German Economic Review ■(■): 1–17

Public and Private Debt: The Historical Record (1870–2010)

Moritz Schularick
Department of Economics, Universität Bonn

Abstract. *Economists routinely emphasize the risks of excessive public borrowing, but tend to have a more benign view of private sector debt. In this study, I draw on recent comparative studies of the macroeconomic history of advanced economies since 1870. I synthesize four historical facts and argue that a more balanced view of public and private borrowing is warranted. First, while both public and private debts have increased markedly, private, not public debts have climbed to historically unprecedented levels. Second, outside war times, financial crises have typically originated in the private sector, yet the costs have increasingly been socialized. Third, the historical record shows that modern democracies have been relatively successful in managing their financial affairs, evidenced by a systematically positive response of primary balances to high debt ratios. Fourth, I demonstrate that private and public debt cycles have been tightly linked since the 1970s.*

JEL classification: *H*60, *G*01, *N*10.

Keywords: Public debt; fiscal policy; private credit; financial stability.

1. INTRODUCTION

Until the recent crisis, economists mostly worried about public debt, not about private debt. With the benefit of hindsight, this was a mistake. In 2007, Spain's public debt was below 36% of GDP, the overall budget was solidly in surplus and the primary budget balance even posted a whopping surplus of three per cent of GDP. In Ireland, the corresponding figures were 25% for the debt ratio and a little less than one per cent for the primary surplus.[1] Both countries hence operated well within the Maastricht rules, even with an extra safety margin. In many respects, they were the poster children of sound fiscal management measured by the criteria of the Maastricht treaty. Yet within two years, their financial systems imploded, their economies crumbled, unemployment soared and both countries were albeit to different degrees, forced to seek financial assistance from other European states. The lesson of this episode seems to be that there was next to nothing in key indicators of public debt that indicated the imminent catastrophe. The build-up of financial fragility occurred on private sector balance sheets. Credit growth in the private sector would have given the correct warning signal that a storm was brewing – as it has regularly been the case in modern economic history (Schularick and Taylor, 2012).

1. Data come from the April 2013 edition of the World Economic Outlook of the International Monetary Fund.

It is not hard to understand why economists have a tendency to be outspoken about the risks of public debts, but take a more nuanced position on the risks of private debt accumulation. When private households and companies borrow, they are generally assumed to be acting in their informed self-interest and bear the outcomes of their actions. When governments borrow, economists' intuition is that incentive problems abound and that the temptation to finance economically wasteful pet projects or serve special interests at the cost of future generations is too big to be contained. For the historian, such fears are reminiscent of an old line of thought centered on the idea that democracies have difficulties managing their finances. Over the centuries, prominent thinkers have diagnosed a fundamental tension between democratic rule, public borrowing and financial stability. For Plato, it was clear that democracy would lead to financial chaos. Democratic politicians would 'deprive the rich of their estates and distribute them among the people; at the same time taking care to reserve the larger part for themselves'.[2] And more than two millennia later in a very different part of the world, James Madison was convinced that democracy would lead to 'a rage for paper money, for an abolition of debts, for an equal division of property and for any other improper or wicked projects'. Twentieth century political economists such as Buchanan and Wagner ([1977], 2000) as well as Crain and Ekelund (1978) have used public choice reasoning to explain the political incentives for debt accumulation in democratic societies.

However, this might not be the only reason why economists lost sleep over the accumulation of public, not private debts. The other side of the story is that the idea of excessive private sector debt accumulation – as it could be observed in recent years in Spain, Ireland and the US, among others – raises a number of theoretically much more demanding problems. It is considerably easier to explain the political economy logic of overexploitation of common pools or problematic incentives for re-election hungry politicians than it is to integrate an endogenous build-up of financial fragility into modern macroeconomic models. For a discipline built on the assumptions of self-equilibrating markets and rational forward-looking actors, it will remain challenging to come to terms with the repeated mispricing of financial assets and explain recurring cycles of overlending and overborrowing. The historical evidence demonstrates that financial crises are typically 'credit booms gone bust' implying that crises are endogenous to developments in the economy, not random exogenous shocks.

To some degree, the global financial crisis has already led to a reorientation of the discipline of macroeconomics toward a more balanced mix of inductive and deductive reasoning. This includes a greater emphasis on empirical research and a renewed willingness to take the insights from economic history on board. In particular, the new comparative macroeconomic history has gained prominence in recent years as scholars have eschewed purely deductive approaches and the discipline began to address the 'pretense of knowledge syndrome' that Ricardo Caballero (2010) diagnosed.

There is hardly a choice. Financial crises and prolonged economic depressions are (thankfully) rare events. This means that if we are to understand these great calamities of modern economies, we have to paint on a broader

canvas and go back in time to obtain a sufficient number of observations. The new emphasis on quantitative research in economic history has already yielded new insights with regard to the link between private credit growth and banking crises (Schularick and Taylor, 2012); the output effects of financial crises (Bordo and Haubrich, 2010; Cerra and Saxena, 2008; Jordà *et al.*, 2011b; Reinhart and Rogoff, 2009, 2010); the role of fiscal policy during financial crisis episodes (Almunia, 2010); the fiscal costs of financial crises (Laeven and Valencia, 2012; Reinhart and Rogoff, 2009; Schularick, 2012); and the effects of debt overhangs on recovery trajectories (Gärtner, 2013; Jordà *et al.*, 2011b; Reinhart and Rogoff, 2009). However, with the exception of the study by Jordà *et al.* (2013), the recent literature has not looked at public debt and private debt jointly.

