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Interest Rates and Fiscal Sustainability

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As baby boomers reach retirement age, concerns over the future path of federal spending on entitlement programs grow among orthodox economists. Researchers closely tied to the "generational accounting" literature (i.e., Kotlikoff 1992) have been particularly prominent here. These economists have developed a measure that they call the "fiscal imbalance" — which they claim measures the magnitude of an existing unsustainable fiscal path. They argue that the fiscal path of the United States is $44 trillion off course compared to a "sustainable" path (Gokhale and Smetters 2003a). Others within the circle have noted the $44 trillion "fiscal imbalance" in numerous opinion pieces (e.g., Gokhale and Smetters 2003b; Kotlikoff and Sachs 2003) and in other publications (e.g., Ferguson and Kotlikoff 2003; Kotlikoff and Burns 2004). An essentially identical measure expressing the imbalance as a percent of future GDP shows it to be about 7 percent (e.g., Auerbach et al. 2003).

The "fiscal imbalance" is calculated as the current national debt plus the present value of future expenditures *less* the present value of future revenues; future expenditures and revenues are estimated or predicted to the infinite horizon (Gokhale and Smetters 2003a; Auerbach et al. 2003). The widely-cited 2003 study by Jagadeesh Gokhale and Kent Smetters was originally commissioned by then-Treasury Secretary Paul O'Neill in 2002, when its authors were deputy assistant secretary for economic policy at the Treasury (Smetters) and consultant to the Treasury (Gokhale), respectively. However, the Bush Administration played down the results of the report as it prepared, in late 2002 and early 2003, to promote a second round of tax cuts (Despeignes 2003). Nonetheless, measuring a "fiscal imbalance" via an identical methodology has since been promoted by others in the U.S. Office of Management and Budget (2005), the Treasury (e.g., Fisher 2003), the International Monetary Fund

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(IMF) (e.g., Mühleisen and Towe 2004), and has also been incorporated into projections of the Trustees for Social Security and Medicare. A final example is worth particular mention: in November 2003, Democratic Senator Joseph Lieberman introduced the "Honest Government Accounting Act" that declared "the most appropriate way to assess Government finances is to calculate its net assets under current policies: the net present value of all prospective receipts minus the net present value of all prospective outlays and minus outstanding debt held by the public." The proposed Act specifically mentioned the study by Gokhale and Smetters and held it as an example of "honest government accounting." Had it been passed into law, the legislation would have created a "commission on long-term liabilities and commitments" to calculate the federal government's "fiscal imbalance" at 75-year and infinite horizons; had the "fiscal imbalance" been determined to exceed pre-set limits in any given year, the President would have been required to submit a plan for reducing the imbalance. In addition, all proposals for increased future spending or reductions in taxes would have been required to be "fiscally balanced" at 75-year and infinite horizons.[1]

These examples are the most recently influential applications of one of the core themes of orthodox macroeconomics: fiscal sustainability. Indeed, most will recognize that fiscal sustainability as presented in the fiscal imbalance literature is essentially an application of the orthodox concept of a government's intertemporal budget "constraint." Consequently, this paper is not as concerned about the particulars of the "fiscal imbalance" or related "generational accounting" literatures; nor, for that matter, does it deal directly with the supposedly looming financial "crises" facing Social Security or Medicare. Instead, the paper is most concerned with understanding and critiquing the assumptions or beliefs at the core of these literatures and measures, and then with providing an alternative view. Fiscal sustainability, when defined via an intertemporal budget "constraint" as the "fiscal imbalance" literature does, relies heavily upon assumptions regarding the relative rate of interest paid on the national debt. Several heterodox economists, particularly Post Keynesians such as Arestis and Sawyer (2003), have also noted this fact. This paper expands upon heterodox research in this area by referencing the actual operations of the Federal Reserve (hereafter, the Fed) and the Treasury as set out in their own research and regulatory publications and as consistent with their own balance sheet operations. In short, the orthodox concept of fiscal sustainability is flawed due to its assumption that a key variable — the interest rate paid on the national debt — is set in private financial markets as in the orthodox loanable funds framework. On the contrary, as a modern or sovereign money (Wray 1998; 2003) system operating under flexible exchange rates, interest rates on the U.S. national debt are a matter of *political* economy (Fullwiler 2006). This has significant implications for the appropriate "mix" of monetary and fiscal policies, particularly if full employment and financial stability are considered fundamental goals of macroeconomic policy that can be enhanced by appropriate fiscal policy actions.

Fiscal Sustainability: The Orthodox View

This section discusses four points central to the current orthodox view of fiscal sustainability. The section begins with the orthodox view of the government budget "constraint," then turns to the most recent orthodox research on deficits and long-term interest rates. These are both central to understanding the third and fourth points that follow: the orthodox view of the government's intertemporal budget constraint and recent research discussing the likelihood of additional, "non-traditional" effects of anticipated future deficits. Throughout the section, consistencies with the recent fiscal imbalance literature are noted and referenced.

1. The government's budget constraint and monetization

The well-known orthodox government budget constraint (GBC) sets government non-interest spending (G) plus interest paid on the national debt (iB, where B equals government debt or bonds held by the non-government sector and i is the average interest rate on the national debt) equal to tax revenues (T), bond sales (ΔB), and changes in the quantity of base money (ΔM), and the subscript t indicates the current period, as in the following equation:

$$(1) \qquad G_t + iB_t = T_t + \Delta B_t + \Delta M_t$$

Also well understood is that $G - T$ is referred to as the government's primary deficit/surplus, whereas $G + iB - T$ is the total government deficit/surplus.

The GBC thus states that non-interest government spending and interest on the national debt held by the non-government sector are equal to tax receipts, changes to the quantity of government bonds held by the non-government sector, and changes to the monetary base. The GBC is almost universally presented in academic literature and textbooks as demonstrating that government spending must be "financed" by either tax revenues or bond sales if monetization (i.e., "printing money") and the unleashing of inflationary pressures presumed to result from monetization are to be avoided. Therefore, it is quite well recognized within the GBC paradigm that a national government would not encounter a financial "constraint" the same way that a private business or household would, given its option to monetize via the central bank. Instead, the "constraint" in (1) is effectively that G should be chosen such that ΔM remains consistent with price stability (or at least a low, stable rate of inflation); that is, the GBC implies a "constraint" in as much as "printing money" to "finance" $G + iB$ is to be avoided. Thus, central to the orthodox view of the GBC is the belief that a deficit ($G + iB > T$) "financed" via ΔM (i.e., direct "borrowing" from the central bank) is significantly more inflationary than the case of "financing" via ΔB.

Finally, and not surprisingly, this belief is clearly at the core of the fiscal imbalance literature, as a few representative quotes demonstrate:

> If revenues are not sufficient to match spending, the government must meet the shortfall by printing money or by borrowing. Sustained reliance on printing money to finance deficits can lead to escalating price inflation, which can have debilitating consequences. (Auerbach et al. 2003, 110)
>
> The printing press is the time-honored last resort of governments that cannot pay their bills out of current tax revenue or new bond sales. It leads, of course, to inflation and, potentially, to hyperinflation. (Ferguson and Kotlikoff 2003, 26)

2. *Interest rates on government debt*

That the government must, like any other agent within the economy, accept the terms of credit imposed by "market forces" as in the supply and demand for loanable funds framework is overwhelmingly — if not universally — accepted by orthodoxy. A recent brief from the Congressional Budget Office (hereafter, CBO) agreed that "by increasing the demand for credit, federal deficits tend to raise interest rates" (2005, 3). It is believed that ever larger deficits generate ever higher interest rates, as the government must offer incentive to encourage private lenders to accept its IOUs in exchange for their saving or as a premium against the risk of default or — again, worse still — the possibility of future monetization to "repay" the deficits. The only caveat considered, of course, has been that "appropriately timed" deficits in the "short run" could enable increased private saving via increased national output, and thus no increase in interest rates would result (e.g., Bernheim 1989). This well-known Keynesian/short run vs. neoclassical/long run dichotomy is viewed from the current "conventional view" (as labeled by Elmendorf and Mankiw 1999) through the lens of temporary vs. permanent deficits. As such, there is widespread agreement with the claim by Rubin, Orszag and Sinai (2004) that "*temporary* budget deficits can be beneficial by providing short-term macroeconomic stimulus when the economy is weak and has considerable unused resources of capital and labor. . . . Whatever decisions are made about short-run fiscal policy when the economy is weak, the objective should be budget balance over the business cycle" (2; emphasis in original). Considering the business cycle in its entirety, or several business cycles strung together through time, it is presumed that labor and capital will be fully utilized on average, and thus a more *permanent* or *persistent* deficit will likely raise interest rates via a necessary reduction in national saving.

In the orthodox approach, "real economic forces" (i.e., supply of saving, demand for capital) set "real" interest rates, while nominal rates are set once expected inflation is accounted for (as in the Fisher effect). Of course, theoretical models of the effects of government deficits upon interest rates are incomplete given that "other factors that influence interest rates are not constant" and that "changes in government debt are influenced by both exogenous and endogenous factors" (Engen and Hubbard 2004, 9). When researchers turn to empirical evidence, however, as Gale and Orszag (2004; hereafter GO) report, "[t]he effects of fiscal policy on interest

rates have proved difficult to pin down statistically" (147) since "previous analyses reach widely varying conclusions about the effects of deficits on interest rates" (147n). CBO's review of the literature similarly notes that "overall [empirical studies] suggest that the effects of federal deficits on interest rates are small. Those studies have produced a wide range of estimates . . ." (2005, 4). Engen and Hubbard's (2004; hereafter, EH) summary (16-25) likewise confirms that "despite the volume of work, no universal consensus has emerged" (16). In this vein, GO run numerous regressions of current (*ex ante*) real interest rates on current fiscal variables, but similarly find that "the fiscal variables are generally not statistically significant in these specifications, and they remain insignificant when the nominal rate is used" (168). EH also report effects that are not statistically significant (36-37).

These results are surprising and obviously "hard to swallow" for orthodox economists (Elmendorf and Mankiw 1999). What redeems the orthodox framework is the "realization" that "the studies that find no significant effect are disproportionately those that do not take expectations into account at all or do so only indirectly through a vector autoregression" (Gale and Orszag 2004, 149). An influential paper by Martin Feldstein (1986) argues instead that in theory the effects of deficits on interest rates should depend upon how persistent the deficits are expected to be.

