 to 2023	4.3	4.0	5.2	4.6
February 2014	2020 to 2024	4.2	3.7	5.0	4.35
January 2015	2021 to 2025	4.2	3.4	4.6	4.0
January 2016	2022 to 2026	4.1	3.2	4.1	3.65

From Long-Term Projections Publications			
Date of Forecast	Forecasted Period	GDP Growth	Average Interest Rate on National Debt
June 2009	2014 to 2083	4.2	5.1
June 2010	2015 to 2084	4.5	5.2
June 2011	2016 to 2085	4.7	5.2
June 2012	2017 to 2086	4.5	5.2
September 2013	2018 to 2087	4.4	5.2
July 2014	2019 to 2088	4.4	4.7
June 2015	2020 to 2090	4.3	4.4

Source: Congressional Budget Office

CBO's forecasts are anything but benign in their political impacts. The projections along with those of the Boards of Trustees of the Social Security and Medicare Trust Funds strongly influence debates among policy makers and in the media regarding whether fiscal policy is on a sustainable path. Similar to CBO's regular practice, the forecasts of the Boards of Trustees of Social Security (2015) and Medicare (2015) assumed nominal GDP growth during 2015 to 2089 of 4.5 percent and average nominal interest rates on the national debt of 5.2 percent. The projected imbalance over 75 years discounted back to the end of 2014 was $15.8 trillion or 92 percent of GDP in 2014.[17] Neither CBO nor either of the Boards of Trustees regularly reports a

[17] Rarely noted in the media or by policy makers is the fact that the Trustees make three separate projections – high cost, intermediate, and low cost. The low cost scenario has routinely shown that the programs remain "solvent" well beyond any forecasted horizon, and the assumptions made in the low cost scenario have been more historically accurate, with intermediate forecasts in subsequent years often inching closer to those of previous low cost scenarios. Also, probably more importantly, Rabn-Havt (2015) reports that CBO is bound by the 1985 Balanced Budget and Deficit Control Act to assume Social Security and Medicare will be fully funded even when trust funds run out (indeed, CBO (2016, note 4 on p.16) acknowledges this fact), which

forecast for the current account position in these publications. This suggests that they are unaware of basic sector balance accounting identities and reveals they have not considered the accounting consistency of their projections. Unless there is a significant current account balance assumed, what they all project is in fact an unsustainable fiscal and monetary policy mix. Either fiscal policy deficits will be so large that the blend of them plus high interest rates will create unbounded growth in government debt service; or, if significant primary surpluses are run to avoid this outcome, the private sector balance will quickly turn negative while interest rates higher than GDP growth will push private sector debt service to the point of unmanageable financial fragility. It is assured, then, that all of these long-term projections will be wrong and are not useful for advising policy makers.

It is interesting to compare these projections to what a projection might have looked like, say, at the beginning of 1940 or 1953 and then forecasting through to the present assuming perfect foresight. The 1940-1953 period obviously skews the results for 1940-2015 given the large deficits run during World War II, so Table 8 presents results for both 1940-2015 as well as 1953-2015. There were 33 years of primary surpluses during 1940-2015 and 27 during 1953-2015, but the average primary deficit was negative throughout: -1.44 percent of GDP and -0.51 percent of GDP, for the respective periods. In both periods GDP growth (7.30 percent and 6.47 percent, respectively) was greater than the average interest rate on the national debt (using the average of the 10-year and 3-month rates as a proxy – 4.64 percent and 5.26 percent, respectively). The final row of Table 8 is the sum of the present value of all primary balances discounted by the average interest rate on the national debt back to the starting period (beginning of 1953 and beginning of 1940, respectively) and then divided by GDP (for 1952 and 1939, respectively). Note that the entry in the final row for 1953-2015 is not that much lower than the Social Security and Medicare Boards of Trustees' recent 75-year projections. But because interest rates were below GDP growth, debt service was modest and averaged below 2 percent of GDP throughout. Were one to instead assume the counterfactual of interest rates greater than nominal GDP growth, unbounded growth in debt service and the debt ratio would be the outcome.

