Sovereign Defaults during the Great Depression: New Data, New Evidence*

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PRELIMINARY

Abstract
The debt crisis of the early 1930s was a key event of the Great Depression and contributed to shaping post-WWII finance. I construct a new dataset for over 20 countries from original sources, which accounts for the maturity structure, local borrowing as well as other key characteristics of countries’ debts, and analyse it in order to uncover the determinants of external default in the interwar period. I provide quantitative evidence for the suggestion put forward in the historiography that the unusually high level of short-term debt of the interwar era was decisive in the 1930s crisis. Contrary to common knowledge, and the assumptions of almost all theoretical models, I furthermore show that, once country characteristics are accounted for, higher debt-to-GDP ratios led to a lower, rather than higher, incidence of default. I link this finding to countries’ ability to tax showing that countries with a greater fiscal capacity were able to sustain higher debt burdens and avoid default. Finally, I show that countries that relied more on financing from abroad, were less likely to default. This result is broadly consistent with both the traditional literature linking the reputational consequences of sovereign defaults to access to financial markets and some more recent developments thereof.

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Bassiano: To you, Antonio,
I owe the most, in money and in love,
And from your love I have a warranty
To unburden all my plots and purposes
How to get clear of all the debts I owe.

William Shakespeare - The Merchant of Venice, Act I Scene I

1 Introduction

This paper reconstructs the size and composition of public and private debt burdens in the interwar period and assesses their impact on the 1930s debt crisis. It does so by presenting and analysing a new dataset for over 20 advanced and developing countries constructed from original sources.

The focus on the interwar era allows me to study a large number of defaults in a relatively short time span. Thus, this paper counterbalances the shortcomings of a smaller sample size by keeping the context in which the defaults took place relatively stable. This is helpful as it allows to distill the default process given common international economic institutions and political arrangements. The sovereign defaults of the early 1930s were, moreover, a key event of the Great Depression. Thus, there is a strong interest in understanding this particular episode in itself. Recent research has highlighted the macroeconomic relevance and international spillover effects of the interwar debt crisis (Ritschl 2002, Ritschl and Sarferaz 2014, Accominotti 2012), but the importance of the 1930s defaults is not restricted to their impact on the course of the Great Depression. Obstfeld and Taylor (1998) argue that the crisis was a watershed in the long-run history of capital mobility. In the USA, the defaults were also seen as the result of the failure of banks to manage their conflicts of interest and this was used as a key justification for the Glass-Steagall Act of 1933 (Carosso 1970, Benston 1990, Flandreau, Gaillard, and Panizza 2010).

Although there is substantial research on the consequences of the 1930s defaults, much less work has been dedicated to their causes, especially in recent years. The most common narrative in the contemporary literature was that the onset of the Great Depression had revealed the international lending of the 1920s as excessive and misguided, leading to
widespread defaults in Latin America and Europe (Harris 1935; Madden, Nadler, and Sullivan 1937; Lewis 1938; Lary 1943). More recent research has stressed the element of “bad luck” in the crisis. Diaz-Alejandro (1983) and Fishlow (1986), for example, claimed that the severity of the Great Depression was the main cause of the defaults. In a similar vein, Flandreau, Gaillard, and Panizza (2010) have argued that the distortions in international financial markets and the conflicts of interests of underwriters were not as pervasive as previously thought, as evidenced by their micro study of bond issues on the New York Stock Exchange, and that this points to “bad luck” playing the prominent role in the debt crisis. Eichengreen and Portes (1986) offer a partial challenge to this view. The authors found that both political and economic factors mattered. While the latter can be interpreted as exogenous shocks, the former were the result of choices and constraints, which imply some degree of discretion.

This paper introduces substantial innovations on both the data and methodological side in order to reassess the role of “bad luck” and discretion in triggering the 1930s defaults. On the methodological side, the use of panel data presents clear advantages. Panel data methods allow to control for unobserved (and unobservable) time-invariant heterogeneity across countries. These specific country characteristics (e.g. institutional quality, default history, demographic structure, financial sophistication, etc.) are likely to be key drivers of defaults given substantial evidence of the unique characteristics of serial defaulters, for example the tendency of some countries to default with low debt-to-GDP levels (Winkler 1933; Eichengreen and Lindert 1989; Reinhart, Rogoff, and Savastano 2003; Oosterlinck 2013).

On the data side, the newly constructed dataset provides a much clearer picture of the debt burden faced by countries. In particular, it illustrates for the first time the incidence of local public borrowing - that is the borrowing of administrative public entities (states, provinces, municipalities, etc.) other than the central government - for a large number of countries. The inclusion of this data is important given that some local authorities borrowed massively on international financial markets and that, in many cases, defaults began at the local level, then expanding to the national level. The new data also allows me to test econometrically, for the first time, a range of channels that have been proposed in the
historical and economic literature on sovereign defaults in general and the interwar era in particular.

In line with the “bad luck” hypothesis and the vast majority of economic models of default, I show that the degree of severity of the economic slump experienced by countries played an important role in triggering defaults at both the national and local level. My results, however, indicate that exogenous shocks are in no way sufficient to explain the defaults. Rather, their complex interaction with country characteristics triggered the debt crisis.

Specifically, I show that the incidence of default was more widespread in countries that relied more on short-term borrowing, even after controlling for a wide range of economic and political characteristics. The finding confirms the hypothesis advanced in the historiography (for example Feinstein and Watson (1995), amongst many others) that the maturity structure of international capital flows played an important role in the interwar debt crisis. Contrary to common knowledge, and the assumptions of almost all theoretical models, I furthermore show that, once country characteristics are accounted for, higher debt-to-GDP ratios led to a lower, rather than higher, incidence of default. I link this finding to countries’ ability to tax by showing that countries with a greater fiscal capacity were able to sustain higher debt burdens and avoid default. Moreover, I show that countries that relied more on financing from abroad, were less likely to default. This result is broadly consistent with both the classic literature linking sovereign defaults to access to finance through reputation and some more recent developments thereof. Concisely, the classic literature postulates that countries will avoid default in order to retain access to international financial markets in the future, while some more recent developments highlight the fact that a sovereign default might have reputational spillovers, for example from the public to the private sector, affecting both international borrowing and trade links. Finally, I show that contrary to previous results by Eichengreen and Portes (1986, 1990b) and Felix (1987), neither monetary nor fiscal policy played a systematic and independent role in the defaults. This finding is consistent with Eichengreen’s own later argument (Eichengreen 1992) that policy responses to the Great Depression were either misguided - in core countries - or extremely limited - in the periphery.

The “bad luck” versus opportunism debate introduced above boils down to two funda-
mental questions, which this paper contributes to answering. Firstly, were the 1930s defaults the result of misjudgment on the part of creditors and opportunistic behaviour by borrowers or the inevitable result of factors beyond the control of borrowing countries? Secondly, to what extent were the factors leading to default global in nature or specific to individual countries?

In light of my results, the answer to the second question would appear to be straightforward: both common shocks and specific country characteristics played a role in the default process. “Bad luck”, exemplified by the Depression and the drying up of liquidity on financial markets, certainly played a very important role in the debt crisis. However, certain key country characteristics, such as reliance on external borrowing, could have provided guidance to investors. Moreover, the evidence points to an excessive reliance on short-term financing in some countries. Thus the claims of contemporaries who blamed the short-sightedness of lenders and the greed of underwriters are at least partly justified.

The first question poses a more difficult challenge relating to the true amount of discretion available to governments in choosing whether or not to default. It would appear that countries did have some discretion in the default process. Establishing whether this was “true” discretion or merely a theoretical one constrained by political economy is beyond the scope of this paper.

To sum up, my findings confirm Eichengreen and Portes’ view that both political and economic factors played a role in triggering the defaults and that each is insufficient without the other. However, the channels I find are different from those highlighted by the previous studies. New data and a different methodology allow me to carry out a more detailed and robust analysis and explain the differences in the results of this paper compared to previous research.

The rest of the paper is structured as follows. Section 2 offers a historical narrative on the incidence and consequences of sovereign default during the Great Depression. Section 4 summarises the most relevant part of the immense empirical and theoretical literature on sovereign risk and default. Section 3 provides details on the newly assembled data-set. Section 5 presents the empirical strategy and discusses the results. Section 6 concludes.
2 Setting the stage: borrowing, lending and defaulting in the interwar period

Sovereign debt has constituted a very important share of financial assets at least since the 19th century, although its preeminence has been diminished by the rise of corporate securities (Tomz and Wright, 2013). Cycles of international lending and default were thus hardly a new phenomenon even at the time of the Great Depression, but rarely had the scale of defaults been so large and their incidence so widespread (Winkler, 1933; Eichengreen, 1991).

Most defaults of the interwar period concentrated in the early 1930s, except for a few episodes in the early post-War I years (e.g. Brazil, Mexico). Following Reinhart and Rogoff (2013)’s definition of external default - this is the failure to meet an interest or principal payment on the due date (or within the specified grace period)\(^1\) - almost 45% of countries in their sample of 70 countries were in a state of default in the first half of the decade. Such widespread insolvency is unique in the 20th century with the exception of World War II and its direct aftermath.

The temporal concentration of these episodes has led to the search for a common cause. Contemporary commentators were quick to judge the international lending of the 1920s as highly speculative and misguided (Lewis, 1938; Lary, 1943; Harris, 1935). Their narrative is one of little or no discrimination between good and bad borrowers on the part of the creditors at the lending stage and the sudden realisation of the unsoundness of investments compounded by the Great Depression shock (Eichengreen, 1991). Feinstein and Watson (1995), for example, document Keynes’ doubts on whether American lending to Europe in the 1920s followed the same patterns and principles of UK lending during the Classical Gold Standard. The underlying conviction was that both lenders and borrowers were driven by distorted incentives, partial or false information, or downright irrationality. Subsequent research has substantiated some of these claims. With regard to German borrowing, for example, Ritschl (2012) has argued that perverse incentives due to the Dawes Plan of 1924 contributed to creating moral hazard on both the borrower and lender side by making reparations junior with respect to commercial debts, leading to excessive borrowing. This set

\(^1\)The episodes also include instances where rescheduled debt is ultimately extinguished in terms of less favourable than the original obligations.
up was then reversed by the Young Plan of 1930, which contributed to a sudden stop and to plunging Germany into economic chaos. This view is also supported by the unorthodox practices of some brokers and bankers in placing the loans, which were documented by contemporary commentators and the investigations of the US Congress (Flandreau, Gaillard, and Panizza [2010]).

The quantitative picture is less extreme. There is ample evidence of discrimination at the lending stage (Eichengreen, 1989; Eichengreen and Portes, 1990a) and satisfactory rates of return for foreign creditors (Madden, Nadler, and Sullivan, 1937; Eichengreen and Portes, 1988; Jorgensen and Sachs, 1988). By studying all New York bond issues of the 1920s, Flandreau, Gaillard, and Panizza (2010) conclude that the desire to maintain their good reputation led to the underwriters generally carefully screening and selecting loans, leading to less malfunctioning in the international financial markets than previously thought. In support of this view, Tables 1 and 2 show the aggregate outcome of foreign investment in the interwar period for US investors.

<table>
<thead>
<tr>
<th></th>
<th>Latin America</th>
<th>Europe</th>
<th>East Asia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total bond investment</td>
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<td>3,380,625</td>
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<td>6,186,091</td>
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<td>1,708,100</td>
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<tr>
<td>Principal repayments</td>
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<td>1,485,946</td>
<td>395,876</td>
<td>2,575,011</td>
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<tr>
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<td>1,449,007</td>
<td>564,985</td>
<td>2,505,200</td>
</tr>
<tr>
<td>Balance</td>
<td>-58,493</td>
<td>1,262,428</td>
<td>570,601</td>
<td>1,774,536</td>
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</tbody>
</table>

Table 1: Outcome of US lending by geographical area in thousands of dollars, 1920-1935
Source: Madden, Nadler, and Sullivan (1937), Table 24 page 147

Regarding Latin American lending, Jorgensen and Sachs (1988) found large differences in rate of returns between defaulters and non-defaulters. Specifically, they studied investors’ returns on Argentinean, Bolivian, Chilean, Colombian and Peruvian bonds and found that, while Argentinean loans yielded higher returns than US Treasury bills, other countries’ defaults translated into losses for foreign investors. In a comprehensive study of bond issues in the 1920s, Eichengreen and Portes (1988) showed that ex-ante yield spreads over risk free domestic options (Treasury bills in the US and consols in the UK) more than compensated British investors and almost compensated US investors for the losses of default. The prof-
<table>
<thead>
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<th>Year</th>
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<th>East Asia</th>
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<td>1920</td>
<td>7.67</td>
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<tr>
<td>1921</td>
<td>7.38</td>
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<td>7.64</td>
<td>7.79</td>
<td>6.39</td>
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<tr>
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</tr>
<tr>
<td>1928</td>
<td>7.34</td>
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<td>6.15</td>
</tr>
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<td>6.15</td>
</tr>
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<td>7.44</td>
<td>6.36</td>
</tr>
<tr>
<td>1931</td>
<td>4.5</td>
<td>6.52</td>
<td>5.86</td>
</tr>
<tr>
<td>1932</td>
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<td>1935</td>
<td>1.78</td>
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<td>6.09</td>
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<tr>
<td><strong>Average</strong></td>
<td><strong>5.41</strong></td>
<td><strong>6.77</strong></td>
<td><strong>7.15</strong></td>
</tr>
</tbody>
</table>

Table 2: Rate of return on US foreign investments by geographical area, 1920-1935
Source: Madden, Nadler, and Sullivan (1937), Table 29 page 157

The itability of single bond issues depended heavily on when they were issued. Bonds issued during the early 1920s, enjoyed unbroken service for a number of years until the defaults of the 1930s. Later issues only provided remuneration for a a limited amount of time before default hit.

What these studies reveal is that - much as in the case of another notorious episode of defaults, that of Philip II of Spain studied by Drelichman and Voth (2011) - the general accepted idea that lenders lost heavily from foreign lending across the board is challenged by the actual outcomes. This is not to say that default did not have a large impact on the American and other creditor economies. Financial transmission channels working through banks exposed abroad probably contributed to the diffusion and severity of the global slump and financial crisis as shown by Ritschl and Sarferaz (2014) and Accominotti (2012) for the German case. For these channels, the distribution and timing of losses from defaults, rather than their cumulative amounts, were of central importance.

The importance of default is also demonstrated by the fact that, although international lending was a relatively small share of all capital issues in interwar United States, default on foreign bonds was so pervasive as to represent one of the largest - if not the largest - bond default item of the first half of the 1930s (See Table 3).