> Since financial markets are forward-looking, excluding expectations could bias the analysis toward finding no relationship between interest rates and deficits. . . . Over the past twenty years, many studies have incorporated more accurate information on expectations of *future* sustained deficits. These studies tend to find economically and statistically significant connections between anticipated deficits and current interest rates. . . . Of nineteen papers that incorporate timely information on projected deficits, thirteen find predominantly positive, significant effects between anticipated deficits and current interest rates, five find mixed effects, and only one finds no effects. . . . Thus, although the literature as a whole, taken at face value, generates mixed results, those analyses that focus on the effects of anticipated deficits tend to find a positive and significant impact on interest rates. (Gale and Orszag 2004, 148-149)

Nevertheless, much of the research incorporating expected deficits does not control for the widely assumed influence of the current business cycle on the current yield curve. Laubach (2003) therefore is an important initiator of a literature examining supposed effects of expected future deficits. He used average five-year-ahead deficit projections taken from both CBO and the Office of Management and Budget as the fiscal variable and then a five-year-ahead (i.e., forward) measure of the real long-term Treasury rate. Both would be expected to be less influenced by the current state of the business cycle. That projections of both agencies are frequently

well off the mark is "irrelevant" according to Laubach (2003, 5). Rather, "[t]he only relevant question is whether the agencies' projections accurately reflect market expectations at the time the projections were made" while "arguably these agencies' projections are using most of the information about future deficits and debt available at the time" (5). His regressions — consistent with the loanable funds framework — used an equity premium and projected potential GDP as control variables. His main conclusion was that a persistent one percent increase in the five-year ahead projected deficit-to-GDP ratio raised five-year ahead long-term Treasury rates by roughly 20 to 40 basis points (depending upon regression specifications). EH essentially duplicated Laubach's study but added oil prices, Federal Reserve security purchases, and a dummy for military buildup as control variables and found a slightly smaller, though comparable effect of about 18 basis points. GO duplicate EH's regressions but add constant and interactive dummy variables for recessions and use defense spending as a share of GDP instead of a dummy variable for military buildups as additional control variables. GO's results are in the 25 to 38 basis point range.

Particularly because the results from these three recent studies fall within a fairly narrow range and are arguably economically significant (18 to 40 basis points), they are now widely reported as the best empirical evidence that persistent government deficits raise real interest rates (e.g., CBO 2005; Mühleisen and Towe 2004). However, the results have been misreported by some, perhaps as a result of the studies' complexities. For instance, after noting the difficulties past empirical studies encountered quantifying the effects of deficits on interest rates, CBO (2005) reports that these recent studies have found "a sustained increase in the federal deficit amounting to 1 percent of GDP raises interest rates by roughly 20 to 60 basis points . . . with the weight of the evidence around 30 basis points" (4). In fact, as reported above, *none* of the studies found statistically significant effects of current deficits on current interest rates. What all three studies purport to find is that a forecast of future deficits by CBO or the Office of Management and Budget has a statistically significant correlation with an imputed *forward* real interest rate. Note that it is not altogether clear what this means since the authors also presented mixed results regarding the effect of the same expected deficit on *current* real *or* nominal long-term interest rates (into which forward rates are, by definition, embedded).

3. The intertemporal government budget constraint

As in the previous two sections, the intertemporal government budget "constraint" (hereafter, IGBC) is known to many. Here, the derivation by Blanchard et al. (1990; hereafter, BCHS) is presented in discrete time since it is often cited or even duplicated in the fiscal imbalance literature (e.g., Auerbach 1994). The IGBC's building blocks are the previous two sections: the GBC and the private credit markets' ability to set real interest rates on the national debt. BCHS's derivation begins as follows: first, in the current year, the change in the nominal value of the debt held by the non-government sector (ΔB) is given by the current primary deficit ($G - T$) plus

interest on the outstanding nominal debt held by the non-government sector (iB), as in equation (2):

$$\Delta B = G - T + iB \tag{2}$$

Note that ΔM does not appear in BCHS's equations, which is common and consistent with the GBC assumption that deficits "financed" via "money creation" are inflationary, if not "hyper" inflationary. For the government's fiscal stance to be "sustainable" intertemporally, then, it is assumed that the path of future spending, taxation, and interest payments must, as in equation (2), avoid "debt monetization."

Lower case letters are used to rewrite equation (2) in real terms (i.e., inflation adjusted) and as percentages of real GDP, which aids in understanding the dynamic evolution of the GBC within the IGBC. Thus, b denotes the ratio of debt to GDP; g and t are government non-interest spending and taxation as percentages of GDP, respectively; Θ is the real rate of growth of GDP; and r is the *ex post* real rate of interest on the national debt, as in equation (3):

$$\Delta b = g - t + (r - \Theta)b \tag{3}$$

In order to consider equation (3) intertemporally, the debt-to-GDP ratio prevailing n years from today, b_n, can be expressed as the debt-to-GDP ratio in the current year (expressed in this case and hereafter as b_0), compounded n years into the future plus the sum of the compounded value of primary deficits projected to be incurred hereafter as a percent of GDP. This is shown in equation (4):

$$b_n = b_0(1 + r - \Theta)^n + \sum_{k=1}^{n}\left[(g_k - t_k)(1 + r - \Theta)^{n-k}\right] \tag{4}$$

Discounting both sides of (4) to the present yields the following:

$$\frac{b_n}{(1 + r - \Theta)^n} = b_0 + \sum_{k=1}^{n}\frac{g_k - t_k}{(1 + r - \Theta)^k} \tag{5}$$

Equation (5) states that the present value of the debt-to-GDP ratio prevailing at some point in the future is equal to the current debt-to-GDP ratio plus the present discounted value of expected future primary deficits as a percent of GDP. As with the GBC, the IGBC as shown in equation (5) is simply an identity.

Like the GBC discussion above, for fiscal sustainability, orthodox interpretations of the IGBC impose an additional condition, which is that the present discounted value of the debt-to-GDP ratio tends toward zero as one considers ever larger values of n. In other words, b_n cannot be increasing faster than its discount factor; this is represented mathematically by taking the limit of the left-hand side of equation (5) as n approaches infinity:

$$\lim_{n\to\infty} \frac{b_n}{(1+r-\Theta)^n} = 0 \tag{6}$$

Inserting equation (6) into equation (5) yields the following for large values of *n*:

$$0 = b_0 + \sum_{k=1}^{n} \frac{g_k - t_k}{(1+r-\Theta)^k} \tag{7}$$

Rearranging,

$$b_0 = \sum_{k=1}^{n} \frac{t_k - g_k}{(1+r-\Theta)^k} \tag{8}$$

Since b_0 is the current debt-to-GDP ratio, BCHS noted that "a sustainable fiscal policy can be defined as a policy [in which] the ratio of debt-to-[GDP] eventually converges back to its initial level, b_0" (Blanchard et al. 1990, 11). Thus, fiscal sustainability as defined by the IGBC does *not* require that a government immediately or even eventually *eliminate* its debt. Note, however, that eventual convergence to b_0 *does* mean that "for a fiscal policy to be sustainable, a government which has debt outstanding must anticipate sooner or later to run primary surpluses . . . large enough to satisfy equation [8]" (12); that is, the cumulative discounted present value of the expected future surpluses must be equal to the current national debt outstanding. "Barring that, the government would have to eventually repudiate its debt, either through straight repudiation or through the use of inflation" achieved via "monetization" (12).

The fiscal imbalance derived in Gokhale and Smetters (2003a) is equivalent to equations (7) and (8), with $n = \infty$. They argue that "the government's fiscal policy may be considered balanced if today's publicly held debt plus the present value of projected non-interest spending is equal to the present value of projected government receipts" (7); this statement — aside from its consideration of levels rather than percentages of GDP — simply rearranges equations (7) or (8), as in equation (9):

$$b_0 + \sum_{k=1}^{n} \frac{g_k}{(1+r-\Theta)^k} = \sum_{k=1}^{n} \frac{t_k}{(1+r-\Theta)^k} \tag{9}$$

The fiscal imbalance measure itself is simply equation (7) (again, $n = \infty$): "For the entire government's policy to be sustainable, its fiscal imbalance must be zero. The government cannot spend and owe more than it will receive as revenue in present value" (Gokhale and Smetter 2003a, 8).

It is worth demonstrating numerically the implications of the above equations beginning with Gokhale and Smetters' assumptions that the initial national

debt (B_0) is equal to \$5.137 trillion and initial real GDP is \$10.7 trillion, which yield a beginning debt-to-GDP ratio, b_0, of 48 percent.[2] They also assume a real interest rate of 3.6 percent. Table 1 shows implications for the path of fiscal variables in the fiscally sustainable case (i.e., fiscal imbalance=0, as in equation (7)) and in an unsustainable case (i.e., fiscal imbalance > 0, or right-hand side of equation (7) > 0). Implications for real GDP growth (Θ) at either 2 percent or 3 percent are both shown. Dollar values are shown in billions. As noted in the paper's introduction, Gokhale and Smetters (2003a) calculated the fiscal imbalance to be \$44.214 trillion, so this serves as the unsustainable scenario in Table 1. In Table 1, for simplicity, it is assumed that the government runs the same size primary surplus/deficit as a percent of GDP each year.[3]

Table 1: Gokhale and Smetters' Sustainable and Unsustainable Fiscal Policies

Infinite Horizon				In 30 Years			In 75 Years		
Real GDP growth	Fiscal Imbalance	Primary Deficit	PV of future Primary						
Θ	Eq. (7)	g-t	Deficits	int/GDP	Δb	b	int/GDP	Δb	b
3%	0	-0.28%	-5.137	1.68%	1.4%	48.0%	1.68%	1.4%	48.0%
3%	44.214	2.13%	39.077	4.33%	6.45%	126.7%	9.43%	11.56%	273.6%
2%	0	-0.75%	-5.137	1.69%	0.94%	48.0%	1.69%	0.94%	48.0%
2%	44.214	5.73%	39.077	10.01%	15.74%	293.9%	33.25%	38.98%	962.6%

The first row of Table 1 shows fiscal sustainability at Θ=3 percent. Here, the primary surplus is 0.28 percent each year (i.e., primary deficit is –0.28 percent each year); the cumulative present value of these surpluses into perpetuity is -\$5.137 trillion, which is equal to $-B_0$. As implied by equations (7) and (8) and as argued by BCHS, this yields $b_0 = b_{30} = b_{75} = 48$ percent. Note that the government continues to run deficits (Δb) equal to 1.4 percent of GDP, and has interest payments equal to 1.68 percent of GDP. In other words, where $b_0 > 0$, the government can run *unified* deficits (i.e., inclusive of interest payments) indefinitely and still have a sustainable fiscal policy, as defined in (7) and (8), as long as it runs *primary* surpluses whose cumulative present value is equal to b_0. The third row of Table 1 shows the same scenario with Θ = 2 percent, which is the rate assumed in Gokhale and Smetters (2003a).[4] Here, primary surpluses must equal 0.75 percent of GDP each year in order for $b_0 = b_n = 48$ percent.

Rows 2 and 4 show implications of a fiscal imbalance equal to Gokhales and Smetters' estimate of \$44.214 trillion; in this case primary deficits are 2.13 and 5.73

percent, respectively, the latter being very similar to the average of future primary deficits calculated in Gokhale and Smetters (2003a) and in Auerbach et al. (2003). After 30 and 75 years, debt-to-GDP ratios rise to 126.7 and 273.6 percent in row 2, respectively, and to 293.9 and 962.6 percent in row 4, respectively. The interest as a percent of GDP (*int*/GDP) column in Table 1 demonstrates what is "unsustainable" about these fiscal paths, since after 75 years interest payments have grown to 9.43 percent of GDP and 33.25 percent of GDP in rows 2 and 4, respectively. Obviously, the unlimited growth of interest payments is at the heart of the unbounded rise in the debt-to-GDP ratio that violates equation (7).

More specifically, rising interest payments require greater taxes, which are presumed to have a negative impact on capital accumulation and economic growth, or greater borrowing, which — as in the previous section — is presumed to raise interest rates and thereby create further increases in interest payments while again slowing capital accumulation and growth. The alternative is "monetization" of interest payments once they are a significant percent of GDP, which again results (according to the orthodox interpretation of the GBC) in greater inflation, if not hyperinflation. Thus, as BCHS noted, where equation (7) is violated, eventually there is repudiation of the debt outright or indirect repudiation through inflation.