Table 8 Deficit and Debt Service Projections Assuming Perfect Foresight

	1940-2015	1953-2015
Number of Years with Primary Deficits > 0	33	27
Number of Years with Total Deficits > 0	12	8
Average Primary Balance as a Percent of GDP	-1.44	-0.51
Average Debt Service as a Percent of GDP	1.74	1.83
Average Total Budget Balance as a Percent of GDP	-3.18	-2.34
Average Nominal Interest Rate on National Debt	4.64	5.26
Average Nominal GDP Growth Rate	7.30	6.47
Sum of Present Value of Future Primary Deficits as a Percent of Starting GDP	343.9	70.2

A standard counter is that setting interest rates below growth inhibits or even threatens central bank independence and its pursuit of price stability in particular. Again, the point here is to transcend the monetary/fiscal dominance paradigm – primary budget balances *were* negative on average; the private sector *was* in significant surplus aside from two periods of historically large asset price bubbles; and throughout, aside from a few years in the early 1980s, interest rates on average were less than nominal GDP growth.[18] Few would complain that any of these significantly threatened central bank independence, while

leads to the projected deficits and public outcry. Were CBO allowed to project the programs' spending according to current laws, the projections would instead show a rapidly declining debt ratio through the rest of the century, as data provided to Rabn-Havt by the Social Security Administration's chief actuary shows. Of course, discussion of program "solvency" at any rate is the wrong focus – the appropriate focus is the path of deficits themselves relative to the state of the economy since no government program can be less solvent than the government itself (e.g., Wray, 2004).

[18] Table 6 and Figure 3 show that 3-month Tbills and 10-year Tnotes were higher than nominal GDP growth during 1979-2000. A different angle is to consider at what point after the Fed's switch to a substantially higher interest rate policy in October of 1979 does the federal funds rate on average become lower than nominal GDP growth on average through 2015. As it turns out, the average for the entire period is already -0.24 percent. By 1983, the average difference for 1983 through 2015 is -0.89 percent. The average difference continues to decline thereafter.

inflation was modest on average.[19] To accommodate the private sector's balance while interest rates were on average below GDP growth, fiscal policy makers in developed, currency-issuing nations have acted countercyclically, often mostly through automatic stabilizers. By and large they have not set primary balances exogenously, independent of the state of the economy, and have not forced central banks to accommodate their policy stances.

If the accounting and operations behind the arguments above are correct, the neoclassical framework for understanding the roles of monetary and fiscal policies has contributed – perhaps a lot – to a macroeconomic policy mix that has been less effective than it could or even should have been. There is little doubt that it contributes to fiscal policy's relegation to the background in favor of monetary policy and a modeling framework that mostly ignores private debt. Even since 2008, with a zero interest rate policy (ZIRP) and as great a case as there probably has been for significant fiscal stimulus in more than 60 years, the vast majority of primary deficits incurred in the U. S. ($5.12 trillion) dwarfs actual stimulus (the Obama stimulus was near $800 billion), not to mention successive rounds of current and future deficit reduction in debt ceiling negotiations. In other words, active fiscal policy was 16 percent of primary deficits incurred, and 12 percent of total deficits incurred. The public discourse is still dominated by consideration of additional potential options for central banks to encourage a previously over-leveraged private sector (or at least household sector) to spend more out of existing income, as it is generally accepted that active fiscal policy is politically unpalatable.

Central banks in many countries are now experimenting with a negative interest rate policy (NIRP). If successful, though, NIRP will be so via a significant reduction in the private sector balance. And if private sector financial positions have not yet fully recovered from their over-leveraged financial states of the late 2000s, monetary stimulus now via NIRP – particularly if central banks shortly thereafter begin raising rates and thus private sector debt service in the face of economic expansion – might require an even "NIRPIER" monetary stimulus later.[20] From the analysis in this paper, the quicker, more sustainable path should be via fiscal stimulus, which can directly raise private cash flows for servicing debts and is a source of cash flows and confidence for increased spending, rather than monetary policy that works through refinancing debts and waiting for increased confidence in future cash flows before spending more relative to existing income.

The appropriate alternative to the "sound finance" view implied by the neoclassical model of intertemporal government budget constraints is Abba Lerner's *functional finance* (1943), which argues that the appropriate appraisal of a government deficit is of its effects on the economy, not its size per se. What should replace a budget constraint, then, is an inflation constraint – the limits of a fiscal action by a currency-issuing government are not financial but rather the economy's capacity to produce goods and services. Lerner referred to this as the "first law of functional finance". The projections of CBO and the Medicare and Social Security Boards of Trustees are particularly disappointing in this regard – what matters is not whether spending will outpace revenues, but whether the deficits will lead to higher inflation. Will inflation be 2 percent as a result of their projections? 5 percent? 10 percent? Higher still? CBO instead assumes inflation will be around 2 percent, while unemployment and GDP will be near the economy's potential, which if true would mean CBO is forecasting that future deficits will not be a problem even with its assumption that interest rates will be higher than GDP growth. CBO's method is backward – instead of assuming an economy at its potential with stable inflation, it should be forecasting the macroeconomic effects of its projections about spending, taxes, interest rates, and so forth.