Table 4 and 5 illustrate my estimates of default size at the National-Provincial and Municipal levels. This variable will be the object of investigation of the econometric exercise.
<table>
<thead>
<tr>
<th>Year</th>
<th>Railroads</th>
<th>Industrial</th>
<th>Public Utilities</th>
<th>Real Estate</th>
<th>Foreign</th>
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</thead>
<tbody>
<tr>
<td>1930</td>
<td>841</td>
<td>134,994</td>
<td>96,344</td>
<td>128,158</td>
<td>708</td>
</tr>
<tr>
<td>1931</td>
<td>213,228</td>
<td>443,560</td>
<td>201,722</td>
<td>556,908</td>
<td>632,015</td>
</tr>
<tr>
<td>1932</td>
<td>201,739</td>
<td>699,034</td>
<td>593,136</td>
<td>543,579</td>
<td>581,385</td>
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<td>1933</td>
<td>1,087,909</td>
<td>482,228</td>
<td>363,933</td>
<td>416,052</td>
<td>1,104,748</td>
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<tr>
<td>1934</td>
<td>310,251</td>
<td>206,435</td>
<td>150,244</td>
<td>83,266</td>
<td>256,601</td>
</tr>
<tr>
<td>1935</td>
<td>761,701</td>
<td>92,275</td>
<td>149,128</td>
<td>46,785</td>
<td>9,064</td>
</tr>
<tr>
<td>Total</td>
<td>2,575,669</td>
<td>2,058,526</td>
<td>1,554,507</td>
<td>1,744,848</td>
<td>2,584,521</td>
</tr>
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</table>

Table 3: Annual bond defaults: principal amounts in thousands of dollars, 1930-1935
Source: Standard Statistics Co., Standard Bond Investments, Weekly Advisory Section, Jan 11, 1936 p. 2,913 as cited by Madden, Nadler, and Sullivan (1937). As pointed out by these authors, the data in this table has several limitations: it does not represent all bond defaults, but only those large enough to be known by security markets and the compilers of the data.

below. Default size is measured as the share of the principal of dollar bonds in default compared to the principal of all outstanding dollar bonds. Given the uncertainty and length of renegotiations following defaults during the interwar period, this ratio represents the best measure of default size at the time of the actual defaults. Using ex-post haircuts in this context would be inadequate as these reflect many factors that are completely unrelated to economic and political conditions of defaulting countries at the time of default. They are also a static measure and do not reflect the evolution of default over time that is instead evident in my default size measure.

The data demonstrates that partial defaults were common and often preceded complete defaults involving all outstanding dollar bonds at both the national and local level. However, some defaults remained partial as in the case of Austria, Argentina and Czechoslovakia. In Brazil, although the central and most local governments defaulted, some municipalities continued to service their debts.

Regarding the consequences of default, Eichengreen and Portes (1990a) found that defaulting countries recovered faster, even after controlling for the severity of the slump and employing a number of strategies to deal with simultaneity. Figure[1] shows the faster recovery of defaulting countries by plotting deviations from the Hodrick-Prescott trend of GDP. The authors argue that the countries which continued to service their foreign debts had to enforce contractionary policies in order to generate the necessary foreign exchange. Restrict-
<table>
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<tr>
<th>Year</th>
<th>Austria</th>
<th>Bulgaria</th>
<th>Czechoslovakia</th>
<th>Germany</th>
<th>Hungary</th>
<th>Poland</th>
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Table 4: Share of the principal of national and provincial dollar bonds in default, 1930-1936
Source: Moody’s (1933, 1934, 1935, 1936, 1937)

<table>
<thead>
<tr>
<th>Year</th>
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<th>Germany</th>
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<td>1931</td>
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</tr>
<tr>
<td>1936</td>
<td>-</td>
<td>-</td>
<td>0.23</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>0.82</td>
<td>-</td>
<td>0.72</td>
<td>1</td>
<td>1</td>
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</tr>
</tbody>
</table>

Table 5: Share of the principal of municipal dollar bonds in default, 1930-1936
Source: Moody’s (1933, 1934, 1935, 1936, 1937)

tive fiscal policies were needed to raise funds to transfer abroad, while loss of gold and foreign exchange reserves led directly to decreases in the money supply, given that foreign exchange was needed for debt repayments (Felix, 1987).

However, aggregate measures of economic performance hide a high degree of heterogeneity in the severity and timing of the Great Depression for defaulting countries as well as in their response to default in terms of the evolution of GDP. Figure 2 illustrates this latter point by plotting the deviations from the Hodrick-Prescott trend for a selection of defaulting countries. No discernible pattern is visible, with some countries starting their recovery already before defaulting, some in correspondence with the event and others after.

A key hypothesis advanced in the historiography is that he maturity structure of international capital flows played an important role in the debt crisis. Feinstein and Watson (1995), among many others, have highlighted the large size of short-term flows in the interwar period. Germany and South American countries - the largest defaulters of the interwar era - relied heavily on short-term borrowing (Jorgensen and Sachs, 1988; Ritschl, 2012, 2013). More generally, short-term debt can be highly problematic in case of drying up of liquidity and current account reversals, due to the fact that these debts have to be rolled over relatively frequently (Erce, 2012). Figure 3 illustrates the higher incidence of short-term borrowing...
Figure 1: Deviations from the 6.25 H-P trend of the average GDP index, 1910-1945
Unweighted average. Default is is identified as a country interrupting interest or amortisation payments on foreign debts. Defaulters: Argentina, Austria, Brazil, Chile, Colombia, Germany, Greece, Mexico, Peru, Uruguay; non-defaulters: Australia, Belgium, Canada, Denmark, Finland, France, Italy, Japan, New Zealand, Norway, Portugal, Sweden, Switzerland, Venezuela.
Source: author’s calculation based on data collected by Barro and Ursúa (2010)

Figure 2: GDP of defaulting countries around default, deviations from 6.25 H-P trend
Source: author’s calculation based on data collected by Barro and Ursúa (2010)
among defaulters. The figure also shows a sharp increase in the share of short term debt between 1929 and 1931, in between the onset of the Great Depression and the beginning of the wave of defaults of the early 1930s. In the analysis below, I show empirically that the incidence of default was more widespread in countries that relied more on short-term borrowing, even after controlling for a wide range of economic and political characteristics.

Figure 3: Short term debt as a share of total debt, 1927-1936
Unweighted average. Defaulters: Bulgaria, Czechoslovakia, Germany, Greece, Poland, Argentina, Bolivia, Brazil, Colombia, Peru. Non defaulters: Belgium, Denmark, Finland, United Kingdom, Ireland, Netherlands, Norway, Switzerland, Venezuela, Japan, Canada, New Zealand
Source: author’s calculations based on data in United Nations (1948). See Section 3 and Appendix A for details

Figure 4 illustrates the evolution of government revenues (as a share of GDP) in the interwar period. The difference between defaulters and non-defaulters is striking. Defaulters saw their revenues collapse by almost 40% on average between 1929 and 1932. By contrast, non-defaulters’ revenues only experienced a mild fall in 1932. The empirical results presented below suggest that countries with stronger fiscal systems (or fiscal capacity) were able to sustain higher debt burdens and also avoid default. It is well established in the literature on state formation and state capacity that the ability to raise taxes is an essential prerequisite for borrowing on a large scale (Mathias and O’Brien 1976; North and Weingast 1989; Besley and Persson 2009; O’Brien 2011), but to the best of my knowledge the link between fiscal
capacity and the interwar debt crisis has not been previously explored.

Figure 4: State revenue over GDP, 1927-1936
Unweighted average. Defaulters: Bulgaria, Germany, Poland, Argentina, Brazil, Colombia. Non defaulters: Belgium, Denmark, Finland, France, United Kingdom, Italy, Netherlands, Norway, Sweden, Switzerland, Australia, Japan, Canada, New Zealand
Source: author’s calculations based on data in Statistisches Reichsamt (1936a). See Section 3 and Appendix A for details

3 Data and data sources

In this section, I provide an overview of the original data collected for this paper. The data was transcribed from a variety of contemporary sources. In the econometric analysis of Section 5, I also rely on data collected by Economic Historians over the years, which are detailed in Appendix A. I conclude the section by highlighting further work necessary to complete and improve the data set. A fully detailed discussion of sources and issues with the data is provided in Appendix A.

The main contribution of this paper on the data side, is a new public debt data set that includes local debt. This type of data was left out of previous work presumably due to its very scattered nature. To the best of my knowledge, I am the first to provide information on sub-national public debt on a systematic basis for a sample of over 20 countries for
the interwar period. I furthermore provide some data on state revenues and expenditure at both the national and local level which is part of an ongoing effort to reconstruct the fiscal stance of a large number of countries in the interwar era. The countries included in the overall data set are Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Bulgaria, Canada, Colombia, Czechoslovakia, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Peru, Poland, Sweden, Switzerland, the United Kingdom and Uruguay. However, not all time series collected are available for all countries (see Appendix A) so that some of the countries drop out of the econometric analysis (see Section 5). In particular, sub-national debt figures are not available on a continuous basis for Austria, Bolivia, Czechoslovakia, France, Hungary and Peru.

In correspondence with the recent crisis, there as been a renewed push to understand the role of public debt in the economic performance of countries. This has been accompanied by a recognition of the usefulness of long-run historical data to understand the phenomenon. [Reinhart and Rogoff (2009) and Abbas, Belhocine, El Ganainy, and Horton (2010)] represent two recent efforts to reconstruct public debt statistics over the very long run. For the interwar period, the two data sets rely on data collected by the League of Nations and later included in a United Nations volume ([United Nations, 1948]), which is also the starting point of my data set. The compilers of the volume were very transparent about the limits of their data (although they were clearly not aware of the magnitude of local public debt). These limits pose a serious challenge to international comparability, and data availability restricts the possibility of improving this aspect of the data.

The data in the volume is limited to central government and central government guaranteed debts. Government guaranteed debts, normally constituted a small share of total government debt except in Australia, where the commonwealth took over all the outstanding debts of the states on 1 July 1929. The compilers of the UN volume claimed that central government debt made up the most important share of public debt. As the newly collected data shows, however, this was not the case for a large number of countries. The UN volume breaks down the debt into domestic long-term and short-term and foreign debt and data on debt service is also reported.

The debt figures presented normally include the debt of state-owned enterprises, but there
are some exception as in the case of the railways of Canada and Switzerland. More generally, the budgetary methods and accounting practices vary significantly across countries. Debt is sometimes shown as gross, sometimes as net with no consistent definition of these two terms across countries. Generally, net debt is the gross debt minus whatever claims against creditors (often the Central Bank of the country itself) are held by the Treasury.

No consistent definition of short term debt existed either. The compilers of the volume settled for considering debts with maturity of two years or less as short term debts and this definition is retained in the paper. The distinction between domestic and foreign debt is also often not the same across countries. Some countries classified the debt based on the currency of issues, some on the place of issuance, while other based it on the domicile of the creditors, whenever this was known. Conversions from foreign currency into domestic currency were also carried out in different ways. In most cases, the parities at which the debt was issued were used. In a few cases, current exchange rates were used, while in others the parity was adjusted periodically. Finally, sometimes war debts were included sometimes excluded. The inclusion or exclusion of these particular debts followed the recognition of these obligations by the debtor state.

Appendix A provides details of these issues on a country by country basis. Whenever this was possible, the comparability of the data was improved by including or excluding certain items, but the overall picture is still that of imperfect comparability across countries. On the positive side, however, the different reporting techniques used, and their changes over time, reflected the perception of the public debt held by the statistical offices and, presumably, the country’s authorities. In a study of default decisions, this should be the key variable of interest. The problem is further tackled by the use of panel data methods which rely on the time series variation of variables rather than the cross-sectional comparison of levels (see Section 5). In this aspect, my paper has a similar approach to Schlularick and Taylor (2012), who face commensurate issues of cross-country comparability in their study of credit booms and busts.

Moreover, all the issues discussed are dwarfed by the exclusion of sub-national public debt from the accounts. As the preface to the UN volume reveals, its compilers were not fully aware of the magnitude of local level debt, considering it a minor item. Figure 5 shows
that this was by no means the case. Local level debt was on average around 25% of all public
debt, and the largest debt item in a number of countries.

Local level debt data provides two fundamental contributions. Firstly, it offers a picture
of the public debt burden that is much closer to that really faced by public authorities. Public
debt is serviced by tax revenues and foreign exchange - in the case of foreign currency debt
- generated by a country’s economy. Central and local governments thus rely on the same
“base” to produce the resources needed to meet their obligations. Secondly, the relative
importance of local debt varied greatly across countries. Figure 6 illustrates this point.
Nations with federal structures and/or large and independent cities were characterised by
massive borrowing at the local level. Examples of these type of countries are Brazil, with an
average share of local debt over total debt of 71.7% between 1928 and 1934, and Germany,
with an average of 49.8% between 1927 and 1936. In more centralised and less sizable
countries, local borrowing was much smaller. Belgium and Bulgaria, for example, had an
average local share of debt of 0.8% and 4.5% between 1927 and 1936 respectively. For this
reason, the comparative debt burden picture is seriously distorted by the exclusion of local level debt. Both issues outlined are clearly a problem for any study wanting to investigate the reasons behind sovereign defaults.

The principal sources from which the debt data data is drawn are two: the UN volume for central government debt (United Nations, 1948) and the Yearbooks of the German Statistical Office for the local level debt (Statistisches Reichsamt, 1936b, 1938, 1939/40). For certain countries (e.g. Argentina), these sources are integrated by the publications of various bodies such as the Institute for International Finance (a body established by Bankers Association of America in cooperation with New York University as response to the interwar debt crisis), the Corporation of Foreign Bondholders (an association created by private British holders of foreign government securities in 1886 to protect their interests) and rating agency’s Moody’s investment manuals (for details, see Appendix A). The latter, in particular, contain a huge amount of information on a large number of countries worldwide. The manuals are central to the data cross-checking process currently under way (see Appendix A).
Figure 7: Average shares of local tax revenue over total revenue, 1927-1936
Source: author’s estimates based on data in Statistisches Reichsamt (1936a, 1935, 1936b, 1937, 1938, 1939/40), Che= Switzerland. See text and Appendix A for details

Data on fiscal revenues from Papadia (2015) also offers a picture that confirms that looking at central government data only has severe limits. Figure 10 illustrates this point by showing the average share of sub-national tax revenues a share of total tax revenues.

Additional data transcribed from original sources, used in this paper includes: state revenue and expenditure, gold reserves and notes in circulation. Details are provided in Appendix A but the figures from from standard sources used in a large number of studies of the interwar period.

4 Sovereign defaults: theory and evidence

Sovereign debt’s defining feature is the limited commitment it implies due to the lack of an authority able to enforce payments. Historically, the issue of contract enforceability issue was much more pervasive and is a key element of the so-called fundamental problem of exchange. Economic historians have long been interested in the reasons that led to the repayment of debts in the absence of a formal legal framework. A classic example is Greif’s work on Maghribi traders in the 11th century (Greif 1989, 1993), while a more recent contribution is
Drelichman and Voth’s study of Genoese bankers’ lending to Philip II of Spain (Drelichman
and Voth, 2011).