In this article, I study the relationship between public and private debts in advanced economies over 140 years (1870–2010). I draw on recent comparative and quantitative research in macroeconomic history and present four related, but distinct historical facts about public and private debts:

First, aggregate debt levels have grown to historically unprecedented levels in all advanced economies over the last century and a half. The break with the past is particularly evident since the 1970s. However, the increase in economy-wide debt levels has been dominated by the behavior of the private sector, in particular by households, not by the public sector (Jordà *et al.*, 2013).

Second, in advanced economies, financial stability risks have almost exclusively come from private sector debt growth, not from the public sector (Jordà *et al.*, 2013). By contrast, the tendency to socialize the losses from private sector financial crises has grown. The fiscal costs of financial crises are large and have become a key health risk for public finances (Laeven and Valencia, 2012; Reinhart and Rogoff, 2009; Schularick, 2012).

Third, the historical record since 1870 generally suggests prudent fiscal behavior by democratic governments in the Western world. The main piece of evidence is that countries have generally responded to high public debt levels by increasing primary surpluses (Mauro *et al.*, 2013; Mendoza and Ostry, 2008), thus fulfilling the fiscal sustainability criterion advocated by Bohn (1998). The fiscal reaction function of governments to increasing debt levels was to systematically raise the primary surplus. Measured by this important criterion, democracy and debt do not seem to be the problematic bedfellows that Buchanan and Wagner ([1977], 2000) and many others thought they were.

Fourth, studying the determinants of changes in public debt since 1970, a close negative relationship emerges between private and public debt accumulation. Countries with pronounced private sector credit booms have generally seen much more benign public debt trends (and vice versa). The private credit cycle and the fiscal cycle are tightly linked as argued by Benetrix and Lane (2011). Other factors that help explain the public debt increase since 1970 are economic growth, the frequency of financial crises and the size of the welfare state. By contrast, political factors such as the ideological orientation of the ruling party or social conflict do not correlate closely with changes in public debt.

Throughout this article, I will chiefly rely on the macroeconomic database assembled and documented by Jordà *et al.* (2013). It builds on macroeconomic and

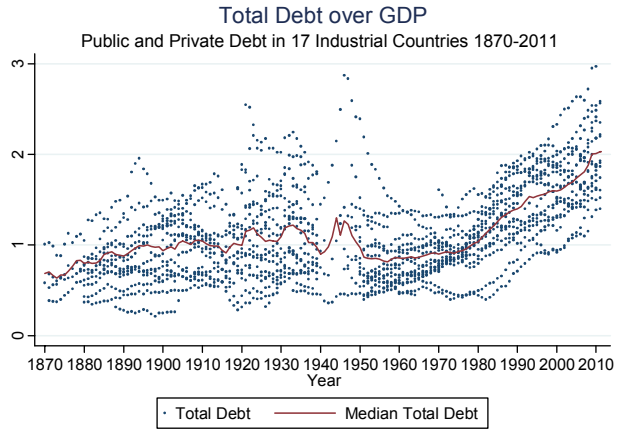

Figure 1 The Development of Aggregate Public and Private Debt since 1870

financial data for the near-universe of 17 advanced economies. The time period, unless otherwise noted, is 1870–2010. The countries covered are the following: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK and USA. The dataset contains, at annual frequency, public and private debt data, interest rates and a wide range of macroeconomic control variables such as income levels and growth, monetary aggregates and inflation rates. Private debt is defined as the total lending of financial institutions to the private domestic non-financial sector, i.e., to private households and non-financial business. For the postwar US economy, market-based borrowing is also included in the aggregate private credit measure. Public debt is the gross debt of the consolidated public sector – although a few historical series cover central government accounts only. The data have been collected from a wide range of primary and secondary sources and have been corroborated with the historical public debt database compiled by researchers at the IMF (Abbas, 2010). The data for primary budget balances come from a recent study by Mauro *et al.* (2013). Data for systemic financial crises are taken from Jordà *et al.* (2011a), which in turn builds on the timing of crisis events pioneered by Bordo *et al.* (2001) and Reinhart and Rogoff (2009) for historical times. The Laeven and Valencia (2008, 2012) dataset of systemic banking crises is the main source for post-1970 crisis events. Other socioeconomic data come from the database compiled by Armingeon *et al.* (2012).

2. PUBLIC AND PRIVATE DEBT SINCE 1870

The simplest first cut of the data is to track the development of the aggregate private and public debt over time. The resulting Figure 1 shows that relative to GDP, the total debt of households, non-financial business and the government has roughly doubled in the course of the twentieth century. Around the year 1900, the median of total private and public debts in the 17 countries under study here was slightly below 100% of GDP. In the year 2010, total debt crossed

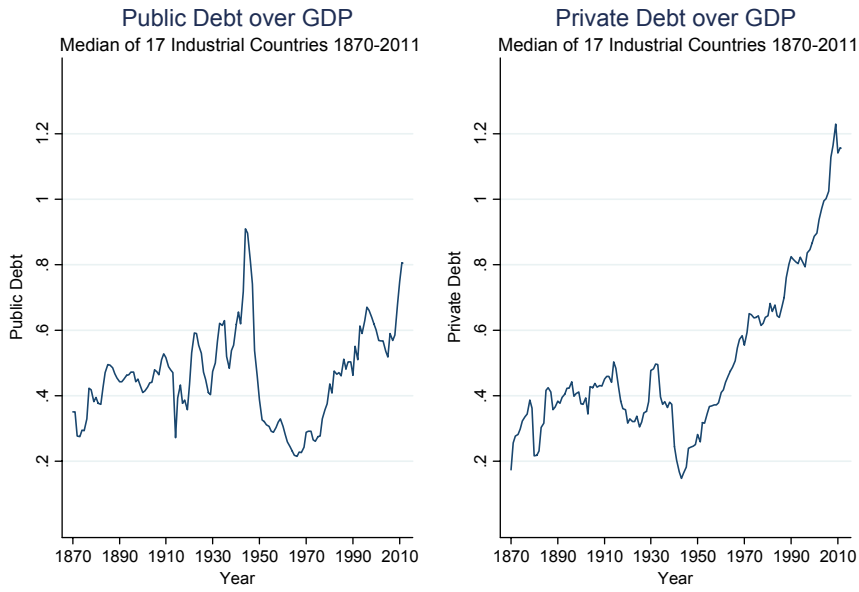

Figure 2 Public and Private Debt since 1870

the 200% level.[3] Since 1970 alone, total debt has risen by about 110 percentage points of GDP. However, the median hides considerable diversity on the individual country level. Today, countries fall in a broad range between 150% and 300% of GDP.