Kotlikoff and Burns (2004) thus argue that the fiscally imbalanced path is a road to ruin whatever choice is made:

> History is replete with examples of what happens when countries can't pay their bills. They raise taxes to exorbitant levels, default on their explicit or implicit obligations, and begin printing money like mad. This triggers inflation, drives interest rates through the roof, and sends exchange rates down the tubes. Businesses go belly up, and banks shut their doors. The result is financial and economic meltdown. (*xvii*)

The solution according to them and others in the fiscal imbalance literature is for a forward looking measure that differentiates sustainable and imbalanced fiscal paths into perpetuity — as in the derivation above of equation (7) or, equivalently, equations (8) or (9) — to be employed that can guide governments into sustainable fiscal paths before such problems arise. This was the stated goal of the Honest Government Accounting Act.

4. "Nontraditional" effects of government deficits on interest rates and the economy

While Table 1 provides examples of the eventual outcomes of unsustainable fiscal paths, some economists go further still, invoking once again the loanable funds market in arguing that the negative effects could in fact occur much sooner than 75 or even 30 years. For example:

> Traditional analysis of [effects upon interest rates from] budget deficits in large advanced economies does not seriously entertain the possibility of explicit default, or of implicit default through high inflation. If market expectations regarding the avoidance of default were to change and investors had difficulty seeing how the policy process could avoid extreme measures [i.e., default or inflationary "monetization"], the consequences could be much more sudden and severe than traditional estimates suggest. (Gale and Orszag 2004, 115)

> 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, 1)

In other words, once financial markets understand that a government's fiscal policy is on an unsustainable path, this should significantly raise the default risk or expected inflation premiums in government bond markets and thereby raise real interest rates significantly more than the "traditional" or "conventional" estimates of 18 to 40 basis points per percent of GDP increase in the deficit cited above.

Ferguson and Kotlikoff (2003) demonstrate that the fiscal imbalance literature is in complete agreement with this "nontraditional" view:

> Conventional wisdom predicts that if investors and traders in government bonds anticipate a growing imbalance in a government's fiscal policy, they will sell that government's bonds. There are good reasons for this. A widening gap between current revenues and expenditures is usually filled in two ways: first, by selling more bonds to the public, and second, by printing money. Either response leads to a decline in bond prices and a rise in interest rates: the incentive people need to purchase bonds. That incentive has to be larger when the real return of principal plus interest is threatened by default or inflation. (24-25)

Interestingly, all admit that there is no way of telling when such an abrupt change in market expectations will occur or precisely how the change will be triggered. But while "we can only guess what level of debt will trigger a shift in investor confidence," nevertheless, "[i]f policymakers are prudent, they will not take the chance of learning" the precise tipping point (Ball and Mankiw 1995, 117).

Of substantial concern is that such a response from financial markets would further accelerate the negative impacts of the government's fiscal imbalance, since — for example — higher interest rates today would mean larger debt service on new and rolled-over debt today. The effects "can feed on each other to create a mutually reinforcing cycle; for example, increased interest rates and [the resulting] diminished economic activity may further worsen the imbalance [since deficits typically rise during downturns], which then can cause a further loss of confidence and potentially spark another round of negative feedback effects" (Rubin, Orszag and Sinai 2004, 2). In short,

> Once these effects were in motion, [they] would substantially magnify the costs associated with any given underlying budget deficit and depress economic activity much more than conventional analysis would suggest. Indeed, the potential costs and fallout from such fiscal and financial disarray provide perhaps the strongest motivation for avoiding substantial, ongoing budget deficits. (2)

The fiscal imbalance literature, not surprisingly, again concurred:

> The process whereby current fiscal policy influences expectations about future inflation is a dynamic one with powerful feedback effects. If consumers in financial markets decide a country is broke and is going to inflate, they act in ways that actually catalyze such an outcome. By pushing up interest rates, they raise the cost of financing the government's debt and hence worsen its fiscal position. (Ferguson and Kotlikoff 2003, 26)

In an op-ed to *The Financial Times,* Gokhale and Smetters even likened the *near-term* ability of the U.S. Treasury to issue bonds to the recent troubles of the California state government:

> California's bond rating has sunk to a level just above junk status — the lowest grade among all 50 states — as it struggles through its budget crisis. California is teaching the US a valuable lesson about the connection between fiscal policy and financial markets. Unfortunately, it may again be setting a trend for the nation: unless action is taken very soon to reform the main US benefit programmes, Washington may have to grapple with the same crisis currently preoccupying Sacramento. . . . Unresolved, the situation could cause US Treasury yields to rise sharply, wreaking havoc on the national economy. (2003b)

Thus, and to conclude this part of the paper, the orthodox position on fiscal sustainability holds that "monetization" is to be avoided since it is more inflationary

than bond sales, while bond sales themselves are subject to interest rates set in private credit markets. A government's fiscal path is defined as unsustainable if the present value of future primary surpluses is not equal to the current level of the national debt. In that case, the debt-to-GDP ratio does not converge to its current level and grows without bound; most importantly, interest payments as a percent of GDP grow without bound, requiring the government to eventually choose between default or inflationary "monetization." Lastly, if financial markets recognize a given fiscal path is unsustainable, default premiums on government bonds would rise significantly as a result, which would then worsen the government's fiscal position and increase the likelihood that default or inflationary "monetization" would occur much sooner than previously anticipated.

Interest Rates and Deficits in a Modern Money Regime

Consistent with the previous section, Ferguson and Kotlikoff (2003, 25) argue that Treasury bond market traders could be expected to raise rates significantly given "unfunded" liabilities arising from Social Security and Medicare; they reasoned that rates had not risen because traders did not yet understand the implications of these liabilities. Four years have since passed with still little reaction from bond markets, while the "unfunded" liabilities have grown significantly from their supposedly already high levels. However, from the alternative perspective presented in this section, that interest rates have not responded in this way is unsurprising; instead Ferguson, Kotlikoff, and others relying on a loanable funds approach remind one of Keynes' analogy of the Classical economists as "Euclidean geometers in a non-Euclidean world who, discovering that in experience straight lines apparently parallel often meet, rebuke the lines for not keeping straight" ([1936] 1964, 16). Speaking most generally, the orthodox literature discussed in the previous section is based upon assumptions that could only be present in a fixed-exchange rate regime (Mitchell and Mosler 2005; Mosler 1995; Sardoni and Wray 2007; Wray 2006). Looking deeper, the orthodox conception of fiscal sustainability demonstrates a fundamentally flawed understanding of the interactions of the Fed, the Treasury, and private financial institutions within the U.S. financial system (e.g., Bell 2000; Bell and Wray 2002-3; Fullwiler 2003; 2005; 2006; Mitchell and Mosler 2005; Mosler 1995, 1997-8; Wray 1998; 2003-4). This section discusses five principles regarding interest rates and deficits in a modern or sovereign money regime (Wray 1998; 2003) consistent with these real world interactions.

1. The Fed's operating target is necessarily an interest rate target

Orthodox economists now recognize that modern central banks target interest rates. As such, earlier debates about the appropriateness of interest rate or monetary aggregate targets appear to be settled at least for now. From the orthodox perspective, the variability and unpredictability of the velocity of money is an (unfortunate) fact of life in a modern financial system. Further, the framework

provided by Taylor (1993) and now known simply as "Taylor's rule" helped allay concerns of many regarding issues raised in Poole (1970) and by others about the shortcomings of interest rate rules in the presence of non-monetary shocks to the economy. Still, there are many "true believers" who either anticipate the velocity of money's return to historical correlations with interest rates and nominal income, or who search for "more perfect" measures of monetary aggregates for central banks to target. Among the most enthusiastic in this regard is — not surprisingly — the St. Louis Fed, which regularly publishes "adjusted" measures of the monetary base (Anderson and Rasche 1996; Anderson, Rasche and Loesel 2003), Divisia monetary aggregates (Anderson and Buol 2005; Barnett 1980), and data related to "McCallum's rule" for a monetary base targeting regime (McCallum 1988).

Orthodox economists have long considered that a central bank's ability to impose reserve requirements could enable money supply control through control over the quantity of reserve balances. This "money multiplier" view is still prevalent in virtually every economics textbook (published in the United States, at least) from the principles level on up to the doctoral level. Heterodox economists — Post Keynesians and Circuitistes in particular — have to the contrary argued that the central bank has no choice but to set an interest rate target (see Fontana and Palacio-Vera (2004) for a recent and thorough discussion of the heterodox critique of the traditional orthodox "instruments and targets" approach). In practice, they have noted, central banks have always provided reserve balances at some price through open market operations or via overdraft/discounting facilities, either to avoid banking system collapse in times of crisis, or in more normal times to avoid a substantial increase in the overnight rate. In the U.S. case, even as the Fed attempted to achieve aggregate reserve and money targets during the 1979-1982 period, Meulendyke (1988) is clear that an interest-rate targeting procedure was in place at the operational or tactical level on a day-to-day basis. Her account essentially validated Moore's (1988) well-known critique of orthodox accounts of the period's interest-rate targeting tactics. More recently, Fullwiler (2003) and Lavoie (2005) have demonstrated that the central bank's obligation to ensure the smooth operation of the payments system means that the provision of reserve balances is necessarily non-discretionary. In the United States, for example, around $2 trillion in payments per business day are settled through bank reserve accounts, and a significant percentage of these payments themselves settle a larger amount of transactions that have been previously netted at various clearing institutions (Fullwiler 2006, 505-510). Payment settlement via reserve balances is facilitated via Fed provision of an average of $30 billion in intraday credit *each minute* to banks and more than $100 billion in intraday credit during peak settlement times (Panigay Coleman 2002, 76); in short, to not supply reserve balances at some price in the quantities necessary for banks to settle their payments is not an option and would immediately threaten the integrity of the nation's payments system.

Another shortcoming of the money multiplier paradigm has also long been recognized by Post Keynesians and Circuitistes: reserve balances are not a constraint on bank lending. While reserve balances can *only* settle a bank's payments or aid the bank in meeting its reserve requirements, a loan is created endogenously at the

request of a creditworthy customer and creates its own deposit. If loan creation or uncertain timing of deposit inflows has created additional reserve requirements for a bank, the bank's response is to borrow in the money markets. Whereas the money multiplier presumes that reserve balances set the limit on a bank's lending or money creation, real-world banks *necessarily* lend first and meet reserve requirements later.

Though economists have traditionally incorporated reserve requirements into nearly any analysis of the Fed's operations, such analysis more appropriately begins by considering these operations in the *absence* of reserve requirements (Fullwiler 2003). In that case, banks use reserve balances only for settling payments with one another, clearinghouses, the Treasury, or the Fed; their demand for reserve balances is very interest inelastic and depends upon anticipated payment flows for the day. Banks have no need for additional balances, while supplying fewer reserve balances than banks need to settle payments would threaten the regular functioning of the payments system. As liabilities on the Fed's balance sheet, the aggregate quantity of reserve balances circulating can only change as a result of an offsetting change somewhere else on the Fed's balance sheet; banks cannot affect the system-wide quantity through their individual borrowing or lending. Absent reserve requirements and given a wide spread between the rate the Fed pays on balances banks hold in Fed accounts (zero percent) and the penalty rate assessed to banks borrowing from the Fed (one percent above the target rate since 2003, though previously, the federal funds rate could rise well-beyond this level as banks avoided the "frown costs" of borrowing from the Fed's discount window), the actual federal funds rate could deviate substantially from its target if the Fed does not accurately estimate and accommodate bank reserve demand.

