Foreign Debt and Secondary Markets: Lessons from Interwar Germany*

Andrea Papadia
LSE
Ph.D. Candidate in Economic History
e-mail: a.papadia@lse.ac.uk

Claudio A. Schioppa
ECARES - ULB
Ph.D. Candidate in Economics
e-mail: claudio.schioppa@ulb.ac.be

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Abstract
Recent advances in sovereign risk theory have suggested that secondary market activity can act as an enforcement mechanism for foreign debt and help advert defaults. We show this mechanism in action by revisiting a little-explored aspect of German economic history in the interwar period: the large repurchases of foreign debt carried out by German citizens and companies between 1931 and 1939. We support our interpretation of the episode with empirical evidence from both primary and secondary sources. The econometric analysis is based on a unique dataset of weekly prices of German bonds traded in New York between 1930 and 1940 and an electronically available dataset of weekly bond prices in the Berlin Stock Exchange for the same period. By identifying structural breaks in these series, we show that German and foreign investors faced different probabilities of repayment, which were decisively influenced by the possibility of trading on secondary markets. We also conclude that, far from encouraging the buyback activity, the German governments, which succeeded each other throughout the decade, kept it under strict control in order to enjoy some of its benefits, while avoiding detrimental macro effects for the German economy and their policy objectives. Unrestrained debt repurchases would have led to excessive debt repayment and welfare losses, while carefully managed ones were an important tool in reaching specific micro goals such as the subsidisation of exports, profit boosting and debt reduction for key industries, companies and individuals.

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Keywords: Germany, Structural Breaks, Financial Markets and the Macroeconomy,

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International Lending and Debt Problems, International Conflicts; Negotiations; Sanctions; Asset Pricing; Bond Interest Rates; Debt; Debt Management; Sovereign Debt
Foreign Debt and Secondary Markets: Lessons from Interwar Germany

[... ] the Schachtian policy of buying back un-serviced loans below par contributed to crushing Germany’s moral standing with the creditors.

Hermann Josef Abs, 1953

He [Hermann Josef Abs] bought back some of the external German debt (Kreuger loan) and made a large arbitrage profit (the difference between the very low price of German debt abroad, and its face value price within Germany) on the deal on his own account.

1 Introduction

The question of why a country should repay its foreign debts has been addressed in depth in the economic literature. Reputation, trade sanctions, access to the international capital market and repercussions on the domestic political and economic environment have all been put forward as factors that might induce a country to honor its debts. A well known fact in this area of International Finance is that when a country’s debt is held by its own citizens, the perceived risk of default is generally low. The cases of Japan and - until recently - Italy have often been cited as examples of large sustainable public debts mostly owned by the countries’ citizens. Insights from the aforementioned literature in combination with this stylized fact are behind recent advances in sovereign risk theory which are due to the work of Broner, Martin, and Ventura (2008, 2010) - hereafter BMV. Their studies take a dynamic approach to debt ownership and sustainability by showing how secondary market activity can reduce the risk of default by allowing foreign debt-holders and the citizens of the debtor country to trade in assets.

1Klug (1993) page 54, from Schwarz (1982) page 60. Herman Josef Abs was the German negotiator at the 1953 London Agreement on German Debt.
2James (2004) page 59. During the 1930s, when these transactions took place, Abs was a director at Deutsche Bank.
3See Panizza, Sturzenegger, and Zettelmeyer (2009) for a review of the recent literature.
BMV argue that, whenever a sovereign crisis ensues and a country’s debts are traded on well-functioning secondary markets, citizens of the debtor country have an incentive to repurchase them, while foreign creditors have an incentive to sell them. The reason is that the debtor government’s incentive to default or repudiate the country’s obligations disappears - or weakens substantially - when the debt is owned by domestic citizens, which translates into a high probability of full repayment for domestic creditors. The government’s incentive to default changes with debt ownership because when the debt is held internally, a default only implies a redistribution of income, while when the debt is owned by foreigners, not enforcing payments leads to a net welfare gain in terms of foregone transfers abroad. As a result of this mechanism, domestic and foreign investors value the debt differently and well-functioning secondary markets allow asset trade between them thus lowering the probability of default. From the point of view of the debtor country as a whole, the buybacks are beneficial ex-ante because they allow the existence of asset trade between countries. However, they are inefficient ex-post, since they reduce overall welfare by forfeiting the possibility of imposing a loss on foreign creditors. For this reason, debtor governments might try and interfere with the functioning of secondary markets and make buybacks difficult.

