The Motives to Borrow

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Abstract

Governments issue debt for good and bad reasons. While the good reasons—intertemporal tax-smoothing, fiscal stimulus, and asset management—can explain some of the increases in public debt observed in recent years, they cannot account for all of the observed changes. Bad reasons for borrowing are driven by political failures associated with intergenerational transfers, strategic manipulation, and common pool problems. These political failures are a major cause of overborrowing and budgetary institutions and fiscal rules can play a role in mitigating the tendency to overborrow. While it is difficult to establish a clear causal link from high public debt to low growth, it is likely that some countries might be paying a price in terms of lower growth and greater output volatility because of excessive debt accumulation.

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1. Introduction

The issuance of public debt is an important tool of economic policy. Borrowing can help countries to deal with negative shocks, undertake countercyclical fiscal policy, and finance exceptionally large expenditures, such as public infrastructure investment projects. Many governments, particularly in advanced economies, responded to the Global Financial Crisis with an exceptionally large debt-financed fiscal stimulus. In the United States, for instance, the Obama administration in 2009 approved the American Recovery and Reinvestment Act, a plan of USD 831 billion—about 5.5 percent of GDP—aimed at creating jobs and boost investment. In the aftermath of the crisis, government debt sharply increased from 64 percent of GDP in 2007 to above 100 percent in 2012. In fact, Figure 1 shows that public debt increased in all advanced economies with the average debt-to-GDP ratio in this group of countries increasing from 61 percent in 2007 to 93 percent in 2016. Stimulus spending and cyclically-lower revenues also resulted in higher public debt—at various levels of government— in many emerging markets as well. China, for instance, embarked on a massive infrastructure and public investment program, spending more than 6 percent of GDP in discretionary stimulus measures, with public debt increasing from 29 to 44 percent of GDP between 2007 and 2016. More recently, the big infrastructure push associated with the China's Belt and Road Initiative is also contributing to growing public debts and possibly to sustainability risks in some emerging and developing countries.

While there are good reasons to issue debt, there are also political failures that induce governments to borrow more than is socially desirable, leading, in some cases, to public debt levels that are hard to rationalize as the optimal decision of a benevolent social planner. Such excessive debt accumulation might not be without costs, as large debts could limit the future capacity to stabilize the business cycle—because of limited fiscal space—and possibly impair future economic growth by either crowding out private investment or increasing uncertainty about future tax and inflation rates.

This chapter starts by discussing why governments borrow, separating good reasons for issuing debt (Section 2) from bad ones (Section 3) and it concludes by describing the link between public debt and economic growth (Section 4).

2. Good Motives to Borrow

2.1 Tax-smoothing

Governments have long financed extraordinary expenditures by issuing debt—most notably, when fighting wars.[2] Often, it would have been socially and politically unacceptable to try to finance such a level of expenditure through contemporaneous taxation alone, so the government resorted to issuing debt. But there is also a sound economic rationale. If the government can only raise distortionary taxes, and if the cost of the economic distortion is convex (i.e., increasing at an increasing pace) in the tax rate, then it makes sense to try to "smooth" taxes over time in order to minimize the total distortionary cost.

One of the first to articulate the concept of tax smoothing explicitly was US Secretary of the Treasury, Albert Gallatin. In his annual Report to Congress, Gallatin (1807) argued:

It appears necessary to provide revenues at least equal to the annual expenses on a peace establishment, the interest on the existing debt, and the interest on loans that may be raised. [As to] whether taxes should be raised to a greater amount or loans be altogether relied upon for defraying the expenses of the war…the losses and privations caused by war should not be aggravated by taxes beyond what is strictly necessary. An addition to the debt is doubtless evil, but experience having now shown with what rapid progress the revenue of the Union increases in time of peace; with what facility the debt, formerly contracted, has been reduced; a hope may be confidently entertained that all the evils of war will be temporary and easily repaired; and that the return of peace will, without any effort, afford ample resources for reimbursing whatever may have been borrowed during the war.[3]

The idea was formalized by Barro (1979), who assumed a convex cost function, and showed that minimizing the present value of the distortionary burden involved equalizing the marginal cost of levying taxes over time. For a given tax base, this implies that the tax rate should be constant

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[2] One of the few non-war related examples of "public" debt was the perpetual bonds issued by the water authority of Lekdijk Bovendams of the Netherlands in 1648. The Lekdijk Bovendams water authority, though not a sovereign government, had taxation powers over the residents protected by the dam; the bonds issued in 1648 continue to pay interest to this day.

[3] See Hall and Sargent (2014).

over time and, if public expenditure is fixed, countries should run deficits (and accumulate debt) in bad times and run surpluses (and pay back the debt) in good times.[4] [5]

While the logic of tax smoothing is clear, the problem that governments confront is that their expenditure is unlikely to be smooth. The classic example is that of a war: a (hopefully) temporary spike in expenditure far above the normal level of government spending. To finance such expenditure through current taxation may be prohibitively costly—and possibly even physically impossible (i.e., would require tax rates beyond the peak of the Laffer curve). More generally, whenever there is some "lumpiness" in the government's spending such as large infrastructure investment projects, there will be a divergence between the time path of expenditure and the (optimally) constant taxes—with public debt making up the difference.

Specifically, under optimal tax smoothing, it can be shown that the primary balance should equal the present discounted value of expected future changes in government spending (Ghosh, 1995a).[6] This is in analogy to optimizing models of the current account, where consumption-smoothing implies that the current account be equal to the present value of expected changes in national cash flow (Sheffrin and Woo, 1990; Ghosh, 1995b). If the government is in a temporarily high-spending state (e.g., fighting a war), then the expected future change in spending is negative, and the government should run a deficit—that is, issue debt. Conversely, if the government anticipates higher spending in the future, then the expected future change is positive, and the government should run a surplus—that is, retire debt (or build up financial

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[4] If taxes are not distortionary, Ricardian equivalence holds, and there are no transactions costs in the trading of government securities, then a form of "Modigliani-Miller" theorem of public finance obtains—and the level of government debt at any moment is indeterminate (Barro, 1979; Stiglitz, 1988; Chan, 1983). As discussed below, however, there may still be good reasons for the government to issue debt—e.g., to provide a safe asset for financial markets.

[5] Very simply, if the tax rate—or, more precisely, the magnitude of the distortion—is expected to increase over time, then the government can reduce the total intertemporal cost by increasing taxes immediately (when the marginal cost is relatively low) so that it need not increase taxes by as much in the future, which would incur a high distortionary cost. Likewise, if the tax rate is currently high but is expected to be lower in the future, the government could reduce the total distortionary cost by reducing the prevailing tax rate but raising future taxes. Barro (1979) Sahasakul (1986). In the presence of uncertainty, taxes should follow a a random walk (Lucas and Stokey, 1983; Aiyagari et al., 2002).

[6] This abstracts from possible "tax-tilting" (analogous to "consumption-tilting"). If the government's subject discount rate is higher (lower) than the economy's effective interest rate (i.e., real interest rate-growth rate of output), then it will want to tilt taxes toward the future (resp. toward the present). As discussed below, if policymakers' discount rate differs from the social discount rate, then there will be a sub-optimal trend in the time-profile of debt.

assets). If there is a permanent increase or decrease in spending, then the expected change is zero, and the government should run neither a primary surplus nor a deficit. Finally, the primary balance plus interest expenditures equals the overall fiscal balance, which in turn equals the net change in public debt. While tax-smoothing determines the change in public debt, it does not pin down the level of debt, which is determined by (the optimal response to) the sequence of shocks to government spending.

One shortcoming of these models is that debt is driven by rational responses to unexpected shocks to government spending, but the government behaves in a "certainty-equivalence" manner—i.e., as though there was no uncertainty about the future course of spending. Once the government explicitly recognizes that there may be shocks to its spending, it will want to build up precautionary saving—by accumulating assets or paying down debt (Aiyagari et al. 2002).[7] Calibration exercises for the US government by Bhandari et al. (2016) suggest that in the long-run, the government should hold a positive, albeit small, net asset position as precautionary savings against future spending shocks. In general, the government will want to hold a portfolio of debt and financial assets that minimizes the risk that it will have to alter tax rates across time or states of nature (Bohn, 1990; Barro, 1995). Building on this premise, numerous papers have explored the optimal capital structure of the government's assets and liabilities in a stochastic setting.[8]

Two further points bear emphasizing about the issuance of debt for tax smoothing purposes. First, for a given the level of output (GDP), unless the government is borrowing from foreigners, the issuance of public debt does not increase the resource envelope of the economy (the Keynesian models discussed below assume that there are occasions in which increasing debt has a positive effect on GDP, at least in the short run). Thus, if the government issues domestic

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[7] This idea was also anticipated by Galatin, who in his 1807 Report wrote "A previous accumulation of treasure in time of peace, might, in a great degree, defray the extraordinary expenses of war, and diminish the necessity of either loans or taxes. It would provide during periods of prosperity, for those adverse events to which every nation is exposed, instead of increasing the burdens of the people when they are least able to bear them." (Gallatin 1807, p. 359). Again, this is in direct analogy to the intertemporal current account literature where uncertain national cash flow leads to the country running a larger surplus or smaller deficit than it would under certainty (Ghosh and Ostry 1997).

[8] See, for example, Kingston (1991), Zhu (1992), Chari, Christiano, and Kehoe (1994), Barro (1995), Judd (1999), Angeletos (2002), Buera and Nicolini (2004), Marcet and Scott (2009). Berck and Lipow (2011) discuss how the tax-smoothing motive gets modified when the risk premium on government bonds is endogenous.

public debt in order to finance spending, then this debt necessarily crowds out private absorption (consumption or investment). Therefore, the only purpose of such borrowing would be to smooth taxes and thus lower the distortionary cost to the economy. But if the government borrows from foreigners—either directly or indirectly (i.e., issues debt to residents who in turn borrow from abroad)—then such borrowing would also expand the economy's real resource constraint, allowing the private sector to also smooth consumption against shocks to government spending. In such cases there will be a positive association between the budget deficit and the current account deficit of the country—and, correspondingly, between the issuance of public debt and the issuance of (public or private) external debt.

Second, while the government's ability to issue debt is welfare improving—inter alia, because it allows for tax smoothing—the debt itself becomes a dead-weight loss once issued. Even purely domestic debt—"a debt we owe ourselves"—represents an economic loss, equal to the present value of the economic distortions associated with the taxes necessary to repay it.[9] (If the public debt is held externally, then there is an additional real resource transfer that will need to be made to non-residents.) The greater the inherited debt, the higher the taxes required to service it. If taxes are distortionary and fall on any factor (e.g., labor or private capital) that is complementary to the productivity of public capital, then—optimally—a government that inherits a higher level of public debt will undertake less public investment, with corresponding effects on output and growth (Ostry, Ghosh, and Espinoza, 2015).

Summing up, the tax smoothing argument suggests that countries should accumulate public debt to finance large and lumpy expenditure (such as wars, natural disasters, and large investment projects), but also that debt accumulation during recessions should be accompanied by debt reduction in good times. While there is ample evidence that countries do accumulate debt during wars, tax smoothing is hard to reconcile with long-term debt accumulation during tranquil periods (the average debt-to-GDP ratio of the G7 countries went from about 40 percent in the

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[9] Even with purely domestic public debt, it makes a big distributional difference to who is the "we" and who is the "ourselves". In the Lucas and Stokey (1983) framework, the debt is held by a single representative agent but the government has only distortionary taxes at its disposal for servicing the debt. The optimal policy in this situation would obviously be for the government to default on its debt (since it is owed to the representative agent who also pays all taxes, but the act of servicing the debt imposes a deadweight distortionary cost on the economy). Since Lucas and Stokey rule out default by assumption, the time-consistent solution consists of a series of "mini-defaults" with each successive government manipulating the interest rate—by issuing more debt (which boosts current period consumption, and reduces the interest rate payable on the inherited debt).