Reserve requirements, far from being central to the process, are simply one possible method of reducing variability in the federal funds rate. Substantial reserve requirements mean banks hold more than enough balances to settle payments and usually allow banks to average balances held over several days; as such, if the quantity of reserve balances supplied is higher or lower than balances demanded, on most days the federal funds rate may not deviate substantially from the target rate. Still, though, reserve balances *only* settle payments or meet reserve requirements; they do not fund loan creation. Instead of reserve requirements, more direct control over the federal funds rate can be had by simply reducing the spread between the rate paid on balances held in Fed accounts and the penalty rate assessed to borrowings from the Fed. This has been repeatedly demonstrated by central banks in countries without reserve requirements, who achieve their interest rate targets very precisely in large part through a 50 basis point spread between the rate paid on reserve balances and the penalty rate for borrowing from the central bank, with the target rate set in the center of this spread. Other changes in operations, such as more frequent open market operations or reduced penalties on overdrafts, can similarly provide more precise control. As many now recognize, an even simpler route to precise control over the overnight target is for the central bank to set the target at the rate banks earn on reserve balances; in that case, the central bank would merely need to leave substantial excess balances in circulation for the target rate to be achieved (Fullwiler 2005, 547;

Lacker 2006, 9; Whitesell 2006). While some of these tactics are thought to be in conflict with other central bank or federal government goals (i.e., minimizing government interest expenditures, meeting reserve requirement needs of banks throughout the maintenance period, reducing payments system risk), some researchers have erroneously equated the choice (regulatory, legal, or otherwise) not to employ these tactics with an *inability* to achieve precise control.

To conclude this section, the money multiplier view of a Fed that raises or subtracts reserve balances to achieve control over monetary aggregates is untenable in practice; rather, the only plausible direct target is an interest rate target. Because banks can only use reserve balances to settle payments or meet reserve requirements, the Fed's provision of reserve balances is by necessity non-discretionary. Were it to do otherwise, large swings in the federal funds rate would create unnecessary disorder and uncertainty in the money markets. Even if researchers someday find or devise a monetary aggregate (e.g., Divisia, adjusted measures of the monetary base, and so forth) worthy of targeting, the actual operating procedure for achieving such a target would necessarily begin with the Fed's interest rate target (though it is well known that interest rates are a particularly blunt — if not counterproductive — instrument for achieving monetary control). This is all quite clear when one first considers monetary operations in the absence of reserve requirements, since it is then obvious that the only possible operating target is an interest rate target.

2. *The federal government is not financially constrained*

In a modern or sovereign money regime, one must distinguish between operational or financial constraints and self-imposed legal or political constraints. As a fiat-currency-issuing, flexible-exchange-rate regime, the U.S. federal government faces no operational or financial constraints on its spending. Though the U.S. federal government might place legal constraints upon itself such as debt ceilings or prohibit the Fed from both providing overnight overdrafts to the Treasury's account and purchasing Treasuries in primary markets, these are self-imposed prohibitions of a currency-issuing government that can be and have been repeatedly sidestepped when it has been deemed desirable to do so. On the other hand, other entities that do not issue fiat currencies (households, business, state and local governments), or governments that fix their currencies' exchange rates to other currencies (as with the European Monetary Union nations or Argentina under the currency board) or commodities (as in a gold standard) *do* in fact face financial constraints and in these cases the threat of default on debt obligations is a legitimate financial concern.

Fiat money issuers such as the U.S. federal government spend simply by crediting bank accounts electronically. The Treasury's account, as a liability on the Fed's balance sheet, lies outside the definitions of reserve balances or the money supply. In effect, the government's spending creates money in the form of reserve balances and recipient deposits — since neither existed prior to the spending action — while the amount of the government's spending is debited from the Treasury's account (Bell 2000; Mitchell and Mosler 2005; Wray 1998). More to the point,

whenever the government spends, money is created; *whenever* the government receives tax payment, money is destroyed since payor deposits and bank reserve accounts are both debited in the process. This is clear from a basic understanding of the balance sheets of the Fed and private banks, and is clearly laid out in the Fed's annual reports on open market operations and in other Fed publications. For example,

> The Treasury maintains its primary account for making and receiving payment, the Treasury general account (TGA), at the Reserve Banks. An increase in the balance of that account means that funds have moved from depository institutions' accounts at the [Reserve] Banks into the TGA. This movement of funds reduces the amount of reserves in the banking system. Conversely, a decrease in the TGA means that funds have moved from that account to depository institutions, thereby increasing the amount of reserves in the banking system. (DeCorleto and Trimble 2004, 443)

Since the government's spending always creates its own government-issued fiat money, outside of self-imposed legal restrictions, there is no operational or financial constraint requiring that its spending be "prefunded" by cash on hand, income, asset sales, or debt issuance as other, non-currency issuing entities must do. Neither the electronic crediting of bank accounts while spending nor the electronic debiting of bank accounts when receiving tax payment or proceeds from bond sales reduce or raise respectively the federal government's operational ability to further spend by electronically crediting bank accounts (Mitchell and Mosler 2005). The concern that the federal government might not be able to "pay its bills" is analogous to a concern that a scorekeeper at a football game might "run out of points" if too many touchdowns are scored (Forstater and Mosler 2005). Instead, the ability to create money without regard to the size or timing of debits from or credits to the Treasury's account is precisely why self-imposed rules requiring that the government's spending during a certain period of time not exceed tax receipts by more than some specified amount can be and frequently have been passed by or overlooked.

As a result, it is also meaningless to consider anticipated liabilities of the federal government once they have been discounted to the present. Nevertheless, the proposed Honest Government Accounting Act praised the fiscal imbalance as a measure of "the amount that, if put aside today, would be just sufficient to cover the imbalance between . . . [anticipated] benefits and receipts." Similarly, the purpose behind the Treasury's commissioning of Gokhale and Smetters' report has been characterized in the following way: "Suppose the government could, today, get its hand on all the revenue it can expect to collect in the future, but had to use it, today, to pay off all its future expenditure commitments, including any debt service net of any asset income. Would the present value of the future revenues cover the present value of the future expenditures?" (Kotlikoff and Sachs 2003). These statements neglect a key fact: because the government creates money whenever it spends — either now or in the future — there would be absolutely no point to "setting aside" its own

money for future spending obligations. Discounting government revenues or spending from the future to the present suggests the government should desire to earn interest on the money it "set aside" today, but just as revenues for bond sales or taxes do not affect the government's operational ability to spend, neither would any interest it would earn affect its ability to spend at a later date.

The ability of a sovereign such as the U.S. federal government to create its own money is explicitly incorporated into the GBC, though it is frequently forgotten or glossed over, as when one refers to whether or not the government can "afford" certain spending programs or whether it will go "bankrupt" before it is able to meet all of its debt obligations. Still, however, the GBC presumes money creation is a "last resort" that is used only when a government cannot raise enough funds through taxation or borrowing. This again fails to recognize that the *very act* of spending *is* the creation of money, while the act of receiving tax revenue *is* the destruction of money (Bell 2000).

Nevertheless, the fact that the U.S. federal government is not financially or operationally constrained does not by itself mean that the current and anticipated paths of spending and taxation are *sustainable* in the sense that the term has been defined by orthodox economists in IGBC equations (7), (8), and (9). A sustainable fiscal policy in that sense requires that even a government facing no operational or financial constraints meet its legally obligated commitments without engendering permanent increases in interest payments as a percent of GDP, which eventually result in spiraling inflation or the repudiation of sovereign-debt service in order to avoid spiraling inflation. Thus, sustainable fiscal policy is more about avoiding large-scale inflations resulting from rising debt service and less about bankruptcy or the federal government's ability to create money. Whether or not a sovereign-currency-issuing government also has within its abilities the capacity to ensure fiscal sustainability depends to a large degree on how interest rates on sovereign debt are determined and on the macroeconomic effects of so-called "monetization," which are the subjects of the following sections.

3. Treasury bond sales are interest-rate support — not financing — operations

The Fed's tactics for accommodating banks' demand for reserve balances are generally two-fold. First, the Fed estimates the reserve balances banks desire to hold at the target federal funds rate; second, the Fed must offset anticipated changes in its own balance sheet, which themselves alter the quantity of reserve balances circulating. Due to this need to offset balance sheet changes, the Fed's daily operations frequently are referred to as "defensive" in nature. The Fed's permanent operations offset reserve balance drains due mostly to banks' currency purchases via outright purchases of Treasuries. Shorter-term operations are generally repurchase (and, less frequently, reverse repurchase) operations in Treasuries that aim to offset changes in float, seasonal changes in currency, and changes in the Treasury's account balance, all while accommodating banks' aggregate demand for reserve balances at the targeted rate.

A review of the New York Fed's annual reports on open market operations reveals changes to the Treasury's account as often the most volatile and least certain

part of daily changes in the Fed's balance sheet. This is not altogether surprising given that "the U.S. government is the largest transactor in the world" (Garbade, Partlan and Santoro 2004, 1).

> During fiscal year 2003, aggregate federal receipts and expenditures averaged $18.8 billion daily. Money was disbursed to pay for purchases of goods and services, civilian and military salaries, transfer payments such as social security, and interest on the national debt. Receipts came primarily from personal and corporate income taxes and social security contributions. (1)

As noted in several of the Fed's publications (e.g., DeCorleto and Trimble 2004; Garbade, Partlan and Santoro 2004; Lang 1979; Lovett 1978; Meulendyke 1998), by orthodox economists (e.g., Hamilton 1997), and by heterodox economists (e.g., Bell 2000; Bell and Wray 2002-3; Wray 1998), the Treasury maintains accounts at thousands of commercial banks — known as the Treasury Tax and Loan (hereafter, TT&L) system — in order to aid the Fed in offsetting day-to-day changes in the Treasury's account. In short, the Treasury transfers daily balances held in its Fed account beyond a certain target ($5 billion on most days) into the TT&L accounts, and likewise calls in balances from TT&L accounts on days that its Fed account has dipped below this target. The net effect of the TT&L system is greatly reduced end-of-day net changes in the Treasury's account, which thereby reduce net changes to total reserve balances circulating that the Fed itself must offset.

