

THE US FISCAL CRISIS: THE DEBT SUSTAINABILITY DELUSION AND THE TRUE COSTS OF FISCAL AUSTERITY

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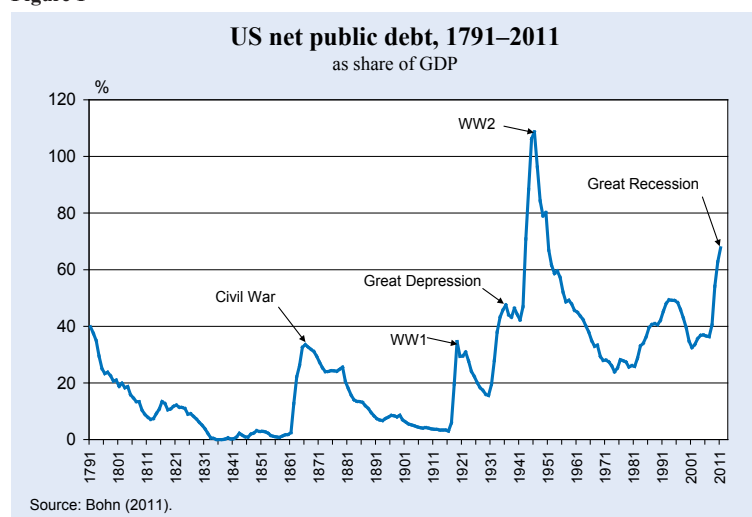
With all the attention that the eurozone sovereign debt crisis attracts it is at times difficult to keep in mind that in the United States, even if default risk is not an issue at present, the fiscal situation is dire. In fact, the United States faces a fiscal crisis of historic proportions. Unfortunately, the heated debates on the sustainability of the public debt over the long run, associated with discussions on the large recent public deficits and the growth of entitlement programs, and on recurrent mini-crises linked to events like the ‘fiscal cliff’, the debt ceiling increases, and the spending ‘sequester’, often miss the point. In this note, I document the historic dimensions of the US fiscal crisis, and argue that debates on the sustainability of the long-run public debt-GDP ratio are misguided, and far less important than the costs that will be incurred as a result of the need to align the debt that is already outstanding today with the government’s ability to pay.

US public debt and deficits since the birth of the Republic

The historic dimension of the ongoing US fiscal crisis is evident in Bohn’s (2011) estimates of the federal net public debt and primary fiscal balance dating back to 1791, a year after the Funding or

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Figure 1



‘Debt Assumption’ Act of 1790, the effective starting point of US federal debt. Looking at the debt as share of GDP in Figure 1, and defining a fiscal or public debt crisis as a year-on-year increase in the debt ratio larger than two-standard deviations (above 8.15 percentage points in Bohn’s debt data), five events are identified: the two world wars (World War I with an increase of 28.7 percentage points over 1918–1919, and World War II with 59.3 percentage points over 1943–1945), the Civil War (19.7 percentage points over 1862–1863), the Great Depression (18.5 percentage points over 1932–1933), and yes, the Great Recession (22.3 percentage points over 2009–2010). The Great Recession ranks as the third largest, with increases in public debt larger than in the Civil War and the Great Depression.² Thus, the United States is up against its third most serious debt crisis since the creation of the Republic, with a surge in debt larger than those caused by a large-scale armed conflict or the unprecedented economic debacle that the Great Depression remains today. The gravity of the US fiscal outlook is accentuated further if we compare the evolution of primary bal-

² Public debt in the hot-zone countries of the European debt crisis has increased as much or more than in the United States in the Great Recession. Weighted by GDP, the combined increase in the debt ratio in Greece, Ireland, Italy, Portugal and Spain reached 30 percentage points between 2007 and 2011, with increases ranging from 17 percentage points in Italy to 83 percentage points in Ireland.



ances after the peaks of all five US debt crises (see Figure 2). All events started with large deficits, yet strikingly in all events but the current one, the primary balance turned into a surplus relatively soon. In fact, in all three world-related debt crises a large primary deficit turned into a small surplus within three years. By contrast, according to the latest baseline projections from the Congressional Budget Office (*Updated Budget Projections: Fiscal Years 2013 to 2023*, CBO, May 2013), the US primary balance will not register a surplus at any time during the next 10 years. The primary deficit will shrink to 0.6 percent of GDP in 2015 and hover around 0.4 percent through 2023. In addition, relative to the Great Depression, the first three deficits of the Great Recession were about twice as large, and by five years after the peak of the Great Depression debt crisis the country had a primary surplus of 0.8 percent of GDP. In summary, the increase in debt has been of historic proportions and without prospects for a correction of the primary balance anywhere near those observed in *all* previous historic US debt crises.