1970-1980 period to over 80 percent in 2007, see Figure 2). The link between debt accumulation and investment is even less clear. A simple regression that controls for country- and year-fixed effects shows a positive correlation between debt-to-GDP ratio and public investment in advanced economies, implying that a one percentage point change in the debt-to-GDP ratio is associated with a 0.04 percentage point increase in public investment (Figure 3). This suggests that, typically, only a small percentage of debt issuance (4 percent) is used to finance public investment projects.[10] It should be noted, however, that these are simple correlations, which do not allow for heterogeneity. Bacchiocchi, Borghi, and Missale (2011) find a negative correlation between debt and public investment in countries with a high debt ratio, and a positive correlation between debt and public investment in countries with low debt ratios. This may help explain the diversity of empirical results regarding the link between public debt and output growth, explored further below.

2.2 Keynesian Demand Stimulus

The discussion thus far has taken output as given, and has considered optimal fiscal policy for an exogenous path of GDP. But governments also try to influence output via fiscal policy, in particular in response to business cycles. And this behavior is one of the main reasons governments run deficits, during periods of economic slack and low growth, and therefore issue debt.

Why countercyclical policy is needed

In most macroeconomic models, monetary and fiscal policy are effective tools to stabilize the business cycle. In open economies, the Mundell-Fleming results imply monetary policy will be ineffective under fixed exchange rates and an open capital account, so only fiscal policy is available. The traditional Keynesian IS-LM model provides the basic intuition behind the standard prescription for countercyclical policies in order to stabilize output. In the case of fiscal policy, changes in spending and taxes help stabilize aggregate demand by acting as a

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[10] In emerging and developing economies, the correlation between public debt and public investment is instead negative but not statistically significant.

counteracting force to changes in private spending. More sophisticated (New Keynesian) models can also validate the IS-LM intuition in dynamic and optimizing environments (Beetsma and Jensen, 2005). This intuition is the basis of most policy discussions on the need for countercyclical policy (International Monetary Fund, 2008).

In discussing output stabilization, there is a sense in which fiscal policy and monetary policy can be seen as substitutes in these models. If a choice is to be made, then monetary policy has been traditionally seen as quicker and less subject to political interference relative to fiscal policy. But this logic does not quite apply to endogenous changes in fiscal policy (what is known as automatic stabilizers), which is why they have typically been seen as superior to discretionary policy (Taylor, 2000).

But even if monetary policy is faster and potentially more effective than fiscal policy in stabilizing fluctuations, there may be instances when monetary policy cannot achieve the first-best result, even with a flexible exchange rate. In particular, when monetary policy is constrained by the zero lower bound on interest rates—as was the case for many central banks during the Global Financial Crisis—the burden necessarily falls on fiscal policy to be the stabilizing tool (Eggertsson and Woodford, 2004). More generally, in the presence of more than one distortion in the economy, not just price rigidity, monetary policy alone may not suffice to bring the economy to its first-best outcome, and fiscal policy could play a role in allowing policy makers to reach first best (Blanchard and Gali, 2010).

The normative statement that fiscal policy should act in a countercyclical fashion is not always validated in empirical analysis, however. Evidence of procyclical fiscal policy is stronger among emerging markets and, in particular, among Latin American economies, as documented by Gavin and Perotti (1997) and by Kaminsky, Reinhart, and Végh (2004). In part, this may be because the scope for deficit financing during downturns is more limited in such countries, while the lack of fiscal discipline during the upswing may reflect political economy considerations (as discussed in Section 3, below). It is also the case, however, that recent evidence—particularly in the aftermath of the Global Financial Crisis—is more encouraging (Frankel, Vegh, and Vuletin, 2013).

The evidence for OECD or European economies is somewhat mixed. Most times fiscal policy is countercyclical but occasionally it turns procyclical, as in the case of recent fiscal consolidations

in European countries (Égert, 2012; Fatás, 2018). One problem is judging the output gap in real time; especially after a financial crisis, the trajectory for potential output—and hence the output gap—may have changed. Procyclical policy has negative economic consequences as it leads to higher output volatility and lower growth (Aghion et al. 2007).

Countercyclical policy, deficits and debt

How do we characterize countercyclical fiscal policy? We judge fiscal policy by its potential effects on output growth, what is typically referred to as a measure of the fiscal policy stance. Measuring these effects requires the use of an economic model, and different models might lead to different conclusions. In a classic paper, Blanchard (1993) discusses this issue at length. By studying a variety of models, he concludes that a good indicator of the fiscal policy stance is the change in the inflation-adjusted budget balance as a ratio to GDP. The logic is that spending affects aggregate demand while taxes help stabilize disposable income and therefore private spending. The effects of taxes and spending might not be identical, but the budget balance comes close enough to capture their combined effect. In other words, fiscal stimulus might not require the issuance of debt since in the standard Keynesian model the balanced budget multiplier is positive. In practice, however, most stimulus spending is associated with budget deficits and the issuance of public debt.

Blanchard (1993) logic is commonly used in policy discussions where changes in the budget balance are used as an indicator of the fiscal policy stance. This establishes a direct connection between countercyclical fiscal policy and debt. When growth is below trend, governments will run deficits, and thus debt will accumulate.

When looking at the change in the budget balance it is important to distinguish between automatic and discretionary changes, even if from the perspective of aggregate demand this is largely irrelevant—it is the overall balance that matters. Automatic stabilizers capture changes in the budget balance that are the result of tax or spending laws that were not decided or modified as a result of current economic conditions. What types of tax and spending rules generate stronger automatic stabilizers? Given our logic on the fiscal policy stance, the answer is those that generate a larger swing in the budget balance. For this, we do not necessarily require strong cyclicality in taxes or spending. In fact, the largest source of automatic stabilizers in advanced

economies is *acyclicality* of public spending. If the government maintains spending constant when GDP is falling, then even if taxes are proportional (so there is no extra countercyclicality in the tax schedule), deficits will increase. In this stylized case, the magnitude of the automatic stabilizers is simply proportional to size of government. Larger governments will have stronger stabilizers and run larger deficits during downturns. The data show that the majority of automatic stabilizers among advanced economies comes from this effect (Fatás and Mihov, 2012). Of course, in addition, spending might automatically increase during downturns and crises, and certain taxes have an elasticity larger than one, both of which add to the strength of automatic stabilizers.

Beyond automatic stabilizers, governments also engage in discretionary fiscal policy changes. These changes follow the same logic as they also contribute to deficits and accumulation of debt during downturns. There is evidence, among advanced economies, that discretionary fiscal policy is used more aggressively in those countries that have the weakest automatic stabilizers (because of their smaller government size)—highlighting the substitutability between these two types of fiscal policy (Fatás, 2009).

From cyclical deficits to accumulation of debt

Our argument thus far is that fiscal policy should be used as a stabilization tool. If governments plan properly for the right balance over the business cycle, then this behavior should have no effect on government debt over the long run. Debt may be expected to increase during periods of below-average economic growth and then decrease when growth is above-average. However, as discussed in the previous subsection, public debt levels were increasing in many advanced economies—despite the booming world economy—even before the onset of the Global Financial Crisis and the ensuing Great Recession.[11] Can this trend be at all related to the dynamics of stabilization policy over the cycle? Is there an asymmetry? And if there is, why are governments not able to produce policies that are more symmetric?

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[11] Contrary to the dictates of tax-smoothing, moreover, many advanced economies were running up debt even though they faced rising health and other public expenditures related to aging populations.

We can think of two potential hypotheses that lead to asymmetries. First, while governments are ready to apply countercyclical policies during recession, they are less likely to follow the same logic during expansions. This is related to our earlier argument about observed procyclical policies (or not enough countercyclical policies). Empirically this is the case, at least for some countries (see Fatás and Mihov (2010) for a sample of European countries or Alesina, Campante, and Tabellini (2008) for a larger sample). The next section discusses the political distortions that may lead to such asymmetry.

The second argument is not so much about political incentives of governments but about excessive optimism or pessimism when forecasting GDP growth. For example, during periods of strong growth, governments produce forecasts of potential output growth that are too optimistic. Fiscal policy is planned under the assumption of no significant economic downturn resulting in fiscal policy being too procyclical in good times. The data confirms this hypothesis as estimates of potential output and its growth rate tend to be highly procyclical and this leads to excessive expansionary fiscal policy in good times (Mc Morrow, Roeger, and Vandermeulen, 2017). As an example, in December 28, 2000, President Clinton announced that the US was on course to eliminate its government debt within the following 10 years. The macroeconomic scenario supporting this forecast did not include the 2001 and 2008 recessions that happened within the next 10 years (nor, in fairness, did it foresee the Afghanistan and Iraq Wars).[12]

But is this bias in growth forecasts only present in good times? Not quite; we also observe excessive pessimism during downturns when potential output estimates are revised downwards. This generates a bias towards excessively tight fiscal policy during recessions. In principle, this bias is towards lower-than-optimal deficits and debt, potentially counteracting the excessive optimism during expansions. Given the difficulties in predicting turning points, however, lags in the implementation of discretionary fiscal measures could result in a net bias toward larger deficits and higher debt on average.

But if excessive optimism in good times is matched by excessive pessimism in bad times we are back at a symmetric argument and we should not observe debt trending upwards or downwards. There are however two possible additional asymmetries that can generate a drift of debt ratios:

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[12] See https://clintonwhitehouse4.archives.gov/WH/New/html/Fri_Dec_29_151111_2000.html

1. There could be an interaction between procyclical GDP forecasts and the political economy argument discussed in the next section. The procyclical forecast bias during expansions might be acted upon while the procyclical forecast bias during recessions is ignored. During recessions the lack of political incentives to engage in fiscal consolidations might not be there and pessimistic growth scenarios do not lead to lower deficits. If this is the case, the overall bias will be towards higher debt.

2. But there is also an asymmetry in terms of the way the economy reacts to procyclical fiscal policy as fiscal policy multipliers tend to be larger during recessions than booms (Freedman et al., 2010; Auerbach and Gorodnichenko, 2013; Jordà and Taylor, 2016). As a result, the procyclical nature of fiscal policy will cause more damage to GDP during downturns than during expansions. This will be more the case during deep recessions where monetary policy is constrained as a result of the zero-lower bound (and unable to stabilize output). In these cases, excessive pessimism about potential output and the associated fiscal policy contraction will make the recession much deeper. And the worst-case scenario is when we consider the possibility of hysteresis (i.e. permanent effects of cyclical shocks). Now the negative effects on GDP are likely to become permanent, validating the unfounded pessimistic expectations of governments. These dynamics can lead to a result that runs contrary to the objective of the government. Under some scenarios governments that engaged in contractionary fiscal policy to reduce debt ratios, might end up with higher levels of debt-to-GDP ratios. This is what the literature calls self-defeating fiscal consolidations (see Fatás, 2018; or DeLong and Summers, 2012). In this case, the resulting bias is again towards more debt even if governments were too conservative from a fiscal policy point of view because of their pessimistic views on GDP growth. Unlike in the previous cases, the solution this time is for a more aggressive policy (larger deficits during crises) to avoid the negative effects on GDP.