> If the Treasury deposited all of its receipts in its Reserve Bank accounts as soon as the receipts came in, and if it held the funds in those accounts until they were disbursed, increases in its cash position would drain reserves from the banking system, and conversely, decreases would add reserves. . . . Treasury balances exhibit significant trends, building up when receipts exceed disbursements and running down when disbursements exceed receipts. Maintaining Treasury balances primarily at Federal Reserve Banks would therefore necessitate frequent and large-scale open market operations to mitigate undesirable fluctuations in bank reserves and the federal funds rate. (Garbade, Partlan and Santoro 2004, 1)

During 1975-1978, the Treasury kept most of its balances in its Fed account instead of investing them in TT&L accounts. As expected and as literature published at the time confirms, this required much larger daily Fed operations to offset changes in the Treasury's account:

> This approach to managing the Treasury's balances increased defensive open market operations and complicated both the

> management of bank reserves and the short-run stabilization of the federal funds rate. (Lang 1979, 6)
>
> Frequent and sizable System open market operations became necessary to offset the sharp fluctuations in bank reserves that would otherwise have resulted from the variations in Treasury balances at the Reserve Banks. (Lovett 1978, 44)

The Treasury's return to utilizing TT&L accounts for cash management thereafter had an immediate effect:

> Since November 1978, when the Treasury changed its cash management procedures, the Federal Reserve has been faced with less uncertainty in managing the week-to-week volume of bank reserves.[5] Weekly swings in the Treasury's balance at Federal Reserve Banks have been smaller, and the decreased volatility of these balances has reduced the Federal Reserve's uncertainty about reserve positions. Consequently, Federal Reserve (Fed) open market operations that are conducted to offset the effects of fluctuations in Treasury balances on bank reserves have not had to be as large as in previous years. (Lang 1979, 3)

Obviously, the purpose of the Treasury's actions through the TT&L system is for daily support of the Fed's interest rate target; absent the transfers to/from TT&L accounts, the Fed would be (and was) required to undertake the same operations itself in order to achieve its target rate. Note, however, that because — *ceteris paribus* — *all* government spending results in an increase in total reserve balance and tax payments result in reserve account debits, on a larger scale Treasury bond sales provide much the same effect of support for the Fed's operations as the TT&L system does for shorter-term and smaller scale imbalances in flows to/from the Treasury's account. When a deficit is incurred, in order for the Fed's interest rate target to be achieved either the Fed or the Treasury *must* sell bonds in order to drain the net addition to reserve balances a deficit would create. If no bonds were sold, the deficit would generate a system-wide undesired excess reserve balance position for banks; as banks attempted to lend these balances, the federal funds rate would be bid down below its target.

Treasury bond sales have thus been referred to as "interest rate maintenance operations" rather than "financing" operations (Mitchell and Mosler 2005; Mosler 1995; Wray 1998). More specifically, bond sales are necessary because the federal funds rate target is above the rate paid to banks for balances held in their reserve accounts (currently zero percent in the U.S.). Note that a given deficit can be broken down into new reserve balances, additional currency in circulation, and new Treasuries held by the private sector. Whether a given deficit adds to reserve balances or bond sales (leaving aside additions to currency in circulation for the moment)

depends upon the method of interest rate maintenance employed by the central bank. At one extreme are countries like Canada, where there are no reserve requirements while the interest rate target is set above the rate paid on reserve balances; total reserve balances held overnight are essentially zero (Lavoie 2005), and thus the reserve effects of any government deficit must be offset completely by bond sales to the non-government sector. When the private sector desires more currency in circulation, there is a net overdraft position in bank reserve accounts as the banking system purchases the currency from the central bank; central bank security purchases offset the net overdraft position so that the system-wide balance remains at zero. At the other extreme is Japan during its recently ended zero interest rate regime, which set the interest rate target (zero percent) equal to the rate paid on reserve balances (zero percent); in that case, any positive quantity of excess reserves — beyond that necessary to settle payments and meet reserve requirements — is still consistent with achieving the interest rate target. As such, a deficit need not add to the non-government sector's government securities holdings while a rise in currency purchased by banks may not require an offsetting open market purchase.

The U.S. method of interest-rate maintenance sits between these two extremes. With the federal funds rate target above the rate paid on reserve balances (zero percent), all undesired excess reserves are drained and a given deficit requires bond sales to the non-government sector. Reserve requirements, on the other hand, raise the quantity of reserve balances banks demand while the quantity of Treasuries held by the non-government sector is reduced in kind. An increased demand for currency requires the Fed to engage in an open market purchase to offset a reserve drain. The U.S. method of interest-rate maintenance therefore requires a larger percent of the national debt be held as reserve balances than in Canada and a larger percent of the national debt be held as government securities by the non-government sector than under Japan's zero-interest policy. The previously-discussed simpler operating procedure of setting the Fed's target equal to the rate paid on reserve balances would leave still more reserve balances circulating than under current tactics while, in that case, Treasuries held by the non-government sector would be reduced in kind.

The key point demonstrated in this section is that the GBC is really an *ex post identity*, not a "budget constraint" (Mitchell and Mosler 2005; Wray 1998). The orthodox interpretation of the GBC in equation (1) presumes that a government will "monetize" its deficit if it cannot "borrow." However, as explained in the previous section, the very act of government spending always creates money. When a deficit is incurred, whether the non-government sector holds additional bonds or reserve balances is unrelated to a "financing" versus "monetizing" decision but instead depends upon the particular method of interest rate maintenance that is in place. Setting the interest rate target above the rate paid to banks reserve balance holdings necessitates that all undesired reserve balances be drained via bond sales, while reserve requirements will reduce in kind the value of bonds held by the non-government sector. In sum, consistent with the fact that a sovereign-currency-issuing government does not face a financial constraint, its bond sales are not financing operations, while the operational purpose of the bond sales is interest-rate maintenance.

4. Monetization vs. bond sales is a false dichotomy

One question still to be considered is whether, with a given deficit, more reserve balances circulating coupled with fewer bonds held by the private sector together raise the likelihood of spiraling inflation, as the orthodox interpretation of the GBC assumes. The approach here recognizes the importance of understanding the balance sheet implications of both of these options (Wray 2003-4). While orthodox economists typically assume a supply and demand relationship, as in the hypothesized loanable funds market, and then build models accordingly, such an approach can miss important relationships in the real world. In particular, *any* transaction in a capitalist economy results in changes in the agents' financial statements; if the hypothesized supply and demand relations are not consistent with the actual changes occurring within the financial statements of the relevant agents, then the hypothesized model is irrelevant. In a modern money regime, "monetization" versus "financing" as characterized both in the GBC and in the orthodox view of the loanable funds market fall into this category.

Consider first the case in which the federal government runs a deficit but neither the Treasury nor the Fed sells bonds. This is "monetization" as described by orthodoxy in the GBC. Figure 1 shows the balance sheet effects of this in the private sector, with the effects on banks and non-banks shown separately. In this case, the government's net spending results in net credits to both bank reserve accounts and to deposits held by the non-bank sector (i.e., recipients of net government expenditures). But since current Fed operating procedures set the federal funds rate target above the rate paid on reserve balances, the deficit in Figure 1 *will* create undesired excess balances and the federal funds target will be bid down — theoretically, to the rate paid on reserve balances. Figure 1 — or, "monetization" — is in fact *not an operational possibility* under current Fed procedures that set the target rate above the rate paid on reserve balances. In other words, even if the federal government wanted to "monetize" in the manner assumed by the GBC, either the Treasury or the Fed would still be required to sell bonds to hit the Fed's target rate, since this is the operational function of bond sales (Mitchell and Mosler 2005; Mosler 1997-8; Wray 1998).

Figure 1: Deficit without Bond Sale

Banks

Assets	Liabilities
+ Reserves	+ Deposits

Non-Bank Private Sector

Assets	Liabilities
+ Deposits	+ Net Worth

That government deficits create increased net saving in the non-government sector is readily seen in Figures 1, 2, and 3. By definition, additional net saving flows to a given sector are entered on a balance sheet as additional net financial assets and net worth for that sector. The creation of any financial asset generates both an asset and a liability; in the case of a government deficit, the liability remains on the government's balance sheet while there is a simultaneous increase in net equity or wealth in the non-government sector. In Figure 1, the new net financial assets are the additional deposits — the M1 measure of money — on the non-bank sector's balance sheet unaccompanied by an offsetting increase in its liabilities. Figure 2 shows the same deficit accompanied by a bond sale that is purchased by banks. In this case, the Treasury purchase by the banking sector is paid for by the debit to reserve accounts. The operational effect of the reserve balance drain is to support the interest rate target. There is still an increase in net financial assets or wealth of the non-government sector, as the deposits (M1) remain on the non-bank private sector's balance sheet. Figure 3 shows the same deficit accompanied by a bond sale to the non-bank private sector, as in sales to non-bank Treasury dealers. As in Figure 2, the reserve drain enables the Fed to sustain the federal funds rate target, and there are again net financial assets created for the private sector in the form of Treasuries on the non-bank private sector's balance sheet.

Figure 2: Deficit with Bond Sale to Bank

Banks			Non-Bank Private Sector	
Assets	Liabilities		Assets	Liabilities
+ Reserves	+ Deposits		+ Deposits	+ Net Worth
- Reserves +Treasuries				

Figure 3: Deficit with Bond Sale to Non-Bank

Banks			Non-Bank Private Sector	
Assets	Liabilities		Assets	Liabilities
+ Reserves	+ Deposits		+ Deposits	+ Net Worth
- Reserves	- Deposits		- Deposits + Treasuries	

In terms of the effect on net financial assets for the non-government sector, the figures show that there is no significant difference between "monetization" or bond sales besides the effects on the federal funds rate. But from the orthodox GBC view that "monetization" is more inflationary than bond sales, Figure 1 is assumed to be more inflationary than Figures 2 and 3. Regarding Figure 1, recall that banks have no reason to hold reserve balances aside from settling payments and meeting reserve requirements. While this forces the Fed to accommodate banks' demand for balances, more importantly here it also means that the reserve drain shown in Figures 2 and 3 can in no way restrict potential money creation by banks. Reserve balances do not "fund" loans or money creation; loans or money creation instead occurs when banks are presented with opportunities to lend at an expected profit.

Another implication, or (at least) interpretation, of the GBC view is that the Treasuries added to the non-bank private sector's net financial assets in Figure 3 are less stimulative than the deposits created in Figure 1, but this is also clearly false. This ignores the fact that M1 money is left circulating when bonds are sold to banks as well (as in Figure 2), so the distinction to be made in this case is actually between bond sales to the non-bank public and bond sales to banks (i.e., Figures 1 and 2 versus Figure 3) even though no orthodox economist has ever suggested that bond sales to banks were more inflationary than bond sales to the non-bank private sector. That the non-bank private sector is holding Treasuries rather than deposits, in Figure 3, does not somehow constrain its spending; just as deposit holders could choose to convert their new wealth to time deposits instead of spending, so can the sector holding Treasuries (which are essentially time deposits at the Fed) choose instead to leverage its new wealth (which is highly valuable as loan collateral at any rate). In short, given a deficit, the non-governmental sector should (*ceteris paribus*) logically be more likely to spend than without the deficit while also appearing more creditworthy to banks (who themselves face no operational constraint on money creation); whether new deficits are held by the non-bank private sector as deposits or Treasuries does not imply more or less ability to spend.

Finally, an overarching and important point is that the *Fed's* operations *do not* create net financial assets on the balance sheets of the non-government sector as orthodox fears of "monetization" seem to infer.[6] The quantity of net financial assets on the non-government sector's balance sheets is set by definition by the size of the government's total outstanding debt, not the Fed's operations. These net financial assets are held by the non-government sector as reserve balances, currency, or Treasuries. Instead of adding to or subtracting from the sum total of these three, the Fed's operations affect their *relative* quantities endogenously in response to the non-government sector's demands for currency and reserve balances given the current method of interest-rate maintenance and the current interest rate target. By national income accounting identity, only a change in the government sector's debt can affect the non-government sector's net financial assets.