At least since the work of North and Weingast (1989), institutions have been identified
as central for a credible commitment to the repayments of debts, thus making borrowing
possible ex-ante. In this vein, the work of Bordo and Kydland (1995) and Bordo and Rockoff
(1996) highlighted the importance of the pre-WWI Gold Standard which, according to the
authors, provided a **good housekeeping seal of approval** and lowered perceived sovereign risk
thus serving as a guide to investors. In accordance with this view, Obstfeld and Taylor (2003)
have shown that adherence to Gold lowered borrowing costs before World War I. However,
the authors were unable to identify any significant reduction in borrowing costs for countries
on Gold during the interwar period, suggesting that investors were correctly skeptical about
the solidity of the system.2

The decision to default hinges on the benefits and costs that such a choice entails (when
the choice is indeed available). Early theoretical contributions stressed direct sanctions and
the role of reputation in determining future financial market access as mechanisms leading
to repayments. An important evolution in reputation-based models of debt was Cole and
Kehoe (1998)’s argument that reputational consequences of default are not constrained to
a limited access to future borrowing, but can lead to the defaulting party being seen as
untrustworthy in all relationships.

Until recently, empirical research had not found strong evidence for reputational costs
of default (Panizza, Sturzenegger, and Zettelmeyer, 2009; Oosterlinck, 2013). By considering
the severity of defaults rather than simple binary default/no default outcomes, Cruces and
Trebesch (2013) have shown that larger defaults do lead to longer exclusions from capital
markets and to higher borrowing costs. Their insight is simple, but powerful: default size
rather than default per se matters for creditors. Defaults vary greatly in size, and it is thus
unsurprising that so should their consequences.3

Another reason for the repayment of foreign obligations is the cost of default connected

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2The results for the Classical Gold Standard have been contested by many authors including Flandreau and
Zumer (2004), Alquist and Chabot (2011), Ferguson and Schularick (2006) and Accominotti, Flandreau,
and Rezzik (2011).

3The theoretical literature has only recently started catching up with the notion of partial defaults, see for
eexample Arellano, Mateos-Planas, and Rios-Rull (2013).
to potential disruptions to trade. While these costs have been generally linked to direct sanctions (Rose 2005), recent research by Martinez and Sandleris (2011) has questioned this notion, suggesting that default can have a broader impact on the international economic activity of countries and also negatively affect foreign direct investment (Fuentes and Saravia 2010).

Another strand of the literature kicked off by Grossman and Van Huyck (1985) has highlighted that, under certain circumstances, defaults can be “excusable”. In other words, they represent the instrument used in the presence of incomplete markets to account for the contingency of a bad state of the world. In this case the defaults are excusable in the sense that they should not lead to any reputational consequences for the defaulter.

Default is also often accompanied by other large macroeconomic events. Reinhart and Rogoff (2009) show that defaults and financial crises go hand in hand throughout history, while other authors have documented that default often precedes large decreases in trade (Rose 2005; Martinez and Sandleris 2011), current account reversals and capital flight (Mendoza and Yue 2012).

Theoretically and empirically, default has been tied to decreases in national income. Tomz and Wright (2007) find a weak negative relationship between default and output in a sample of 175 sovereign borrowers from 1820 to 2005. The authors conclude that countries tend to default in “bad times”, but that a difficult economic situation is neither a sufficient nor necessary condition for sovereign default. The authors calculate that only 60% of defaults took place during “bad times” and that the average deviation of output from trend at the start of a default was only -1.6%, while calibrated default models predict that defaults take place almost exclusively when GDP is below trend and when this deviation is on average -8%.

Tomz and Wright offer valuable suggestions on how to reconcile theory and empirics. In particular they argue that “bad times” might need to be defined differently, and namely as decreases in exports, government revenues, or higher world interest rates, rather than GDP. Based on recent research, Tomz and Wright (2013) argue that time aggregation might also matter for their results if default is caused by large albeit short-lived declines in output not captured by annual data.

---

4 The authors’ results were confirmed for different time periods, samples of countries, and approaches to measuring trends in output by Durdu, Nunes, and Sapriza (2010).
Research has also revealed a vast heterogeneity in default episodes. As discussed above, the size of haircuts as a consequence of default can vary greatly across different episodes. In his review of the historical literature on debt defaults, Oosterlinck (2013) highlights the difference between different types of contract breach, with mild defaults (involving only interest payments and possibly sinking funds) at one hand of the spectrum and repudiation at the other. Oosterlinck also points out that what might not be considered default by jurists might be so for creditors. The clearest case of this is the repayment of international debts through the printing and debasing of currency\textsuperscript{5}. For the purpose of this paper, however, I focus on default in the classic sense: the one in which a government suspends payments on external obligations.

Defaults also tend to be selective. The most common type of discrimination is that between domestic and foreign creditors. The historical relevance of the dichotomy between internal and external defaults has been highlighted by Reinhart and Rogoff (2011). This paper, however, studies external defaults only, given their overwhelming prevalence in the interwar period. Erce (2012) identifies three types of default episodes: neutral, discriminatory against foreigners, discriminatory against domestic lenders. The classification is based on a number of indicators such as amounts involved, haircuts and the timing of involvement. But there can also be discrimination between different classes of creditors, both internal and external. As Eichengreen and Portes (1988) have shown, in several cases US creditors were treated less favourably than their British counterparts during the interwar period. A prominent example of this is the German default: political pressure from the UK government and the non-interventionist attitude of the US led to a more favourable settlement for British nationals.

However, for all the research that has been produced, the determinants of external defaults are not firmly established in the empirical literature and tend to vary across different time periods and samples of countries. In Section 5 I test the channels described in this section to the extent that my data set - described in the next Section - allows me to.

\textsuperscript{5}Naturally this applies only to countries able to borrow in their own currency. The inability to do so has been dubbed “original sin” by Eichengreen and Hausmann (1999).
5 Econometric analysis

In this section, I present the results of my econometric analysis, in which I study the determinants of default size defined as the share of the principal of foreign Dollar bonds in default. I discuss the methodology employed in the estimation in Section 5.1. I then proceed in four steps. The first step is an attempt to reproduce the results found in Eichengreen and Portes (1986), which still represents the reference paper for studies of default during the Great Depression (Section 5.2.1). I extend this analysis in the second step by exploiting the richer data set described in Section 3. The results are presented for illustrative purposes in Appendix B.0.1. Thirdly, I implement a more flexible econometric specification that allows me to maximize the sample size, while dealing with some endogeneity issues. This analysis is presented in Appendix B.0.2. Finally, I use dynamic panel data methods to account for country and time-fixed effects (Section 5.2.2). This last step come at the cost of a lower variability in the explanatory variables due to the nature of dynamic panel data estimators and the loss of explanatory power of variables measuring inherent country characteristics such as openness and credit-worthiness, but ensures much more robust results by allowing me to control for country fixed-effects.

I test four sets of channels. The first relates to macroeconomic shocks and the accepted Great Depression narrative. I test whether the severity of the slump had an effect on the probability and size of default. The second channel relates to whether default is correlated with potential external penalties such as a decrease in trade or future borrowing. Thirdly, I study the influence of domestic economic and political circumstances on external default. In the former category I include the country’s trade openness, the financial system’s fragility and the reliance of the economy on foreign lending. Political factors relate to the view of default by competing pressure groups within a country. Whereas debtors and domestic creditors in competition with international ones might see external default as a good policy, internationally oriented groups, such as large firms and banks, might stand to lose significantly from being cut off from international markets through default. Finally, I test whether the fiscal and monetary policies enacted had any traction in affecting the default outcome.

The findings indicate that both political choices and constraints and economic factors played a key role. Both “bad luck” and opportunism thus entered the process of default,
leading to defaults that were only partly “excusable”.

5.1 Methodology

In my analysis, I use three different types of estimators. The first two - pooled Ordinary Least Squares (OLS) and Tobit - are used in the first three steps described above, while a Generalised Methods of Moments (GMM) estimator is used in the panel estimation which represents the final step in my econometric strategy.

In Section 5.2.1 and B.0.2, I start by presenting simple pooled OLS models in which the size of default between 1934 and 1936 is regressed against some key control variables.

\[
\text{defaultsize}_{i,t} = \mathbf{x}_{i,t}\beta + \epsilon_{i,t}
\]

Assuming all the usual Gauss-Markov conditions are met, OLS yields consistent estimates of the marginal effects of the explanatory variables on default size, even with the dependent variable constrained in the 0 – 1 interval (Wooldridge, 2010). However, the linear model suffers from well known problems deriving from the fact that the conditional mean of the dependent variable is assumed to be linear in the regressors. This means that the predicted default size can lie outside the 0 – 1 interval. In any case, linear regressions represent a good starting point for two reasons: 1) straight forward interpretation of the coefficients 2) the possibility of including fixed effects in a simple way.

Like Eichengreen and Portes, I also run Tobit models. This model is often called a censored model, even though it does not actually imply any censoring in the data. Wooldridge (2010) defines it as a corner solution response model since its key feature is that the response variable is bounded by one or two corner values and can have positive probability mass at these. The two-limit Probit model can be expressed in terms of a latent variable formulation in the following way:

\[
y* = \mathbf{x}\beta + \epsilon
\]

\[
y = a_1, \text{ if } y* \leq a_1
\]

\[
y = y*, \text{ if } a_1 < y* < a_2
\]

\[
y = a_2, \text{ if } y* \geq a_2
\]
where \( y \) is the observed dependent variable, \( y^* \) is the actual dependent variable and \( a_1 \) and \( a_2 \) are the two “corners”. Like all non linear models, the coefficients cannot be interpreted as marginal effects as one would do with OLS or other linear models. The marginal effects need to be computed for each level of the explanatory variables, but their sign and significance can be interpreted just as in the linear case.

The results of the pooled estimations are vulnerable to omitted variable bias, since I cannot control for potentially crucial unobserved country random/fixed effects. In Section 5.2.2 I tackle these issues by employing dynamic panel data methods. Another key feature of panel data methods is that they exploit the time-series rather than cross-sectional variation. This is a particularly attractive feature in the context of this paper. Different accounting and reporting standards across countries mean that the data, and the debt data in particular, tend to represent somewhat different magnitudes across countries. By exploiting the time series variation, all one needs for consistent estimation is that accounting standards do not change over time for the same country, a condition that is more easily met than the one mentioned above about cross-country comparability (see Section 3 above).

The dynamic element is of crucial importance given that state dependence in the case of default is a natural assumption. A country could be in default in a certain period simply because it was in default during the last period. Negotiations accompanying sovereign default are notoriously lengthy processes (the interwar period was no exception) and even in the face of improving economic conditions a country might seek to restructure its obligations to obtain a reduction in the debt. Inserting a lagged dependent variable also serves the purpose of accounting for a potential omitted variable bias, given that the other lagged regressors are almost certainly correlated with the lagged default indicator.

In the context of dynamic models, usual fixed and random effects estimators are biased since the lagged dependent variable is correlated with the differenced error term. For this reason, a GMM estimator is necessary. This type of estimator uses longer lags of the dependent variable to instrument the lagged dependent variable itself. For this strategy, it is essential that the error be serially uncorrelated. Standard tests exist to verify whether this

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6Please note that in Tables 6, 10 and 11 I report the estimates of a one limit Probit model instead of a two limit one, with the corner being the upper limit 1. This is due to technical issues with the convergence of the likelihood function, which I am currently working on. The results should not be impacted). The model is estimated through Maximum Likelihood (MLE).
condition is met (see below).

A widely used GMM estimator is the Arellano-Bond (Arellano and Bond, 1991). Its popularity is due to the fact that it exploits the moments conditions generated by instrumenting differenced variables with longer lags of their levels without losing any observations (apart from the first) in the process. This is achieved by changing the number of instruments with the lags available.

The model is estimated in first differences to eliminate the fixed effects, but a drawback of this strategy is that time-invariant explanatory variables are lost and slow-moving ones are subject to a drastic reduction in their variability, leading to imprecise estimates and possibly to significant coefficients in reality appearing to be statistically insignificant.

An approach to deal with this problem in the context of the Tobit model has been proposed by Wooldridge (2005). It requires the introduction of the initial value of the dependent variable as well as the full set of regressors for all time-periods as controls. Unfortunately, it only applies to random effects (i.e. the unobservable time-invariant country heterogeneity is assumed independent of the other regressors in the equation). The random effects assumption is difficult to defend in most economic contexts, and the one examined here is no exception since unobservable country characteristics, like perceived credit-worthiness, might very well be correlated to regressors like the share of foreign debt. This is because the former could potentially be a key determinant of the latter. In any case, the estimates are reported and analysed in conjunction with the rest. As Wooldridge (2010) argues, both the linear and Tobit approach have advantages and drawbacks which at the current state of statistical knowledge cannot be overcome. He suggests reporting and drawing inference from both. Due to the fact that the introduction of the full vector of regressors leads to a sharp increase in the numbers of parameters to be estimated, variables which were found to be insignificant in previous specifications were removed from the estimation so as to make compution less cumbersome.

7A procedure for a fixed effects Tobit has been proposed, but it is quite difficult to implement. I aim to do this as soon as possible.
5.2 Results

5.2.1 Replicating Eichengreen and Portes

Eichengreen and Portes (1986) performed a cross-sectional two-limit Probit regression (which is another name for a two-limit Tobit regression) by pooling data from 1934 to 1938. This model estimates the contribution to the probability of default as in a classic Probit model, but allows for the dependent variable to have positive probability mass at the two corners (0 = nodefault and 1 = complete default) and a continuous distribution in between (partial default).

My sample differs from theirs for the moment, in that it goes only up to 1936 and excludes Austria, Mexico, Chile, Greece, Spain, Costa Rica and El Salvador, which are present in Eichengreen and Portes’ sample. On the other hand, it includes New Zealand, Canada, Uruguay, Switzerland, the United Kingdom, France and Belgium, which are absent from theirs. Hungary, Czechoslovakia, Argentina, Brazil, Colombia, Australia, Japan, Bulgaria, Denmark, Finland, Germany, Italy, the Netherlands, Norway and Sweden are common to both samples. The choice of countries included in the sample is, at this stage, driven mostly by data availability. An expansion of the sample is currently under way. Data for Poland is available, but the country is dropped at this stage of the analysis since it defaulted only in 1936, thus leading to reverse causality concerns. Another difference with Eichengreen and Portes’ analysis is that I only look at defaults in foreign Dollar bonds. I believe it is sensible to treat Dollar and Sterling defaults separately given that Eichengreen and Portes’ own work (Eichengreen and Portes 1988) shows that Sterling and Dollar bondholders were treated quite differently. Data collection on Sterling bond defaults is currently under way and these will be included in the analysis as soon as possible. The final difference with Eichengreen and Portes is that, in my sample, I lack a good measure of terms of trade deterioration. For this reason, I use lagged deterioration in total trade instead. I also lack measures of notes in circulation and or gold reserves for Australia, New Zealand, Brazil and Argentina so that, when the reserve ratio variable is included, these countries drop out of

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8Czechoslovakia and Hungary drop out of the estimation in Section B.0.2 due to the fact that no data on local debt is available. The countries are included once again in the analysis in Section 5.2.2 since in this section, I exploit time-series instead of cross sectional variation.
the analysis. I aim to fill these gaps as soon as possible.