Finally, we should not forget that at times of crisis, accumulation of debt is not simply the result of standard Keynesian countercyclical policy but also of the support that governments provide to repair weak financial and banking systems. In many cases this support results in changes in government debt levels that are as large as or larger than the outcome of the deficits triggered by demand-supporting fiscal policy measures (International Monetary Fund, 2015, Campos,

Jaimovich, and Panizza, 2006). This is important because even if potential GDP forecasts are unbiased, estimates of deficits and debt will be too optimistic if they do not consider the occasional support for the financial system during large crisis. Once these, hopefully rare, events happen, debt levels will be higher than expected. At that point, the logic of tax smoothing that we have discussed earlier implies that debt levels will remain higher for a long time as the adjustment is optimally spread over many years (Ostry, Ghosh, and Espinoza, 2015).[13]

2.3 Asset Management and Government Debt as Safe Asset

The third good reason for issuing debt can be summarized under the broad rubric of public asset management. Just as a home owner with a mortgage might also have a savings account, so a government might want to have a positive amount of debt while it accumulates financial or physical assets. One obvious instance is when the asset yields a higher financial rate of return to the government than the cost of the debt. The financial return may be direct (holding financial assets or user fees, tolls, or royalties on the physical asset) or indirect (infrastructure investment that raises GDP and therefore the eventual tax base). Likewise, as long as the asset yields sufficient social benefits (raising citizens' welfare, even if that does not translate into higher GDP, at least not in the short-run), debt-financed public investment may make sense. In such cases, however, the government nevertheless needs to ensure it has sufficient general taxes to meet its debt service. Indeed, as elaborated upon below, the greater the reliance on some nebulous social benefit in making the case for the investment, the greater the risk that the project turns out to be a white elephant—and that the government later runs into debt-servicing difficulties.

Also, and related to our earlier discussion, financial sector bailouts might lead to an increase in the balance sheet of governments (Reinhart and Rogoff, 2009; Laeven and Valencia 2013; Amaglobeli et al., 2017). When governments need to recapitalize the banking system, they acquire a financial asset (the equity stake in the bank), which they typically finance by issuing debt (in fact, the recapitalization often takes the form of a government bond). A recent study on the fiscal costs of systemic banking crises over the period 1970–2011 shows that the median cost

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[13] Mauro (2011) surveys fiscal adjustment episodes by comparing ex-post outcomes with ex-ante plans.

of direct government intervention in the banking sector amounted to about 7 percent of GDP (factoring in the indirect fiscal costs raises the impact of banking crises to 12 percent of GDP, International Monetary Fund, 2015).

When looking at the balance sheet of governments we can also find arguments for increases on both side of the balance sheet that are related to the need for governments to provide liquidity in certain markets. For example, many governments have external debt but also hold foreign exchange reserves because they provide FX liquidity at normal times or at a time when it is most needed (e.g., during a sudden stop of capital flows or an export shortfall or a terms-of-trade shock).

A second need for liquidity comes from financial markets and the need for a safe asset. Public debt in this case is not issued to meet the government's borrowing needs but to provide financial markets with risk-free instruments. Historically (e.g., development of Britain's financial markets, including the stock exchange, money markets etc.), the government debt market has been important for financial market development.[14] Indeed, at the national level, government debt markets have often played a key role in developing nascent financial markets, including extending the yield curve to longer maturities and providing a benchmark. International Monetary Fund (2012) highlights the overall benefits of safe assets. Abbas and Christensen (2010) show that moderate levels of non-inflationary government debt have a positive overall impact on economic growth. Gorton and Ordoñez (2013) analyze the benefits of government debt as a safe asset during crisis to show that within their model "*The decline in output during a crisis is lower to the extent that there are more government bonds outstanding*".

Government Debt and Safe Assets.

Singapore is an interesting case of a government that has persistent surpluses but still issues debt to supply the financial system with a safe asset. As per the government statement:[15]

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[14] See Michie (2001), Chapters 1 and 2.

[15] https://www.gov.sg/factually/content/is-it-fiscally-sustainable-for-singapore-to-have-such-a-high-level-of-debt

"The Singapore Government does not borrow to fund its Budget. It operates on a balanced budget over each term of Government. The two types of domestic debt securities issued are for reasons unrelated to the Government's fiscal needs:

*(1) **Singapore Government Securities (SGS)** are issued to develop the domestic debt market. SGS are marketable debt instruments issued for purposes of developing Singapore's debt markets. They provide a risk-free benchmark against which other risky market instruments are priced off.*

*(2) **Special Singapore Government Securities** (SSGS) are non-tradable bonds issued specifically to meet the investment needs of the Central Provident Fund (CPF). Singaporeans' CPF monies are invested in these special securities which are fully guaranteed by the Government. The securities earn for the CPF Board a coupon rate that is pegged to CPF interest rates that members receive."*

Chile is a similar case. Until 1999, domestic corporations that wanted to borrow abroad faced challenges because of the lack of a sovereign benchmark in the international market. As a consequence, in 1999, the Chilean Treasury started placing sovereign bonds in the international markets with the explicit objective of creating such a benchmark (Braun and Briones, 2008). After a bond placement in 2014, the Chilean Ministry of Finance stated: "...both issues obtained very low interest rates for the Government of Chile in the current market context, which will establish advantageous benchmark rates for Chilean firms in external financial markets."[16]

At the international level, there is a similar need for safe assets, and these assets are likely to be associated to one of the major reserve currencies (US dollar, Euro, Yen). In fact, the Global Financial Crisis—because of a combination of flight-to-safety and several sovereigns losing their AAA status—has resulted in a shortage of global safe assets with a variety of consequences (see Caballero, Farhi, and Gourinchas, 2008; Brunnermeier et al., 2017; Gourinchas and Jeanne, 2012, among others).

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[16] http://www.hacienda.cl/english/press-room/news/archive/ministry-of-finance-chile-has.html

2.4 Dynamic Inefficiency

A final potential argument for the issuance of government debt is the possibility that the economy is dynamically inefficient and that the private sector cannot optimally provide vehicles to transfer wealth across generations. Government debt can play that role. In this environment, issuing additional government debt not only can be sustainable but it is optimal (Blanchard, 1985). For dynamic inefficiency to hold, it requires that the rate of return of an economy must be below its growth rate. Interest rates on government debt are often below GDP growth rates, but what matters is the rate of return on capital.[17] In a seminal study, Abel et al. (1989) provided strong evidence for 6 advanced economies that the criterion for dynamic inefficiency was not met. However, recent decades have seen substantial reductions in real interest rates on safe assets, which could suggest it could be worth revisiting their findings to see whether their conclusions still hold. Geerolf (2017), concludes that dynamic inefficiency cannot be ruled out for several advanced economies. But whether the evidence is sufficiently compelling to warrant a clear policy recommendation in some of these countries remains an open question (Blanchard and Summers, 2017).

3. Bad Reasons to Issue Debt

The previous section showed that there are good reasons to borrow. Budget deficits, and the resulting accumulation of debt, can be optimal during recessions or in the presence of exceptional events such as war, natural disasters, or financial crises. Borrowing may also be justified by the need to finance large investment projects.

However, cyclical stabilization should not lead to a steady accumulation of debt, as deficits during bad times should be compensated by budget surpluses during economic expansions. Moreover, while countries do accumulate large debts during wars, there is only limited evidence of a link between public debt accumulation and surges of public investment (Figure 3).

A benevolent social planner would borrow up to the point at which the social marginal cost of an additional unit of debt (this includes principal, interest repayment, and any possible externality

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[17] While observed interest rates are often somewhat below GDP growth rates, if that were true on a persistent basis, then the government would effectively not face an intertemporal budget constraint.

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brought about by higher debt levels) equals to the social return of an additional unit of debt-financed government expenditure. Overborrowing refers to a situation in which the government borrows more than is socially optimal. Yared (2018) suggests that the accumulation of public debt in recent decades is due to overborrowing driven by political distortions which leads to time inconsistent preferences and a bias towards present consumption.

3.1 Why Do Countries Overborrow?

Just as it is wrong to compare the behavior of the government with that of a household—because the government is a large player and its borrowing decisions can have important spillovers, positive and negative, on the economy—it is also wrong to assume that policymakers always try to maximize social welfare. While it is reasonable to assume that the decision of a household head to borrow aims at maximizing the household's welfare, a policymaker's decision to contract public debt may not be driven by the objective of maximizing social welfare. In order to understand why countries overborrow, it is necessary to move from normative to positive theories of public debt (Alesina and Tabellini, 1992). The economic literature has emphasized four potential sources of excessive debt accumulation: (i) political budget cycles and rent seeking; (ii) intergenerational transfers; (iii) strategic manipulation; and (iv) common pool problems.

We start with a flash review of the literature on the political economy of debt and then we discuss how budget institutions can mitigate political failures that lead to excessive debt accumulation.[18]

Political budget cycles and rent seeking

The literature on the political budget cycle suggests that politicians cut taxes and increase spending to increase the likelihood of being reelected. At the most basic level, the presence of a political budget cycles requires that voters suffer from "fiscal illusion." Only voters who do not fully understand the intertemporal nature of fiscal policy may be tempted to vote for politicians

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[18] See Yared (2018), Alesina and Passalacqua (2016), and Battaglini (2010) for recent detailed reviews of the political economy of public debt.

who cut taxes or provide more public services without increasing taxes. In the traditional public choice literature, fiscal illusion is amplified by the asymmetric application of Keynesian stabilization policies, with policymakers happy to run budget deficits during recessions but less inclined to run surpluses in period of rapid economic growth (Buchanan and Wagner, 1977).

Political budget cycles models do not necessarily require the presence of irrational voters. For instance, Rogoff and Sibert (1988) develop a model in which the presence of fully rational but imperfectly informed individuals leads to a political business cycle because pre-electoral budget deficits are the only mechanism through which policymakers can signal their competence (the reason being that only competent politicians will be able to balance the budget after the election). Another implication of these types of models is that policymakers may engage in more visible, but not necessarily more efficient, types of public expenditure (Rogoff, 1990).[19]

Political business cycle models implicitly assume that policymakers want to remain in power. This may be because of ego-rents or because, by staying in power, they can implement their favorite policies. It is, however, also possible that policymakers want to be in power to extract resources from the economy. Yared (2010) studies the behavior of politicians that try to extract rents and need to decide whether to extract a limited amount of resources in each period or extract everything they can in one period and then lose power. One of the implications of the model is that a high level of debt reduces the politicians' incentive to extract the maximum amount of rent and makes her behave more likely a social planner.

Intergenerational transfers

Individuals can leave positive bequests to their offspring but private negative bequests cannot be enforced by law. However, individuals who would like to leave a negative bequest can use public debt to redistribute resources from future to current generations. Cukierman and Meltzer (1989) use an overlapping generations model to study an economy with two types of individuals:

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[19] A somewhat different strand of literature studies the link between public debt and political actions that go beyond voting. Assume, for instance, a situation in which different groups of citizens think that they are treated unfairly because they believe that the set of available resources is larger than what is actually available. Using insights from behavioral economics Passarelli and Tabellini (2013) suggest that such perception of unfairness may lead to costly riots and that, in order to prevent such riots, the government will borrow more than what it would be optimal if the citizens had full information on the available resources. In this case, excessive debt accumulation is a second best optimum.

citizens who would like to leave a positive bequest to their children and constrained citizens who would like to leave a negative bequest. The first group only cares about public debt through its effect on the economy because individuals who belong to this group can fully undo the intergenerational effects of higher public debt by increasing their bequest. Bequest-constrained individuals, instead, would like to issue more debt because this relaxes their constraint. In such a set-up, the level of debt depends on the bequest constraint faced by the median voter.[20]

Other models that focus on intergenerational transfers include Tabellini (1991) who develops a model with defaultable debt and wealthy and poor voters. In this setting, higher levels of debt (up to a point) create an incentive to repay the debt by linking intergenerational with intragenerational transfers. Song et al. (2012), instead, study a model in which the young and the old have different preferences for public goods and taxation is distortionary. In this this setting, the level of debt is determined by these preferences (that can vary across countries) and the political power of the two groups. Jackson and Yariv (2015) show that if there are two group of individuals and one group (the old) cares less about the future than the other group (the young) a government that aggregates the preferences of these two groups may suffer from a present bias. Yered (2018) shows that theory is consistent with the fact that there is a positive cross-country correlation between the growth rate of public debt and aging of the population. It is worth noting that standard social planner model would predict the opposite correlation.