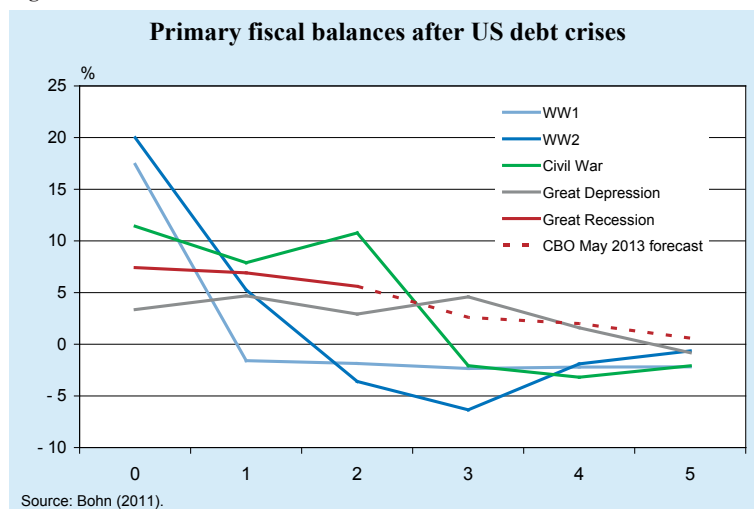
The delusion of sustainable public debt ratios

The concept of a sustainable public debt ratio is simple: a sustainable public debt ratio for the purpose of Macroeconomic surveillance (with apologies to Macro Theorists who dislike using the term sustainable in other than the game-theoretic sense) is one that is consistent with fiscal solvency, or more precisely, consistent with the intertemporal government budget constraint. This means that the outstanding public debt ratio *today* needs to match the expected present discounted value of future primary balances. Formally, define the government budget constraint in shares of GDP each period as:

$$(1) \quad d_t - \frac{\gamma_{t+1}}{R_{t+1}} d_{t+1} = pb_t$$

Here, d_t is the debt-output ratio, pb_t is the primary balance-output ratio, γ_{t+1} is the rate of output growth, and R_{t+1} is the real interest rate on public debt issued

Figure 2



at t and maturing at $t+1$. Then, defining $\phi_{t+1} = \gamma_{t+1}/R_{t+1}$ and if the no-Ponzi-game condition holds, recursive substitution using (2) yields the intertemporal government budget constraint, or solvency condition of the government:³

$$(2) \quad \frac{d_0}{y_0} = \frac{pb_0}{y_0} + \sum_{t=1}^{\infty} \left[\prod_{i=1}^t \phi_i \right] \frac{pb_t}{y_t}$$

Despite the simplicity of this fiscal solvency notion, many pages of journals, textbooks and policy publications have gone into studying and proposing various techniques for assessing it empirically, many of which have been debunked by the seminal work of Henning Bohn. After several articles digging deeper into the issue, he showed that all what is needed to satisfy condition (2) is that the public debt be a stationary time series at ANY finite order of differencing (see Bohn 2007). The mathematics of this have to do with the simple fact that exponential growth (at which the discounting of future debt in the No-Ponzi game condition evolves) always dominates polynomial growth (at which that future debt ends up growing when debt is difference-stationary of a finite order). But the interesting insights are two: first, the debt can be sustainable even if it converges to a very high share of GDP, in fact it can be sustainable

³ This formulation assumes that all public debt is one-period debt, which is unrealistic. As of May of 2012 the average maturity of US treasuries was 5.3 years. Following Hatchondo and Martinez (2009), we can approximate multiple maturities by introducing a consol with payouts falling at a constant rate δ . This *lowers* the discount factor of primary balances to $\phi_{t+1} = (\gamma_{t+1}/R_{t+1})/[1 + (\gamma_{t+1}/R_{t+1})(1-\delta)]$, which for the same interest and growth rates implies that *larger* primary balance streams are needed to generate a given present value as the average maturity of debt rises. For instance, if pb is constant and γ_{t+1}/R_{t+1} is constant at 1.02, the present value of the primary balances with one-period debt equals $51pb$, whereas at an average maturity of 5.3 years it falls to $2.2pb$. Thus, the one-period-debt assumption is by far the most optimistic scenario.

even if it explodes, just not ‘too fast’. Second, as an implication of the first, establishing debt sustainability in observed data (i.e. in the past) is not a productive endeavor.