In sum, the orthodox GBC concern over whether or not a deficit is accompanied by bond sales is irrelevant for understanding the potential inflationary effects of the deficit. As demonstrated in the preceding section, the operational

function of bond sales is to support the interest rate target, not to "finance" a deficit. A government bond sale does not somehow reduce funds available for non-government agents to borrow as presumed in the orthodox loanable funds market approach, while the absence of a bond sale does not somehow mean there is a greater amount of liquid financial assets, income, or "funds available" for borrowing or spending. Instead, a government deficit always *adds* to the non-government sector's net financial wealth whether or not a bond sale occurs. Both the Treasury's bond sales and the Fed's operations affect only the relative quantities of Treasuries, reserve balances, and currency held by the non-government sector; the total sum of these (and thus the total net financial assets of the non-government sector) is set by the outstanding government debt. With or without bond sales, it is the non-government sector's decision to spend or save that matters in regard to the potential inflationary impact of a given government deficit.

5. Interest rates on government debt are monetary phenomena

Given the real-world relations between banks, the Fed, and the Treasury as described in the preceding discussions — deficits do not crowd out but rather create net financial assets for the non-government sector; Treasury security sales are interest-rate maintenance operations rather than financing operations; the federal government faces no operational or financial constraints; and the Fed necessarily sets an interest rate target — then the orthodox accounts of the GBC and the effect of deficits upon "the supply of funds available" in the loanable funds market, and thereby on interest rates, are inconsistent with these relations. Instead, it follows from the preceding points that the interest rate on the national debt in a modern money regime is a *monetary* phenomenon.

Consistent with the orthodox loanable funds approach, some have questioned the Fed's ability to influence other short term rates. Widely cited articles by Benjamin Friedman (1999; 2000) argued that the Fed needed financial market traders to essentially "go along" in order for its target to influence other short-term interest rates. More recently, and for different reasons, Daniel Thornton (2004; 2006) has even suggested that "most target changes are endogenous — the Fed adjusts its target whenever the equilibrium short-term rate changes" (2006, 24). Both agreed that "it would take very large open market operations to defend a target rate that differed significantly from the equilibrium rate should market participants come to doubt the Fed's ability to defend its rate objective" (Thornton 2006, 24).

Such statements neglect a fundamental truth about the Fed's operations: because banks *need* reserve balances to settle large numbers of payments each day and to meet reserve requirements, the Fed's target rate influences other short-term rates through arbitrage, not vice versa. In other words, because banks *need* reserve balances, the interbank rate targeted by the Fed "matters" in the determination of other short-term rates even though the Fed makes no attempt to directly affect these other rates (Fullwiler 2006).[7] This is confirmed empirically in numerous studies, most recently by Bartolini, Hilton and Prati (2005); Cyree, Griffiths and Winters (2003); Demiralp,

Preslopsky and Whitesell (2004); Griffiths and Winters (1997); and Lee (2003); all of which find evidence of day-of-maintenance period and high-payment-flow day effects in overnight Eurodollar and/or repurchase agreement markets that mimic well-documented and well-understood patterns of the federal funds rate (e.g., Demiralp and Farley 2005; Furfine 2000; Griffiths and Winters 1995; Hamilton 1996). Research shows that arbitrage between these markets is *very* active to the point that differences in default risk, collateral, and availability of offshore facilities come into play. Demiralp, Preslopsky and Whitesell found that arbitrage opportunities between these markets of only a few basis points are left unexhausted, while Bartolini, Hilton and Prati used high frequency, intraday data and found even smaller arbitrage opportunities remained. In short, there is no "equilibrium" short-term rate besides the rate targeted by the Fed; instead, it is the Fed's target that serves as the anchor for these other rates.

Both orthodox (e.g., Friedman 1999; 2000; King 1999) and heterodox (e.g., Palley 2001-2) researchers have suggested that banks' abilities to circumvent reserve requirements or utilize private payment settlement methods could eventually threaten the Fed's ability to influence other interest rates through its target rate. Again, however, this misunderstands the fundamentals of monetary operations. The *quantity* of reserve balances banks desire to hold in reserve accounts is irrelevant to the influence of a central bank's target over other rates (Fullwiler 2006, 508-510); for instance, recall that in Canada there are *no* reserve balances circulating except on an intraday basis. What matters is simply that the demand for reserve balances be significant enough — in other words, *non-trivial* — such that the Fed's target anchors other short-term rates. Regardless of how reserve requirements or payments systems evolve in the future, that the non-government sector's tax liabilities are settled with the Treasury via banks' reserve accounts is sufficient for a *non-trivial* demand for reserve balances to exist (Fullwiler 2006, 515-521). Whereas neo-Chartalist research has demonstrated that a tax liability payable in the government's money creates a demand for this money (e.g., Wray 1998), the corollary here is that a tax liability settled via reserve accounts held at the central bank is also sufficient for the central bank's interest rate target to serve as an anchor for other market interest rates.

An understanding of monetary operations is similarly necessary for understanding the nature of interest rates paid on the outstanding national debt. While the U.S. federal government issues debt across a broad spectrum of maturities, this is not necessary nor has it always been the case. The unnecessarily complex method of security issuance and wide array of maturities likely contributes to misinterpretations as in the loanable funds paradigm. The following paragraphs discuss four different methods for issuing debt under a modern money regime.

Given a deficit, the most general or simplest method would be for the non-government sector to hold only reserve balances, as in Figure 1. Of course, this would eventually leave billions if not trillions of dollars in excess balances, and the federal funds rate would fall to zero, as many have pointed out (e.g., Bell and Wray 2002-3; Forstater and Mosler 2005; Fullwiler 2005; Mosler 1995; 1997-8; Wray 1998; 2003; 2003-4). Forstater and Mosler (2005) thereby declared that the most general or

"natural" case is a federal funds rate of zero. Note that the nominal rate on the national debt would be zero in this case regardless how large the debt was, provided that it was greater than the quantity of balances needed by banks to settle payments (including settling customers' tax liabilities) and meet reserve requirements.

As previously noted, current monetary operating procedures achieve a positive federal funds rate target by leaving only as many balances in circulation as banks need to settle payments and meet reserve requirements. Thus, the "reserve balance only" option is possible with a positive interest rate target only where the target rate is equal to the rate banks earn on reserve balances. As the proposals from Lacker (2006) and Whitesell (2006) confirm, an operating procedure with interest payment and no bond sales enables the Fed to simply announce changes to its interest rate target by raising or lowering the rate paid on reserve balances (Fullwiler 2005, 547). This slightly less "general" or "natural" case of a national debt held only in reserve balances that earn interest would again leave the interest rate on the national debt equal to the Fed's short-term interest rate target regardless of the size of the debt or the deficit.

The Treasury's third option for debt operations is to issue short-term Treasury bills, as in Figures 2 and 3. Just as with other short-term investments such as repos or Eurodollars, the rate on short-term Treasuries will not deviate significantly from the Fed's target without providing an arbitrage opportunity to investors, regardless how many are issued. As above, that taxes must be settled with reserve balances is sufficient for the Fed's target rate to act as an anchor for short-term interest rates including short-term Treasury rates. As with interest payment on reserve balances, the rate paid on the national debt in this case is thus determined primarily by the Fed's target rate, though the two will likely differ somewhat due to different maturities and default risk premiums.

Treasury notes and bonds — the fourth option for the Treasury's debt operations — are essentially fixed-rate, long-term time deposits held by the non-government sector; again, this is shown in Figures 2 and 3. It is well known that the rates on these instruments are primarily determined by current and expected future levels of short-term interest rates, though varying term and liquidity premiums can also be significant. Federal Open Market Committee Chair Bernanke recently reiterated this point while reciting the implied arbitrage relationship:

> All else being equal, if short-term rates are expected to be high on average over the relevant period, then longer-term yields will tend to be high as well. *Were that not the case, investors would profit by holding a sequence of short-term securities and declining to hold long-term bonds. . . .* Likewise, if future short-term rates are expected to be low on average, then long-term bond yields will tend to be low as well. (Bernanke 2004, 3; emphasis added)

Of course, since the short-term rates themselves follow the Fed's target closely, this means that longer-term rates are primarily based upon current and expected actions of

the Fed. As with the other methods of debt issuance, the size of the national debt or deficit is irrelevant to the level of interest rates on these long-term, fixed-rate government issued time deposits except in as much as they influence the Fed's current or expected monetary policy stance.

Overall, the interest rate paid on the national debt is set by the stance of monetary policy whether it is held as reserve balances of the interest-bearing variety or Treasury bills, while the expected stance of monetary policy is significant when longer-term, fixed-rate Treasury notes and bonds are issued. As Bernanke noted, for traders to try and set bid-ask rates on Treasury securities that deviate significantly from these principals, even amid the expectation of growing future deficits, would eventually present an arbitrage opportunity for other traders to exploit. Note that the monetary nature of Treasury rates also clarifies how long-term rates have remained stubbornly low (and even slightly declined) since the Fed's tightening cycle began in the summer of 2004, even as the phenomenon has been labeled a "conundrum" by most economists. St. Louis Fed President Poole verifies that long-term Treasury rates have been largely consistent with monetary policy expectations of traders as revealed in futures markets and the yield curve:

> The key to understanding this situation is that increases in the target funds rate were well predicted in June 2004, when the increases began from the unusually low federal funds rate of 1 percent. In June 2004, the market correctly gauged that the Fed would raise the funds rate steadily and gradually for the next year and a half. Not until the November 2005 FOMC meeting did the target funds rate exceed the rate that had been expected in June 2004. With the funds rate rising on the expected track, there was no reason for the 10-year bond rate to depart in any major way from its level in June 2004. The increase in the bond yield since November 2005 is consistent with the idea that the funds rate has now increased somewhat more than the market anticipated earlier. (Poole, 2006, 5)

Regarding Poole's comments about late 2005, note that it was then that the 10-year Treasury rate finally began to move significantly above 4.5 percent; Rudebusch, Swanson and Wu (2006, 2n) concurred with Poole that "the upward shifts in money market futures rates during 2005" indicate that continued policy tightening "appears to have been unanticipated" prior to that time.

Gokhale and Smetters' previously cited concern that the federal government could be faced with rising default premiums on its debt, as occurred in California, mistakes a currency-issuing entity (i.e., the federal government) for a currency-using entity (i.e., state and local governments, households, firms, and so forth) within modern money regimes (Mitchell and Mosler 2005). Moreover, orthodox researchers' previously cited "evidence" that *expected* deficits raise forward real interest rates is highly questionable since *none* of these studies controlled for the monetary policy

expectations of traders that are important determinants of forward rates even in orthodox models of the term structure (e.g., Rudebusch, Swanson and Wu 2006). In short, whatever statistically significant correlations between deficits and interest rates orthodox researchers do or do not find, if their analysis misrepresents the actual interactions between the Fed, the Treasury, and others in the financial system, then the analysis is disputable at best.

To conclude this section, in a modern money regime such as the United States, deficits accompanied by bond sales do not crowd out but rather create net financial assets for the non-government sector, the operational purpose of bond sales is interest-rate support, and the Fed's interest rate target anchors other short-term rates given that tax liabilities must be paid in reserve balances. As a result of these regime characteristics, the interest rate on the national debt is a monetary phenomenon that mostly reflects the current and expected (if long-term securities are issued) interest-rate "anchor" set by the Fed, not the size of the current or expected future levels of the debt or deficits as assumed in the loanable fund market paradigm. This monetary nature of interest on the national debt is consistent with the fact that the federal government never *needs* to issue its debt as securities and instead could simply leave circulating interest-bearing reserve balances that earn interest at the Fed's target interest rate. Self-imposed constraints or lack of political will might keep such a simplified procedure from being implemented, but they do not change the monetary nature of rates paid on the national debt. In short, the *choice* to issue short-term or long-term securities is merely a more complicated version of operations in the general or (with a zero interest rate target) "natural" case.