Strategic manipulation

On February 18, 1981 President Reagan described his program for economic recovery in a joint session of the US Congress. Among the topics discussed in his speech, there was the high level of public debt, which was approaching $1 trillion (this was total US Federal debt, Federal debt held by the public was about $770 million or 25 percent of GDP).[21] Eight years later, the US

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[20] In the presence of imperfect capital markets individuals may prefer higher levels of debt to undo credit constraint faced by households. In such a set up a higher level of debt could be Pareto optimal and would not necessarily lead to any intergenerational transfer.

[21] Our national debt is approaching $1 trillion. A few weeks ago I called such a figure, a trillion dollars, incomprehensible, and I've been trying ever since to think of a way to illustrate how big a trillion really is. And the best I could come up with is that if you had a stack of thousand-dollar bills in your hand only 4 inches high, you'd be a millionaire. A trillion dollars would be a stack of thousand-dollar bills 67 miles high. The interest on the public debt this year we know will be over $90 billion, and unless we change the proposed spending for the fiscal year

federal debt held by the public had surpassed $2.1 trillion (a 100 percent increase in real terms) and reached 39 percent of GDP.

Why would a conservative like president Reagan accumulate so much debt, and why are large and persistent primary surpluses often associated with left-of-the center governments (Eichengreen and Panizza, 2016)? Persson and Svensson (1989) show that, in the presence of two parties with different preferences for spending and taxation, left-of-the-center parties (which prefer more public goods at the cost of higher taxes) may decide to run budget surpluses so that the right-wing party will inherit a low level of debt and will not have a strong incentive to reduce public expenditure. Similarly, the right-wing party will increase the level of debt so that the left wing party will have to limit spending when in power.[22]

While the model of Persson and Svensson (1989) shows how debt can be used to influence the actions of successive governments, it does not necessarily lead to excessive debt accumulation because deficits by right wing governments are canceled with surpluses by left wing governments. Alesina and Tabellini (1990) develop a model in which political parties have preferences for different types of public expenditure and accumulate debt in order to constraint the choices of future governments. In this setting, the level of debt depends on the likelihood of being reelected. Governments which are sure to stay in power behave like a social planner and issue no debt. However, governments with low probability of reappointment will overborrow.

The key intuition of the models of Persson and Svensson (1989) and Alesina and Tabellini (1990) is that debt is a state variable that the party in power can use strategically to influence and constrain the actions of successor governments.[23] One weakness of these models is that they were developed in a set up that rules out output shocks and hence the tax smoothing motive that create incentives to self-insure by accumulating assets (Aiyagari et al., 2002). It is thus difficult

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beginning October 1st, we'll add another almost $80 billion to the debt. http://www.presidency.ucsb.edu/ws/index.php?pid=43425

[22] Müller et al. (2016) develop a similar model with similar implications (in normal times a left-of-the center government issues less debt because wants to be able to implement countercyclical policies in bad times), but in this case the incentive of the right-wing government to issue debt does not depend on its likelihood of remaining in power.

[23] Papers that emphasize the strategic role of debt also include Aghion and Bolton (1990), Tabellini and Alesina (1990) and Lizzeri (1999).

to use these models to build testable predictions on how debt reacts to economic shocks in different institutional environment.

Common pool

Common pool problems originate from the presence of externalities which lead to a situation in which the private benefit of an additional unit of public expenditure is different from the social marginal cost of funding this extra unit.[24] The presence of concentrated interests amplifies the common pool problem. When policy actions benefit a certain group and are funded with a general tax, the relatively small group of people who benefit from the policy will have strong incentives to lobby in favor of the policy. The much larger, but dispersed, group of actors that bears the cost of this action will have weaker incentives to act against it.

The exact way in which the common pool problem manifests itself depends on the institutional setting. There is a large literature in in political sciences (dating back to Weingast, Shepsle, and Johnse, 1981 and Baron and Ferejohn, 1989) that models common pool problem and pork barrel spending in the US Congress. However, common pool problems also apply to situations in which the budget law is prepared by the government and then sent to the legislative body for approval. In such a setting, it is possible to think of a strategic interaction between the Ministry of Finance, which worries about the overall budget constraint, and the spending ministries which are subject to pressure from different interest groups (Alesina and Perotti, 1996). In such a setting, hierarchical rules in which the Ministry of Finance first decides the overall budget envelope and then the line ministries decide on the allocation may play a role in reducing excessive spending (more on this below).

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[24] An example of the common pool problem is the chicken and lobster story. Assume that a restaurant offers only two dishes: chicken and lobster. Further assume that the chicken costs $10 and the lobster costs $20, and that an individual is willing to spend up to $11 for the chicken and up to $14 for the lobster. If the individual goes to the restaurant alone, she will order the chicken and obtain a consumer surplus of $1. Now assume that ten identical individuals decide to have lunch together and then split the bill. In this case, the individual marginal cost of ordering the lobster instead of the chicken is $1 ($10/10) and the individual marginal benefit of ordering the lobster is $3 ($14-$11). As consequence, each individual will order the lobster. The total bill will be $200, and each participant will need to pay $20 (the collective marginal cost of ordering the lobster is $10 per capita), resulting in a negative consumer surplus of $6. We first heard the chicken and lobster story from Ricardo Hausmann.

Common pool problems, however, may lead to overspending but not necessarily to budget deficits and debt accumulation. Overborrowing requires an additional distortion. One possible distortion is due to an environment in which property rights are not well defined and where each group fears that any residual government asset will be appropriated by the other group. Each group will therefore find optimal to demand large transfers and push the government to its borrowing limit (Tornell and Lane, 1999 and Velasco, 2000).[25]

Political turnover amplifies common pool problems because if parties have different preferences for different types of public goods they will have an incentive to overspend in their favorite good when in power and this incentive to overspend is inversely related to the probability that the party will be in power in the next period. In other words, government that are not sure whether they will be in power next period are more likely to be impatient (Aguiar and Amador, 2011)

The empirical evidence is generally consistent with common pool models as it finds that budget deficits tend to be larger in countries characterized by deeper political cleavages and party fractionalization (Yared, 2018).

Common pool problems can also lead to overborrowing if legislators do not know whether they will be part of future governing coalitions. Battaglini and Coate (2008) show that adding uncertainty to a dynamic common pool model leads to two contrasting forces which unify the main findings of the normative literature on public debt (e.g., Barro, 1979 and Aiyagari et al., 2002) with those of the positive literature that emphasizes the role of political failures (e.g., Alesina and Tabellini, 1990). One the one hand, there is a self-insurance incentive: policymakers want to accumulate assets in order to insure against future shocks (as in Aiyagari et al., 2002). On the other hand, there is a political distortion: policymakers accumulate debt because they may not be part of future governing coalitions and higher levels of debt constrain the behavior of future policymakers as in the strategic models described above. When debt levels are low, political distortions dominate the self-insurance incentive and the government overborrows. As debt increases, the self-insurance motive becomes more important and fiscal policy becomes

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[25] Krogstrup and Wyplosz (2010) show that the presence of international externalities common pool problems can justify the presence of supranational debt ceilings.

similar to the policy that would be chosen by a social planner (albeit with a higher equilibrium level of debt).[26]

3.2 Controlling Overborrowing

The economics literature identifies three possible avenues to limit overborrowing. The first focuses on the electoral system, the second on fiscal rules, and the third on budgetary institutions.

Electoral systems

Battaglini (2010) shows that a simplified version of the model of dynamic electoral competition discussed in Battaglini (2014) yields the unambiguous prediction that proportional electoral systems suffer from a deficit bias with respect to majoritarian electoral systems. This prediction is in line with a large number of papers that show that democracies with a proportional electoral system accumulate more debt than democracies with a majoritarian system (e.g., Roubini and Sachs, 1989 and Grilli et al., 1991).[27]

A related literature that compares presidential and parliamentary democracies finds that presidential democracies tend to have smaller governments than parliamentary democracies (and, within parliamentary democracies, majoritarian systems have smaller governments than proportional systems) and that in parliamentary democracies increases in government spending during recessions are less likely to be reversed during economic expansions (Persson and Tabellini, 2003, 2004). If taxes remain constant over the business cycle, this behavior may lead to a ratchet effect and to a deficit bias in parliamentary democracies.

Fiscal rules

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[26] This literature tends to study the bargaining process within a legislature that includes representatives from different districts. There are also papers that focus on the electoral process and study how different parties choose policy platform with the objective of winning an election. Battaglini (2014) develops a probabilistic voting model which yields an equilibrium with excessive debt accumulation. The properties of this model are similar to those of the legislative model of Battaglini and Coate (2008) but the mechanism that leads to overborrowing is somewhat different.

[27] The degree of proportionality is usually measured with the size of electoral district (Taagepera and Shugart, 1989, and Lijphart, 1994).

Fiscal rules aim at reducing addressing the time inconsistency problem and limit debt accumulation by imposing an upper limit on budget deficits. A government that implements a fiscal rule trades off a constraints on its own action (something the government does not like) with a constraints on successor governments (something the government does like). Fiscal rules have become more and popular and while in the mid-1990s there were less than 20 countries with a national or international fiscal rule there are now nearly 100 countries that adhere to some type of fiscal rule (Yared, 2018).

The most extreme fiscal rule is the balanced-budget rule requiring zero deficits in every period. Such a rule may reduce welfare because it limits the government's ability to use countercyclical policies (or to smooth taxes).[28] A rule that aims at balancing the budget over the business cycle addresses this issue at the cost of being less transparent. Yared (2018) presents a detailed survey of these tradeoffs by discussing the role of public information, the degree of enforcement (including the role of escape clauses), and the costs and benefits of rules based on specific targets (i.e., the total or primary deficits) vis-à-vis rules that concentrate of policy instruments (such as spending).

On the empirical side, there is a large literature on the effect of balanced-budget rules for subnational governments (especially US states see, for instance, Poterba, 1994) and also a large literature on the fiscal rules adopted by many European countries. The results of this latter literature are mixed. On the one hand, Debrun et al. (2008) and Bergman et al. (2016) find that fiscal rules play a significant role in limiting budget deficits in European countries; on the other hand, Von Hagen (2006) suggests that the fiscal rules imposed by the Maastricht Treaty did not constrain the behavior of the largest countries in the euro area. The main challenge is to go beyond simple correlations and establish whether such rules have a causal effect on fiscal outcomes (Heinemann et al. (2018)). Caselli and Wingender (2018), using an innovative identification strategy and a bunching estimation method, find that the Growth and Stability Pact has led to a bunching of fiscal deficits around the 3 percent Maastricht deficit ceiling.

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[28] Azzimonti et al. (2016) show that a balance budget rule is never welfare improving for economies with a positive level of debt.

Budgetary institutions

The preparation of the budget is a complex exercise which involves several players within the government as well as the interaction between the executive and the legislative. There is evidence that the institutions that regulate the preparation of the budget and guarantee its transparency have an impact on fiscal outcomes.

When focusing on the preparation of the budget, the economic and political science literature differentiates between hierarchical and collegial rules. The former tend to give more power to the ministry of finance, while the latter are more inclusive and give more power to the spending ministries and allow the legislature to amend the budget. Hierarchical rules mitigate the common pool problem and are thus associated with smaller deficits and debt accumulation (for surveys of the literature see Eichengreen et al., 2011, and Hallerberg et al., 2009). There is, of course, a trade-off in terms of democratic accountability.