If implemented as Lerner envisioned, a functional finance "rule" accommodates the private sector's financial balance on average and across secular and cyclical paths, while being simultaneously consistent with an inflation constraint. In an economy pushing real capacity limits or even experiencing demand-pull inflation before that point (for instance, if some important markets experience supply bottlenecks), the rule calls for smaller deficits. It requires that the government's budget not fall below the point that it causes

[19] The annual compounded growth rate of the PCE Price Index in the U. S. during 1959-2015 was 3.3 percent. For the CPI, it was 3.5 percent during 1947-2015. These fairly modest inflation rates are significantly affected by the relatively high inflation rates of the 1970s (annual compounded growth for the PCE Price Index was 6.7 percent; for the CPI it was 7.4 percent) that were aided by several supply shocks.

[20] This applies to negative interest rates on currency (essentially taxes on currency), as well, which would likewise "work" by encouraging more spending out of existing income and thereby reduce private sector financial balances.

inflation, while at the same time not being constrained to any particular size except that which is consistent with full capacity utilization at any given point in time. Such a fiscal position might be referred to as "neutral" (Fullwiler and Kelton, 2007) – since it would neither push nor pull too hard – or "responsible" (Kregel, 2010), since it is consistent with policy makers' mandate to create full employment.

Functional finance does not violate the mathematics of fiscal sustainability precisely because it is concerned with the effects of deficits. Accelerating government debt service at full employment is simply one example of the fiscal position threatening the inflation constraint. As with all inflationary threats in a functional finance regime, it requires higher taxes or cuts in non-interest spending to raise the primary balance until the total deficit is again "neutral" or "responsible." This is the case regardless of the level of interest rates relative to GDP growth – higher interest rates that bring more debt service simply mean reducing the primary budget balance in kind, though this is due to the inflation constraint, not any sort of concerns about fiscal sustainability. [21] Consequently, functional finance is not necessarily inconsistent with monetary dominance – the central bank still has the freedom to set its target based on its preferred strategy. What functional finance adds, however, is the opportunity to think beyond the traditional monetary/fiscal dominance dichotomy and recognize that it is possible to have a fiscal policy framework consistent with accounting and operations that also does not necessarily threaten central bank independence.

Lastly, functional finance is consistent with the operational realities of the monetary system. Explaining his "second law of functional finance," Lerner argued that the government should issue interest-bearing liabilities only when the private sector did not want to hold its "money." This is in fact what already happens, since the private sector cannot be forced to hold physical currency and banks similarly cannot be forced to hold more reserve balances than the banking system desires at the target rate unless the central bank pays IOR at its target rate. Any national debt beyond that which the private sector wants to hold at zero interest will be interest bearing out of operational necessity – whether as reserve balances earning IOR or securities issued – unless the central bank desires an interest rate target of zero. Lerner (p. 41) put it, "[T]he almost instinctive revulsion that we have to the idea of printing money, and the tendency to identify it with inflation, can be overcome if we note that this printing does not affect the amount of money *spent*. That is regulated by the first law of Functional Finance, which refers especially to inflation and unemployment."

The shortcoming is that there is not a precisely defined "rule" for functional finance, or even a clear framework for designing automatic stabilizers and then under what specific conditions to go beyond automatic stabilizers and employ active fiscal stimulus or tightening. Part of this is due to the neoclassical worldview that monetary policy should dominate, which provides little reason for the thousands of monetary economists to investigate anything other than optimal monetary policy and the limits on fiscal policy consistent with it. And yet the lack of precision is not much different from that of the favored rules for "optimal" monetary policy, usually modeled by Taylor-type rules, which say little more than "raise/lower rates when inflation is too high/low or real GDP is too high/low". Indeed, since 2008 it should be clear that the standard Taylor-type interest rate rules were not of much use as central banks worked through successive stages of QE, ZIRP, and NIRP, not to mention their interventions in money and capital markets during 2008-2009. Even within the neoclassical paradigm, it is well understood that the "base" or "natural" rate of interest that the central bank would set if the economy were at potential output and its inflation target is not precisely knowable (not unlike the "natural rate of unemployment"), and so various advanced econometric methods are used to try and "find" it. Even then, the Taylor approach only refers to the overnight rate; in graduate textbooks and recent seminal works in monetary theory there are no other interest rates in the models.