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<th>(3)</th>
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<td>OLS</td>
<td>Tobit(MLE)</td>
<td>Tobit(MLE)</td>
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<td>0.912**</td>
<td>0.884*</td>
<td>1.218**</td>
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<td>(0.196)</td>
<td>(0.146)</td>
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<td>Lagged 1931 trade/trade 1929</td>
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<td>-0.0230</td>
<td></td>
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<tr>
<td></td>
<td>(0.251)</td>
<td>(0.487)</td>
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<td>1928 trade/GDP</td>
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<td>-3.200**</td>
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<td></td>
<td>(0.491)</td>
<td>(0.739)</td>
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<tr>
<td>% Change in deficit 1929-31</td>
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<td>0.0137</td>
<td>0.0161</td>
<td>0.0200</td>
</tr>
<tr>
<td></td>
<td>(0.0151)</td>
<td>(0.0158)</td>
<td>(0.0174)</td>
<td>(0.0173)</td>
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<td>South America</td>
<td>0.463**</td>
<td>0.418**</td>
<td>0.616*</td>
<td>0.554*</td>
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<td>(0.153)</td>
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<td>Australia</td>
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<td>-0.959**</td>
<td>-0.914**</td>
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<td>1.635**</td>
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<td>(0.353)</td>
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<td>(0.498)</td>
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<td>Lagged trade/GDP</td>
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<td>-4.640**</td>
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Robust standard errors in parentheses
** p<0.01, * p<0.05

Table 6: Replicating Eichengreen and Portes

Table 6 presents the results of the two specifications proposed by Eichengreen and Portes estimated by both OLS and Tobit. The two specifications differ in the definition of trade deterioration used. Changes in the reserve ratio compared to 1929 was inserted as a control and found to be insignificant in all specifications. Since its inclusion leads to a substantial reduction in sample size, I have dropped it from the regressions. My results do not fully match those of Eichengreen and Portes. This is probably due to the differences in the sample outlined above, and could indicate that their results are not very robust given that some major countries, which I include, are excluded from their analysis. In any case, the estimates need to be taken with a grain of salt due to the issues outlined above.

Like Eichengreen and Portes, I find that countries with a higher foreign debt burden were more likely to default and to undergo larger defaults. However, this result is not confirmed.
in any of my further regressions below, demonstrating the importance of my richer data set and different econometric strategy. Once country fixed-effects are controlled for, I actually find the countries with a heavier overall debt burden were less likely to default.

I also find that an adverse shock to trade has the right sign in the first specification (columns 1 and 3) - countries which experienced a larger deterioration in their trade compared to 1929 were more likely to default - but the coefficient is not significant. In the second specification (columns 2 and 4), the coefficient has an unexpected positive sign indicating that a smaller deterioration in trade was conducive to default. This counterintuitive result has two possible explanations. Reverse causality is a first culprit given that this specification includes post-default data which could be influenced by the occurrence of default. The second is the need for more refined trade data and bilateral trade flows in particular. This explanation seems plausible since the result pops up again in the panel estimation below. This data is in the process of being collected.

Unlike Eichengreen and Portes, who find a positive and insignificant effect of openness on the probability of default, I find that more open countries were less willing to default. This result is very much in line with economic theory and intuition and its interpretation is straightforward: countries whose GDP consisted for a greater share of imports and exports had more to lose from the fall in trade that normally accompanies defaults due to their direct (e.g. sanctions, embargoes) or indirect (lack of trade finance) effects.

I also find that my South America dummy (Eichengreen and Portes use a Latin America one, which they find to be insignificant) retains explanatory power for default. Given the prevalence of default among South American nations, this is not surprising. The Australian dummy is also found to be significant, although with an opposite sign. Eichengreen and Portes, who also find this result, argue that this could be due to the political and economic ties between Australia and its main creditors - the UK and the USA - which, everything else equal, would decrease the incidence of default. However, my new data set on public debt suggests that the significance of the Australian dummy could also be due to the fact that the Australian Commonwealth assumed all the debt of the states in 1929, and the model thus over-predicts default for this country, since for other countries local debt is excluded at this stage. Another reason could be an implicit guarantee of the debt by the United Kingdom.
I find that the change in the reserve ratio does not influence default. Eichengreen and Portes find a positive coefficient which “indicates that countries experiencing relatively large increases in the ratio of gold reserves to currency in circulation had the greatest tendency to default.” The authors find this result quite implausible and call for better data on money supply and reserves. I plan to collect such data myself.

Finally, Eichengreen and Portes find an inverse relation between default size and the change in the deficit, which would seem to indicate that an increase in “austerity” would be helpful for avoiding default. In my results, I do not find a significant relationship between fiscal variables and default. The reason could be that the relationship could go either way: austerity can depress the economy making default more likely, or austerity can generate the necessary resources (taxes, foreign exchange) to service the debt. Due to the evident problems of this specification however, not much weight should be placed on these results.

5.2.2 Expanding the analysis: dynamic panel methods

In this section, I expand the analysis along two dimensions. On one side, I include my newly collected data and make full use of the sample: Poland is now included in the analysis and so are all available observations between 1927 and 1936. On the other, I employ dynamic panel data methods. The explanatory variables are introduced with a lag and the lagged dependent variable is used as a regressor. As explained in detail above, this allows me to control for state-dependence and omitted variable bias.

The model takes the following form

\[ \text{defaultsize}_{i,t} = \gamma \text{defaultsize}_{i,t-1} + x_{i,t} \beta + \epsilon_{i,t} \] (1)

where \( x \) is a vector of controls.

The main changes with the previous specification in terms of data are as follows. First of all, I include the lagged total debt as a control. This includes both internal and external debts of the central government and of the local public authorities. This makes the debt levels more comparable than in the previous case since it captures, for all countries, the general debt as opposed to a portion of it, which could furthermore be influenced by different accounting standards and conventions. I also run a regression in which I split the public debt into
central and local shares (column 2)

Unfortunately, no distinction between foreign and internal debt is available at the sub-national level and the foreign debt is not divided in long and short-term portions. For this reason, the lagged foreign debt share in the total central government debt and the lagged short-term share in the domestic central government debt are employed as proxies for the total foreign and short-term shares respectively.

I also include a lagged “on gold” dummy in order to study whether the possibility that leaving the Gold Standard constituted a complement or alternative to default. As in Wolf (2008), I consider a country to have left the Gold Standard in case it either devalues and/or introduces exchange controls, whichever comes sooner. I further include a dummy that indicates whether a banking crisis took place in the 5 preceding years (also lagged). This is to test whether the suggestions by Erce (2012) that a weak banking sector might make a country more reluctant to default due to the fact that banks tend to hold large amounts of government bonds. Moreover, banks might be harmed by external defaults through their ties with foreign banks and other financial institutions.

I introduce a control for the lagged natural logarithm of the per capita GDP. This is done to see if richer countries systematically differ from poor ones. Finally, I control for the level of democratic rule in the country as proxied by the lagged polity2 score constructed by Marshall and Jaggers (2005) to investigate whether more democratic societies were less likely to default even after controlling for other political and economic characteristics.

Finally, I included some further newly constructed variables, namely two indicators of fiscal capacity consistent with O’Brien (2011)’s definition of the term - central government revenue over GDP and local government revenue over GDP - and an indicator on dependence from borrowing from abroad, in particular the United States, defined as the dollar-denominated debt to GDP ratio.

The Sargan test for identifying restrictions and the Arellano-Bond test for first and second degree autocorrelation in the error term confirm that the estimating strategy of the Arellano-Bond model is sound. I run the model for both total defaults (Table 7) and

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9Erce argues that countries with a weak banking sector tend to avoid internal rather than external defaults. However, here dollar bonds could still be held by domestic banks, since many countries do not report the debt based on the domicile of the owner, but rather the place or currency of issue.
national-provincial and municipal defaults separately (Tables 8, 9)

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<td>-0.218**</td>
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<td>-0.768</td>
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<td>-1.366**</td>
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<td>-0.454***</td>
<td>-0.454***</td>
<td>-0.454***</td>
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<td>-1.085***</td>
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<td>-0.619</td>
<td>-0.619</td>
<td>-0.619</td>
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<td>0.843**</td>
<td>0.852**</td>
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Robust standard errors in parentheses. Time fixed-effects included in all specifications. Statistically insignificant controls not shown: L.longgold, L.bankingcrisis, L.polity, L.trade/GDP

**** p<0.01, ** p<0.05, * p<0.1

Table 7: Expanding the analysis: full dynamic Arellano-Bond panel estimation, total defaults

In all five specifications in Table 7 I find that default is strongly persistent. This, as mentioned above, is not surprising given that, for the sample considered, most countries that enter a state of default do not leave it before the end of the period under consideration. In general, lengthy negotiation processes mean that countries can remain in a state of default even after changing economic and political conditions. In column 1 and 2, I report that the total and central debt-to-GDP ratio is negatively associated with default size. This indicates that countries that borrowed more with respect to the size of their economy were also less likely to default. This result might seem surprising at first and could be attributed to reverse causality: countries that were less likely to default (were inherently more credit-worthy) were able to borrow more in the first place leading to

---

10 I experimented with longer lags of the dependent variable, but found negative rather than the expected positive persistence. This is the typical result one obtains when there is no true persistence.
a negative correlation between the debt to GDP ratio and default size. Given that I am controlling for country fixed effects, however, this argument does not hold, at least if credit-worthiness is time-invarying (or slow moving). An alternative explanation is that countries with a higher debt to GDP ratio were those whose governments (both national and subnational) relied more heavily on borrowing for their functioning. Once other determinants of default are controlled for, these countries would be expected to be less willing to default and be excluded from financial markets. Naturally, countries with higher debt burdens would benefit more than countries with lower ones from default, but would also potentially be more adversely affected by being excluded from financial markets.

An alternative and more convincing explanation, which is supported by the results in columns 3 to 5, is that countries with more fiscal capacity - as measured by public revenues over GDP - were able to borrow more and also avert default. In column 3, the inclusion of central government fiscal capacity removes much of the explanatory power of the debt-to-GDP ratio. Columns 4 and 5 illustrates that when the fiscal capacity is entered in the regression without the debt-to-GDP ratio its coefficient is both highly significant and large. In column 6, the local fiscal capacity is entered as a control. This shows up as insignificant and also make the coefficient on central fiscal capacity insignificant, presumably by reducing the number of observations.

The idea that countries which relied more on external finance were less likely to default is supported by the results in column 5. The negative, large and statistically significant coefficient of the total dollar debt to GDP ratios indicates that countries which relied more on dollar-denominated debt to finance both their public and private sectors, were less likely to default on dollar loans. This result fits well both with traditional reputation based models of sovereign defaults, and recent developments that highlight the possibility of reputational spillovers (Cole and Kehoe [1998]) - in this case from the public to the private sector - and the fact that government will take into considerations the reliance of the whole economy on external finance while making the default decision (when this decision is indeed available) (Erce [2012]).

I also find in all specifications, except column 4, that the share of short-term debt in the total debt is positively related to default. This results fits well with economic intuition
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</table>

Table 8: Expanding the analysis: full dynamic Arellano-Bond panel estimation, national-provincial defaults

and the Great Depression context. Recent contributions have highlighted that difficulties in rolling over short term debts might be a key driver of default (Erce, 2012). During the interwar era, after the surge in foreign lending between 1924 and 1928, foreign lending slowed down abruptly until coming to an almost complete halt in 1930 (Feinstein and Watson, 1995). While long term investments were not immediately recalled, liquidity dried up on financial markets. This has been identified by many authors as a leading factor in the pressure felt by countries such as Germany, which had borrowed short-term on a large scale. In fact, the first item to be tackled in connection with the German sovereign debt crisis was the short-term debt, which was suspended through a Standstill agreement in 1931 and successively rolled over until the complete default of 1934 (James, 1986; Ritschl, 2012, 2013). South American countries also relied heavily on short-term debt, which required a continuous rollover (Jorgensen and Sachs, 1988). The unusual size of short term flows during the 1920s was indeed one of the defining characteristics of interwar lending (Feinstein and Watson, 1995).
A result that is difficult to reconcile with the existing historiography of the interwar period is the fact that countries that saw a smaller deterioration in their trade compared to 1929 are found to have been more likely to default. A possible explanation is that countries in danger of default, attempted to boost their trade and thus foreign exchange revenues in order to avoid default. This result might also indicate the need for more refined bilateral trade data.

Columns 1 through 5 also report a more straightforward result: countries that experienced a deeper recession were more likely to default. This finding lends weight to the “bad luck” hypothesis.

The results in Table 8 for national-provincial defaults only are essentially the same. The only differences are small changes in the coefficients.

Table 9 presents the results for municipal bonds. Once again the defaults appear to be highly persistent. There are some indications for a role of fiscal capacity (column 5), short term debts (column 3) and the polity score (columns 3 and 6), but none of these appear to be robust. What is clear however, is that changes in economic conditions as measured by the change in GDP per capita were a key cause of default also at the municipal level. Countries whose GDP per capita decreased by less, ad a smaller incidence of default at the municipal level.

More works needs to be done to understand municipal defaults, but the first indication is that economic conditions, even aggregate ones, mattered. In my third paper I aim to analyse sub-national defaults at a disaggregated level in order to better understand what drove some governments to default and others not to.

5.2.3 Discussion

In this section, I provide a discussion of a number of results from the econometric analysis above.

How can the extent of short-term borrowing and lending of the interwar years be explained? Why did certain countries rely on it more than others? A full answer to these questions is clearly beyond the scope of this paper. A realistic hypothesis is that the uncertainty of the interwar economic climate led investors to caution themselves by extending a
larger share of short-term credit rather than committing themselves through long-term loans. Creditors’ preference for short-term loans could mean that borrowing governments would be faced by a trade-off between cheaper and riskier (due to the constant roll-over it requires) short-term credit and safer, but more expensive long-term credit ([Broner, Lorenzoni, and Schmukler 2013]). Based on this interaction between creditors and debtors, less creditworthy countries and more uncertain time-periods would lead to a higher share of short-term credit. In a self-fulfilling expectations fashion, this would in turn increase the probability of a debt crisis due to difficulties in rolling over the short-term debt. This hypothesis could be tested through a systematic comparison between short-term and long term bond yields, which I intend to carry out in the future.