We show this mechanism in action in interwar Germany. As the country’s debt crisis became acute in the early 1930s - due to both political instability and economic woes - a differential opened up between the price of German bonds (both public and private) traded in Germany and in financial centres abroad (Figure 1).\footnote{Source: IFK, Jahrstatistiches Handbuch 1933 & 1936. In 1931, the Berlin stock exchange was only open between the 1st of January and the 12th of July and from the 3rd to the 18th of August. The trading started again in April 1932. In March 1935, the interest rate of the 6% bonds traded in Berlin was reduced to 4.5%.} The spread indicates that the value of the German debt was different depending on the domicile of the creditor. The price differential, in turn, fuelled the practice of debt repurchases, often by individuals and entities different from the original issuer (Klug, 1993). The debt purchased abroad at a discount could then be sold at home for a much higher price. In other words, there was room for large, riskless arbitrage profits.

However, as foreseen in BMV’s framework, the practice of repurchasing foreign debt was soon put under strict control by the German authorities. Between July and August 1931, Germany’s central bank - the Reichsbank - introduced exchange controls in order...
to curb capital flight (Bonnel, 1940; Childs, 1958; James, 1985). This measure meant that foreign exchange was made available to private individuals and companies in limited amounts and for purposes agreed upon with the authorities. Among the purposes for which foreign exchange was allocated, there was the repurchase of German foreign debt abroad in the form

Figure 1: The index price of German bonds in Berlin and New York.
of bonds and blocked accounts. Klug (1993) interpreted this as an encouragement by the authorities to engage in the practice. As highlighted by Childs (1958), however, given the large price differentials of German bonds and the potential arbitrage profits to be made, this encouragement was hardly necessary. The restriction on the availability of foreign exchange and the strict control of its use by the German authorities were, instead, stumbling blocks for the activity which, in turn, caused the persistence of the price differential.

At the same time, debt buybacks were used as a policy tool by the German authorities and eventually amounted to around 4 billion Reichsmarks, making the episode one of the largest documented in history. Contemporaries discussed these events widely, but were unable to fully grasp their size. More recently, they have been revisited in connection with the practice of exchange controls, which characterised German foreign economic policy during the 1930s, most notably by James (1985). Klug (1993) is the only author to have dedicated a detailed economic analysis to the episode. He interpreted it as a mixed policy of debt overhang reduction and export promotion. While the latter interpretation has a long pedigree dating back to contemporary commentators, the former was previously only briefly discussed by James. This view of the episode rests on the interpretation of buybacks as a coordinated action by a country aimed at reducing its debt overhang, which gained prominence among economists during the 1980s debt crisis. Klug compellingly argued that the subsidisation of exports was not likely to be a strong enough motif for the involvement of the German authorities in such an extensive buyback practice. However, if any reduction in the market value of German debt was achieved, it was minimal, as Klug himself shows. This is due to the fact that, as highlighted by Bulow and Rogoff (1988) in a seminal paper, debt repurchases raise the market value of residual debt, thus offsetting the decrease in its face value. In BMV’s framework, instead, buybacks arise naturally as a private initiative due to the different valuation of debt. Our suggestion - that debt buybacks were used to accrue benefits to specific individuals and organizations, not as a systematic macro tool for debt reduction or export subsidization - is fully compatible with this latter view. While unrestrained debt repurchases would have been detrimental to Germany, tightly controlled ones could achieve

5See for example Balogh (1938); Bonnel (1940); Ellis (1941); Einzig (1934); Harris (1935); Heuser (1934)

6Some prominent examples of this literature are: Bulow and Rogoff (1988, 1991); Froot (1989); Kenen (1991); Krugman (1988, 1989); Sachs (1988a,b)
Providing empirical support for our interpretation of the episode is no trivial matter. The motivations that pushed German citizens to repurchase the debt cannot be observed. The same is true for the incentives of foreign investors and German authorities. Although a wealth of historical documents exists, these need to be treated with great care: secrecy, lack of cooperation and double-dealing were defining characteristics of international relations during the interwar period. The internal political situation in Germany was no better, especially after the rise to power of the Nazis. For these reasons, the strategy employed in this paper is to carry out an econometric analysis based on the prices of German debt in Berlin and New York. The data are informative, available at high frequency (weekly) and likely to be free from direct manipulation. Our analysis of the price of German government bonds in these two financial centers supports our theoretical framework and historical reconstruction. We estimate point estimates structural breaks and assign them a precise time horizon by constructing asymmetric confidence intervals. We then connect these breaks to significant political or economic events, finding that restricting access of German citizens to secondary markets had a strong adverse effect on bond prices, on the same footing as events such as the beginning of World War II.