Transparency of the budget also matters. Rogoff and Sibert (1988) emphasize that imperfect information can lead to political business cycles and Milesi-Ferretti (1997) discusses how politicians who want to overborrow have incentives to window-dress their budget laws, even more so when the politicians are corrupt.[29] Standard strategies for manipulating the budget include keeping various items off-budget and adopting overoptimistic projections on either the state of the economy or on the effect of certain policies on tax revenues or expenditure.

Building on the intuition of Alesina and Tabellini (1990) and Rogoff and Sibert (1988), Beetsma et al. (2017) develop a model which finds that transparent budgets mitigate incentives to overborrow. This prediction is consistent with the empirical literature that finds that fiscal transparency is associated with lower levels of public debt in advanced, emerging market, and low-income countries (Alt and Lassen, 2006, Alesina et al., 1999, Dabla-Norris et al., 2010).

4. Debt, Growth and Investment

Regardless of the motives to borrow, high levels of government debt can have adverse effects on the economy, as they may limit the capacity to run counter-cyclical fiscal policy and reduce

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[29] Alesina and Cukierman (1990) show that politicians who favor policies which are different from those who would maximize their chances of reelection favor transparent budget procedures that do not reveal their preferences.

private sector investment through the standard crowding-out channel; by tightening credit constraints; by creating the expectation of higher future distortionary taxation; or by increasing uncertainty. On the other hand, public borrowing—even if it results in a higher debt ratio—can be good for growth, if the additional borrowing is directed at financing productive investment—such as a big push in infrastructure—or at stimulating aggregate demand (see above, Section 2.3).[30]

If Ricardian Equivalence does not hold, the decrease in public saving associated with debt accumulation will not be fully compensated by higher private saving, and will lead to a lower stock of capital, resulting in higher interest rates and lower economic growth (Diamond, 1965; Blanchard, 1985). This is the classic crowding-out effect, which can also be obtained with a simple IS-LM model. Using the back-of-the envelope calculations of Elmendorf and Mankiw (1999), Panizza and Presbitero (2013) show that this effect is not quantitatively large.[31] The crowding out effect of public debt could, however, become large if, in the presence of credit rationing and financial frictions, government debt tightens the credit constraints faced by private firms (Broner, Erce, Martin, and Ventura, 2014). The recent evidence of the European sovereign debt crisis has shown that the expansion of the share of government debt held by the banking sector in times of crisis crowds out private sector lending (Altavilla, Pagano and Simonelli 2017; Becker and Ivashina 2018).

High public debt can also have a negative effect on economic activity by increasing uncertainty about future tax rates, by leading to expectations of future confiscation, possibly through inflation and financial repression (Cochrane 2011), or by precipitating a financial crisis. There is, in fact, evidence that high levels of public debt could signal debt sustainability concerns and translate in higher sovereign yield spreads (Codogno et al., 2003; Laubach, 2009; Baum et al.,

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[30] However, the empirical literature on the growth effects of public investment is not conclusive. While there is evidence of a positive growth effect of debt-financed public investment in advanced economies (Abiad et al., 2016), a study of a number of episodes of public investment booms casts doubts on this positive narrative and suggest that the growth impact could be very limited, at the cost of larger *ex-post* public debts (Werner, 2014).

[31] By assuming that an annual real GDP growth is 3 percent and a convergence speed of 2 percent, Panizza and Presbitero (2013) show that the steady-state change in output computed by Elmendorf and Mankiw (1999) implies that increasing debt by 50 percent of GDP would reduce annual GDP growth by approximately 10 basis points in the first twenty years. In a three-asset setting, Friedman (1978) argues that higher government debt can "crowd-in" private capital accumulation, depending upon the substitutability between assets in financial portfolios.

2013), which are then transmitted to the private sector. In fact, the debt overhang literature (Krugman, 1988; Sachs, 1989; Aguiar, Amador and Gopinath, 2009) suggests that there is a level of debt at which these growth effects are so large that debt relief would benefit both debtors and creditors.

Governments generally react to increasing public debt with austerity measures, running smaller deficits or larger surpluses (Bohn, 1998; Mendoza and Ostry 2008; Ghosh et al., 2013; Mauro et al., 2015). In this respect, high levels of public debt may also have a negative impact on growth as they could limit a country's ability to conduct countercyclical policies and, possibly lead to self-defeating, austerity policies, and thus increase output volatility and reduce economic growth. As the relationship between the level of debt and the ability of conduct countercyclical policies is also dependent on the composition of public debt (Hausmann and Panizza, 2011; De Grauwe, 2011), countries with different debt structures may start facing problems at very different levels of debt.

4.1 What Do the Data Say?

The rapid increase in public debt in the aftermath of the Global Financial Crisis sparked a large empirical literature on the growth effects of public debt.

An influential paper by Reinhart and Rogoff (2010a) uses data for 20 advanced economies over 1946-2009 to build a histogram that plots average GDP growth for different levels of debt and shows that average and median growth is substantially lower when public debt surpasses 90 percent of GDP. Figure 4 shows that this finding is robust to using more recent data from the newly available Global Debt Dataset (Mbaye et al., 2018). The Figure shows that average and median growth rates become smaller when moving to larger debt-to-GDP ratios. Average (median) growth declines from 3.7 percent in country-year pairs when the debt-to-GDP ratio is less than 30 percent to 2.6 (2.7) percent when the debt ratio is between 30 and 60 percent and further decreases to 1.2 (1.6) percent when debt surpasses 90 percent of GDP. However, these differences are smaller when looking at a large sample of 119 low- and middle-income countries, where average growth declines from 4.4 percent for low-indebted countries to 2.6 percent in high-debt (above 90 percent) countries (Figure 5).

Reinhart and Rogoff's (2010a) article was followed by a large number of papers aimed at assessing whether the correlation between debt and growth was robust to controlling for other variables in a proper regression set-up, and to instrumenting public debt to assess its causal effect on economic growth. Another set of papers focuses on non-linearities allowing for non-arbitrary debt bracket.

By and large, there is strong evidence that public debt is negatively correlated with future economic growth. Some of these papers also find that the correlation between debt and growth becomes stronger when public debt approaches 100 percent of GDP (Checcherita-Westphal and Rother, 2012; Baum et al., 2013, provide evidence for the euro area, Cecchetti, Mohanty and Zampolli, 2012, focus on advanced economies, and Woo and Kumar, 2015, focus on a sample of advanced and emerging economies). We corroborate the negative correlation between debt and growth by plotting current debt level and future growth and showing that, controlling for year- and country-fixed effects, there is a strong negative correlation between the debt-to-GDP ratio in year t and real GDP growth between t and $t+5$ (Figure 6).

The presence of a negative correlation between public debt and future growth does not necessarily imply that high levels of debt *cause* lower growth. Indeed, the negative correlation between debt and growth could simply pick up reverse causality (as public debt tends to increase when growth slows down) or be driven by unobservable omitted variables that are jointly correlated with debt and growth.

Establishing causality requires an instrumental variable or a natural experiment which allows the researcher to isolate exogenous changes in public debt. In the presence of persistent variables like the debt-to-GDP ratio, the standard approach of using of past values of the variables of interest or GMM estimators that use lagged values of the various explanatory variables as instruments do not solve the identification problem (Bellemare et al., 2017; Reed, 2015). Panizza and Presbitero (2014) propose an instrumental variable strategy that uses valuation effects brought about by the presence of foreign currency debt. They find that, once properly instrumented, debt has no effect on future growth. One problem with this strategy is that in their sample of advanced economies the share of foreign currency-denominated debt is relatively small, and hence the instrument is not very strong. Another way to achieve identification is to move from macro to micro data. Huang et al. (2017, 2018) match firm-level balance sheets with

data on either public debt across a sample of 69 countries or local government debt across 270 Chinese cities to show that government debt tightens financing constraints for private sector manufacturing firms. There is, however, a tradeoff between identification and the ability of assessing the macroeconomic effects of debt accumulation. While firm-level analysis allows to precisely test one channel through which debt may have a negative effect on growth, they "hide" the potential macroeconomic links between debt and growth which are captured by the fixed effects. For instance, it would be possible that that higher levels of debt increase investment for all industries and firms considered by Huang et al. (2017, 2018), but that investment increases less for credit constrained firms.

Papers that use time series approaches to estimate the relationship between debt and growth tend to give contrasting results. On the one hand, Chudik et al. (2017) use an autoregressive distributed lag model on a sample of advanced and emerging economies and find a negative long run relationship between debt and growth with causality going from debt to growth. On the other hand, Lof and Malinen (2014) use a panel VAR approach and show no evidence of an effect of debt on growth in a sample of 20 advanced economies.

Besides studying the average correlation between debt and growth, the economics literature also seeks to identify possible non-linearities and threshold effects. The original histogram of Reinhart and Rogoff (2010a) suggested the presence of such discontinuities when debt reached 90 percent of GDP. Even though Reinhart and Rogoff (2010b) clarify that they "do not pretend to argue that growth will be normal at 89% and subpar (about 1% lower) at 91% debt/GDP any more than a car crash is unlikely at 54mph and near certain at 56mph," the notion that there is a non-linearity in the debt-growth relationship and that this non-linearity is at a specific value—often 90 percent—has become popular. Follow-up work by Checherita-Westphal and Rother (2012), Baum et al. (2013), Cecchetti, Mohanty and Zampolli (2012), and Woo and Kumar (2015) corroborated the presence of such threshold effect in a regression framework.[32]

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[32] The evidence of the actual presence of a common debt threshold in these studies is weak. See Panizza and Presbitero (2013) for an overview and Ash et al. (2017) for a replication of some of the most widely cited studies. For instance, Woo and Kumar (2015) run a simple growth model interacting the debt-to-GDP variable with three dummies for ratios: (i) below 30 percent, (ii) between 30 and 90 percent, and (iii) above 90 percent. In 2 (out of 4) specifications of their Table 5, they find that the coefficient of the debt ratio is negative and significant when larger than 90 percent, but this coefficient is lower than (equal to) that for debt between 30 and 90 percent in the OLS (GMM) estimates. In other words, they cannot test that the *correlation* between debt and growth is statistically

However, assessing non-linearities is complicated by lack of statistical power due to the limited number of observations above the relevant threshold, and it is possible that the results of the literature are driven by the imposition of some parametric approach and on a few outliers (Ash et al., 2017). Moreover, this literature imposes common coefficients and thresholds across countries, while the data suggest that there is substantial heterogeneity especially when looking at larger samples, which pool together developing and emerging economies as well (Eberhardt and Presbitero, 2015). Consider, for instance, Figure 7, which plots the outcome of a non-parametric regression based on a sample of 20 advanced economies over the period 1960-2016 and shows that (i) the average negative correlation between debt and future (5 years ahead) growth hides a large degree of heterogeneity across countries, and (ii) while the relationship between debt and growth is nonlinear there is no common threshold beyond which an increase in debt is associated with a growth slowdown.

One reason for the presence of country-specific thresholds is that the level at which public debt becomes "too high" must depend on country characteristics. For example, in the context of sovereign default, Reinhart, Rogoff and Savastano (2003) classified countries into clubs and "debt intolerance" regions, which depend not only on borrowers' debt levels, but also on their credit and inflation history. Alternatively, Eichengreen, Hausmann, and Panizza (2005) emphasized the role of debt composition. In the debt and growth literature, Kourtellos et al. (2013) explicitly modeled the possibility of different regimes depending on a large set of country characteristics: their results, based on a large sample of 82 countries suggest that the effect of debt on growth critically depends on the quality of a country's institutions, in the sense that only when institutions are below a certain level higher debt translates into lower GDP growth. As countries with poor institutions also have higher debt levels, these results provide a mechanism to interpret (and are consistent with) the general finding of a negative relationship between debt and growth. Specifically, countries with low-quality institutions may be more inclined to the political budget cycle and less able to control overborrowing. In addition, those countries could have a higher propensity to finance government consumption rather than productive investment, leading to higher debt and lower growth.