A further result presented in the analysis above is that countries with higher debt to GDP ratios were less likely to default. These countries clearly had the most to gain from default in terms of foregone payments to creditors. However, a high debt to GDP ratio is also

Table 9: Expanding the analysis: full dynamic Arellano-Bond panel estimation, municipal defaults
an indicator of a strong reliance on borrowing for the functioning of the public sector. For countries relying heavily on borrowing, being cut off from financial markets following default could entail significant costs and it would appear that in the interwar period the perception of these costs outweighed the perception of the benefits. Marcet and Marimon (1992) have argued that defaulting countries do not necessarily have to be completely excluded from financial markets following default. They show that an equilibrium can be sustained where countries can borrow for consumption-smoothing while having no access to loans for investment projects. However, this last instance still represents a cost for borrowers that might induce them to choose the full enforcement equilibrium.

While the above explanation is plausible, I find empirical support for the more convincing idea that the result is the result of an omitted variable bias with the omitted variable being countries' fiscal capacity. Countries able to raise more taxes a a share of GDP would be able to sustain higher debt-to-GDP ratios and also be able to avert default more easily. In fact, it is well established in the literature on state formation and state capacity that the ability to raise taxes is an essential prerequisite for borrowing on a large scale (Mathias and O'Brien, 1976; North and Weingast, 1989; Besley and Persson, 2009; O'Brien, 2011), but to the best of my knowledge the link between fiscal capacity and the interwar debt crisis has not been previously explored empirically. The debt-to-GDP ratio and fiscal capacity exhibit a high correlation (around 0.5 to be precise, see Figure 8).

Figure 9 illustrates the patterns of government revenues for defaulters starting from 4 years before they interrupted their debt repayment. Two distinct patterns are visible. A number of countries - Bulgaria, Argentina, Brazil, Uruguay and Colombia - experienced a massive fall in their revenues as a share of GDP around 2 years before they defaulted. This persisted until the actual default took place. Germany and Poland, instead increased their revenues, only to see them fall again around the default date. In Germany in particular, the austerity measures put in place by chancellor Brüning before the default are clearly visible. The strain, however proved to be excessive and Germany defaulted anyways. Once the National Socialist party came to power, fiscal policy turned expansionary.

Finally, the finding that countries were less likely to default the higher the share of dollar-denominated debt in their economy is particularly interesting in conjunction with the finding
that the incidence of foreign debt (denominated both in dollar and other currencies) in total government debt does not have explanatory power for default on dollar-denominated debt. On one side, this finding highlights potential reputational spill-overs from the public to the private sector (see Cole and Kehoe (1998) for a general discussion of reputational spill-overs), but also that these spill-overs might have been compartmentalised along different lenders.

![Figure 8: Public Debt and Revenues](source: Section 3 and Appendix A)

Regarding the municipal defaults, the finding that changes in economic conditions were their main driver is further supported by the structure of tax revenues at the local level. As Figure 10 illustrates, income taxes dominated the revenues of sub-national governments in most countries in the interwar era. This presumably made their revenues more elastic to changes in income and meant that the Great Depression shock hit them particularly hard.

### 5.2.4 Future steps

Many of the future steps relating to data discussed throughout the analysis above will have a direct influence on the econometric analysis. This will materialise in further channels to test, a broader data set and different definitions of key variables. Strictly on the econometric side, the key future step will be the estimation of a Tobit model with fixed effects.
Figure 9: State revenue over GDP, 4 years to default=1
Source: See text and Appendix A for details

Figure 10: Tax revenue composition of local governments for the interwar period
6 Conclusion

In this paper, I have revisited one of the key events of the Great Depression and of the international finance of the 20th Century: the sovereign debt crisis of the early 1930s. My study aimed to fill the gap in our understanding of the event, due to the lack of rigorous testing of a number of explanations of the defaults put forward in the economic literature and historiography.

In order to do this, I presented two fundamental innovations with respect to previous research. Firstly, I constructed a new data set on public debt, revenues and expenditures from original primary sources. This features, for the first time, sub-national bodies in a consistent manner for over 20 countries worldwide. Local government debt consisted around 25% of all public debt on average in the Great Depression era. For some large countries with federal structures and others featuring large and independent cities, the share of local debt exceeded 50% of total debt. The figures for local revenues and expenditure are broadly similar. My public debt data is furthermore disaggregated into long-term, short-term and foreign components. This new data is directly responsible for two of the key findings of this paper: 1) A high share of short-term debt over total debt was a leading cause of default 2) States with stronger fiscal systems were able to both borrow more and avert default more effectively.

Secondly, I employed a flexible and rigorous econometric strategy which features the use of modern panel data techniques to account for unobserved country heterogeneity. This led to an increase in the precision and reliability of my results compared to previous studies of the interwar debt crisis, such as Eichengreen and Portes (1986). Thanks to this strategy, I obtain results, which confirm some hypotheses put forward by scholars of the Great Depression throughout the years. However, I also show that some suggestions, particularly the idea that fiscal and monetary policies (narrowly defined to indicate the running of deficits surplses and changes in the reserve ratio)differed systematically between defaulters and non-defaulters, do not stand to closer scrutiny.

Returning to the two key questions posed in the Introduction of this paper:

1. Were the defaults the result of misjudgment on the part of creditors and opportunistic behaviour by borrowers or the inevitable result of the worldwide slump and other
factors beyond the control of borrowing countries?

2. To what extent were the factors leading to default global in nature or specific to individual countries?

I show that both global shocks and specific country circumstances mattered. The Great Depression was a global event, but the degree of its severity as well as the pre-existing conditions of countries facing it were wildly at variance. The depth of the crisis and the reliance on short-term credit seem to have been particularly important elements in triggering sovereign defaults.

The first question is more difficult to answer. While it is the case that all the variables found to be relevant in explaining default reflect economic factors, a number of them are inputs of a political decision-making process in which a certain degree of discretion, whether real or theoretical, is involved, ruling out default as an automatic reaction to shocks beyond the control of the country.

In particular, the lower likelihood of default for fiscally stronger and more borrowing-dependent countries reflects the underlying political predisposition of countries in the interwar era, which led them to favour, under certain conditions, the internationally oriented sectors of their economies and the creditors as opposed to the internally oriented sectors and competing public sector payees. Thus, external shocks certainly played an important role, but so did the political choices and constraints underlying sovereign default decisions.

The comprehensive picture of the Great Depression defaults offered by the paper thus indicates that monocausal interpretations of the event, which assign the key role to either “bad luck” or the irresponsible behaviour of borrowers, lenders and middle-men, should be taken with caution. The interwar debt crisis was a key event in the unfolding of the Great Depression and it influenced policy-makers, academics and public opinion for decades thereafter. As could be expected, it was a highly complex event in which exogenous shocks and discretionary choices all played a key role.
References


A Data Sources

In this Appendix, I provide detailed information on all the data collected. The sources and potential issues with the series are described.

A.1 Reliability

How reliable are the sources used in this paper? Regarding the German data sources, during the interwar period the collection of economics statistics was subject to a strong push forward in many countries, with Germany at its lead. As Adam Tooze argued:

In the aftermath of the First World War enthusiasm for statistics and economic research was not confined to Weimar Germany. Indeed, in its early years Wagemann’s institute [The Institut für Konjunkturforschung founded in 1925] drew its inspiration mainly from abroad. The major influences were the Harvard Committee for Economic Research, the NBER in Washington, the statistical initiatives of Herbert Hoover’s Department of Commerce, and the Soviet Conjunction Institute. In France and Britain also, there were calls for the government to play a greater role in data gathering and economic research. In the early 1920s private institutes for business-cycle research had been established in London and Paris along similar lines. [In Italy, the push for a better understanding of society through the collection of statistical data resulted in the creation of the Instituto Centrale di Statistica (Istituto Nazionale di Statistica - ISTAT - today) in 1926.] However, no other European service ever achieved the size or authority enjoyed by the Berlin institute. The Weimar republic was unique among west European states in the scale of its support for economic research which was not academic in character but designed specifically to supply information to government. [Tooze (1999)]

Ernst Wagemann, the founder of the Institut für Konjunkturforschung, was also the head of the German Statistical Office (Statistiches Reichsamt) from 1924 to 1933 and the work of the institute and the statistical office were closely tied together. Even after Wagemann lost his position as the head of the Statistical Office, he retained his lead at the Institute, with Hitler’s personal backing and support. Under the Nazis, both the Institut für Konjunkturforschung and the Statistiches Reichsamt lived a sort of golden age in terms of man power and resources (Tooze [1999]), which resulted in the collection of a huge array of domestic and international statistics, a small part of which are used in the current paper. Some of the original data reconstructions produced by the Institute were highly regarded and found their way into international publications, such as Moody’s investment manuals (for example, the Institute reconstructed the international foreign debt position of a number of countries in 1932, and this was published in Moody’s manuals unfailingly for a number of years thereafter).

However, the work of Rainer Fremdling (see, for example, Fremdling [2005, 2007]) has revealed that both the Institute and the Statistical Office worked under enormous pressure
from the authorities. This was mostly connected to the strategic planning for the war effort and the desire not to reveal too many details about the state of the German economy. For this reason, information was at times hidden through aggregation, misreported or not reported altogether. The data I use in this paper, however, would not be considered as sensitive information with regard to the war effort and is thus likely to be free of manipulation. Moreover, the ongoing cross referencing work with alternative non-German sources (Moody’s manuals in particular) has revealed no inconsistencies so far.

The United Nations (1948) volume also relied on the best available evidence from the time. The League of Nations regularly collected a wide range of international data in its Statistical Yearbooks, which the compilers of the UN volume organised and presented in a unified and coherent fashion. The issues with these data are discussed at length above and in Appendix A, but the volume represents a remarkable, and transparent, effort to reconstruct a precise picture of central government debt in the interwar years.

Finally, what is to be made of the data found in private publications created for the benefit of clients and investors such as those of Moody’s, the Institute for International Finance and the Corporation of Foreign Bondholders? Firstly, the data found in these volumes is often in agreement with data reported elsewhere. A thorough process of cross-checking is currently under way that will hopefully confirm this in a systematic way. Generally, the reliability of the data presented in these publications is based on the fact that offering quantitative information and thereon based commentary and advice represented the core business of these institutions. Moody’s, which was the first company in the world to produce foreign government bonds ratings in 1918, relied directly on the data collected to create its ratings, as the criteria listed in Gaillard (2012) show.

A.2 Next steps
Throughout the econometric analysis of Section 5, I detail the principal future steps data-wise. I also plan to expand the sample of countries analysed. Realistically, this expansion will not involve a very large number of countries given severe data availability issues. The countries that will be included in the future should include: Mexico, the Philippines, Spain, Thailand, Turkey.

A.3 Common data sources
Default size: The default size is calculated as the share of the principal of Dollar bonds at all level of government in default over the principal of total Dollar bonds at all levels of government. Information on the date and amounts in default are taken from Moody’s (1933) page a17 page for defaults up to 1932, Moody’s (1934) page a44 for 1933, Moody’s (1935) page a45 for 1934, Moody’s (1936) page a47 for 1935 and Moody’s (1937) page a41-a44 for 1936.

Total Dollar Debt: The total - public and private - dollar-denominated debt is obtained from Lewis (1938), Statistical Table 1, page 619-629.
Banking crisis and on gold dummies: The banking crisis dates from which I build my banking crisis in the previous five years indicators are from Bernanke and James (1991). The authors do not offer a precise definition of banking crisis, but their dates are largely consistent with those of Reinhart and Rogoff (2009) who define a the onset of a banking crisis as the occurrence of two types of events: 1) “bank runs that lead to the closure, merging or takeover by the public sector of one or more financial institutions; [...] 2. [...] the closure, merging, takeover or large-scale government assistance of an important financial institution (or group of institutions), that marks the start of a string of similar outcomes for other financial institutions.” The dates for which countries return and leave the gold standard by devaluing or introducing exchange controls are from Crafts and Fearon (2013).

Nominal non-PPP-adjusted GDP: Klasing and Milionis (2013) estimate nominal, non-PPP-adjusted GDP between 1870 and 1949 starting from Maddison’s GDP estimates. They employ the so-called “short-cut method”. This method has a long history and Prados de la Escosura (2000) offers a detailed description. In essence, it exploits the relationship between PPP adjusted and non-PPP-adjusted GDP determined by the relative prices of traded and non-traded goods and the relative income level of the country compared to the benchmark country. In doing this, it makes use of the Balassa Samuelson theorem.

GDP per capita: GDP per capita is taken from the Maddison’s Project’s latest update (Bolt and van Zanden 2013) which incorporates the latest GDP estimates available.

GDP index: Data on the deterioration of GDP compared to 1929 is obtained from the GDP indexes in Barro and Ursua (2010). The authors collect the latest (up to 2010) available GDP estimates for a sample of countries. Data for Bulgaria, Czechoslovakia, Hungary, Ireland, Poland, and Bolivia was missing from this data set. In this cases, the GDP deterioration was calculated using the Maddison’s Project per capita GDP estimates.

Trade and openness: Trade and openness figures are derived from the data present in Klasing and Milionis (2013). The authors derive the openness figures by combining their estimates of nominal GDP with trade data in Barbieri, Keshk, and Pollins (2009).

Polity score: This is the polity2 score from the POLITY IV database (Marshall and Jaggers 2005). It is a combined score of autocracy and democracy (both measure between 0 and 10) and is obtained by subtracting the autocracy score from the democracy one. The two scores are weighed indicators of the competitiveness of political participation, the openness and competitiveness of executive recruitment and constraints on the chief executive.

A.4 Country-specific sources and information

A.4.1 Argentina

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 11 in millions of Pesos on 31 December 1914-1938. Data includes treasury bills obligations. Foreign debt shown at legal parity except for some shown at contractual rates. In the original figures, bonds held by the treasury have been discounted since 1927, I have kept them in to improve cross-country comparability. Short term debts in 1927 do not include outstanding unpaid commitments. Original source: Memoria del
Local Government debt: The data is collected from a variety of sources. No figure is available for 1928 and is interpolated as a the average between 1927 and 1929. No evident signs of jumps are present between the different series and the substantial overlap between the main data sources insures that the figures are consistent over time. The figure for 1927 is from Institute of International Finance (1927) - Credit Position of Argentina. and the 1929 figure is from Corporation of Foreign Bondholders (1929). The 1930 and 1931 figures are dervied as the difference between the total public debt reported in from Moody's (1931), page 10 and Moody's (1934) page 1667 the central government debt reported in Moody's (1935). The 1932-1934 figures are taken from Moody's (1935) page 1771. The figures from 1935 to 1937 are taken from Statistisches Reichsamt (1939/40). The sub-national bodies covered in all sources are essentially the same. Minor differences exist between Institute of International Finance (1927), which includes the following municipalities: Buenos Aires, Rosaio, Cordoba, Santa Fe, Bahia Blanca, San Juan; and provinces: Buenos Aires, Santa Fe, Cordoba, Mendoza, Tucuman, Entre Rios, Santiago del Estero, Corrientes, San Juan, Jujuy, San Luis, and the rest of the sources which include a number of additional minor bodies which, however, have a very small overall impact. These are the municipalities of: Rio Cuarto, Mendoza, Tucuman, Parana, Monteros, Santiago de Estero, Catamarca, Salta, La Rioja; and the provinces of: Salta, Catamarca, La Rioja and Jujuy. All figures are in millions paper Pesos.