To sum up, the framework presented in this paper is able to explain why the buybacks started in Germany in 1931 as a private initiative. It is further able to explain the behaviour of the German government who was only apparently promoting them, but de facto restricting in them in order to pursue its policy objectives. Finally, it explains the reason for the appearance and persistence of the price differential between German bonds at home and abroad. It therefore contributes to both the literature on this specific episode and to the literature on sovereign debt and international financial markets in general.

The rest of the paper is organized as follows. Part 2 provides some historical context. Part 3 introduces the theoretical model through which we interpret the buyback episode and Part 4 presents our data as well as additional descriptive statistics. Part 5 presents our econometric strategy and the results of the analysis, while Part 6 summarizes our arguments by connecting theory and evidence. Part 7 concludes.
2 Historical Context

2.1 The debt stockpile: reparations and borrowing in the 1920s

The exact burden of war reparations imposed on Germany was not established by the post World War I settlement of the Treaty of Versailles. Even after the London Schedule of Payments of 1921 - which formally established Germany’s obligations for the first time - uncertainty remained as to how much Germany would eventually have to pay. Schuker (1988) recounts how reparation payments were divided into three tranches: A, B and C. While it was fairly clear that the first two tranches would constitute part of the final reparation burden, the C tranche - which was of considerable size - was never effectively billed to Germany, but hovered in the air for most of the interwar period. Additionally, during the 1920s the German economy borrowed heavily on international capital markets thus accumulating a huge external debt. Germany’s principal creditor was the United States of America so that Schuker called this lending American ”Reparations” to Germany.

<table>
<thead>
<tr>
<th>Creditor country</th>
<th>Debt share</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>41.72%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>16.96%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>12.96%</td>
</tr>
<tr>
<td>England</td>
<td>12.94%</td>
</tr>
<tr>
<td>France</td>
<td>4.79%</td>
</tr>
<tr>
<td>Bank for International Settlements</td>
<td>3.49%</td>
</tr>
<tr>
<td>Italy</td>
<td>0.69%</td>
</tr>
</tbody>
</table>

(a) by creditor country

<table>
<thead>
<tr>
<th>Debtor sector</th>
<th>Debt share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>61.68%</td>
</tr>
<tr>
<td>Public bodies</td>
<td>16.38%</td>
</tr>
<tr>
<td>Banks</td>
<td>15.35%</td>
</tr>
<tr>
<td>Reichsbank and Goldiskontbank</td>
<td>3.67%</td>
</tr>
<tr>
<td>Private citizens</td>
<td>2.41%</td>
</tr>
<tr>
<td>Insurance companies</td>
<td>0.40%</td>
</tr>
<tr>
<td>School, churches etc.</td>
<td>0.11%</td>
</tr>
</tbody>
</table>

(b) by debtor sector

Table 1: Total German foreign commercial debt, November 1931

Data collected from archival sources\(^7\) gives us a snapshot of the nature and composition of German foreign commercial debts at the end of November 1931 (Table 1 and 2). As men-

\(^7\)Source: Bank of England Archive OV34/69 - Die Auslandsverschuldung Deutschlands nach dem Stande von 30. November 1931
tioned, the USA was the principal German creditor, with holdings of over 40% of the total foreign commercial debt. England, The Netherlands, Switzerland, France and the Bank for International Settlements also had significant holdings. Germany’s industry was the principal debtor in the country, accounting for almost 62% of total foreign debts. The Public Sector and Banks accounted for around 16% and 15% respectively. A large share - around 46% - of German foreign commercial debt was short term (with a maturity of less than a year) with the rest divided between medium term - around 4% - and long term - around 50%. The geographical distribution of this short-term debt was quite different from the long term one, with the USA playing a less important role and the debt more evenly distributed across the other principal creditors. The industrial sector played a slightly smaller role in short-term borrowing while the banks’ share was higher than that of overall debt.