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higher when debt is larger than 90 percent of GDP. Checcherita-Westphal and Rother (2012, Table 3), instead, run a quadratic model and report the confidence intervals of the turning point, which 49 to 119 percent of GDP.

Also using this logic, the presence of a common threshold effect across countries has recently been challenged by Eberhardt and Presbitero (2015) and Chudik et al. (2017). Both papers address the long-run relationship between public debt and growth in a panel set-up that can accommodate the role of global factors—like financial crises or trade spillovers—that are correlated across countries and allow for the possibility that the effects of debt on growth are different across countries. Neither analysis finds a common threshold in the relationship between public debt and growth, but they do find evidence of a negative relationship between (rising) debt-to-GDP ratios. An important result is that the debt trajectory can have more important consequences for economic growth than the level of debt-to-GDP itself (Pescatori et al., 2014), in line with recent evidence on how public debt could affect debt sustainability and market access (Bassanetti et al., 2018).

Other authors have looked at the dynamics between debt and growth from an historical perspective. Esteve and Tamarit (2018) focus on the Spanish economy for the period 1851–2013 and find some support for a negative relationship between public debt and growth, but no clear evidence of a debt threshold. Balassone et al. (2013) consider the experience of Italy since its unification in 1861 and find that when debt exceeds 100 percent of GDP its negative effect on growth becomes stronger. Eberhardt (2017) challenges this conclusion on grounds that time series analysis (e.g., cointegration) does not imply causation and is not suited to look at non-linearities. Adopting a more flexible framework and data over more than two centuries for Great Britain, Japan, Sweden, and the United States, Eberhardt (2017) finds no evidence for any long-run non-linear relationship between debt and growth.

Overall, our reading of the empirical literature is that, at least in advanced economies, there is a negative correlation between public debt and subsequent economic growth but no convincing evidence of *causality*: high debt and low growth may just reflect a weak macroeconomic framework, which is driving both aggregates. Moreover, cross-country averages hide a more complex reality, as the debt and growth relationship is driven by a number of factors that differ across countries and no clear evidence of a common tipping point beyond which additional debt has a negative effect on growth.

Six years after Reinhart, Reinhart and Rogoff (2012) we still agree with them that the "endogeneity conundrum has not been fully resolved" (p. 80).

Finally, it bears emphasizing that even if is true (in a causal sense) that "debt is bad for growth" it does not necessarily follow that governments should pay down the existing debt (Ostry, Ghosh, and Espinoza, 2015). In terms of social welfare, it may be more costly to pay down the debt than to live with it. In steady-state, this result is follows directly from tax-smoothing. Unless taxes are set to just service the debt indefinitely, they will either have to be increased in order to maintain sustainability against a growing debt, or they will have to be decreased once the debt has been repaid—either violates the principle of smoothing taxes to minimize the distortionary costs. Interestingly, the result also holds out of steady-state—at least for an important class of utility functions (i.e., iso-elastic). This is because, even though the presence of distortionary taxes implies wedges between private and social marginal products and rates of substitution, the market interest rate equals the discount rate of a benevolent government (i.e., that seeks to maximize the representative agent's utility).[33] The government can choose to pay down $1 of domestic debt today at a certain distortionary cost. Or it can wait till tomorrow, when the debt and the cost will have grown by (1+r), the market interest rate. But the government discounts the future at precisely (1+r), so it is indifferent between paying down the debt today or tomorrow. Since the same argument holds across all periods, the steady-state result—that it is optimal to just live with the inherited debt—obtains even out of steady state.

4.2 Not All Debts Are Equal

One of the reasons why it is difficult to identify common patterns and pin down the *causal* effect of debt on growth is that not all debts are equal and factors such as what the debt was used for, who holds government debt, its currency composition and its maturity are key elements that can affect fiscal vulnerabilities, the use of debt for tax smoothing purposes, and how government and private agents could react to future changes in debt. Unfortunately, applied economists are not usually able to observe all these characteristics, but only the *level* of government debt.[34] In other words, treating debt as a *black box* and imposing the restriction that any given level of debt has the same consequence on economic growth, regardless of its structure is too simplistic. We need

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[33] See Chari, Christiano, and Kehoe (1994) for an analogous result.

[34] A notable exception is the work by Abbas et al. (2014), which collect historical information on the structure of public debt for 13 advanced economies.

to factor into the empirical analysis all the other elements that matter (Eberhardt and Presbitero, 2015; Chudik et al., 2017),

Even in the studies where debt is allowed to affect countries in different ways, the lack of data availability on its structure prevents from a clear understanding of what is driving the heterogeneity in the results. The key issue, especially from a policy perspective, is not just to acknowledge that the economic consequences of borrowing are different across countries, but to understand which factors explain why a given debt level could be a constraint in one country but not in another. For instance, for any given debt level, having a larger exposure to foreign creditors—the share of public debt held by non-residents is traditionally very low for Japan (around 5-7%), while it is close to 40% in Italy and even higher in Ireland (Abbas et al., 2014)—or a shorter maturity structure, increases debt vulnerabilities, hampering growth (of course debt structure is itself endogenous, adding another layer of complication ever if the data were available.).

Similarly, looking at gross debt measures, as is normally done—including in this chapter—may be misleading, given that gross debt ignores financial assets held by the government (as well as the share of debt held directly by the government through cross-holdings). In some countries, this is particularly large, making their *net* stock of debt significantly smaller than the *gross* debt used in the empirical analyses. On the other hand, implicit liabilities, such as pensions, and debt by local governments and state-owned enterprises often results in much larger public sector debt stocks than the official debt numbers would suggest. However, capacity constraints in debt management offices and lack of data makes it difficult to have a common definition of net and implicit debts, which are comparable across countries (Panizza and Presbitero, 2013).

5. Concluding Remarks

Governments issue debt for a variety of reasons—both good and bad. Among the good reasons are intertemporal tax-smoothing, fiscal stimulus during economic downturns, and asset management, including providing financial markets with safe assets. While such motives can explain some of the increases in public debt—in particular, after wars or major financial crises—they cannot plausibly account for all of the observed changes. The correlation between public investment and public borrowing—supposedly a major non-wartime motivation for issuing

debt—is surprisingly weak. Indeed, the behavior of governments is sometimes quite at odds with these theories. A notable example is the build-up of public debt in many advanced economies during the early 2000s, when the world economy was booming, and the looming prospect of aging-related costs should have spurred public saving.

Counter-cyclical fiscal policies with implementation delays and forecast biases might be part of the explanation for the upward trend in public debt in many advanced economies. But a full accounting needs to go beyond purely economic rationales and consider social, political, and institutional factors that might be at play. Politicians pursuing their own self-interest and seeking to maximize their chances of re-election may engage in a political business cycle that results in debt rising over time. Strategic manipulation whereby the party in power seeks to circumscribe its (possible) successor's ability to spend public funds by deliberately running up public debt will likewise result in a positive debt bias. And common pool problems, which result in the private benefit of an additional unit of spending exceeding the social marginal cost of funding this extra unit of expenditure, provide a third political economy explanation.

But why does overborrowing matter? And what can be done about it? Other chapters in this volume explore some of the consequences of excessive government borrowing—including debt sustainability problems and possible crises. Even in the absence of crises, however, public debt can be costly. In welfare terms, the cost of public debt is the present discounted value of distortions associated with the taxes necessary to service that debt. Empirically, there is a negative relationship between public debt and output growth. The jury is still out on whether that relationship is causal—higher levels of public debt impeding growth—and in reality, the answer must depend on what the debt was used to finance, how it is expected to be repaid or serviced, and a host of other country-specific factors.

As to measures that democracies can take to limit overborrowing, the literature has identified three key avenues: electoral systems, fiscal rules, and budgetary institutions. While their effectiveness will depend on country circumstances, all imply some trade-off between the flexibility to respond to shocks and to issue debt for good economic reasons and the need to discipline policy makers from borrowing excessively.

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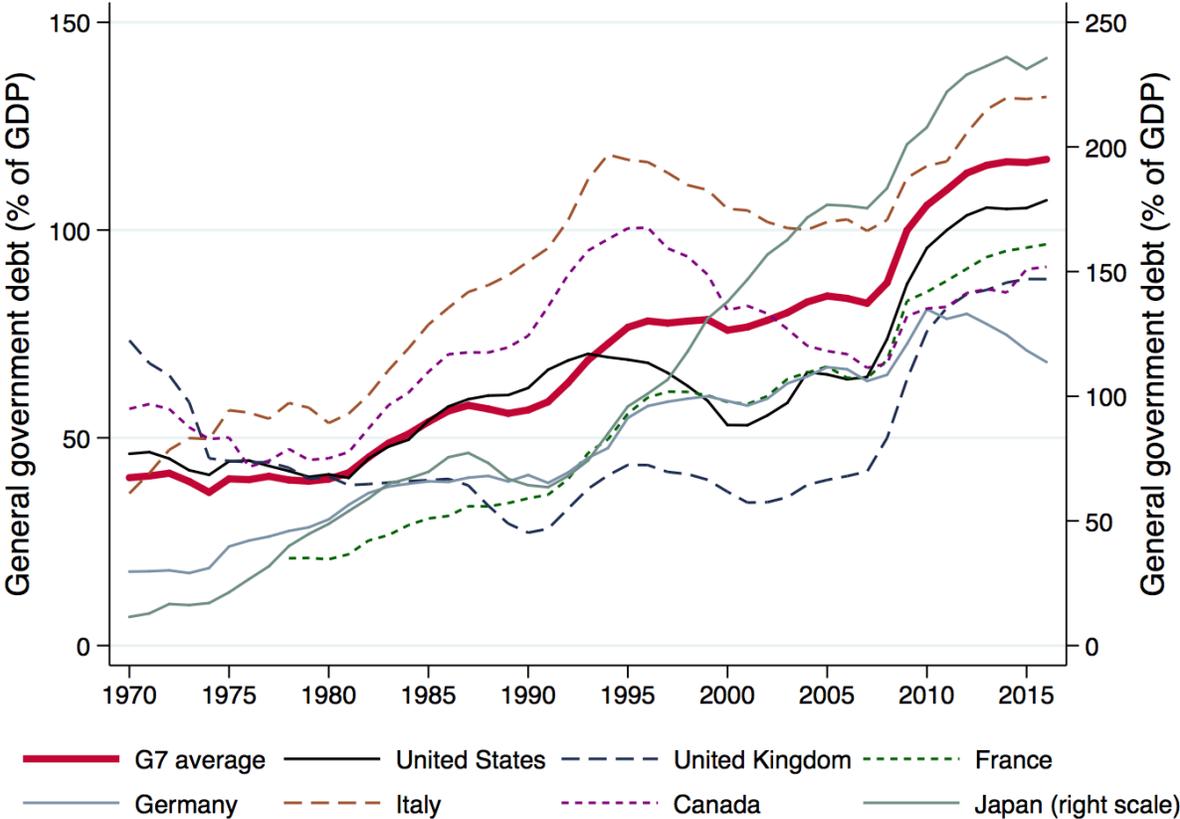
Figure 1: Change in Government Debt after the GFC, Selected Advanced Economies
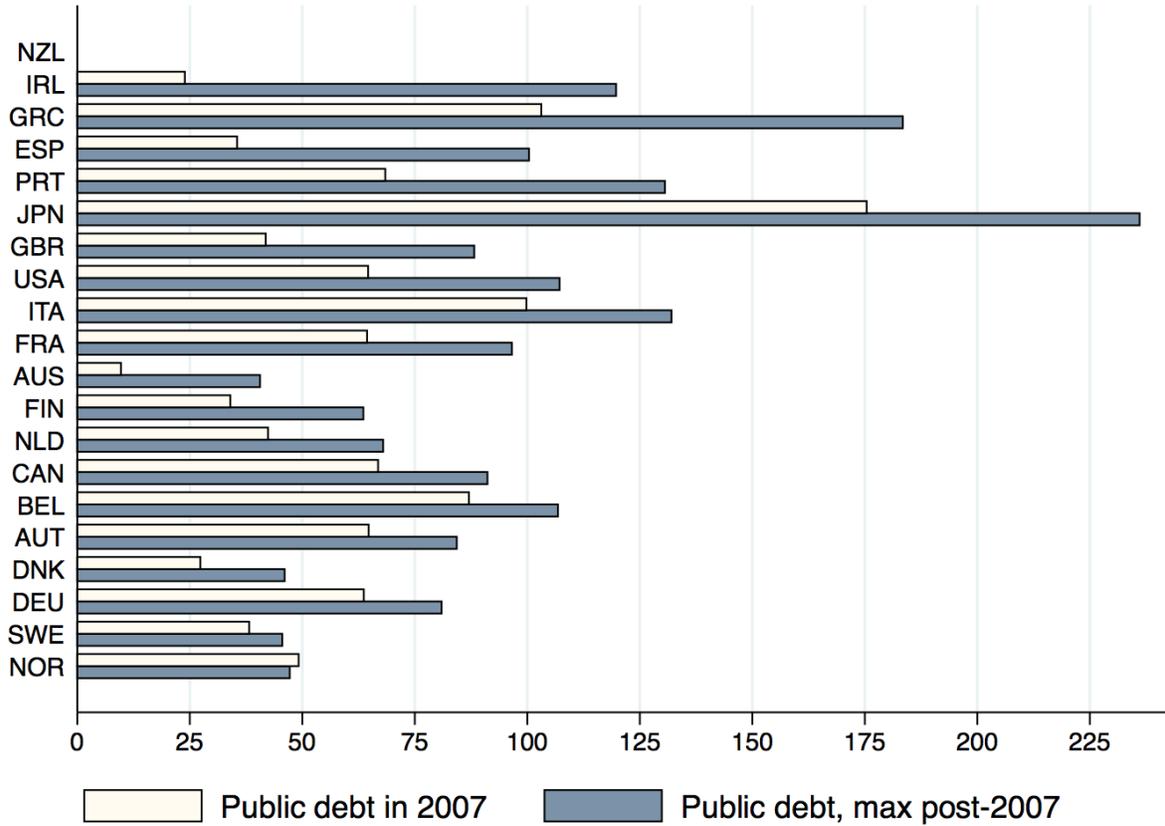
Notes: Data plot general government debt as a percent of GDP. Data are not available for New Zealand.
Source: Global Debt Dataset (Mbaye et al., 2018).