To illustrate further these points, and apply them to the current US experience, consider a sufficient condition for debt sustainability that also follows from Bohn’s work: the existence of a fiscal reaction function in which the response coefficient of the primary balance to public debt (ρ), after controlling for other determinants of the primary balance such as the cyclical positions of GDP and government purchases, is statistically significantly positive (of any size, as long as is positive):

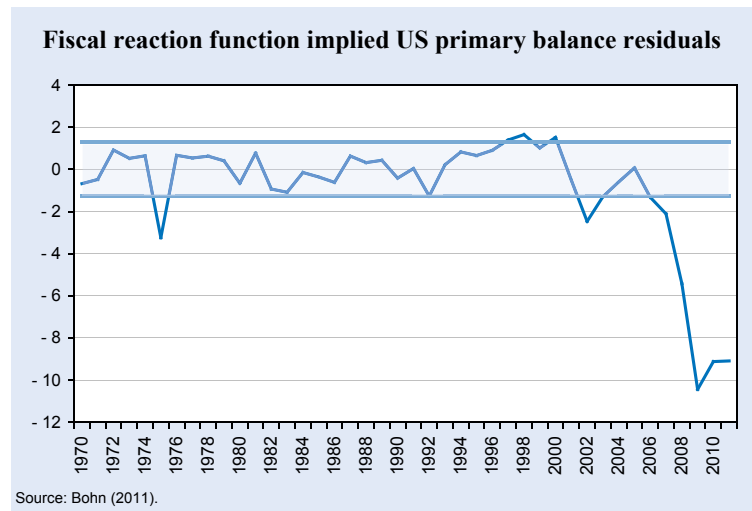
$$(3) \quad pb_t = m + \rho d_{t-1} + \beta_y y_t^{gap} + \beta_g g_t^{gap} + \varepsilon_t$$

Mendoza and Ostry (2008) produced estimates of fiscal reaction functions in a cross-country panel that included industrial and developing countries, and identified a set of countries for which they hold empirically. Interestingly, in their sub-panel of industrial countries, the response coefficient is within the range of Bohn’s estimates based on US data. Their estimates were: $m = -1.058$, $\rho = 0.022$, $\beta_y = 0.31$ and $\beta_g = -0.21$, all statistically significant.

This estimated reaction function can be used to study the predicted dynamics of US public debt. In particular, it is possible to establish two results: first, the primary deficits from 2008 to 2011 represent a structural break in the reaction function, because they are much larger than what the reaction function predicts. This is shown in Figure 3, which plots the residuals from the estimated reaction function along with standard error bands.

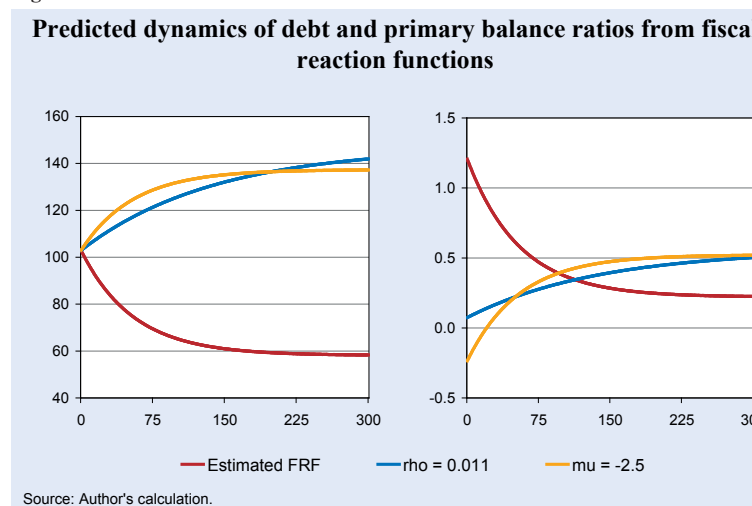
The second result we can establish with the fiscal reaction