Overall, Figure 1 demonstrates an unprecedented increase in total debt (and corresponding financial assets) in most countries in the second half of the twentieth century. Western economies have seen a steady increase in the degree of 'financialization,' measured by the volume of public and private credit to output, after the Second World War. The amount of debt relative to productive capacity has climbed to historical highs in virtually all developed countries. Although financial deepening until the 1970s could be interpreted as return to prewar levels (i.e., after the collapse of private financial intermediation during the Great Depression and during World War II), the sharp increase in the past 30 years stands out as a structurally new development in modern capitalist history (Schularick and Taylor, 2012).

How was this increase in economy-wide debt in recent decades distributed between the public and the private sector? As it turns out, only about one third of the increase in total debt in the Western world since 1970 was due to public debt accumulation. In other words, the overwhelming share of the rise has been due to higher borrowing by households and companies. Digging deeper into the split between households and companies, Hume and Sentence (2009) have shown that the global credit boom of the past decades has been mainly driven by household borrowing. Clearly, public debt ratios have also increased in most, albeit not all, Western economies in the second half of the twentieth century.

3. Note that these figures exclude financial sector debt, because assets and liabilities of the financial sector sum to zero by definition.

Table 1 Debt and financial crises, 1870–2010

	(1)	(2)	(3)	(4)	(5)
Δ Private Credit/GDP (5-year m.a.)	17.01***		17.05***	28.74**	
	(4.707)		(4.723)	(11.58)	
Δ Public Debt/GDP (5-year m.a.)		−3.001*	−1.906		−2.972
		(1.677)	(2.376)		(3.119)
Lagged Private Credit/GDP level				−0.112	
				(0.542)	
Lagged Public Debt/GDP level					0.0199
					(0.265)
Interaction Term				−12.65	−0.668
				(12.57)	(2.732)
Observations	2,111	2,228	2,018	2,035	2,041
AUC	0.609	0.564	0.617	0.612	0.561
s.e.	(0.033)	(0.030)	(0.034)	(0.033)	(0.031)

Standard errors in parentheses.
*p< 0.10, **p< 0.05, ***p< 0.01.
Source: Jordà, Schularick and Taylor (2013).

Yet until the global financial crisis of 2008, they had more or less stayed within the upper end of their historical peacetime range, whereas the break with history had occurred in the private sector, as shown in Figure 2.

3. DEBT AND FINANCIAL CRISES

The fact that private, and not public debt, has broken out of its historical ranges relative to GDP is not the only reason why economists should take private sector indebtedness as serious as public debt. Another reason is that risks of financial instability typically emanated from the private and not from the public sector. This is a key result of a recent study by Jordà *et al.* (2013) who studied the role played by private and public debts as determinants of systemic financial crises (Table 1).[4]

They specify a standard forecasting framework relating the log-odds ratio of a financial crisis event occurring in country *i* in year *t* to lagged changes in the private and public debt-to-GDP ratio. Simply put, they run a horserace between private and public borrowing as a predictor of financial crises. To summarize the

4. Since 1870, there have occurred no less than 95 systemic financial crises in the sample of 17 countries used here. Following the definition of Laeven and Valencia (2012), a financial crisis is characterized as a situation in which there are significant signs of financial distress and losses in wide parts of the financial system that lead to widespread insolvencies or significant policy interventions. The important distinction here is between isolated bank failures, such as the collapse of the Herstatt Bank in Germany in 1975 or the demise of Baring Brothers in the UK in 1995, and system-wide distress as it occurred, for instance, in the *Gründerkrise* in the 1870s, the Japanese banking crises in the 1990s, or during the global financial crisis of 2008. It is clear that the lines are not always easy to draw, but the overall results appear robust to variations in the crisis definitions. A list of years in which systemic financial crises occurred in the 17 countries under study here can be found in the Appendix A.

information contained in the lagged variables, five-year moving averages are used in the following regression model:

$$logit(p_{i,t}) = \beta_{0i} + \beta_1 L(\Delta\ PublicDebt_{i,t}) + \beta_2 L(\Delta\ PrivDebt_{i,t}) + \epsilon_{i,t} \quad (1)$$

The core results from the Jordà *et al.* (2013) study are reproduced in Table 1. The table sends two very clear messages. Looking back at 140 years of economic history, it appears that financial crises have very little to do with public debt. Only changes in private credit are associated with increasing crisis risks. The coefficient on public debt is statistically insignificant and even has the 'wrong' sign. As shown in regression (5), this holds true even at high levels of public debt. The second main insight is that financial crises are not random events, but endogenous to developments in private credit markets. As discussed above, this is problematic for strategies that model crises as exogenous shocks to the economic system. Economists who are interested in understanding the driving forces of financial stability risks have no choice, but to study the dynamics of private debt accumulation, not public borrowing.