The very concept of a "natural rate" of interest consistent with potential GDP and the central bank's inflation target is overly simplistic. Is it an overnight rate? Is it a 10-year rate? A 5-year rate? There are publications and models assuming a short-term rate, and others attempting to empirically "uncover" a long-term rate. Is the natural rate of interest a risk-free rate? Why is it not a mortgage rate, a corporate bond rate, a commercial loan rate, or perhaps some other rate at which households and businesses actually borrow? The transmission of the central bank's target to other rates is imprecise and variable, first through longer-term Treasuries that typically lead the central bank's target (and thus can work against the central bank,

[21] Godley and Lavoie (2007) illustrate this within a simple stock-flow consistent model with a functional finance-based fiscal policy. Martin (2007) discusses further the implications through a more detailed version.

falling as the central bank is tightening in anticipation of the economy slowing, and vice versa) while default risk spreads are often procyclical (which is the opposite pattern of the central bank's target, or at least of a pattern that would reinforce the central bank's interest rate rule). In short, how can there be "a" natural rate at which the central bank can directly set its own target rate that is "the" rate consistent with potential output and price stability in a world of multiple interest rates, variable spreads over the central bank's target, evolving financial sector positions interacting with the government's fiscal position, and evolving distributions in general of borrowers and savers?

The question ultimately is this: given that the operational realities of the monetary system, interactions of sector financial balances, private sector financial fragility, and the differing effects on private sector leverage of fiscal and monetary policies are all inherent to the real-world macroeconomic policy environment, what is the appropriate mix of monetary and fiscal policies in different circumstances that would be consistent with full employment, price stability, and private sector financial sustainability?[22] Conclusions reached from a serious consideration of this question applicable to the real world should go well beyond monetary dominance where fiscal policy "gets out of the way," which cannot be a general framework since it is a macroeconomic policy mix that could only possibly apply to narrowly defined, special cases.

Conclusion

With the winding down of successive rounds of quantitative easing now concluded, the discussion in monetary policy circles is of a "normalization" back to higher interest rates and an "optimal" strategy based on Taylor-type interest rate policy rules. As St. Louis Fed President James Bullard put it even back in 2015, "[T]he particular [Taylor-type] rule that's... been around policy circles for the last decade or more... suggests that we should have already lifted off" (Bullard, 2015, p. 19). It is interesting to recall Willem Buiter's lamentation of the "uselessness of 'state of the art' academic monetary economics" that "not only did not allow questions about solvency and illiquidity to be *answered*. They did not allow such questions to be *asked"* (Buiter, 2009; emphasis in original). In other words, the models that now say interest rate policy should return to a Taylor-type framework are the same ones that did not incorporate private sector insolvency or illiquidity. But unless there was a "normal," pre-crisis world where economists and monetary policy makers should have been able to ignore private sector debt and insolvency, then such a "normalization" seems unwarranted. It is reminiscent of Keynes's famous criticism that "[E]conomists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us is that when the storm is past the ocean is flat again" (Keynes, 1921, p. 80). Returning to the pre-crisis models and policy frameworks is not unlike believing that "the ocean is flat again" now or will be in the very near future.

This paper has argued that a sustainable mix of fiscal policy and monetary policies must be understood and designed consistent with the following "principles": (a) fiscal sustainability is about interest on the national debt more than primary budget balances or the national debt themselves; (b) for currency-issuing governments under flexible exchange rates, interest rates on the national debt are a policy variable, (c) central bank independence can be threatened by the size of a government's deficit relative to the economy, but not by "being forced into printing money," (d) government debt has important interactions with private sector debt, (e) the private sector *can* become dominated by speculative/Ponzi financial positions and this evolution might even be accelerated by tightening monetary policy, and (f) policy rates and interest on the national debt have historically been below GDP growth, and may need to be without large current account surpluses or a fiscal policy approach based on functional finance. These all follow from basic operations and accounting related to government and central bank operations, while at the same time none of them are integrated into the neoclassical approach to modeling monetary economies and designing policy in "normal" times or otherwise.

[22] Still more could and should be added, such as the role of an appropriately designed financial regulatory regime or consideration of possible monetary policy tools beyond standard open market operations, QE, or the overnight interest rate target.

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