<table>
<thead>
<tr>
<th>Creditor country</th>
<th>Debt share</th>
<th>Debit sector</th>
<th>Debt share</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>27.02%</td>
<td>Industry</td>
<td>53.00%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>17.26%</td>
<td>Public bodies</td>
<td>25.97%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>16.30%</td>
<td>Banks</td>
<td>8.34%</td>
</tr>
<tr>
<td>England</td>
<td>14.04%</td>
<td>Reichsbank and Goldiskontbank</td>
<td>7.52%</td>
</tr>
<tr>
<td>Bank for International Settlements</td>
<td>7.52%</td>
<td>Private citizens</td>
<td>4.58%</td>
</tr>
<tr>
<td>France</td>
<td>5.41%</td>
<td>Insurance companies</td>
<td>0.47%</td>
</tr>
<tr>
<td>Italy</td>
<td>0.76%</td>
<td>School, churches etc.</td>
<td>0.12%</td>
</tr>
<tr>
<td>Other countries</td>
<td>11.69%</td>
<td>(a) by creditor country</td>
<td>(b) by debtor sector</td>
</tr>
</tbody>
</table>

Table 2: German foreign short-term commercial debt, November 1931

German commercial foreign debt was issued in a variety of currencies, but the US Dollar was by far the principal currency of denomination (Table 3). Around 50% of the debt was issued in the US currency, 12% in British Pounds, 11% in Reichsmarks, 10% in Swiss Francs and 9% in Dutch Florins.

Ritschl (2012a) argues that the Dawes Plan signed in 1924 was one of the triggers for Germany’s heavy borrowing during the course of the decade. The plan was intended to provide some relief to a country that was slowly coming out of an economic and political
<table>
<thead>
<tr>
<th>Currency</th>
<th>Debt share</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Dollar</td>
<td>50.0%</td>
</tr>
<tr>
<td>Pound Sterling</td>
<td>11.8%</td>
</tr>
<tr>
<td>Reichsmark</td>
<td>10.7%</td>
</tr>
<tr>
<td>Swiss Franc</td>
<td>9.7%</td>
</tr>
<tr>
<td>Dutch Florint</td>
<td>9.2%</td>
</tr>
<tr>
<td>French Franc</td>
<td>3.6%</td>
</tr>
<tr>
<td>Other currencies</td>
<td>4.9%</td>
</tr>
</tbody>
</table>

Table 3: German foreign commercial debt by currency of issue, November 1931

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP</th>
<th>Commercial Debt</th>
<th>Reparations</th>
<th>Total Debt</th>
<th>Comm. Debt</th>
<th>Comm. Debt/GDP</th>
<th>Tot. Debt/GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>89.05</td>
<td>27</td>
<td>40</td>
<td>67</td>
<td>30.3%</td>
<td>75.2%</td>
<td></td>
</tr>
<tr>
<td>1929</td>
<td>89.25</td>
<td>31</td>
<td>46</td>
<td>77</td>
<td>34.7%</td>
<td>86.3%</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>82.93</td>
<td>32.6</td>
<td>35</td>
<td>67.6</td>
<td>39.3%</td>
<td>81.5%</td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>69.15</td>
<td>33.6</td>
<td>34</td>
<td>67.6</td>
<td>48.6%</td>
<td>97.8%</td>
<td></td>
</tr>
<tr>
<td>1932</td>
<td>56.44</td>
<td>25.9</td>
<td>25.9</td>
<td>45.9%</td>
<td>45.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1933</td>
<td>57.72</td>
<td>23.2</td>
<td>23.2</td>
<td>40.2%</td>
<td>40.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1934</td>
<td>64.38</td>
<td>18.1</td>
<td>18.1</td>
<td>28.1%</td>
<td>28.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td>71.75</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1936</td>
<td>79.65</td>
<td>16.4</td>
<td>16.4</td>
<td>20.6%</td>
<td>20.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1937</td>
<td>89.11</td>
<td>14.8</td>
<td>14.8</td>
<td>16.6%</td>
<td>16.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1938</td>
<td>99.19</td>
<td>13.9</td>
<td>13.9</td>
<td>14.0%</td>
<td>14.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: German foreign debt, billions of Reichsmarks

The crisis epitomised by the hyperinflation. This international agreement featured the issue of bonds with maturity in 1949, the proceeds of which went to Germany in order to help it keep monetary stability and meet reparation payments (Piet, 2004). More importantly, however, Ritschl argues that the Dawes Plan made reparation payments de facto junior with respect to commercial debts. This created a moral hazard issue, which incentivised international lenders to provide loans to German companies and public bodies, confident that
their claims would be senior to reparations. At the same time, the moral hazard applied to the German counterparts, who found it very convenient to borrow abroad. Ritschl further argues that this regime was eventually reversed by the Young Plan, drafted and adopted between 1929 and 1930, which re-established the seniority of reparations with respect to commercial debts. This contributed to plunging Germany in economic chaos by causing a sudden stop as commercial creditors saw their claims endangered. By that time, foreign commercial debts had reached the astronomical level of 32.6 billion Reichsmarks (Table 4). With the inclusion of reparations, Germany’s foreign debt amounted to 67.6 billion Reichsmarks, or 81.5% of GDP. Mainly due to a sharp fall in GDP, the foreign debt to GDP ratio reached its peak at the end of 1931 exceeding 100% (Ritschl, 2012b).