Rethinking Sustainable Macroeconomic Policy

Both the orthodox GBC and the modern money analyses recognize the federal government's ability to create money and therefore its ability to always service its own financial obligations; any default on obligations in its own money would be a choice, not a necessity, unlike default for a non-currency issuer. As previously demonstrated, fiscal sustainability as defined by orthodoxy is not about the ability to repay or service debt even as some orthodox economists at times express concern over whether a sovereign government can "pay its bills." Instead, the orthodox view of fiscal sustainability has to do with whether the combination of debt and interest will create unbounded increases in interest payments, which eventually lead to rising inflation or default on the government's obligations in order to avoid inflation. However, the GBC understanding of the inflationary impacts of "monetization" and the loanable funds market view of interest rate determination (including the supposed "non-traditional" effects of deficits), which together lay the foundations for the orthodox view of fiscal sustainability, are inapplicable to a modern money regime. As demonstrated in the previous section, "monetization" versus "financing" of a deficit is a false dichotomy, while interest on the national debt is a monetary phenomenon. The flawed foundations of the orthodox analysis of fiscal sustainability call for an alternative understanding of sustainable macroeconomic policy that is consistent with a modern money regime, which is the subject of this section.

The U.S. national debt in 2007 is about 30 percent of GDP. Consistent with the concept of fiscal sustainability as defined by the IGBC, this figure does not include Treasuries held by the Fed (about six percent of GDP) since almost all interest paid is returned to the Treasury. Similarly, non-marketable Treasuries held in the Social Security and Medicare trust funds or by other federal government agencies (about 27 percent of GDP) are not included in the ratio since interest payments to these trust funds are intergovernmental transfers (see note 2). Obviously, the debt ratio for the U.S. or any other country has been higher or lower than the current level at different points in time, and it would appear arbitrary to suggest that the ratio should converge in the future at any particular ratio. Nonetheless, the IGBC sets this as the criterion for sustainability in equations (7) and (8) above. BCHS recognize this and readily admit that "the requirement that the ratio of debt to [GDP] eventually returns to its initial level is clearly not very convincing. A policy aimed at stabilizing the debt to [GDP] ratio at 40 per cent rather than 20 percent should clearly not be characterized as an unsustainable fiscal policy" (14).

Indeed, because the unbounded increase in interest payments as a percent of GDP is the key characteristic of an unsustainable fiscal policy as defined by the IGBC, BCHS demonstrated that the condition of sustainability "will hold as long as the debt to [GDP] ratio converges to any ratio, not only the initial one. It may even hold if the ratio grows forever as long as it does not grow eventually at a rate equal to or greater than ($r - \Theta$) [i.e., the real interest rate less the growth rate of real GDP]" (14). Of course, this has been recognized at least since Domar (1944) showed that "the problem of the debt burden is a problem of an expanding national income" relative to the rate of interest (817). As in Domar's paper, BCHS noted that "if ($r - \Theta$) were negative, the government would no longer need to generate primary surpluses to achieve sustainability. . . . The government could even run permanent primary deficits of any size, and these would eventually lead to a positive but constant level of debt, $[g - t]/(r - \Theta)$" (15).

Table 2 illustrates this point by assuming the real interest rate (r) is one percent below the real GDP growth rate (Θ); that is, in Table 2 the real interest rate is 2 percent and 1 percent, respectively coupled with real GDP growth rates of 3 percent and 2 percent. Like Table 1, Table 2 utilizes Gokhale and Smetters' (2003a) assumptions except for the lower real interest rate used in this case (Table 1 assumes the real interest rate is 3.6 percent). As predicted by both BCHS and Domar, in Table 2 the fiscal imbalance remains at zero even as primary deficits are 0.47 percent of GDP into perpetuity for either case. Interest as a percent of GDP remains at 0.93 percent and 0.47 percent of GDP into perpetuity, respectively coupled with total deficits of 1.4 percent and 0.94 percent of GDP.

As a related matter, while Gokhale and Smetters (2003a) propose — and the proposed Honest Government Accounting Act would have *required* — that the IGBC be calculated at the infinite horizon, these calculations are known to be meaningless if the rate of real GDP growth is greater than the rate of real interest. The simplest example of this is shown in equation (10) below, which is identical to equation (7) except that it is explicitly noted here that $n = \infty$ while a constant primary deficit as a percent of GDP into perpetuity is assumed.

Table 2: Gokhale and Smetters' Sustainable Fiscal Policies with θ - r = 1%

Infinite Horizon				In 30 Years			In 75 Years		
Real GDP growth	Fiscal Imbalance	Primary Deficit	PV of future Primary						
Θ	Eq. (7)	g-t	Deficits	int/GDP	Δb	b	int/GDP	Δb	b
3%	0	0.47%	-5.137	0.93%	1.4%	48.0%	0.93%	1.4%	48.0%
2%	0	0.47%	-5.137	0.47%	0.94%	48.0%	0.47%	0.94%	48.0%

$$(10) \qquad \textit{Fiscal Imbalance} = b_0 + \sum_{k=1}^{\infty} \frac{g_k - t_k}{(1 + r - \Theta)^k} = b_0 + \frac{g_1 - t_1}{r - \Theta}$$

In particular, if $r < \Theta$, then increasingly larger primary deficits *improve* the fiscal imbalance according to equation (10), whereas primary surpluses *worsen* it.

Alas, BCHS note, "[t]here 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" (15). In calculating the $44 trillion "fiscal imbalance," Gokhale and Smetters (2003a) likewise assume a two percent growth rate of real GDP into perpetuity, while they "use a real discount rate of 3.6 percent per year, corresponding to the average yield on 30-year Treasury bonds during the past several years" (23). These points are highly questionable empirically. Regarding use of the 30-year bond rate, according to the U.S. Treasury's Office of Debt Management (2006, 10), the average maturity of debt outstanding during the past 25 years has never been above 70 months and stood at 53 months at the end of 2005; likewise, the average maturity of Treasuries issued has not been above 90 months during this period and is currently at 36 months. Thus, the use of a thirty-year Treasury is inappropriate as a proxy for the average Treasury rate, if not an attempt to (disingenuously?) set the Treasury's rate paid as high as possible (since long-term rates are usually higher than short-term rates as a result of maturity premiums).

To compare real interest rates to real GDP growth, considering instead the benchmark three-month and ten-year Treasury rates as proxies for average Treasury rates is clearly more legitimate since average maturities of issuance and of outstanding securities nearly always fall within this range. There is no universally agreed upon method of imputing real interest rates, particularly at longer maturities. Instead, a straightforward way to view the "interest rates versus GDP growth" comparison is to consider nominal values for both since the difference in nominal or real terms will be identical. Table 3 shows average nominal values for 3-month Treasuries, 10-year

Table 3: Nominal GDP Growth and Nominal Interest Rates

	1953:2 - 1979:3	1979:4 - 2000:4	2001:1 - 2006:3	1953:2 - 2006:3
Ave 3-Month Rate	4.36%	6.88%	2.49%	5.16%
Ave 10-Year Rate	5.33%	8.50%	4.46%	6.50%
Ave GDP Growth	7.37%	6.38%	5.11%	6.73%
3-Month Rate less GDP Growth	-3.01%	0.50%	-2.62%	-1.57%
10-Year Rate less GDP Growth	-2.04%	2.12%	-0.65%	-0.23%

Treasuries, and nominal GDP growth during 1953:2 – 2006:3; and it shows both interest rate less nominal GDP growth for this period. Contrary to BCHS's assertion, Treasury rates have been less than the average GDP growth rate for the entire 1953:2 – 2006:3 time period, as shown in the far right column of Table 3. Notably, the only exception was during the 1979:4 – 2000:4 sub-period in which the Fed pursued a high interest rate policy aimed at reducing inflation.

The monetary nature of Treasury rates is illustrated rather dramatically in Figure 4, which shows nominal three-month and ten-year Treasury rates less nominal GDP growth during 1953:2 – 2006:3, calculated as two-year moving averages to smooth quarterly volatility. The Fed's shift to high rate policy during 1979:4 – 2000:4 is again obvious as average rates less nominal GDP growth for the sub-periods in Table 3 are shown with bold horizontal lines. Also, the smoothing effect of the two-year moving average illustrates how changes in long-term Treasury rates are dominated by changes in short-term Treasury rates, which are themselves tightly anchored to the Fed's target, as previously discussed. Not surprisingly, the pattern of interest outlays on the national debt as a percent of GDP shown in Figure 5 also follows the overall pattern of interest rates less nominal GDP growth in Table 3 and Figure 4. Note that even with the return to federal government deficits since 2002, interest payments as a percent of GDP have fallen back to pre-1979 levels — aside from a bit of an increase in 2006 as the Fed raised the federal funds rate near the rate of nominal GDP growth. In sum, data on Treasury rates less GDP growth shows that the Fed's policy stance is the significant force in setting the interest rate on the national debt, not the size of the deficit or other forces presumed by the orthodox approach.

Many heterodox economists argue that persistent or at least frequent deficits that are often large can be necessary to sustain sufficient aggregate demand (even in the long run). If this view is taken seriously, the monetary nature of interest paid on the national debt provides insight into how persistent primary deficits might be "sustainable" according to BCHS's definition. For instance, Table 4 shows primary deficit and interest combinations for a hypothetical economy growing at a six percent nominal rate per year on average (as Table 3 shows, the U.S. average has been 6.73 percent during 1953:2 – 2006:3) and beginning with a debt-to-GDP ratio of 50 percent. Interest payments as a percent of GDP at 30-year and 75-year intervals are

Figure 4: Nominal Treasury Rates Less Nominal GDP Growth Rate (2-Year Moving Average)