Figure 2: The Evolution of the Debt-to-GDP ratio in G7 countries

Source: Global Debt Dataset (Mbaye et al., 2018).

Figure 3: Correlation between change in public debt and contemporaneous public investment
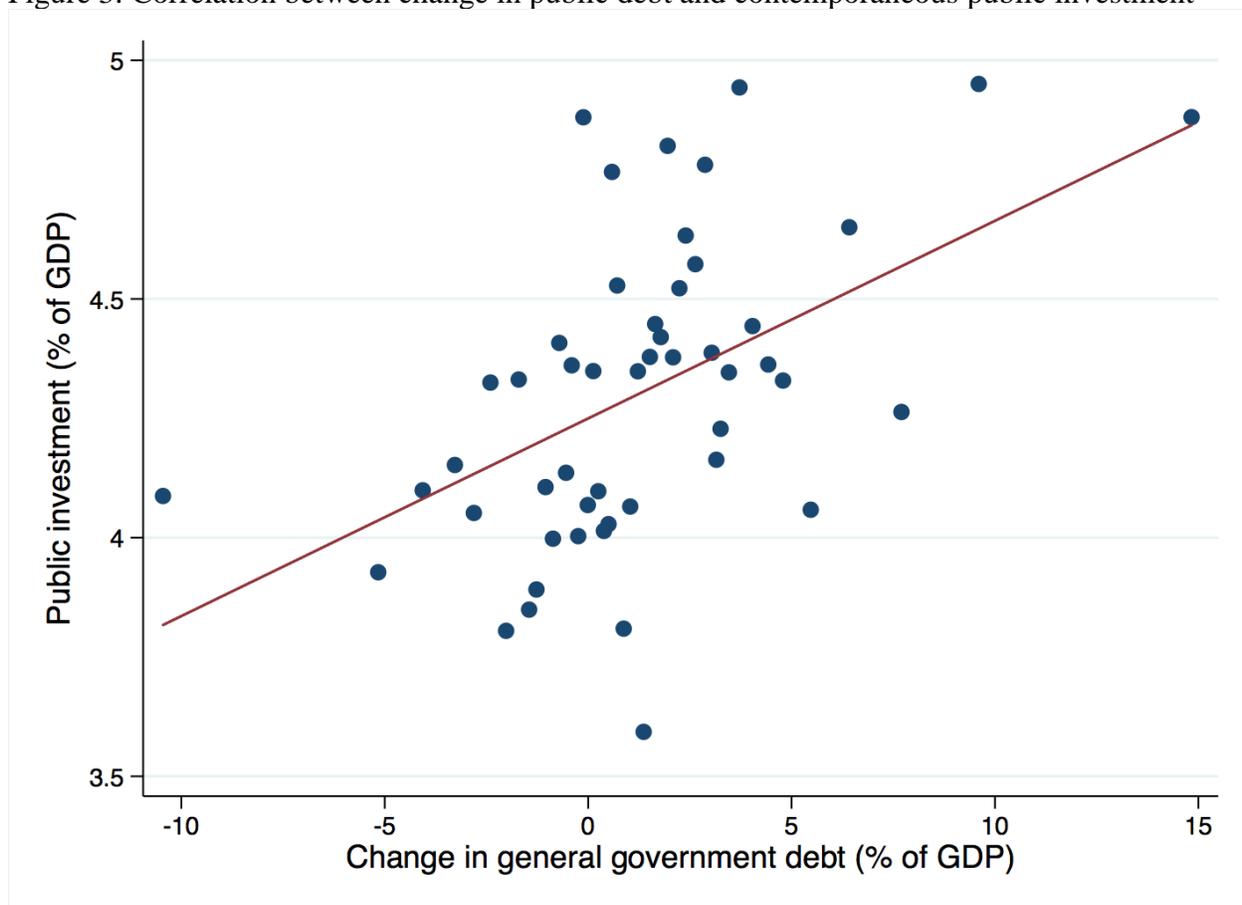
Notes: A regression of the ratio of public investment over GDP at time *t* against the change in the ratio of general government debt over GDP between *t* and *t-1*, controlling for year and country fixed effects, gives a coefficient on the debt variable of 0.041 (p-value of 0.011), meaning that a 10 percent increase of the debt-to-GDP ratio is associated with 0.4 percent higher ratio of public investment over GDP. To generate the binned scatterplot, starting from the sample of 19 OECD economies (data on general government for New Zealand are not available), the change in the ratio of general government debt over GDP between year *t* and *t-1* (x-axis) and public investment (as a percent of GDP, y-axis)) in year *t* are regressed against year and country fixed effects. Then, the x-residuals are grouped into 50 equal-sized bins and the chart plots, for each bin, the mean of public investment (as a percent of GDP) in year *t*, within each bin, holding the controls constant. The red line is the linear fit of the OLS regression of the y-residuals on the x-residuals.
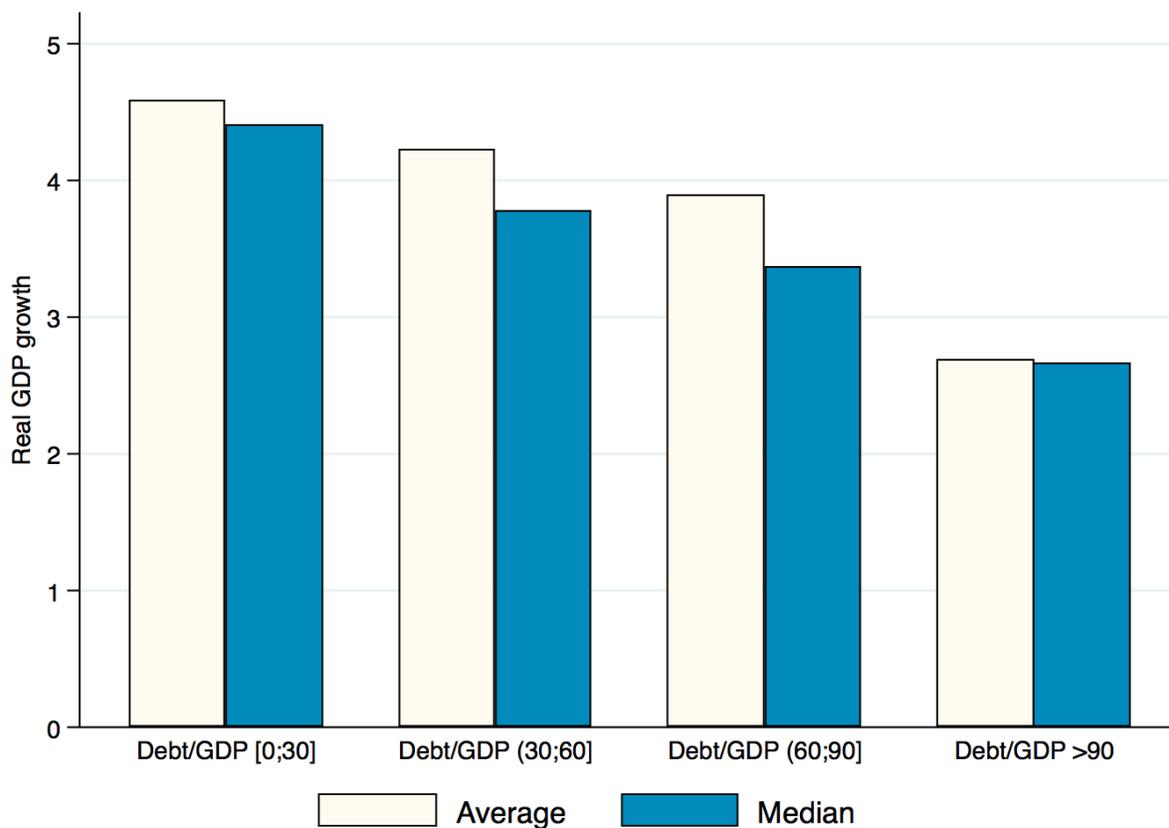Source: Global Debt Dataset (Mbaye et al., 2018) and World Economic Outlook.