2.2 The many guises of default: German economic policy in the 1930s

In the summer of 1931, the Reichsbank - under the rule of Hans Luther - ratified exchange controls, in order to curb capital flight (Bonnel, 1940; Childs, 1958; James, 1985). The matter was intricate from the start, and exchange controls regulations were changed countless times. Following their informal adoption in July 1931, they led to "three general exchange-control laws, upwards of 50 separate decrees of amendment and adaptation, and something in the neighborhood of 500 administrative rulings, to say nothing of clearing, compensation, and payment agreements with partner countries"8. The principal feature of this legislation was the fact that foreign exchange would be made available to private individuals and companies in limited amounts and for purposes agreed upon with the authorities. The allocation of foreign currency was established based on the requirements of the previous year.9 This arrangement lasted until 1934 (James, 1985), when even stricter controls on the use of foreign exchange for buybacks were established (Klug, 1993).

At the international level, Germany’s economic, financial and political chaos was reflected

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8Ellis (1940), page 9.
9In particular, in November 1931, it was established that 75% of previous year’s requirements of foreign exchange would be allocated. In March 1932, the share was lowered to 35% and successively raised to 50% (Klug, 1993).
in a series measures aimed at giving temporary relief to German debtors. On the 21st of June 1931, US president Hoover introduced a one-year moratorium on German intergovernmental debts and reparations. The Reichsbank was provided with a $100 million emergency loan from the Bank of International Settlements, the Bank of England, the Bank of France and the Federal Reserve Bank of New York. In addition, the first Standstill Agreement - signed in August 1931 - meant that approximately 6.3 billions Reichsmarks of German short-term debts were frozen. Finally, the Lausanne Conference of July 1932 virtually put an end to reparation payments, while, at the same time, maintaining and protecting the service of the Dawes and Young loans (Piet, 2004).

The steps towards default accelerated after the rise to power of the Nazis in January 1933 and the reinstitution of Hjalmar Schacht as president of the Reichsbank on the 17th of March of the same year. In August 1934, the head of the German central bank was also given the command of the Wirtschaftsministerium (Ministry of Economics). Schacht was a prominent figure in German and international economic and financial circles and was generally considered responsible for ending Germany’s hyperinflation in the first half of the 1920s. He was also a strenuous opposer of the war reparations imposed on Germany. At the same time, he was generally seen as a friendly figure by the international community, at least until the initial phases of his second stint as President of the Reichsbank. International creditors were soon up for disappointments. James (1985) recounts the steps taken by Schacht, shortly after his reinstitution. A new Law on Payments Abroad was approved in May 1933, which forced all foreign debts not covered by the Standstill Agreements - including the Dawes and Young loans - to be repaid through a Konversionskasse (Conversion Bank) and which reduced the service of the debts to 75% of the level of June 1933. By the end of the same year, the amount transferred was reduced to 30%. In January 1934, the Reichsbank declared that scrip would be exchanged with foreign currency for 67% of the nominal value. This meant that 77% of the debt service could be met. In the spring of

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10 The agreement was renewed until 1939 with German debtors directly repaying part of the debts every year.

11 Debtors could pay up to 50% of the debts service, provided that this did not exceed 4% of the principal. The remaining service was to be paid in scrip Reichsmarks (i.e. currency with no legal tender) with a discount of 50%. The Reichsbank, in turn, promised to exchange the scrip with foreign currency.
1934, however, Germany instituted a complete transfer moratorium (Ellis, 1941), which formalised Germany’s default on its foreign obligations. The Germans introduced aggressive measures even with regard to the Dawes and Young loans, which had previously commanded a privileged status. In May 1933, notwithstanding the protests of the Bank for International Settlements who was the guarantor of these loans, Germany unilaterally revoked the Gold Clause (Piet, 2004). This meant that the loans would now be serviced in nominal rather than in real terms.