A.4.2 Australia

Central and local Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 15 in millions of Pounds on 30 June 1914-1938. Australia is one of the few instances where the original data included both Commonwealth and State debts. These data is included throughout the period even though the Commonwealth took over the outstanding debts of the States only on July 1 1929 under the terms of the Financial Agreement between the Commonwealth and the States. In the analysis, I have separated the two types of debts in order to insure a better comparability across countries. The sate debts data comes from Statistisches Reichsamt (1939/40) (30 June 1926-1938). Original sources: The Budget, Finance Bulletins - Summary of Australian Financial Statistics, the Treasure’s Statements of Receipts and Expenditure, Official Year-Book of the Commonwealth of Australia.

State revenue and expenditure: 1920-1933 Statistisches Reichsamt (1936a) page 526,
A.4.3 Austria

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 19 in millions of Schillings on 31 December 1914-1938. Increase from 1930 partially due to the inclusion of some pre-1914 debts previously not recognised by the Austrian government. Original figures include some foreign loans issued in Austria, which I exclude to improve comparability across countries. Foreign debt data in foreign currency, 1924-31: converted into Shillings at the current exchange rates; 1932: converted at the official rate; 1933-37: converted at the average rates of private clearings on the respective dates. Debt service charged against ordinary revenue (excluding proceeds from loans). Original source: Bundes-Rechnungsabschluss der Republik Oesterreich, Statistiches Handbuch fuer die Republik Oesterreich.

Local Government debt data: not available.


Gold reserves and notes in circulation: Reserves only: 1924-1933, Statistisches Reichsamt (1936a) page 208, Jahreszahlen. 1934-1937, Statistisches Reichsamt (1939/40) page 258*-259*.

A.4.4 Belgium

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 21 in millions of Francs on 31 December 1914-1938. Short term data includes medium term debt. Foreign debt data converted at current rates of exchange with the exception of francs 1932 and 1934 loans converted at parity rates before the devaluation of October 1936. Intergovernmental debts are included throughout. Increase from 1924 to 1925 is partly due that for the first time certain war debts of which Belgium did not hold itself responsible were included in accordance with an agreement with the US. Debt service represents total expenditure against ordinary expenditure. Up to 1930 it includes ex service men’s fund and pensions, which cannot be separated from the rest. Original source: Office Central de Statistique, Annuaire Statistique, Evolution des Finances de l’Etat, 1931-40, Banque Nationale, Bulletin d’Information et de Documentation.

Local Government debt: Statistisches Reichsamt (1939/40) on 312 December 1926-1937 in millions of Francs.


Gold reserves and notes in circulation: 1920-1933 Statistisches Reichsamt (1936a) page 43, Jahreszahlen. Reserves only: 1934-1938, Statistisches Reichsamt (1939/40) page
A.4.5 Bolivia


Local Government debt data: not available.


A.4.6 Brazil

Central Government debt - long-term, short-term, foreign - and debt service data: [United Nations (1948) page 27 in millions of Milreis on 31 December 1914-1938. The original short term debts figures included paper notes in circulation. These have been removed for better comparability. The debt service figure for 1933/34 is for 15 months ending 31 March 1934 and the debt service figure for 1934 is for 9 months ending December 1934. The service of the foreign debt includes for 1931, 1934, 1937 and 1940-45 the portions not transferred but allocated to special accounts which forms part of the floating domestic debt. In September 1931, the payment on the foreign debt service was suspended. in March 1932 a plan for partial repayment of the service on the foreign debt was established for the period April 1934 to March 1938 and then suspended in 1937 again. Most of the foreign debt and a small part of the domestic debt are expressed in gold milreis. The gold milreis was a unit of account used starting from the 19th century to report certain items by the Brazilian government. The gold milreis figures have been converted into paper milreis at the official parity of 27 pence per gold milreis. The floating (short-term) debt has been converted into paper milreis at current rates of exchange. It is made up of promissory notes destined to liquidate frozen credits of foreign exporters in accordance with the commercial agreements between Brazilian government and foreign exporters. The decline from 1927 to 1928 is partly due to the fact that the French 5% 1908-09 Itapura-Corumba Railway Loan considered up to 1927 as being in gold francs was unilaterally converted paper francs. Beginning with 1923, the funded (long term) domestic debt does not include obligations held by the Caixa de Amortizacao (1932: 32 millions paper milreis). Original sources: Contadoria Geral de la Republica: Balancos Gerais da Union (title varies slightly during period 1914-43), Anuario

**Local Government debt data:** Moody’s (1936) between 1928 and 1934 in millions of paper milreis. Data is available only for external debt. The total debt figure is inferred by assuming that the proportion between internal and external debt is the same as the national one.

**State revenue and expenditure:** 1920-1933 Statistisches Reichsamt (1936a) page 427, Jahressahlen. 1934-36, League of Nations (1936/37) page 264-273.

**Gold reserves and notes in circulation:** Reserves only: 1920-1933 Statistisches Reichsamt (1936a) page 426. Jahressahlen. 1934-1938, Statistisches Reichsamt (1939/40) page 258*-259*.

**A.4.7 Bulgaria**

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page in millions of Leva on 31 December 1914-1926, 31 March 1928-1934, 31 December 1934-1938. Short term debt data include debts to national bank. Foreign debts converted at the appropriate parity for compatibility. Share of Ottoman debt owed by Bulgaria is not included throughout. Debt owed to Bulgaria due to property sequestrated and liquidated in the UK is also not included. Debt service includes reparations starting from 1928/29. During WWI, these payments were suspended and then resumed through agreements in 1920, 1925 and 1927 until further suspension in April 1932.

**Local Government debt data:** Statistisches Reichsamt (1939/40) on 31 December 1926-1931 and 1935 and 31 March 1932-1934 in millions of Leva.

**State revenue and expenditure:** 1920-1933 Statistisches Reichsamt (1936a) page 43, Jahressahlen. 1934-36, League of Nations (1936/37) page 264-273.

**Gold reserves and notes in circulation:** 1920-1933 Statistisches Reichsamt (1936a) page 43, Jahressahlen. Reserves only: 1934-1938, Statistisches Reichsamt (1939/40) page 298*-299*.

**A.4.8 Canada**

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 34 in millions of Dollar on 31 March 1914-1938. Long term debt data, according to Canadian classification: includes treasury bills and deposit certificates. Short-term floating debt consists of various demand liabilities. Total debt represents gross debt. Foreign debt is shown at parity. Original source: Public Accounts; Canada Year-Book.

**Local Government debt data:** Statistisches Reichsamt (1939/40) between 1926 and 1936. The data includes provincial and municipal debt.

**State revenue and expenditure:** 1920-1933 Statistisches Reichsamt (1936a) page 377-78, Jahressahlen. 1934-36, League of Nations (1936/37) page 264-273.
A.4.9 Colombia

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 34 in millions of Pesos on 31 December 1927-1938. Domestic short-term debt excludes state notes in circulation. The foreign debt is transformed in the national currency at parity $1=1 peso and 1=5 pesos. Redemption of foreign debt has been suspended since 1932 and interest payments since 1935, however some partial payments have been made. Original Source: Informe Financiero de Contralor General, Anuario Estadistica, Boletin del departamento de Contraloria.

Local Government debt data: Statistisches Reichsamt (1939/40) between 1926 and 1937 in millions of Pesos. The data includes the debt of municipalities and departments.

A.4.10 Czechoslovakia

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 49 in millions of Kroner on 31 December 1918-1938. Long-term domestic debt includes debt to national bank (state notes debt), except for for 1919-23. Part of the increase in the debt is due to the settlement and adjustment of pre-1914 and 1914-1918 war debts. The foreign debt 1920-1930 is converted into national currency at the rate ruling at the moment of inscription of the various loans in the debt ledger. Beginning with 1934, the debt in foreign currency has been converted at the rates of exchange on respective dates. Some of the original debt service figures do not include commissions, I have added them to improve comparability. The reduction in amortization and interest in foreign debts since 1931 was due to the Hoover Moratorium of June 1931 and the Lausanne conference of 1932. From 1933, the regular redemption of domestic debt was suspended, but bonds were accepted for payment of arrears of taxes and purchases of bonds were effected by the state. Original sources: Closed Accounts, Office National Statistique, Renseignements Statistique. Ministry of Finance, Dr. J. Dolansky, Vyklad k Rozpoctu Na Rok 1947 (budget Expose’ 1947).

Local Government debt data: No continuous series is available. a single data point for 1933 is present in Statistisches Reichsamt (1939/40).

Gold reserves and notes in circulation: 1920-1933 Statistisches Reichsamt (1936a) page 293, Jahreszahlen. Reserves only: 1934-1938, Statistisches Reichsamt (1939/40) page 258*-259*.

A.4.11 Denmark

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 51 in millions of Kroner on 31 March 1914-1938. In 1933/34, the loss on exchange in repayment of the foreign debt is included with “interest”. The short-term debt includes treasury bills and, up to 1931, also debts from unpaid interest. It does not include overdrafts on the current account of the ministry of finance with the central bank and other banks which are normally more than offset by assets with those banks. Debt towards central bank is available but has not included for compatibility with other countries where reported on net. The foreign debt is shown at legal parity, except for some French loans. Beginning in 1925/26, interest payments as published by official accounts are offset by interest received from capital invested in real estate, plan equipment and by a percentage invested in capital for depreciation. The net balance is added or deducted from current receipts. Data on total interest received is available, but negligible. I also use real cost of redemption rather than the nominal one. Original Sources: Statsregnskab (closed accounts), Statistik Aarbog, Danske Staatslaan.

Local Government debt data: Statistisches Reichsamt (1939/40) on 31 December between 1926 and 1938 in millions of Kroner. The data includes the debt of municipalities and departments.


A.4.12 Finland

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 60 in millions of Finnish Marks on 31 December 1916-1938. Data excludes debts repurchased and held by public debt administration. Debts are shown at book value. For 1914-1931, the debt service is total expenditure charged against ordinary revenue (receipts exceeding proceeds from loans). For 1932-1945, the expenditure is charged against current receipts. Foreign interest payments include exchange losses. For 1932-1945, redemption payments are charged against capital receipts, which include proceeds from loans. Amounts therefore include conversions. Original Sources: Accounts, Bureau Central de Statistique, Annuaire Statistique de Finlande, Recueil de Statistique, Communication from Bank of Finland, Institute for Economic Research.

Local Government debt data: Statistisches Reichsamt (1939/40) on 31 December between 1926 and 1936 in millions of Finnish Marks. The data includes the debt of munici-
palities and other local communities.

**State revenue and expenditure:** 1920-1933 [Statistisches Reichsamt](1936a) page 63, Jahreszahlen. 1934-36, [League of Nations](1936/37) page 264-273.

**Gold reserves and notes in circulation:** 1920-1933 [Statistisches Reichsamt](1936a) page 62, Jahreszahlen. Reserves only: 1934-1938, [Statistisches Reichsamt](1939/40) page 258*-259*.

### A.4.13 France

**Central Government debt - long-term, short-term, foreign - and debt service data:** [United Nations](1948) page 64 in millions of Francs on 31 December 1917-1919 and 1922-38, 31 May 1920 and 31 March 1921. Debt figures up to December 1937 are in comptes generaux, yearly data, figures after 1937 are not directly comparable to earlier ones. Long term debt also includes medium term debt, mainly bonds of more than two years maturity at time of issuance (which are long term debt according to the UN classification used in their 1948 volume). For 1914-1935, short term debt includes advances from the central bank, while for 36/37 these are excluded and re-included starting from 1938. Foreign debt was converted in Francs at the exchange rate at the date in question. The foreign debt was excluded from official statements from 31 March 1932 to 31 December 37. Starting from 1938, data excludes interallied debts from WWI. The debt service data for 1920/21 are figures from 1920., 1921/22 figures from 1921, 1929/30 from1929, for 1929 last 9 months only. 1927-32 are provisional figures. Original Sources: Closed Accounts (Comptes Generaux), Ministère des Finances, Dette Publique (Situation Mensuelles), Inventaire de la Situation financière (1913-1946). **Local Government debt data:** [Statistisches Reichsamt](1939/40) on 31 December between 1926 and 1936 in millions of Finnish Marks. The data includes the debt of municipalities and other local communities.

**Local Government debt data:** [Statistisches Reichsamt](1939/40) on 31 March between 1926 and 1930 in millions of Francs. The figures are very small compared to the central government debt (around 3% in 1930). For this reason they are assumed to be negligible for the empirical analysis.

**State revenue and expenditure:** 1920-1933 [Statistisches Reichsamt](1936a) page 95, Jahreszahlen. 1934-36, [League of Nations](1936/37) page 264-273.

**Gold reserves and notes in circulation:** 1920-1933 [Statistisches Reichsamt](1936a) page 95, Jahreszahlen. Reserves only: 1934-1938, [Statistisches Reichsamt](1939/40) page 258*-259*.

### A.4.14 Germany

**Central Government debt - long-term, short-term, foreign - and debt service data:** [United Nations](1948) page 67 in millions of Reichsmarks on 31 March 1914-1938. Between 1913/14 and 1922/23 most of the debt (almost entirely internal in nature) was wiped out by the hyperinflation and the redemption of the paper mark Treasury bills held by the Reichsbank by payment in new Rentenmarks (1 rentenmark = 1 trillion paper marks).
The increase from 1925 to 1926 was due to the fact that most “pre-stablisation” debts had been converted into the new “loan liquidation debt” which was shown for the first time in the public debt statement of 1 March 1926, this amounted to 5,500 millions RM. For 1919/20 to 1922/23, the long term includes debts taken over from the states (largely railway). For the same period, miscellaneous obligations and guarantees in the form of treasury bills are included. For 1932/33 to 1944 tax payment certificates are included. The foreign debt is shown at par until 31 march 1933. From march 1934 loans issued in US Dollar, Sterling an Swedish Kroner have been converted at the mean exchange rate of the respective years. The decrease from 1933 to 1934 is chiefly the result of the change in the conversion rates. The further gradual decline is due not only to actual transfers to the creditors abroad but has resulted also from amounts in marks deposited in favour of foreign creditors at the Reichsbank but not transferred due to the lack of foreign exchange, which have been deducted from the outstanding debt. These amounted on 30 sept. 1944 to Reichsmarks 150.4 million. Original sources: Closed Accounts, Reichs-und Staatsanzeiger, Statistisches Reichsamt, Statistiches Jahresbuch, Wirtschaft und Statistik.