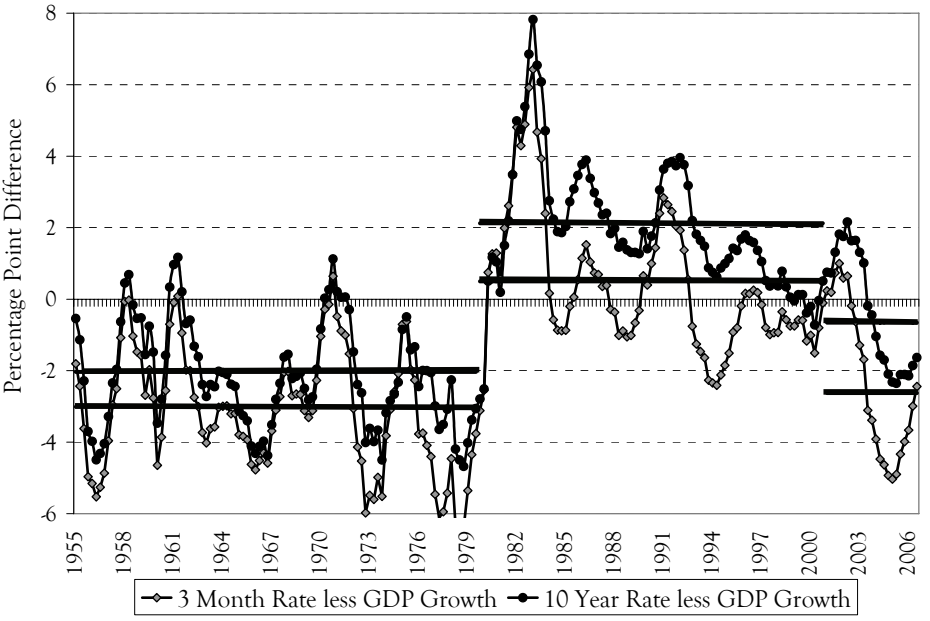
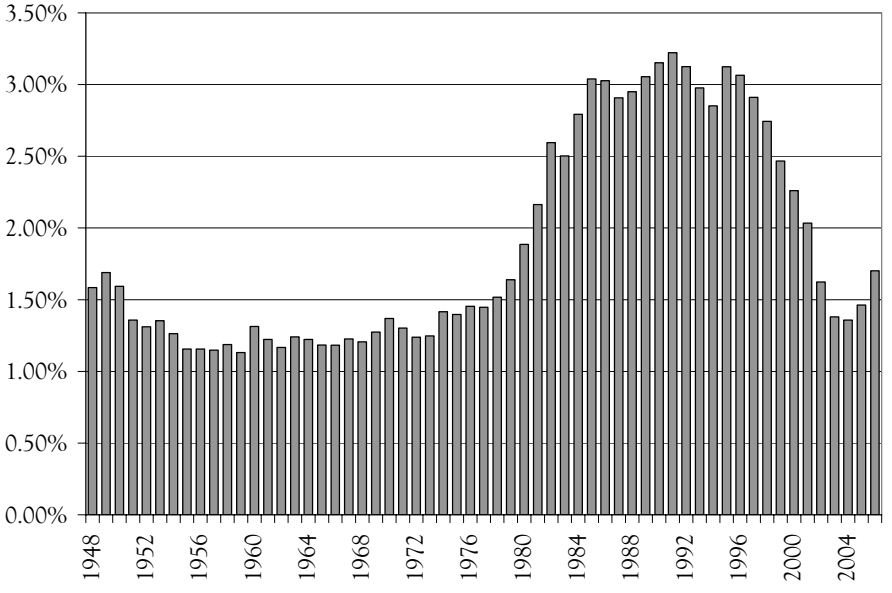


Figure 5: Federal Interest Outlays as a Percent of GDP



calculated for persistent primary deficits of two, four, and six percent of GDP, while interest rates are assumed to be set *below* the rate of GDP growth. Also, the size of interest rate outlays as a percent of GDP after convergence to a constant percent of GDP and the year this convergence occurs are both shown (thus, *all* of the scenarios in Table 4 are "sustainable" paths *in theory* according to the IGBC approach). Finally, as Arestis and Sawyer (2003) note, interest payments are subject to income taxes, and thus actual net interest paid will be less than the nominal interest rate; Table 4 shows interest payments with a 20 percent tax rate, which is a conservative assumption given that most bond holders would be in high tax brackets. As the table shows (and as is fairly intuitive), persistent primary deficits — even six percent of GDP — may not generate overly large interest payments if the interest rate is significantly less than the GDP growth rate. This is particularly true if taxation of interest is assumed, which is obviously the more realistic scenario. However (and, again, intuitively), this becomes less true as the interest rate is increased relative to GDP growth, even as the rise in interest payments and thus in the debt-to-GDP ratio is ultimately bounded.

In sum, while the orthodox approach cautions against the eventual (hyper) inflationary effects of persistent primary deficits, a rethinking of what constitutes sustainable macroeconomic policy is in order. Recall again that in a modern money regime there is no question regarding the federal government's *ability* to "pay its bills" or to set the interest rate at which it services its debt. As such, if in fact a functional finance-type approach to macroeconomic stabilization is the appropriate one, and if persistent primary deficits result from such a fiscal regime, it follows that *what is unsustainable is a high interest rate monetary policy* since it is monetary policy that drives interest rates on the national debt. Clearly the Fed's high interest rate policies during 1979:4 – 2000:4 were unsustainable in a world in which persistent primary deficits are required to sustain aggregate demand at full employment. Table 4 shows furthermore that some monetary policies in which interest rates are set at moderately high levels but still below the rate of GDP growth can also be essentially unsustainable if sizeable, persistent primary deficits are required for attaining permanent full employment. On the other hand, Table 4 shows that given low interest rate monetary policies, persistent and even persistently large primary deficits will not substantially raise interest payments as a percent of GDP and thus will not be "unsustainable" in the sense argued by BCHS and suggested in the IGBC.

Concluding Remarks

The sustainability of fiscal policy as determined via the orthodox IGBC framework is irrelevant for understanding the workings of a modern money economy. The orthodox assumption that interest rates are determined in a loanable funds market and the related assumption that inflationary impacts of deficit "monetization" differ

Table 4: Interest Outlays for Deficit and Interest Rate Combinations

Assuming Nominal GDP Growth = 6% and Starting Debt/GDP = 50%

Interest Rate	Annual Primary Deficit	Interest in 30 Years		Interest in 75 Years		Convergence Year and Interest	
		tax=0%	tax=20%	tax=0%	tax=20%	tax=0%	tax=20%
1%	2%	0.42%	0.32%	0.40%	0.31%	Year 57, 0.40%	Year 46, 0.31%
	4%	0.72%	0.56%	0.79%	0.61%	Year 88, 0.80%	Year 129, 0.62%
	6%	1.02%	0.80%	1.18%	0.91%	Year 105, 1.2%	Year 85, 0.92%
2%	2%	0.98%	0.74%	1.00%	0.73%	Year 65, 1.0%	Year 31, 0.73%
	4%	1.65%	1.25%	1.94%	1.42%	Year 141, 2.0%	Year 103, 1.45%
	6%	2.33%	1.76%	2.88%	2.12%	Year 158, 3.0%	Year 128, 2.18%
3%	2%	1.75%	1.26%	1.93%	1.32%	Year 167, 2.0%	Year 94, 1.33%
	4%	2.88%	2.10%	3.69%	2.55%	Year 219, 4.0%	Year 199, 2.67%
	6%	4.01%	2.95%	5.45%	3.78%	Year 239, 6.0%	Year 185, 4.0%
4%	2%	2.78%	1.93%	3.48%	2.18%	Year 319, 4.0%	Year 263, 2.29%
	4%	4.48%	3.16%	6.51%	4.15%	Year 375, 8.0%	Year 232, 4.57%
	6%	6.18%	4.40%	9.53%	6.12%	Year 401, 12.0%	Year 294, 6.86%
5%	2%	4.20%	2.78%	6.21%	3.48%	Year 775, 12.0%	Year 319, 4.0%
	4%	6.60%	4.48%	11.25%	6.51%	Year 863, 20.0%	Year 375, 8.0%
	6%	9.00%	6.18%	16.29%	9.53%	Year 911, 30.0%	Year 401, 12.0%

from those of deficit "financing" are both fundamentally flawed. Instead, the orthodox view that fiscal deficits might have large effects on interest rates is appropriate only for a non-sovereign-currency-issuing government operating under fixed exchange rates, not for a modern money regime with flexible exchange rates. Consistent with the monetary nature of interest rates in a modern money regime, rates on Treasuries have followed the stance of monetary policy, not fiscal policy, and have only risen above the rate of GDP growth during times when high interest rate policies were pursued by monetary policy makers. And, because interest rates on the national debt in a modern money regime are a matter of monetary policy, it follows that the stance of monetary policy has much to do with whether or not a given fiscal path is "sustainable" according to BCHS's definition.

The "sound finance" view of fiscal policy is obviously central to the orthodox view of fiscal sustainability. As BCHS argue, "[s]ustainability is basically about good housekeeping. It is essentially about whether, based on the policy currently on the books, a government is headed towards excessive debt accumulation" (8). By contrast, the functional finance view argues that it is involuntary unemployment and excessive unutilized capacity that a government and a nation should view as being "unaffordable." Much as the theoretical foundations for fiscal policies consistent with the philosophy of functional finance have been detailed by other researchers (e.g., Arestis and Sawyer 2003; Mosler 1997-8; Nell and Forstater 2003; Wray 1998), this paper contributes to the theoretical foundations for a monetary policy complement to these fiscal policies. The corollary here is the recognition that a nation may not be able to "afford" monetary policy regimes that persistently set high interest rates if it also wants to pursue policies that promote true full employment and macroeconomic stability, particularly if the latter necessitate persistent primary fiscal deficits. The Fed's monetary policies during 1979 – 2000 stand out as remarkably "unsustainable" in this regard. Another necessary — though, admittedly, not sufficient — hurdle to overcome in the progression toward a functional finance-based macroeconomic policy is to abandon analyses based on the flawed IGBC framework currently employed by numerous government offices. In short, if it is true that involuntary unemployment is a frequent — if not persistent — characteristic of a modern capitalist system as Keynes, Minsky, and many others have concluded, then the nation most certainly cannot "afford" to have its policies run according to such a mistaken analytical framework as the one at the heart of the misguided and tragically mislabeled Honest Government Accounting Act.

Notes

1. In Congressional testimony in 2003, Smetters went a step further than even Senator Lieberman, proposing much the same as the latter's "Honest Government Accounting Act" but as an amendment to the U.S. Constitution.
2. Gokhale and Smetters (2003a) erred in adding trust funds for entitlement programs to their measure of the existing national debt. While it is true that these represent a future liability of the government, the interest on them is not a government outlay but is rather an intergovernmental transfer. Even if this interest payment is "financed" by "borrowing" that further raises the size of the

trust fund, this is likewise an intergovernmental transfer and does not affect the debt held by the non-government sector or the government's outlays to the non-governmental sector. However, the current exercise is merely to demonstrate the logic of fiscal sustainability using Gokhale and Smetters' well-known example, not to have precise real-world measures of the variables.

3. This is somewhat different from Gokhale and Smetters (2003a) since significant primary deficits related to entitlement programs are not expected for 15 to 30 more years, which weights more of their estimated $44 trillion fiscal imbalance after 75 years than would be the case using the examples in Table 1.
4. Gokhale and Smetters (2003a) do not explicitly state their assumed growth rate of real GDP. However, given that real GDP begins in their study at $10.7 trillion and given a real interest rate of 3.6 percent, their assumed growth in real GDP can be determined from these since their stated estimate for the cumulative discounted value of real GDP at the infinite horizon is $682 trillion (2003b, 37). In other words, using the typical constant growth formula, (10.7 x 1.02) / (0.036 – 0.02) is equal to 682.
5. At the time, the reserve requirement maintenance period was one week in length. The increase to a two-week maintenance period occurred in 1984.
6. The exception to this is float on the Fed's balance sheet, which in fact does create additional reserve balances for banks without an increase in accompanying liabilities. The economic significance of this is minimal, however, generally totaling well below $1 billion compared to a total national debt of well over $4 trillion.
7. Furthermore, there is no reason for market participants "to doubt the Fed's ability to defend its rate objective," since the Fed clearly has no operational or financial constraint upon its ability to do so, like any sovereign-currency issuer. See Fullwiler (2006, 514) for a more complete discussion.

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