Figure 3



function is that small adjustments in ρ and/or m keep the current large debt ratio consistent with fiscal solvency, and can justify primary balances closer to the observed ones, but the sustainable debt ratio converges to a much higher long-run average. This is illustrated in Figure 4, which shows debt and primary balance dynamics for three reaction functions: (a) the Mendoza-Ostry estimated reaction function, (b) an alternative with ρ cut by a half (to 0.011) and (c) a third option in which m falls to -2.5 . In all three scenarios the dynamics start from the 103 percent US gross public debt ratio observed in 2011. Scenario (a) predicts primary surpluses right from the start, peaking at about 1.2 percent of GDP, which are obviously much higher than the actual and CBO projected deficits (in line with the large residuals in Figure 3). In this scenario, debt falls gradually and returns to the 58 percent observed average debt ratio for 1960–2007, but it takes it about 100 years!

Figure 4



Scenarios (b) and (c) produce sharply lower initial primary surpluses, and even small deficits, but the debt ratio converges to a new long-run average of about 140 percent. This 140 percent debt ratio is just as sustainable as the 58 percent, because the present value of primary balances in all three scenarios equals the 103 percent debt ratio of 2011, and thus all three are consistent with condition (2) for the same initial debt ratio.

The results reviewed above make it evident that discussions about the long-run debt ratio and its sustainability are a delusion, because multiple long-run average debt ratios corresponding to very different patterns of future primary balances, which reflect structural changes in fiscal reaction functions, are equally sustainable. Moreover, this delusion also extends to the heated debate over fiscal stimulus v. fiscal austerity. The delusion here is in the belief that there is an alternative to the latter. There is not, because again, if fiscal solvency is to be maintained (i.e. if default is not an option), the 22.3 percentage points increase in the debt ratio that has already taken place between 2009 and 2011 requires a matching increase in the expected present discounted value of future primary fiscal balances. Thus, we can discuss the time profile that primary balances ought to follow to produce this increase, which means, for example, that if we want to have larger deficits in early years, we must be willing to accept more-than-proportionally higher primary surpluses in future years (due to discounting), and a higher long-run average debt ratio, but austerity defined by the amount by which the expected present value of the primary balance needs to rise is unavoidable. Even if we allow for debt restructuring, unless we contemplate a write-off equivalent to the full 22.3 percentage points of the Great Recession debt shock, some degree of fiscal austerity will still be required to produce the higher primary surpluses to match the debt shock net of restructuring.

Given the solvency condition (2), it should be acknowledged that the above discussion already takes into account how improved (diminished) growth prospects make the required fiscal austerity more (less) difficult to attain. Higher growth rates, perhaps over the long run or during the early transition out of the debt crisis, would increase the present value of the primary balance as a share of GDP, and thus reduce the burden placed on revenue increases and/or cuts in outlays in producing the required in-

crease in the right-hand-side of the solvency condition. The same applies to the equilibrium dynamics of the financing costs of the government and the maturity profile of the debt. To the extent that the effective real interest rate paid on the debt aggregated across maturities is expected to fall (rise), the burden placed on the primary fiscal balance falls (rises). But taking the contributions of these two factors (growth and real interest rates) as given, the fact remains that some of the burden of the required adjustment falls on higher primary balances, and thus on fiscal austerity.

It is also important to note that, even after considering Herndon, Ash and Pollin's (2013) corrections on the work of Reinhart and Rogoff (2010), the evidence still indicates that growth falls at higher debt ratios. Herndon *et al.* (2013) show that growth *falls* by 110 basis points, from 4.2 percent to 3.1 percent, when the debt ratio passes 0.3, and is 200 (100) basis points smaller at debt ratios of 0.9 or above than at debt ratios below 0.3 (0.9).⁴ Hence, we should not expect growth to come to the rescue. On the contrary, the lower growth predicted by the empirical evidence if the US opts for much higher long-run debt ratios indicates that the burden on fiscal austerity alone will have to be larger.