Ellis (1940) convincingly argues that the striking aspect of the exchange control system that came to life in Germany during the 1930s was that, while it had all the characteristics of an emergency measure and was so perceived by most contemporaries, it ended up becoming the defining feature of German foreign economic policy during the decade. Holders of German securities abroad followed the unfolding of events closely and with growing anxiety. As will be shown in Part 5, these events were reflected powerfully in the price of German bonds traded in important foreign financial centres such as New York, London, Zürich, Amsterdam and Paris. By comparing the debt crises of the 1930s and 1980s, Eichengreen and Portes (1990a) have shown that financial markets were no more sophisticated in the 1980s than in the 1930s. The authors further claim that there is no evidence that banks in the 80s possessed an advantage over bond markets in the 30s in processing information on sovereign risk. They also indicate that sovereign bonds were traded widely in secondary markets, a finding confirmed by Stone (1991). These findings are important prerequisites for the interpretation of the German episode we put forward in this paper.

2.3 The debt buybacks: conflicting interpretations

Heuser (1934), together with many contemporaries, interpreted the buybacks as a way to

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12 Contemporary commentators such as Einzig (1934), for example, identified the Reichsbank’s measures as a severe blow to creditors’ hope of ever seeing full repayment.
13 Interestingly, Flandreau, Gaillard, and Packer (2011) find that at the time rating agencies performed very poorly, similarly to today.
14 Eichengreen and Portes also argue that creditor government involvement was common, but its importance varied greatly from country to country. The authors finally show that bond markets were, not surprisingly, heavily influenced by political events.
subsidise German exports. The mechanism worked as follows. Due to the devaluation of the Pound and the Dollar following the departure from the Gold Standard of England and the United States, many German exports ceased to be competitive on world markets. If a company could demonstrate that its production costs exceeded world prices, the Reichsbank had the option of granting it the possibility of repurchasing German debt (blocked accounts or bonds) on foreign markets with part of the export proceeds and selling it back in Germany for much higher prices.\textsuperscript{15} These exports were additional (in German: \textit{Zusatzausfuhr}), in the sense that they would not have been possible without this disguised subsidy. The German government declared that, for this reason, they represented a source of foreign exchange, rather than a leakage.\textsuperscript{16} On average only 50\% of the export proceeds were used to repurchase bonds (at least officially), while the rest was handed over to the Reichsbank. Heuser (1934) argues that, for various reasons, Germany did not have at its disposal the policies normally employed to stimulate exports and reduce imports, an idea also supported by Childs (1958). Devaluation, for example, was ruled out for both political reason and the large size of the foreign currency denominated debt, which would have increased dramatically in real value. Further deflationary policies in an already depressed economy, moreover, might have caused violent social unrest and additional capital flight. Finally, exchange controls limited imports, but, as a consequence, also increased the price of essential imported raw material and investment goods. The additional export system that exploited debt repurchases was, according to the author, one of the few options left to Germany to increase exports and maintain the debt service. This system was a essentially a way to depreciate the Reichsmark on export markets, while avoiding a depreciation in the exchange rate which would have led to an increase in the real value of foreign debt. More prosaically, Einzig (1934) wrote that Germany had found a way of ”eating [its] cake and keeping it”.

However, the view of debt buybacks as simply a mean to increase exports has been contested. Ellis (1941) expressed doubts as to whether the repurchase of bonds and blocked accounts could be directly linked to additional exports. He and other authors (Balogh, 1938;

\textsuperscript{15}A detailed description of the mechanism can be found in Heuser (1934), page 212-214.
\textsuperscript{16}FOLIO FHG/3, London School of Economics and Political Science Archive: The Repurchase of German Foreign Bonds, Berlin January 26 1934 (copy of a memorandum prepared in English by the German Government).
Childs, 1958) furthermore argued that the role of exchange controls and debt repurchases in trade policy gained some importance only in the middle of 1932, while the buybacks started already in 1931. Additionally, by tapping archival evidence from the Wirtschaftsministerium, Klug (1993) showed that the price differential between New York and Berlin was not considered high enough for the additional export practice to be beneficial, given the foreign exchange shortage faced by Germany. Klug also claims that the fact that German exports expanded most between 1934 and 1936, when buybacks were low, is a sign that these were not instrumental in Germany’s foreign economic policy. However, buybacks might have been low exactly because they were not needed to subsidise exports. Furthermore, the introduction of Schacht’s New Plan in 1934, meant that Germany started engaging heavily in bilateral trade agreements. These often comprised clearing agreements and the direct exchange of goods which increased German exports considerably without the need of explicit or disguised subsidies.