**Local Government debt data:** Statistisches Reichsamt (1936b) between 1927 and 1933 and Statistisches Reichsamt (1938) in millions of Reichsmarks. The data includes the debt of States Municipalities and free cities.

**State revenue and expenditure:** 1920-1933 Statistisches Reichsamt (1936a) page 18, Jahreszahlen. 1934-36, League of Nations (1936/37) page 264-273.

**Gold reserves and notes in circulation:** 1920-1933 Statistisches Reichsamt (1936a) page 16-17, Jahreszahlen. Reserves only: 1934-1938, Statistisches Reichsamt (1939/40) page 258*-259*.

### A.4.15 Hungary

**Central Government debt - long-term, short-term, foreign - and debt service data:** United Nations (1948) page 67 in millions of Peng on 30 June 1924-1938. Beginning with 30 june 1932 the monthly reports on the financial conditions of Hungary include ceratin items not shown in the original UN figures. These additional amounts are available and I have included them together with administrative liabilities. The foreign debt is shown at official rates of exchange on the corresponding dates. The decrease in 1932 has been due in part to the depreciation of the Sterling and US Dollar. The debt service figures do not include the amounts of debt service paid directly by the public undertakings. For 1926/27 and 1927/28 administrative expensive have been included. Since december 1931, the foreign debt service has been partly suspended and the Peng equivalents of the untransferred portion were paid into blocked accounts from where large amounts re-borrowed by the Hungarian government against treasury bills. Original sources: Closed accounts, Monthly Statements on Financial Conditions in Hungary.

**Local Government debt data:** No continuous series is available. a single data point for 1931 is present in Statistisches Reichsamt (1939/40).

**State revenue and expenditure:** 1920-1933 Statistisches Reichsamt (1936a) page 305, Jahreszahlen. 1934-36, League of Nations (1936/37) page 264-273.

A.4.16 Ireland

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 87 in millions of Pounds on 31 March 1923-1938. In addition to amounts recorded in the UN volume there is a liability under the housing act of 1932 and also a liability under the damage of property act amounting on 31 March 1945 to 9.4 and 4.3 million respectively. The latter liability on which an annuity of 250,000 is payable for a sixty year period commencing in 1926 has been included since 1944/45 in the official debt statements. The debt redemption consists of net amortization payments out of ordinary revenue. OriginalSources: Eire Finance accounts; Ireland Statistical Abstract.

Local Government debt data: Statistisches Reichsamt (1939/40) on 31 March between 1926 and 1937 in millions of Pounds. The data includes the debt of all local bodies.


A.4.17 Italy

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 89 in millions of Lire on 30 June 1914-1938. The foreign debt was converted at old parity rates. The original foreign debt figures exclude the war debt 1914-1918, consisting chiefly of obligations to the governments of the UK and the US, I have included these to improve comparability. I have also included interest payments on the war debt of 1914-1918. Redemptions include conversions. Original sources: Rendiconto Generale, Annuario Statistico Italiano, Compendio Statistico Italiano.

Local Government debt data: The figures for 1926 and 1935 are from Statistisches Reichsamt (1939/40). The data in between is estimated using the shares of local and central government debt in Francese and Pace (2008) and the central government debt in United Nations (1948). All data is in millions of Lire and covers all local public bodies.


A.4.18 Japan

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 92 in millions of Yen on 31 March 1914-1938. The figures include the debt incurred for the general as well as the special accounts. The figures presented under “other borrowings” in the UN volume represent “loans at various rates of interest” which could not be subdivided into domestic and foreign issues. I have added them to the domestic debt. The short term debt includes special exchequer notes, treasury notes, rice purchase notes and silk-purchase notes. The foreign debt was converted into yen at the gold parity rates (£1 = 9.763 yen, $1 = 2.006 yen, 1 French Franc = 0.387 yen). Original sources: Department of Finance, financial and economic annual of Japan, resume' statistique de l’empire du japon, bank of japan, Economic Statistics of Japan, Oriental economist, Supreme commander for the allied powers, Japanese economic statistics.

Local Government debt data: Statistisches Reichsamt (1939/40) on 31 March between 1926 and 1937 in millions of Yen.


A.4.19 Netherlands

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 90 in millions of Guilders on 31 December 1914-1938. Total domestic debt does not include advances by the national bank guaranteed by the government against assets in Reichsmarks amounting to Gulden 4,500 million on 31 December 1944. The foreign debt, when present, is included in the amounts shown under ”long term domestic debt”. In 1922 two loans of Florins 125 million and in 1924 another loan of florins 100 million were issued in America. These loans were redeemed in 1932 and 1929 respectively. Total interest payments defrayed from ordinary receipts and up to 1933 inclusive also expenditure from Loan Fund. Receipts of the loan fund which was abolished in 1934 consisted chiefly of taxes additional to certain excise funds. The domestic redemption represents expenditure charged against ordinary revenue only. Certain extraordinary payments were made during 1920-1944. Original sources: Jaarcifers voor Nederland, Maandschrift van het Centraal Bureau voor de Statistiek.

Local Government debt data: Statistisches Reichsamt (1939/40) on 1 January between 1927 and 1938 in millions of Guilder. The data covers local communities and provinces.


A.4.20 New Zealand

Central Government debt - long-term, short-term, foreign - and debt service data: [United Nations (1948)] page 100 in millions of Pounds on 31 March 1914-1938. The foreign debt due in London was entered at parity without adjustment on account of currency changes. Interest payments represent the actual net interest payments out of consolidated fund only. They do not include expenditure for loans for the purpose of state advances to settlers, workers, local authorities etc. where interest charged to the Consolidated Fund are recovered from receipts derived from interest paid by the borrowers. For 1923-1943 exchange losses on London debt are excluded but the are only relevant for for the 1940s. Redemption represents consolidated fund only. Original sources: Public Accounts, New Zealand Official Year-book.

Local Government debt data: [Statistisches Reichsamt (1939/40)] on 31 March between 1926 and 1937 in millions of Pounds. The data covers all local authorities.


Gold reserves and notes in circulation: Reserves only: 1934-1938, [Statistisches Reichsamt (1939/40)] page 258*-259*.

A.4.21 Norway

Central Government debt - long-term, short-term, foreign - and debt service data: [United Nations (1948)] page 106 in millions of Kroner on 30 June 1914-1938. The long term debt figures after June 1932 do not include the loan from the invalidity fund amounting to kroner 4.5 million on the above mentioned date. The figures include the “unpaid capital by the state-guaranteed banks”. From 30 June 1933, the item is not included with the debt proper but shown separately as a state liability in the official accounts. The foreign debt is shown at parity rates (£1=18.16 Kroner, 1 Franc=0.72 Kroner, $1 =3.73 Kroner, 1 Swedish Kroner= 1 Norwegian Kroner, 1 Swiss Franc= 0.72 Kroner with the exception of certain loans in Pounds converted at the rate £1=18.12, 18.16 or 18.18 Kroner and Swedish Kroner converted at the rate of 1 Swedish Kroner=1.02575 Norwegian Krone. Interest payments include commissions and other expenses. Redemption expenditure is charged against capital receipts (including proceeds from loans). Original sources: Closed Accounts; Statistique Officielle de la Norvège, Seire VIII; Statistical Year-books of Norway.

Local Government debt data: [Statistisches Reichsamt (1939/40)] on 30 June between 1926 and 1936 in millions of Kroner. The data covers municipalities and prefectures.


A.4.22 Peru

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 113 in millions of Soles on 31 December 1918-1938. Non-comparable data is available for the period 1914-1917. The foreign debt was converted into Soles at parity rates. The increase in foreign debt in 1930 and 1931 was chiefly due to the adoption of higher conversion rates. As interest payments on the foreign debt were suspended in May 1931, arrears of interest were added to the outstanding capital. The service on the foreign debt was completely suspended with the exception of the sterling 7.5% guano loan. Interest payments on the foreign debt were partially resumed in 1937. Original sources: Balance y Cuenta de la Republica, Extracto Estadistico del Peru.

Local Government debt data: figures are available for external debt only, between 1927 and 1933 from Werhahn (1937).


A.4.23 Poland

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 116 in millions of Zloty on 31 March 1919-1938. Short term debts for the period 1919-23 are in Polish marks and consist mostly of treasury bonds and loans by the central bank in form of large advances in paper money to the government. For the period 1924-39, short-term debts consist of treasury notes, non-interest bearing advances from the Bank of Poland and the remainder of bonds and notes matured. The foreign debt for the period 1919-23 is shown in in Zloty at the rate of 5.183 zloty=$1. For 1924-1939, the foreign debt is shown at the rates of exchange on the respective dates with the exception of the dollar issue of the 7% stabilisation loan of 1927 and the debt taken over from the former Austrian monarchy, which have been converted at par. Original sources: Budgets, Closed Accounts, Annuaire Statistique de la Republique Polonaise, the Statistical Bulletin of the Ministry of Finance, the Bulletin of the Bank of Poland, Central Statistical Office, Statistical News.

Local Government debt data: Statistisches Reichsamt (1939/40) on 31 March between 1926 and 1938 in millions of Zloty. The data covers all local public bodies.


A.4.24 Sweden

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 133 in millions of Kroner on 31 December 1914-1922 and 30 June 1923-28. The original figures of domestic long-term includes foreign debt starting from 30 June 1923. I have separated the two using foreign debt figures on 31 December of the same year. The foreign debt was converted into kronor at parity and consists solely of bonds in the hands of creditors resident abroad. The fall in foreign debt is partially due to repayments and repurchases by Swedish residents. The debt service represents total budgetary expenditure. Original sources: Closed Accounts, Year-books of the National Debt Office (Riksgaeldskontoret), Statistical Year-books of Sweden.

Local Government debt data: Statistisches Reichsamt (1939/40) on 31 December between 1926 and 1935 in millions of Kroner. The data covers municipalities and provinces.


A.4.25 Switzerland

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 137 in millions of Francs on 31 December 1914-1938. The original figures for the public debt are those of the confederation, excluding the debt of the Cantons and the federal railways debt. I have included the railways debt. The debt service figures do not include railway debt. Administrative costs are included in redemptions up to 1923 and in interest payments from 1924. The debt service expenditure is charged against ordinary revenues (excluding expenditure from loan proceeds). Original source: Comptes d’Etat, Statistical Year-books of Switzerland.

Local Government debt data: Statistisches Reichsamt (1936b) between 1925 and 1935 in millions of Francs. The data covers the Swiss cantons and municipalities.


A.4.26 United Kingdom

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 147 in millions of Pounds on 31 March 1914-1938. The aggregate liabilities of the state do not include the funding loan and victory bonds tendered for death duties but not yet cancelled. The foreign debt is shown at par. The debt service includes not only appropriation from revenue but also interest payments on national savings.
certificates paid in excess of the provision in the permanent debt change and interest met from receipts under section 1 (5) (b) of the defence loan act, 1937. Payments on the war debt of 1914-1918 have been suspended completely since 1934. Original source: Finance Accounts of the United Kingdom.

Local Government debt data: Statistisches Reichsamt (1939/40) on 31 March between 1926 and 1936 in millions of Pounds. The data covers England, Wales and Northern Ireland, but not Scotland.


A.4.27 Uruguay

Central Government debt - long-term, short-term, foreign - and debt service data: United Nations (1948) page 154 in millions of Pesos on 31 December 1914-1938. The domestic debt includes the so-called “international debt”, consisting of two Brazilian issues, which are payable in Uruguayan Pesos and are held in Uruguay. No information is available for short-term debts between 1914 and 1928. The foreign debt was converted at old parity rates (4.7 Pesos=£1, 0.966 Pesos =$1, 0.1865 Pesos=1 gold Franc). In 1915 the redemption of the the foreign debt was suspended in agreement with the bondholders. In 1916, it was agreed to prolong the suspension until one year after the war. Redemption of the foreign debt was again suspended on 20 January 1931 and resumed partially on 1 January 1937 and completely on 1 January 1939. Domestic debt payments were suspended on 1 November 1932 and resumed on 27 February 1937. I have added/substracted exchange losses to the debt service in order to improve comparability. Original sources: Deuda Publica Nacional. Anuario Estadistico.

Local Government debt data: the figures from 1928 to 1933 are from Moody’s (1935) and from 1936 to 1928 from Statistisches Reichsamt (1939/40). The debt is recorded on 31 December in millions of Pesos.


A.5 Alternative data sources

Moody’s manuals offer an excellent opportunity to cress check the data collected from other sources. While the manuals do not generally offer time series that are as complete and systematic as the German sources and the League of Nations, they contain a huge amount
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<td>total debt/GDP</td>
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<td>-0.143</td>
<td>-0.492*</td>
<td>-0.110</td>
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<td></td>
<td>(0.175)</td>
<td>(0.0997)</td>
<td>(0.207)</td>
<td>(0.103)</td>
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<td>foreign debt/total debt</td>
<td>0.773**</td>
<td>0.701**</td>
<td>1.401*</td>
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<td></td>
<td>(0.272)</td>
<td>(0.233)</td>
<td>(0.519)</td>
<td>(0.508)</td>
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<td>short term debt/total debt</td>
<td>0.472*</td>
<td>1.040**</td>
<td>1.170*</td>
<td>2.088**</td>
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<td></td>
<td>(0.224)</td>
<td>(0.169)</td>
<td>(0.433)</td>
<td>(0.531)</td>
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<td>longgold</td>
<td>-0.285</td>
<td>-0.287</td>
<td>-0.287</td>
<td>-0.361*</td>
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<td></td>
<td>(0.166)</td>
<td>(0.148)</td>
<td>(0.155)</td>
<td>(0.157)</td>
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<td>banking crisis pre 1931/default</td>
<td>-0.601*</td>
<td>-0.394*</td>
<td>-0.688**</td>
<td>-0.464*</td>
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<td></td>
<td>(0.261)</td>
<td>(0.162)</td>
<td>(0.241)</td>
<td>(0.179)</td>
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<td>ln(gdp/cap1928)</td>
<td>0.342*</td>
<td>0.194</td>
<td>0.452*</td>
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<td>(0.130)</td>
<td>(0.0971)</td>
<td>(0.171)</td>
<td>(0.141)</td>
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<td>average polity score 1929-36/default</td>
<td>-0.0321*</td>
<td>-0.0342*</td>
<td>-0.0327*</td>
<td>-0.0425**</td>
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<td>(0.0146)</td>
<td>(0.0143)</td>
<td>(0.0140)</td>
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<td>standard deviation polity score 1927-36/default</td>
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<td>-0.0510</td>
<td>-0.0757</td>
<td>-0.0828</td>
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<td>(0.0277)</td>
<td>(0.0299)</td>
<td>(0.0385)</td>
<td>(0.0406)</td>
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<td>lagged 1931 trade/trade 1929</td>
<td>-1.011*</td>
<td>-1.234</td>
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<td></td>
<td>(0.480)</td>
<td>(0.640)</td>
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<td>1928 trade/GDP</td>
<td>-1.046</td>
<td>-2.049*</td>
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<td></td>
<td>(0.700)</td>
<td>(0.967)</td>
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<td>%change in deficit 1929-31</td>
<td>-0.00616</td>
<td>-0.0262</td>
<td>-0.00252</td>
<td>-0.0297**</td>
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<td>(0.0152)</td>
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<td>South America</td>
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<td>0.0366</td>
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<td>(0.150)</td>
<td>(0.167)</td>
<td>(0.201)</td>
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<td>Australia</td>
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<td>-0.0375</td>
<td>-0.424</td>
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<td>(0.151)</td>
<td>(0.197)</td>
<td>(0.214)</td>
<td>(0.295)</td>
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<tr>
<td>lagged trade/trade 1929</td>
<td>0.0887</td>
<td></td>
<td>0.441</td>
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<td>(0.346)</td>
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<td>lagged trade/GDP</td>
<td>-0.342</td>
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<td>-0.917</td>
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<td></td>
<td>(0.810)</td>
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<td>(1.160)</td>
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<td>Constant</td>
<td>-0.850</td>
<td>-1.032</td>
<td>-1.282</td>
<td>-1.545</td>
</tr>
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<td></td>
<td>(0.805)</td>
<td>(0.774)</td>
<td>(0.864)</td>
<td>(1.166)</td>
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<tr>
<td>Observations</td>
<td>41</td>
<td>41</td>
<td>41</td>
<td>41</td>
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<tr>
<td>R-squared</td>
<td>0.889</td>
<td>0.859</td>
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Table 10: Expanding the analysis: new data

The cross checking of the data is a very labour intensive activity given that, as mentioned the data in the Moody’s manuals is quite scattered, and is currently still under way.