The true costs of fiscal austerity

The bottom line of the above arguments is that debating long-run debt sustainability or the choice between fiscal stimulus v. austerity are both delusions: regardless of where the debt ratio ends up in the long run, the 22.3 percentage points increase of the public debt ratio already accumulated during the Great Recession requires an increase of equal magnitude in the expected present discounted value of the primary balance-GDP ratio. This required adjustment, particularly the pros and cons of different approaches to go about it, *is* the relevant issue for discussion. In this regard, the United States confronts important tradeoffs in terms of both tax and spending adjustments. On the side of the latter, there

⁴ The financial media debate on this topic has also been largely a delusion. Even in the corrected scenario, it would be wrong to conclude that high debt is not a malaise and fiscal stimulus can go forward without concern. A cut of 100 basis points in growth carries a huge welfare cost, equivalent to as much as 20 percent of US annual private consumption! This is Lucas's (1987) computation with log utility and a coefficient of relative risk aversion equal to 1. Moreover, as argued in this note, fiscal austerity cannot be avoided if the debt already produced by the fiscal crisis is to be made consistent with solvency. It is not a matter of taste, it is a matter of balancing the checkbook.

are well-known structural problems driving the secular growth of entitlement programs, particularly Medicare and Social Security, and a sustained improvement in the fiscal outlook requires meaningful changes to these programs. On the side of revenues, the debate merits careful consideration of efficiency, distribution and welfare implications of alternative strategies, particularly taking into consideration that the United States is fully integrated into world financial and goods markets.

In order to assess the welfare implications of policy responses to the fiscal crisis it is necessary to use a fully specified model of their economic effects. The fiscal reaction function alone is grossly insufficient, because it is a reduced-form representation of all the determinants of the dynamics of the primary balance and debt from which normative implications cannot be derived, and from which the effects of policy tools and of the equilibrium responses of agents to the use of those tools cannot be disentangled. In designing the models, however, it is important to make explicit the treatment and assumptions about key fiscal variables and their effects on economic distortions and outcomes. It is also very important to include the intertemporal government budget constraint and the 22.3 percent increase in the present value of primary balances required to maintain the government solvent.

Macroeconomic models of various levels of complexity can be used to assess the effects of policy responses to fiscal crises. One important benchmark to consider is the canonical Neoclassical framework, in which taxes distort aggregate economic decisions and thus the efficiency of equilibrium allocations and prices, while abstracting from other frictions that can make matters even more difficult for re-attaining fiscal solvency (such as nominal rigidities, financial frictions in private markets, or the possibility of sovereign default and freeze-ups in public debt markets). Moreover, the Neoclassical framework is also useful because it is the benchmark around which classic theoretical and quantitative results of Ramsey optimal taxation have been developed.

Mendoza, Tesar and Zhang (2013) provide a quantitative Neoclassical framework that is aimed at studying the implications of tax policy strategies to tackle a fiscal crisis. Their study focuses on the European Union. They construct a two-country

variant of the Neoclassical balanced-growth model with distortionary taxation and endogenous capital utilization, and calibrate it so that one country represents the hot-zone countries of the eurozone debt crisis (the GIIPS – Greece, Ireland, Italy, Portugal and Spain) and the other represents ten other eurozone countries in more stable situation (the EU10, of which France, Germany and the Netherlands are the largest ones). Their analysis includes country-specific estimates of the effective tax rates on labor, capital and consumption, and of the GDP-ratios of government purchases and total non-interest outlays.⁵ They also take into account key features of eurozone tax systems, such as the effectively-residence-based nature of the income tax system, the harmonization of VATs and a depreciation allowance on non-residential fixed capital. Then they give as input to the model the observed debt increases of the GIIPS and EU10 regions between 2007 and 2011 (30 and 18 percentage points respectively) and ask two questions: first, what kind of increases in tax rates would be required to restore fiscal solvency? Second, since in their model unilateral tax changes trigger cross-country externalities and incentives for strategic interaction, what would be the outcome of cooperative and non-cooperative tax adjustments?