Moreover, there is a substantial and growing body of evidence that the fiscal costs of financial crises are high. The combination of weaker economic growth and lower revenues as well as the increase in government expenditures linked to bailout costs and automatic stabilizers widens deficits and increases government debt. Laeven and Valencia (2012) calculate that in the case of Ireland, the direct fiscal costs of bailing out the banking sector amounted to more than 40% of GDP. On average, Laeven and Valencia put the direct fiscal costs of banking crises since 1970 at about seven per cent of GDP. Note that this excludes the indirect costs of stabilizing the economy in recession.

Looking at the overall behavior of public debt ratios after financial crises, Reinhart and Rogoff (2009) argue that a strong link exists between banking crises and subsequent increase in public debt which might go as far as leading to sovereign default. Recent events in Spain and Ireland have clearly given ample support for this link. Reinhart and Rogoff calculate that government debts rise by 86% relative to precrisis levels within three years after a systemic banking crisis. Yet, their sample includes many emerging markets where currency mismatch and balance of payment problems exacerbate the costs. Studying advanced

Table 2 Changes in public debt after financial crises, 1870–2010.

Percentage point change of the debt/GDP ratio	Post-crisis years*	*N*	Normal times	*N*
All years	0.83	362	0.19	1,149
Pre-WW2	−0.04	267	1.16	495
Post-WW2	3.31	95	−0.43	705
Post-1975	3.46	93	0.88	378
Post-1975 and small financial sector*	2.27	52		
Post-1975 and large financial sector	4.96	41		

Notes: The figures shown represent the average annual change in the ratio of public debt over GDP in the first five years after a financial crisis; financial sector are large (small) when the credit to GDP ratio is above (below) 70%. *$p < 0.10$.
Source: Schularick (2012).

economies, Schularick (2012) shows that the overall fiscal costs of crises have increased strongly in the course of the twentieth century. In the pre-WWII period, financial crises had no meaningful effect on public debt ratios. Yet after WWII, the deterioration is on average 330 basis points per year – adding up to around 20 percentage points over five years after the crisis.

Moreover, both Laeven and Valencia (2012) and Schularick (2012) present evidence that the size of the financial sector is an important driver of the fiscal costs of financial crises. Direct bailout and stabilization costs increase with the size of the financial sector. Table 2 shows that if a crisis strikes an economy with a large financial sector, the effect grows from two to nearly five percentage points per year. This implies a deterioration of the public debt-to-GDP ratio of close to 30 percentage points over five years. While an average deterioration of the public debt-to-GDP ratio of 30 percentage points in the wake of a financial crisis might seem unusually large, this estimate is easily confirmed by a few well-known case studies. After the Swedish banking crisis in 1991, the public debt ratio increased from 55% in 1991 to 83% of GDP in 1997; in the aftermath of the Spanish financial crisis of 1978, public debt went from 12% of GDP to 37%; and before the 2007 crisis, the UK had a public debt-to-GDP ratio of 43% in 2007, which had risen to 90% by the end of 2012 – a deterioration of close to 50 percentage points of GDP. In short, an average deterioration of the public debt-to-GDP ratio by 30 percentage points in the wake of a financial crisis looks like a plausible point estimate.

Summing up, in the light of the past 140 years of Western macroeconomic history, private sector credit growth, not public debt accumulation provides the key to understanding the build-up of financial fragility. At the same time, financial crises have become a key risk factor for the health of public finances. This provides yet another important reason why economists should look at both public and private debt developments.

4. DEMOCRACY AND DEBT

Economists' preoccupation with public borrowing often relies on a public finance version of the 'tragedy of the commons'. Self-interested individuals have an incentive to overexploit shared resources, such as common agricultural land or forests, as they get to enjoy the benefits while only paying a fraction of the costs. Public choice theory sees the fiscal process in modern democracies in a similar light (Eichengreen *et al.*, 2011). Those who enjoy the benefit of extra government spending are not the same as those who have to pay for it. This irrefutably leads to an inherent spending bias in modern democracies. To accommodate high spending and low taxation preferences of politicians and voters, debt financing of additional expenditures turns out to be the easiest solution. As voters and politicians have access to future tax funds through borrowing, they are tempted to spend today and leave the bill to future generations. Absent binding rules, democracy unavoidably leads to excessive spending, deficits and debts. The joint financial resources of the society will be overexploited in the same way shared fishing ponds usually are.

The classic warning of the inherent deficit bias of modern democracies comes from the work of Buchanan and Wagner ([1977], 2000, p. 95): 'Elected politicians

enjoy spending public monies on projects that yield some demonstrable benefits to their constituents. They do not enjoy imposing taxes on these same constituents'. Unsurprisingly, Buchanan and Wagner were also more than skeptical that democracies would be able to manage their finances in a sustainable way, culminating in a memorable sentence that is reminiscent of old fears that democracy means financial disaster: 'Budgets cannot be left adrift in the sea of democratic politics' (Buchanan and Wagner ([1977], 2000, p. 182)).

However, this fundamental skepticism of public choice theorists is not easily reconciled with two other strands in the literature. First, economic historians have typically argued the opposite, namely that the rise of democracy was a prerequisite for sustainable and credible fiscal management. In this view, it was the ascent of 'citizen creditors' in the Netherlands and in Britain after the Glorious Revolution that has prepared the ground for sustainable public finances, modern debt markets and low interest rates. In their well-known study, North and Weingast (1989) argued that parliamentary control of public spending in Britain allowed the government to credibly commit to uphold property rights and service the debt. For North and Weingast (and many others), democratic oversight of spending and borrowing was the mechanism through which the modern state achieved prudent management of fiscal affairs and reassured investors. For instance, the safety of government borrowing under democratic rule is widely acknowledged to have given Britain and the Netherlands advantages in raising funds for wars. The Netherlands' independence owes much to the ability of the Dutch Republic to raise funds, just as Britain's victory over Napoleon had an important financial element (Ferguson, 2001). Macdonald (2006) argues that democracies have become politically and militarily powerful in the modern times exactly because of the fiscal solidity of democratic rule.