The local debt debt has been carefully cross-checked whenever possible thanks to the sometimes substantial overlap between different sources. the picture is that of general agreement between the different sources.

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o information that the agency used for its own ratings [Gaillard, 2012] and thus was very careful in collecting.

The cross checking of the data is a very labour intensive activity given that, as mentioned the data in the Moody’s manuals is quite scattered, and is currently still under way.

The local debt debt has been carefully cross-checked whenever possible thanks to the sometimes substantial overlap between different sources. the picture is that of general agreement between the different sources.
B Further regression analysis

B.0.1 Expanding the analysis: new data

B.0.2 Expanding the analysis: new data and methodology

In this section, I expand the analysis along two dimensions. On one side, I include my newly collected data which turns out to be key for the estimation. On the other, I employ a more flexible pooled specification that allows me to make full use of the sample: Poland is now included in the analysis and so are all available observations between 1927 and 1936.\footnote{For completeness’ sake, I also run a regression with the same specification as the previous section and the new data. This is presented in Appendix.\footnote{Erce argues that countries with a weak banking sector tend to avoid internal rather than external defaults. However, here dollar bonds could still be held by domestic banks, since many countries do not report the debt based on the domicile of the owner, but rather the place or currency of issue.}}

The explanatory variables are introduced with a lag and the lagged dependent variable is used as a regressor. As explained in detail above, this allows me to control for state-dependence and omitted variable bias.

The estimating equation takes the following form.

\[ \text{defaults}e_{i,t} = \gamma \text{defaults}e_{i,t-1} + \mathbf{x}_{i,t}\beta + \epsilon_{i,t} \tag{2} \]

The main changes with the previous specification in terms of data are as follows. First of all, I include the lagged total debt as a control. This includes both internal and external debts of the central government and of the local public authorities. This makes the debt levels more comparable than in the previous case since it captures, for all countries, the general debt as opposed to a portion of it, which could furthermore be influenced by different accounting standards and conventions. Unfortunately, no distinction between foreign and internal debt is available at the sub-national level and the foreign debt is not divided into long and short-term portions. For this reason, the lagged foreign debt share in the total central government debt and the lagged short-term share in the domestic central government debt are employed as proxies for the total foreign and short-term shares respectively.

I also include a lagged “on gold” dummy in order to study whether the possibility that leaving the Gold Standard constituted a complement or alternative to default. As in Wolf (2008), I consider a country to have left the Gold Standard in case it either devalues and/or introduces exchange controls, whichever comes sooner. I further include a dummy that indicates whether a banking crisis took place in the 5 preceding years (also lagged). This is to test whether the suggestions by Erce (2012) that a weak banking sector might make a country more reluctant to default due to the fact that banks tend to hold large amounts of government bonds\footnote{Erce argues that countries with a weak banking sector tend to avoid internal rather than external defaults. However, here dollar bonds could still be held by domestic banks, since many countries do not report the debt based on the domicile of the owner, but rather the place or currency of issue.} Moreover, banks might be harmed by external defaults through their ties with foreign banks and other financial institutions.

I introduce a control for the lagged natural logarithm of the per capita GDP. This is done to see if richer countries systematically differ from poor ones. Finally, I control for the level of democratic rule in the country as proxied by the lagged polity2 score constructed
by [Marshall and Jaggers (2005)] to investigate whether more democratic societies were less likely to default even after controlling for other political and economic characteristics.

The results are presented in Table 11. In this part of the analysis, the focus should be placed on variables with a low (or zero) variability over time. Due to the introduction of fixed effects in the panel data estimation below, these variables are subject to a drastic reduction in their variability and the precision of their estimation is greatly reduced, potentially leading to statistically significant coefficients being reported as insignificant (this would be the case for variables such as the “on gold” and “banking crisis” dummies, for example). Moreover, variables such as institutional quality, credit-worthiness and openness can be proxied through time varying-variables as I do here, but their effect is likely to be captured by the country fixed-effects. For strongly time-varying variables and non-inherent country characteristics, the relevant analysis is the one carried out in Section 5.2.2 below.

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<tr>
<td>lagged default size</td>
<td>-0.0212</td>
<td>-0.0197</td>
<td>-0.390</td>
<td>-0.633</td>
</tr>
<tr>
<td>(0.0147)</td>
<td>(0.0172)</td>
<td>(0.443)</td>
<td>(0.460)</td>
<td></td>
</tr>
<tr>
<td>lagged total debt/GDP</td>
<td>0.0959</td>
<td>0.0978</td>
<td>0.632</td>
<td>0.495</td>
</tr>
<tr>
<td>(0.0526)</td>
<td>(0.0533)</td>
<td>(0.337)</td>
<td>(0.296)</td>
<td></td>
</tr>
<tr>
<td>lagged foreign debt/total debt</td>
<td>0.0718</td>
<td>0.0729</td>
<td>0.0410</td>
<td>0.389</td>
</tr>
<tr>
<td>(0.0992)</td>
<td>(0.0997)</td>
<td>(0.489)</td>
<td>(0.529)</td>
<td></td>
</tr>
<tr>
<td>lagged on gold</td>
<td>-0.0619*</td>
<td>-0.0353</td>
<td>-1.168**</td>
<td>-1.070**</td>
</tr>
<tr>
<td>(0.0278)</td>
<td>(0.0285)</td>
<td>(0.437)</td>
<td>(0.406)</td>
<td></td>
</tr>
<tr>
<td>lagged banking crisis</td>
<td>-0.00363</td>
<td>-0.0134</td>
<td>-0.0549</td>
<td>-0.213</td>
</tr>
<tr>
<td>(0.0207)</td>
<td>(0.0235)</td>
<td>(0.226)</td>
<td>(0.222)</td>
<td></td>
</tr>
<tr>
<td>lngdpcc1928</td>
<td>0.00743</td>
<td>-0.00158</td>
<td>-0.461</td>
<td>-0.184</td>
</tr>
<tr>
<td>(0.0301)</td>
<td>(0.0287)</td>
<td>(0.307)</td>
<td>(0.207)</td>
<td></td>
</tr>
<tr>
<td>lagged polity score</td>
<td>-8.83e-05</td>
<td>-6.03e-06</td>
<td>0.00285</td>
<td>-0.00168</td>
</tr>
<tr>
<td>(0.00264)</td>
<td>(0.00259)</td>
<td>(0.0217)</td>
<td>(0.0182)</td>
<td></td>
</tr>
<tr>
<td>standard deviation polity score 1927-36/default</td>
<td>5.06e-05</td>
<td>-0.00115</td>
<td>0.0750</td>
<td>0.0158</td>
</tr>
<tr>
<td>(0.00427)</td>
<td>(0.00831)</td>
<td>(0.0537)</td>
<td>(0.0582)</td>
<td></td>
</tr>
<tr>
<td>lagged 1931 trade/trade 1929</td>
<td>-0.0617</td>
<td>0.684</td>
<td>(0.761)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0959)</td>
<td></td>
<td>(0.761)</td>
<td></td>
</tr>
<tr>
<td>1928 trade/GDP</td>
<td>-0.266*</td>
<td>-0.256*</td>
<td>-3.204*</td>
<td>-4.099*</td>
</tr>
<tr>
<td>(0.111)</td>
<td>(0.113)</td>
<td>(1.573)</td>
<td>(1.797)</td>
<td></td>
</tr>
<tr>
<td>lagged %change in deficit w/r 1929</td>
<td>0.000178</td>
<td>-0.000454</td>
<td>0.0111</td>
<td>-0.0103</td>
</tr>
<tr>
<td>(0.000732)</td>
<td>(0.000771)</td>
<td>(0.0166)</td>
<td>(0.0264)</td>
<td></td>
</tr>
<tr>
<td>GDP change over 1929</td>
<td>-0.228</td>
<td>-0.148</td>
<td>-3.986*</td>
<td>-2.724</td>
</tr>
<tr>
<td>(0.164)</td>
<td>(0.146)</td>
<td>(1.747)</td>
<td>(1.408)</td>
<td></td>
</tr>
<tr>
<td>South America</td>
<td>0.0184</td>
<td>0.0278</td>
<td>0.00420</td>
<td>0.158</td>
</tr>
<tr>
<td>(0.0439)</td>
<td>(0.0435)</td>
<td>(0.254)</td>
<td>(0.215)</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>-0.0532</td>
<td>-0.0290</td>
<td>-2.024</td>
<td>-2.075</td>
</tr>
<tr>
<td>(0.0291)</td>
<td>(0.0299)</td>
<td>(0)</td>
<td>(0)</td>
<td></td>
</tr>
<tr>
<td>lagged trade/trade 1929</td>
<td>-0.118**</td>
<td>-0.967*</td>
<td>(0.465)</td>
<td></td>
</tr>
<tr>
<td>(0.0448)</td>
<td>(0.0448)</td>
<td>(0.465)</td>
<td>(0.465)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.326</td>
<td>0.357</td>
<td>7.304*</td>
<td>5.622*</td>
</tr>
<tr>
<td>(0.225)</td>
<td>(0.217)</td>
<td>(3.403)</td>
<td>(2.637)</td>
<td></td>
</tr>
</tbody>
</table>

Observations: 214
R-squared/pseudo R-squared: 0.830 0.833 0.7390 0.7500
Robust standard errors in parentheses
** p<0.01, * p<0.05

Table 11: Expanding the analysis: flexible specification
The results in Table 11 indicate that default is highly persistent, an expected result that is confirmed and discussed in more detail in the next section. More relevant for this section of the paper, is the finding that countries that were on Gold were less likely to default (the coefficient is insignificant in column 2). In other words, it would appear that the decision to leave the Gold Standard by introducing exchange controls and/or devaluing opened the way for default, and was thus a complement rather than a substitute for default. The reason why this is the case is quite straightforward: defaulting while still being tied to Gold and, especially, while having no capital or exchange controls would lead to massive capital flight. Consistently with this finding, Mitchener and Wandschneider (2014) have recently provided evidence that avoiding capital flight following external default was the key driver, together with trade restriction, of the decision to employ capital controls. By studying the German default, Papadia and Schioppa (2014) also find that capital controls were a prerequisite for a full external default. They argue that the introduction of capital controls in 1931 and their strengthening over the course of the decade were used to disrupt the functioning of secondary markets for German foreign debt, thus severely limiting the repurchase of the debt securities by German citizens.

I furthermore find that more open countries (countries that had a larger share of trade in their GDP in 1928) were less likely to default. The result is very intuitive and in agreement with both economic theory and previous empirical studies for different time-periods. Trade sanctions and other indirect consequences of default leading to a reduction in commercial and financial exchanges (e.g. foreign direct investment) with foreign countries have been often used in models trying to explain why countries would ever want to repay their foreign debts. Openness has also been empirically linked to the reason why countries would want to avoid default (Hernandez-Trillo, 1995; Rose, 2005; Martinez and Sandleris, 2011). Countries with a larger international sector have more to lose from being partially or totally cut off from international exchanges following default, and should therefore be expected to be less willing to do so.

The results are also interesting for what they do not find. For this interwar period sample, banking crises do not appear to be linked to external default in a causal manner. The hypothesis was that countries that experienced a banking crisis, would be less willing to default fearing repercussions for their banking system. Erce (2012) argues that this should be the case if banks hold a large amount of public debt. It is well known that in the 1930s there was substantial repatriation of foreign debt during the Great Depression, but this took place mostly after defaults and was severely limited by the introduction of exchange controls. This would suggest that domestic banks did not hold large amounts of the governments’ foreign currency debt. This could explain the lack of significance of the banking crisis coefficient which, in any case, has the expected sign in all specifications, but is very imprecisely estimated.

I furthermore find that the polity score coefficient is not significant. Other studies on the effect of democracy on defaults offer contradictory results (Tomz and Wright, 2013). Some find that “voters would punish incumbents for defaulting on the foreign debt,” leading to democracies being less prone to default (Tomz and Wright, 2013). At the same time,
democratic leaders may be less willing to impose the pain of austerity needed to service the foreign debt (through higher taxes and the contraction of imports) fearing the consequences of these at the urns. With the result possibly going both ways, it is unsurprising that empirical research finds mixed results, with this study being no exception.

Finally, I find that richer countries did not systematically differ from poorer ones once other variables are controlled for - the coefficient on the natural logarithm of the GDP per capita in 1928 ($\ln(gdp_{pc1928})$) is insignificant - and that this more complete specification eliminates the residual explanatory power of the Australia and South America dummies.

There are some additional significant results, namely that countries that experienced a smaller fall in their GDP compared to 1929 were less likely to default (column 3) and that countries that experienced a smaller fall in their trade also compared to 1929 were less likely to default (column 2 and 4). These results are very intuitive, but only the one relating to GDP is confirmed by the panel regressions carried out in the next section. I am therefore skeptical of the robustness of the trade result, since it refers to variables with a high degree of variability over time and should not be subject to the same problems in panel estimations discussed above.