Figure 4. Government Debt and Growth, Selected Advanced Economies; 1960-2016
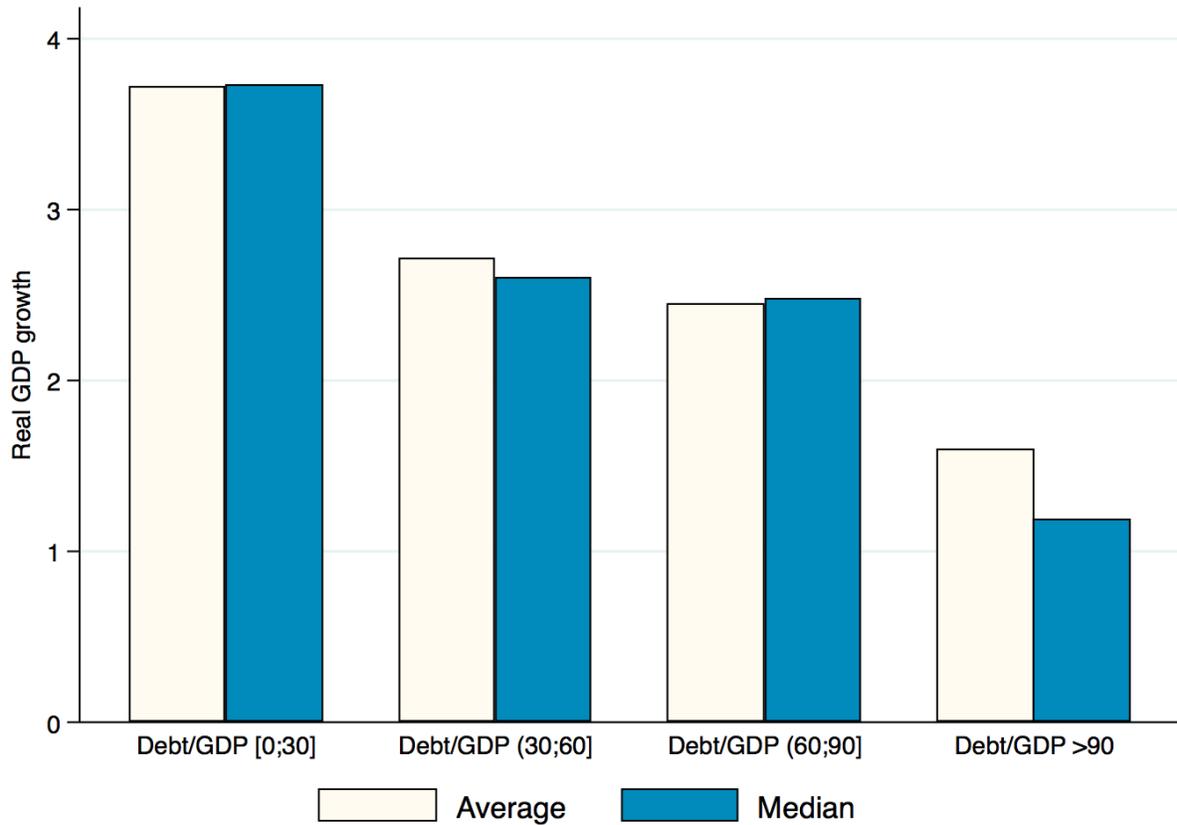
Notes: The sample includes 20 advanced economies as in Reinhart and Rogoff (2010, Figure 2): Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom, and the United States. Data refer to central government debt, apart from the Netherlands, for which general government data have been used, because of data availability. Source: Global Debt Dataset (Mbaye et al., 2018) and World Economic Outlook.

Figure 5. Government Debt and Growth, Low and Middle Income Countries; 1960-2016

Notes: Data refer to central government debt. The sample includes 131 low and middle income countries. Data refer to central government debt.
Source: Global Debt Dataset (Mbaye et al., 2018), World Development Indicators and World Economic Outlook.
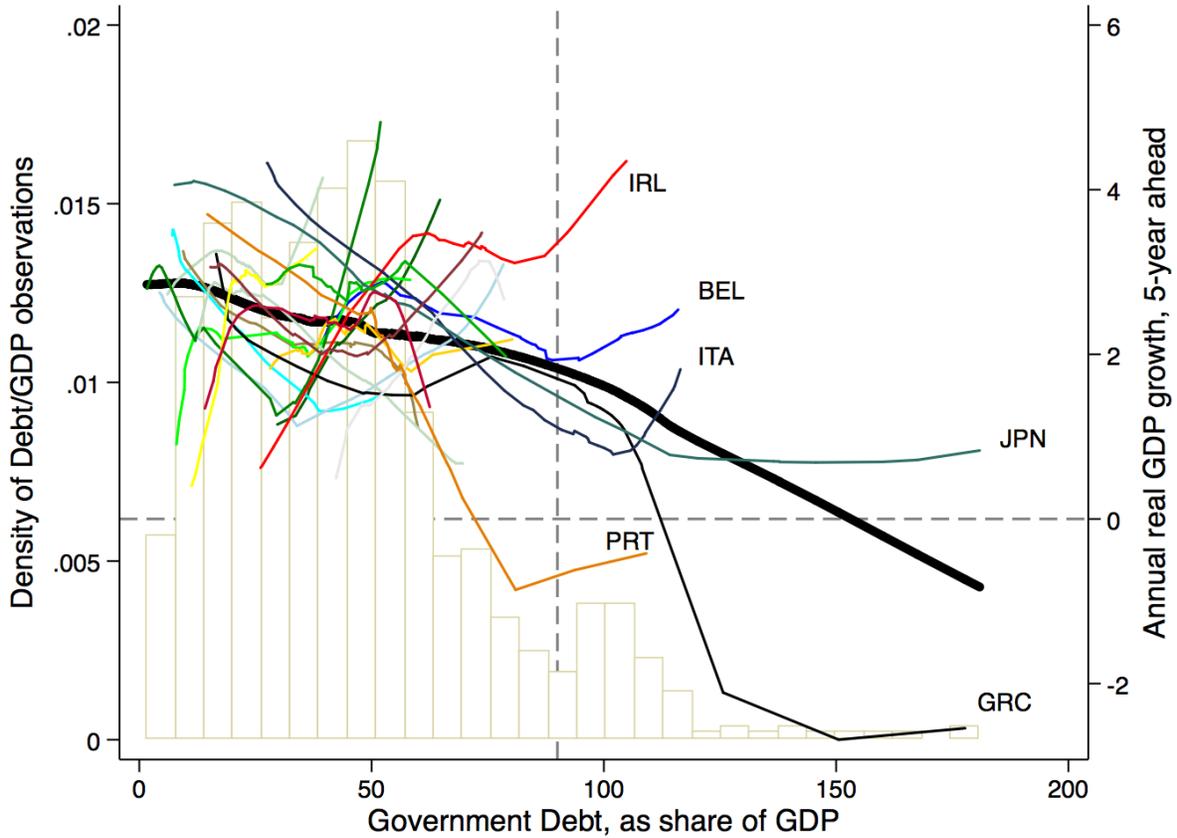
Figure 6. Government Debt and Future GDP Growth, Selected Advanced Economies; 1960-2016
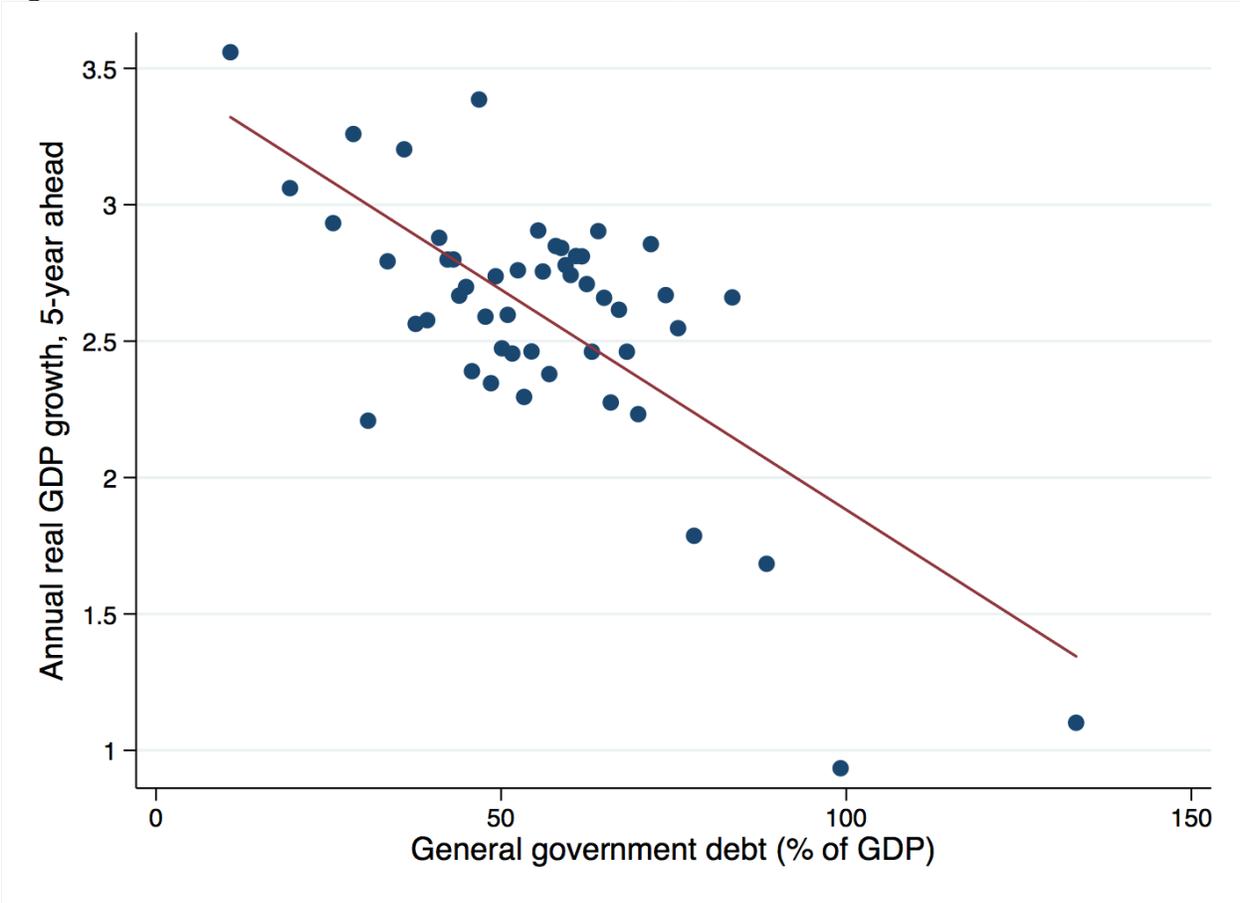
Notes: A regression of the annual real GDP growth between $t+5$ and t against the ratio of general government debt over GDP at time t, controlling for year and country fixed effects, gives a coefficient on the debt variable of -0.016 (p-value of 0.001), meaning that 10 percent higher debt-to-GDP ratios are associated with 0.2 percent lower future growth over 5 years. To generate the binned scatterplot, starting from the sample of 19 OECD economies (data on general government for New Zealand are not available), the annual real GDP growth between $t+5$ and t (y-axis) and the ratio of general government debt over GDP at time t (x-axis) are regressed against year and country fixed effects. Then, the x-residuals are grouped into 50 equal-sized bins, then the chart plots, for each bin, the mean of the annual real GDP growth between $t+5$ and t, within each bin, holding the controls constant. The red line is the linear fit of the OLS regression of the y-residuals on the x-residuals.
Source: Global Debt Dataset (Mbaye et al., 2018) and World Economic Outlook.

Figure 7: Non-linearities and Heterogeneity in the Debt-Growth Relationship

Notes: The sample includes 20 advanced economies as in Reinhart and Rogoff (2010, Figure 2): Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom, and the United States. Data refer to central government debt, apart from the Netherlands, for which general government data have been used, because of data availability. Source: Global Debt Dataset (Mbaye et al., 2018) and World Economic Outlook.