Second, recent long-run empirical studies have, by and large, found evidence that in the long run, democracies have been successful in avoiding the common pool problem and running fiscal policies aligned with their long-run budget constraint (Mauro *et al.*, 2013; Mendoza and Ostry, 2008). Empirically, these findings rely on the robust response of fiscal policy to high debt ratios. In light of the importance of these findings, a closer look at the empirical evidence that fiscal behavior of advanced economies has generally satisfied the government's intertemporal budget constraint seems warranted.

The core idea advanced by Bohn (1998, 2005) was to study the response of the primary balance to increasing debt levels. Bohn demonstrated that in a regression of the primary surplus on the public debt ratio (and controls for transitory shocks to output and expenditures), a positive regression coefficient on the debt ratio is sufficient for sustainable fiscal policy consistent with the intertemporal budget constraint. In essence, a positive response of fiscal policy to higher debt ratios means that the government systematically increases the primary balance when public debt is high. This, over time, puts a break on the increase in the debt-to-GDP ratio. If rising public debt levels would not elicit a change in fiscal policy, the debt-to-GDP ratio would keep on rising, eventually leading to default.

Both Mauro *et al.* (2013) and Mendoza and Ostry (2008) implement Bohn's solvency test for a wider country sample. Their studies come to an identical conclusion: In general, the 'fiscal policy reaction function' of advanced democracies passes the solvency test. In the longer run, higher debt levels have systemati-

Table 3 Debt sustainability regressions, 1870–2007

	(1)	(2)	(3)	(4)
Public debt/GDP($t-1$)	0.0161***	0.0208***	−0.0156***	−0.0197***
	(0.00299)	(0.00268)	(0.00500)	(0.00494)
Cyclical position		−0.0205		0.102***
		(0.0140)		(0.0234)
War		−0.0688***		0.0378***
		(0.00310)		(0.00556)
Observations	2,025	2,025	2,180	2,180
R^2	0.014	0.213	0.004	0.037

Notes: Dependent variable is the primary balance in (1) and (2) and the change in the public debt-to-GDP ratio in (3) and (4). *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$. Standard errors in parentheses. Country fixed effects not shown.
Sources: See text. Primary balances from Mauro *et al.* (2013).

cally triggered a positive change in the primary balance. Bohn's 'model-based sustainability' test is based on the following regression equation:

$$pb_{i,t} = \rho\ d_{i,t-1} + \beta\ Z_{i,t} + n_i + \epsilon_{i,t}, \tag{2}$$

where *pb* denotes the primary balance, *d* is the level of debt-to-GDP and *Z* is a vector of control variables containing the cyclical deviation of output from an HP-filtered trend and a dummy variable for temporary expenditure shocks[5] , while n_i are country-fixed effects. The main coefficient of interest is ρ which represents the fiscal policy reaction to the public debt ratio. The data for primary balances come from the study by Mauro *et al.* (2013).

Repeating the estimations for the present sample of 17 advanced countries, shown in Table 3, confirms the results of previous studies by Mendoza and Ostry (2008) and Mauro *et al.* (2013): ρ is positive and statistically highly significant, suggesting that over the past 140 years governments have systematically reacted to higher debt ratios by raising the primary balance. A slight variation in Bohn's models can be found on the right hand side of Table 3. The regressions (3) and (4) use the change in the debt-to-GDP ratio as the dependent variable (hence the change of the sign of the coefficient). The results are identical: Judging by the past reaction function of fiscal policy, the 17 advanced economies studied here have generally run fiscal policy in a way consistent with long-run solvency.

5. THE RISE OF PUBLIC DEBT SINCE 1970

The second half of the twentieth century has seen the first major increase in public debt ratios in peacetime. On average, public debt ratios have increased by close 50 percentage points for the sample of 17 countries between 1970 and 2011 – clearly a very high and worrying number for peacetime economies. However, two caveats apply. First, the average is strongly influenced by Japan where public debt increased by more than 200 percentage points of GDP since 1970. Without Japan,

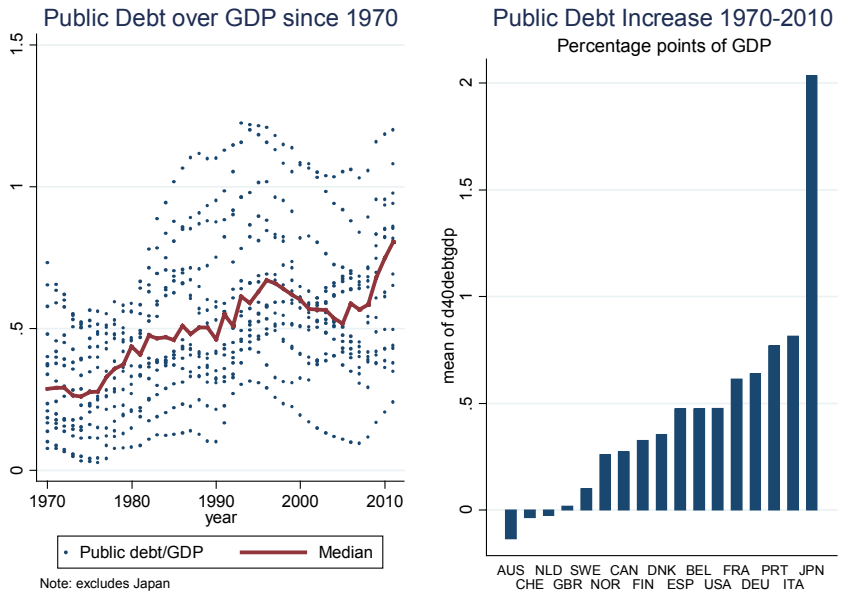

Figure 3 Industrial Countries: Increases in Public Debt since 1970

the average increase falls to 37 percentage points – still a significant number. The second caveat is that the global financial crisis as a (hopefully) once in two or three generations event plays a big role. Excluding Japan and cutting the sample off in 2007, on the eve of the crisis, cuts the threatening 50 percentage point number more than in half. On average, the public debt-to-GDP ratio in advanced economies increased by 20 percentage points from 1970 to 2007 – or a little more than half a per cent per year. Clearly, in the long run, even small numbers can have big long-run effects. However, diagnosing the failure of fiscal regimes in advanced democracies on the basis of the 2007 numbers would also be a stretch.