The same two questions could be asked of the United States, taking into account the observed increase in US public debt (22.3 percentage points), the US tax structure (which features higher capital taxes and lower labor and consumption taxes than in the eurozone), and the fact that the United States is also integrated into world markets of goods and financial assets. The first question (what tax rates are needed to restore fiscal solvency?) is critical because it relates to an issue of feasibility: since fiscal revenues exhibit Laffer curves, the relevant ones being for the *present value* of tax revenues that goes into primary balances in the solvency condition (2), it is not clear whether it is feasible for the economy to generate the required extra revenue (i.e. whether the revenue needs exceed the maximum supported by the Laffer curves).⁶ The second question relates to potentially

⁵ Mendoza et al. (2013) show that macro indicators of fiscal policies are similar across the GIIPS and EU10. In 2008, the GDP-weighted GIIPS (EU10) effective tax rates on capital, labor and consumption were 21 (20), 33 (36) and 14 (18) percent respectively, and the ratios of government purchases and total government outlays were 20 (21) and 46 (48) percent respectively. Tax rates were computed as proposed by Mendoza, Razin and Tesar (1994).

⁶ Trabandt and Uhlig (2011) also construct Laffer curves for industrial countries using a closed-economy model and focusing on steady-state comparisons.

important international spillovers. To the extent that fiscally-weaker economies require larger tax hikes than others they are open to trade with and that require smaller or no adjustments, they become relatively tax-disadvantaged or inefficient. As a result, physical capital ends up flowing away from the former and into the latter, resulting in a decline in factor incomes, consumption and output in the former and increases in the latter. Thus, in the Mendoza-Tesar-Zhang setup, the true costs of fiscal austerity are captured by the resulting social welfare implications of these movements.

The findings of the European-aimed calculations of Mendoza *et al.* (2013) suggest lessons for the US scenario that hint at the fact that indeed fiscal austerity carries hefty costs and entails large tax adjustments if government outlays remain unchanged. It is not even clear that some tax alternatives are feasible. For instance, Mendoza *et al.* find that the present value Laffer curve for total tax revenue (net of constant outlays) of the GIIPS produced by unilateral moves in their capital taxes peaks below the required revenue increase of 30 percentage points. In fact, at the peak the Laffer curve supports an increase of only 12 percentage points in the present value of the primary balance, and this by increasing the capital tax from 21 to 35 percent, with a large welfare cost equivalent to a 6-percent decline in the trend level of consumption per capita. Raising revenue *via* capital taxation is very difficult because of the international externalities of tax policy, which in this case disfavor the GIIPS as they are the region becoming tax-inefficient. If the same scenario is modeled with the GIIPS in autarky, the same capital tax hike to a 35 percent tax rate yields enough revenue to cover the 30 percentage points needed to offset the debt shock. Prospects are less pessimistic for labor tax hikes, because these can raise the required extra revenue by raising the tax from 33 to 38 percent and at a smaller welfare cost, but from a distributional perspective it means imposing the burden of adjustment on labor.

The findings of Mendoza *et al.* (2013) also show that non-cooperative strategic interaction in capital tax movements, or unilateral changes, would leave the GIIPS with strong incentives to default or break away from the EU, because GIIPS can generate the required revenue increase at lower capital tax rates, lower implied distortions, and

thus lower welfare costs under autarky than under open capital and current accounts, and obviously defaulting would reduce the need to produce larger primary surpluses. Non-cooperative tax competition triggers a ‘race to the bottom’ in capital taxation, and thus places even more of the burden of adjustment on labor or consumption taxes. Coordination of tax moves or an initial redistribution of the debt burdens, both of which can attain fairly similar welfare outcomes, are superior policies but require international negotiation.

The United States has the advantage that it relies much less on consumption taxation than Europe. Hence, in responding to its debt shock with taxes, consumption taxation would rank first, but this can be somewhat misleading because in Neoclassical models the consumption tax tends to be less distorting than income taxes, and this may not be the case in models with other features (e.g. with heterogeneous agents the regressiveness of consumption taxes, and labor taxes also, would be an issue). Nevertheless, even in the Neoclassical model the distortions induced by the consumption tax would increase and this entails a welfare cost. Moreover, there is no guarantee that the political outcome would go this way, and if it goes for capital or labor taxes instead, the distortions and implied welfare costs will be larger, particularly since the high degree of openness of the US economy would expose the United States to adverse international externalities due to an inefficient tax structure.

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