Klug’s suggestion is that debt buybacks were an instrument to reduce Germany’s debt overhang. This interpretation has its roots in the theoretical literature on debt buybacks which originated as a consequence of the 1980s debt crisis in Latin America. An intense debate arose among economists as they discussed different forms of debt reduction, including market-based ones such as debt repurchases. Opinions on the practice varied widely, with some authors considering buybacks a useful instrument within the toolkit of developing countries attempting to lower their debt, and others considering them outright harmful for both debtors and creditors.\footnote{Although the systematic study of buybacks is relatively recent, their practice has a long history. While they were almost unknown in the 19th century, as the German episode demonstrates, they were widespread already in the 1930s (Klug, 1993).}

The main rationale for voluntary, market-based initiatives aimed at reducing the debt overhang is that they can help overcome the free rider problem among creditors (Froot, 1989). Each creditor has no interest in reducing her claims, especially if the debtor is believed to be on the wrong side of the debt Laffer curve. The reason is that, in this scenario, debt relief raises the value of expected repayment and thus of residual claims, benefiting creditors. So, although, as Krugman (1988), page 2 puts it, ”there is no magic in market-based debt reduction, as opposed to more straightforward approaches” such an
approach might be chosen by the debtor country in order to overcome the creditor free rider problem. Another interpretation is that buybacks can be used as a signal of the willingness to reform (Fernandez-Ruiz, 2000). Froot, however, concludes that buybacks are difficult to work in practice, mainly due to the fact that finding the necessary resources is not trivial and that the exact dynamics behind the debt Laffer curve are difficult to measure.

Bulow and Rogoff make the classic case against buybacks. In Bulow and Rogoff (1988) the authors define buybacks schemes as boondoggles and argue that debtors cannot gain by unilaterally repurchasing their foreign debts if they do not receive concessions from creditors at the same time. This is because the buybacks simply translate into a subsidisation of creditors with the use of scarce resources, which have a high opportunity cost. Moreover, by turning to the market, debtor countries pay a price corresponding to the average value of the debt, while the reduction of debt reflects its marginal value, which for highly indebted countries is lower. In other words, a debt repurchase reduces the market value of the debt minimally because the price of the residual debt increases. The authors cite the example of Bolivia, where a $34 million operation reduced the market value of the debt by a mere $400,000. In Bulow and Rogoff (1991), the authors build on the insights of their previous paper. They formally show that when a country owes more than it can repay, even if buybacks do reduce overhang and stimulate investment this does not translate into gains for the debtor country. The reason is that the resulting improvements in the economic outlook are foreseen by the creditors who demand higher prices to sell their debt. The authors show that creditors are able to extract more than 100% of the efficiency gains resulting from the reduction in debt overhang. So, as further elaborated by Detragiache (1994) buybacks can be beneficial for both debtors and creditors only when they take place in the context of further concession and the seniorisation of existing debts relative to new ones.

A limit of this literature is that it considers buybacks only in the context of a coordinated programme by a highly indebted country trying to reduce its debt overhang. However, buybacks can also take place when the citizens and firms of a debtor country value the debt differently from creditors abroad. Classens and Diwan (1989) argue that the difference in

18 However, the authors argue that, in this case, the buybacks were a signalling strategy that allowed Bolivia to have access to IMF lending.

19 The seniorisation of existing debts is necessary to avoid their dilution through excessive new borrowing.
valuation can arise in three instances: 1) discount factors differ between creditor and debtors, 2) creditors receive an amount different from that paid by the debtor, 3) the perceived probability of default is different for debtors and creditors. This list, however, does not exhaust the reasons why debt buybacks by private agents can take place. The mechanisms will be discussed in more detail in Part 3, but the main intuition is the following. If the debtor government enforces payments between domestic agents, but not from domestic agents to foreign ones, debt will be valued more by the domestic agents. If a price differential arises due to these considerations, citizens of the debtor country will have an incentive to repurchase the country’s foreign debt in order to make riskless arbitrage profits (Broner, Martin, and Ventura, 2010). The same mechanism applies even when the debtor government is unable to enforce payments because of a weak institutional environment. In this case, however, the citizens of the debtor country will repurchase the debt in order to insure themselves against enforcement errors (Broner, Martin, and Ventura, 2008).

In support of Klug’s interpretation of the episode stands the wider experience of debtor countries in the 1930s. According to Eichengreen and Portes (1990a), page 4 ”[ . . . ] market-based debt reduction made a useful contribution to resolving the debt crisis of the 1930s by reducing the debt overhang and eliminating marginal creditors”. The authors, however, do not mention Germany in their assessment of the role of buybacks in the 1930s, even though it carried out by far the largest of such operations. James (1985) argues that buybacks contributed to restore German credibility abroad, a fact demonstrated, according to him, by the changes in the price of German bonds. In his study, Klug analyzes a large number of German bond issues in New York, finding that buybacks raised secondary market prices, but the effect was not strong. According to the author, this finding demonstrates that the Bulow and Rogoff (1991) framework does not apply to the German case. He therefore concludes that Germany might have marginally benefited from the buybacks due to debt overhang reduction. The mobilization of billions of Reichsmarks as well as the involvement of countless companies and private investors to achieve a marginal reduction in the market value of German debt seems, however, unrealistic.