Looking more closely at the performance of individual countries, the first thing that meets the eye is the big variation among the 17 industrial countries in the sample. The notion of a uniform trend in public debt ratios across Western countries in recent decades is wrong and misleading, as shown in the left panel in Figure 3. On the contrary, the visual impression underscores the divergence of fiscal performance in recent decades. The right hand side panel in Figure 3 demonstrates the enormous differences in public debt accumulation in the Western world since 1970. As mentioned above, Japan's public debt-to-GDP ratio increased by 220 percentage points until 2011. However, Japan is clearly an outlier. The best performer was Australia, a country whose growth performance was boosted by the commodity hunger of China and other emerging markets. Australian debt-to-GDP ratio has fallen by 10 percentage points of GDP since 1970.

For the empirically minded economic historian, such variation immediately raises the question if and how one can explain such wide variation in debt trajectories since 1970. To provide a more solid empirical backing for the debate about the trajectories of public debt in recent decades, I propose a parsimonious but potentially illuminating set of cross-country regressions relating the change in the debt-to-GDP ratio to important economic, financial, political and social factors.

Which variables can potentially account for the large variation in the change of public debt ratios in advanced economies over the last four decades? Real GDP growth, inflation and the level of public debt seem unproblematic as explanatory variables: GDP growth and inflation determine the development of nominal GDP, the denominator of the debt-to-GDP ratio. As discussed in the previous section, initial debt levels have historically shaped the behavior of primary balances. Empirical studies of deficit bias, such as Fabrizio and Mody (2006), distinguish political, social and economic drivers of public borrowing. The size of the welfare state, measures for social conflict (strike activity) and the political orientation of the government are variables that could matter for debt outcomes. Streeck (2011), too, has argued that debt growth in recent decades was ultimately driven by attempts to accommodate social demands of citizens. Data for political and social control variables are taken from the comparative political dataset compiled by Armingeon *et al.* (2012). The size of the welfare state is measured by the ratio of transfers over GDP.

On the financial and economic side, we have already seen that financial crises have become an important risk factor for public finances (Honohan and Klingebiel, 2003; Laeven and Valencia, 2012; Schularick, 2012). The impact of crises on public debt trajectories will be approximated through a dummy variable taking the value of 1 for a five-year window after the start of the crisis. Moreover, Jaeger and Schuknecht (2004) and, more recently, Benetrix and Lane (2011) have identified a close connection between the private credit cycle and fiscal policy outcomes. In essence, they argue that the private financial cycle, which is tightly linked to asset prices and consumption growth, boosts fiscal revenue above and beyond its impact on economic growth. To test the explanatory power of these different channels, I will estimate a panel regression with year effects of the following form:

$$\Delta(Debt/GDP)_{i,t} = \beta\ d_{i,t-1} + \gamma\, Z_{i,t} + \delta_t Year_t + \epsilon_{i,t}, \tag{3}$$

I focus the statistical analysis on the explanatory variables contained in the vector of control variables Z. A dummy variable for Japan is also included as the country's debt trajectory clearly constitutes an outlier. Note that I am predominantly interested in the cross-sectional dimension, i.e., I want to explain why the debt-to-GDP ratio rose more strongly in some countries than in others. By contrast, the within-country time dimension is somewhat less illuminating. The preferred specification would therefore be one which only includes year effects. However, an omission of country effects raises the usual concerns about unobserved heterogeneity and omitted variable bias. As a robustness check, I will include country-fixed effects which have no meaningful effect on the overall results. The time period for the analysis is 1970–2007. The fiscal effects of the recent crisis are therefore not captured. This seems sensible because the main interest relates to the structural deterioration of public debt ratios over the last decades, not to the different impact that the global financial crisis had on budgets. This being said, extending the sample to cover the immediate crisis years does not lead to meaningfully different results. The error term $\varepsilon_{i,t}$ is assumed to be well behaved (Table 4).

Table 4 gives comparative insights into the dynamics of public debt changes in the Western world since 1970. What do the regressions show? Consistent with the results in the previous section, countries with already high public debt levels

Table 4 Determinants of the change in the public debt-to-GDP ratio, 1970–2007.

	(1)	(2)	(3)	(4)
Public Debt/GDP$_{t-1}$	−0.0028	−0.0056	−0.0146**	−0.0313***
	(0.0055)	(0.0056)	(0.0058)	(0.0084)
Growth	−0.419***	−0.403***	−0.374***	−0.435***
	(0.0788)	(0.0785)	(0.0840)	(0.0845)
Inflation	−0.0196	−0.0479	−0.0319	−0.0943
	(0.0438)	(0.0439)	(0.0511)	(0.0632)
Δ Private Credit/GDP		−0.131***	−0.120***	−0.115***
		(0.0371)	(0.0377)	(0.0388)
Financial Crisis		0.0075*	0.0074	0.0113**
		(0.0045)	(0.0045)	(0.0048)
Log(Transfers/GDP)			0.0220***	0.0474***
			(0.0053)	(0.0106)
Log(Strike Days)			0.0001	−0.0018*
			(0.0001)	(0.0011)
Left Government			−0.0001	0.0001
			(0.0001)	(0.0001)
Japan Dummy	0.0422***	0.0403***	0.0533***	–
	(0.0058)	(0.0058)	(0.0067)	–
Observations	645	645	614	614
Adjusted R^2	0.320	0.335	0.352	0.330

Standard errors in parentheses.
*p< 0.10, **p< 0.05, ***p< 0.01.

have accumulated less debt, whereas those with ample 'fiscal space' have generally used it more. Unsurprisingly, economic growth plays a large and significant role for debt dynamics. High growth dampened the increase in the debt-to-GDP ratio, whereas inflation seems less important. The negative coefficient on economic growth also indicates an overall counter-cyclical stance of public borrowing. As expected, financial crises go hand in hand with an increase in the debt-to-GDP ratio by close to one percentage point per year (in addition to their effect on economic growth).

Other than those, two more variables stand out as important drivers of public debt in recent decades: Private sector credit growth and the size of the welfare state. The strong relation between private and public credit growth underlines the importance of looking at public and private debts jointly. This result is not new. Jaeger and Schuknecht (2004) as well as Benetrix and Lane (2011) have

shown before that the financial cycle and the fiscal cycle are closely linked. The estimations presented here confirm these findings. Since 1970, higher private credit growth had a substantial dampening effect on the rate of public debt increase. A potential channel is that a well-oiled private credit cycle generated large revenue windfalls for the government, and asset credit-driven price gains reduced the need for government spending. In any case, the results lead further support to the main thesis that private credit growth and the trajectories of public debt cannot be looked at in isolation.

The size of the welfare state seems to matter too. All else equal, countries with larger welfare states showed a tendency to accumulate more debt – a result that lends support to fears that welfare states are inherently prone to resort to debt finance. Yet it is equally interesting to note what factors do not matter: Left-wing governments did not borrow more than right wing governments. The number of strikes, an arguably rough proxy for social conflict, bears no meaningful relation to changes in public debt ratios.

6. CONCLUSION

Public debt has for a long time been a key theme in economic research. Historians, too, have spent much ink studying the development of public debt and have only recently begun to take the increasing 'financialization' of the modern economy seriously. The spectacular increase in total debt relative to income in recent decades has mainly been the product of an unprecedented growth of private sector debt. Yet the dynamics of private sector debt accumulation and its interaction with public borrowing remain poorly understood, partly because modeling excessive private borrowing and the endogenous emergence of financial imbalances is a challenging task for macroeconomists.

In this study, I have identified four key facts with respect to the historical development of public and private debt. First, the extraordinary growth of private sector debt was chiefly responsible for the strong increase in total debt levels in Western economies in the second half of the twentieth century. While public debt has grown in most countries, about two-thirds of the increase in total economy debt originated in the private sector. Second, overborrowing and financial crises are recurrent phenomena, but at least in peacetime, financial stability risks typically originated in the private sector. Put differently, to understand the driving forces of financial crises, one has to study private borrowing and its problems. Third, worries about imprudent fiscal management in democratic societies are popular, but rest on surprisingly weak empirical foundations. Historically, fiscal policy was consistent with a core sustainability criterion: Over the past 140 years, democratic governments have systematically raised primary surpluses in response to higher debt levels. Fourth, the historical record of the past 40 years shows a close negative association between the private credit cycle and public debt growth. Economies with strong private credit growth have seen substantially lower rates of public debt growth since 1970, strengthening the historical case for a joint study of public and private debt trends.

ACKNOWLEDGEMENTS

This article was prepared for the National Academy of Science working group on public debt. It draws on joint work with Òscar Jordà (Federal Reserve Bank of San Francisco) and Alan Taylor (University of California, Davis) whom I thank. The opinions expressed and the errors are mine. Financial support from the National Academy of Sciences and the VolkswagenStiftung are gratefully acknowledged. Niklas Flamang and Lukas Gehring provided excellent research assistance.

Address for correspondence: Moritz Schularick, Department of Economics, Universität Bonn, Adenauerallee 24–42, D-53113 Bonn, Germany. Tel.: +49 228 737976; fax: +49 228 739189; e-mail: moritz.schularick@uni-bonn.de

APPENDIX A

Table A.1 Financial crisis dates

AUS	1893	1989							
BEL	1870	1885	1925	1931	1939	2008			
CAN	1873	1907	1923						
CHE	1870	1910	1931	2008					
DEU	1873	1891	1901	1907	1931	2008			
DNK	1877	1885	1902	1907	1921	1931	1987	2008	
ESP	1883	1890	1913	1920	1924	1931	1978	2008	
FIN	1878	1900	1921	1931	1991				
FRA	1882	1889	1907	1930	2008				
GBR	1873	1890	1974	1984	1991	2007			
ITA	1873	1887	1891	1907	1921	1930	1935	1990	2008
JPN	1882	1900	1904	1907	1913	1927	1992		
NLD	1893	1907	1921	1939	2008				
NOR	1899	1922	1931	1988					
PRT	1890	1920	1923	1931	2008				
SWE	1878	1907	1922	1931	1991	2008			
USA	1873	1884	1893	1907	1929	1984	2007		

Source: Jordà *et al.* (2013).

REFERENCES

Abbas, A. S., *et al.* (2010). 'A Historical Public Debt Database', IMF Working Paper, No . 245.

Almunia, M. *et al.* (2010), 'From Great Depression to Great Credit Crisis: Similarities, Differences and Lessons', *Economic Policy* 25, 219–265.

Armingeon, K., R. Careja, D. Weisstanner, S. Engler, P. Potolidis, M. Gerber (2012), *Comparative Political Data Set III 1990–2010*. Institute of Political Science, University of Berne, Bern.

Benetrix, A. and P. R. Lane (2011). 'Financial Cycles and Fiscal Cycles', Manuscript, June 2011.

Bohn, H. (1998), 'The Behavior of US Public Debt and Deficits', *The Quarterly Journal of Economics* 113, 949–963.

Bohn, H. (2005), 'The Sustainability of Fiscal Policy in the United States', CESifo Working Papers No. 1446.
Bordo, M. D., J. G. Haubrich (2010), 'Credit Crises, Money and Contractions: An Historical View', *Journal of Monetary Economics* 57, 1–18.
Bordo, M., B. Eichengreen, D. Klingebiel, M. S. Martinez-Peria (2001), 'Is the Crisis Problem Growing More Severe?', *Economic Policy* 16(32), 51–82.
Buchanan, J. M. and R. E. Wagner ([1977] 2000), *Democracy in Deficit: The Political Legacy of Lord Keynes. Vol. 8 of The Collected Works of James M. Buchanan*. Liberty Fund,Indianapolis, Ind.
Caballero, R. J. (2010), 'Macroeconomics after the Crisis: Time to Deal with the Pretense-of-Knowledge Syndrome', *Journal of Economic Perspectives, American Economic Association* 24(4), 85–102.
Cerra, V., S. C. Saxena (2008), 'Growth Dynamics: The Myth of Economic Recovery', *American Economic Review* 98, 439–457.
Crain, W. M. and R. B. Ekelund Jr (1978), 'Deficits and Democracy.' *Southern Economic Journal* 813–828.
Eichengreen, B., R. Feldman, J. Liebman, J. von Hagen and C. Wyplosz (2011), Public Debts: Nuts, Bolts and Worries, Geneva Reports on the World Economy, 13.
Fabrizio, S. and A. Mody (2006), 'Can Budget Institutions Counteract Political Indiscipline?', IMF Working Paper No. 123.
Ferguson, N. (2001), *The Cash Nexus: Money and Power in the Modern World, 1700–2000*. Basic Books, New York.
Gärtner, K. (2013), 'Household Debt and Economic Recovery Evidence from the US Great Depression', European Historical Economics Society Working Papers No. 36.
Honohan, P., D. Klingebiel (2003), 'The Fiscal Cost Implications of an Accommodating Approach to Banking Crises', *Journal of Banking & Finance* 27, 1539–1560.
Hume, M. and A. Sentence (2009), 'The Global Credit Boom: Challenges for Macroeconomics and Policy,' *Journal of International Money and Finance* 28(8), pp. 1426–1461.
Jaeger, A. and L. Schuknecht (2004), 'Boom-Bust Phases in Asset Prices and Fiscal Policy Behavior', IMF Working Paper No. 54.
Jordà, Ò., M. Schularick and A. M. Taylor (2011a), 'Financial Crises, Credit Booms, and External Imbalances: 140 Years of Lessons.' *IMF Economic Review* 59 (2011): 340–378.
Jordà, Ò., M. Schularick and A. M. Taylor (2011b), 'When Credit Bites Back: Leverage, Business Cycles, and Crises', National Bureau of Economic Research Working Paper No.17621, 2011 (Journal of Money, Credit and Banking, forthcoming).
Jordà, Ò., M. Schularick, A. M. Taylor (2013), '*Sovereign Versus Banks: Credit, Crises, and Consequences*.' National Bureau of Economic Research Working Paper No. 19506, 2013.
Laeven, L. and F. Valencia (2008), 'Systemic Banking Crises: A New Database', IMF Working Paper No. 08/224, November.
Laeven, L. and F. Valencia (2012), 'Systemic Banking Crises Database: An Update', IMF Working Paper No. 12/163.
Macdonald, J. (2006), *A Free Nation Deep in Debt: The Financial Roots of Democracy*. Princeton University Press, Princeton.
Maddison, J., 'The Federalist No. 10. The Utility of the Union as a Safeguard Against Domestic Faction and Insurrection', Daily Advertiser, Thursday, 22 November 1787, retrieved online; http://www.constitution.org/fed/federa10.htm
Mauro, P., R. Romeu, A. Binder and A. Zaman (2013), 'A Modern History of Fiscal Prudence and Profligacy', IMF Working Paper No. 5.
Mendoza, E. G., J. D. Ostry (2008), 'International Evidence on Fiscal Solvency: Is Fiscal Policy 'Responsible'?', *Journal of Monetary Economics* 55, 1081–1093.

North, D. C., B. R. Weingast (1989), 'Constitutions and Commitment: The Evolution of Institutional Governing Public Choice in Seventeenth-Century England', *The Journal of Economic History* 49, 803–832.

Plato, The Republic, 'MIT Internet Classics Archive', retrievable online: http://classics.mit.edu/Plato/republic.9.viii.html

Reinhart, C. M. and K. S. Rogoff (2009), 'The Aftermath of Financial Crises', National Bureau of Economic Research Working Paper No. 14656.

Reinhart, C. M., K. S. Rogoff (2010), 'Growth in a Time of Debt', *American Economic Review: Papers & Proceedings* 100, 573–578.

Schularick, M. (2012), 'Public Debt and Financial Crises in the Twentieth Century', *European Review of History - Revue Europeenne d'Histoire* 19, 881–897.

Schularick, M., A. M. Taylor (2012), 'Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870–2008', *American Economic Review* 102, 1029–1061.

Streeck, W. (2011), 'The Crises of Democratic Capitalism', *New Left Review* 71, 5–29.