Klug (1993) further claimed that the Nazi government was particularly attached to the practice of debt buybacks, even though - as discussed - these began well before it rose
to power. Barkai (1990), however, argues that the Nazis had no clear economic ideology. Their method consisted in establishing some goals, and trying to reach them through trial and error and by leaving the technicalities to experts and bureaucrats, often outside the Nazi party, such as those of the Wirtschaftsministerium and the Reichsbank. James (1985) argues that both Luther and Schacht used the pivotal role of the Reichsbank in foreign and economic policy to realise "their economic vision". These elements hardly suggest a harmonious and coherent economic policy in Germany in the first half of the 1930s. In agreement with the interpretation of buybacks given in this paper, the Reichsbank saw the unrestrained practice of debt repurchases as a form of capital flight and a giveaway to foreign creditors (James, 1985). The author also documents the disappointment of the Reichsbank’s president Hans Luther for the failure of the German central bank to curb the practice more successfully, notwithstanding the strict measures introduced.\textsuperscript{20} James also notes that although the Wirtschaftsministerium, looked at the buybacks with more favor because of their potential role in promoting additional exports, it too attempted to actively restrict the practice and bring it under the control of the authorities. In sum, while the two institutions desired to regulate the repurchases of foreign debt, they never considered suppressing them altogether. In fact, their use in supporting exports in some key industries was strongly promoted.

Eichengreen and Portes (1990a) provide some useful insights into the creditors’ stance towards buybacks in the 1930s. In public, creditors opposed these measures arguing that foreign exchange should be directed towards servicing debts. Creditors also accused debtor countries of manipulating secondary market prices. Privately, instead, they were much more receptive to the practice. Given that no one else but the creditors themselves could sell their bonds back to the debtors, and that residual creditors would - everything else equal - see the value of their claims increase, this private stance appears to be much more reasonable.\textsuperscript{21} The authors report a statement by the Council of Foreign Bondholders from 1937 which stated

\textsuperscript{20}These included the suppression of the publication of free foreign quotations on German securities and the ban on the repatriation by foreigners of the proceeds of selling German bonds within Germany (Ellis, 1941).

\textsuperscript{21}This unless, of course, creditors expected outright repudiation at some point in the future, but in this case they had a strong incentives to sell their bond holdings as well.
that restraints of bond repurchases would be met with "strong and . . . effective criticism on the ground that, by limiting the market in such bonds, it would act detrimentally to the bondholders". Once again, this position is perfectly compatible with the interpretation of debt repurchases in this paper: it is disruptions in the working of secondary markets that damage creditors, while their well-functioning increases the probability of repayment by reducing the debtor governments’ incentives to default. In his study, Klug (1993) mentions that the large accounting profits, which private companies made through debt repurchases, have been indicated by some commentators as the main cause for the buybacks. He, however, dismissed this instance on the basis that this would not explain the behaviour of the Nazi government. As he himself notes, however, the Nazi government eventually imposed its will on private initiatives of buybacks by severely restricting the availability of foreign exchange. Klug finally argues that buybacks took place mostly in countries where the threat to debtors in the form of trade disruption was most damaging to Germany. This consideration is also compatible with the argument in this paper. If credible sanctions increase the probability of repayment towards a country, the government has no reason to interfere with secondary markets since they do not influence the chance of repayment.

What can be concluded from previous studies on the German buybacks in light of the framework presented in this paper is that Germany managed to make the most out of an initiative that started spontaneously. It was not planned or introduced by the authorities. On the contrary, in order to extract some benefits out of it, the German authorities had to make sure they kept it under strict control. After all, the huge price differential between German bonds at home and abroad was a more than sufficient driver for investors to engage in debt buybacks. The practice, however, might have eventually led to the repayment of a large chunk - if not all - of the German external debt. Hence, Germany could have lost not only the possibility of repudiating its debt in the future or receiving more debt relief from its creditors, but also accessory benefits such as export subsidisation. By restricting debt buybacks, Germany had no reason to repudiate its debt, and, in fact, Hitler himself did not consider this the best option (Klug, 1993). As long as the whole debt was not bought back, Germany could profit from the situation and keep its ties with international markets.
3 A model of debt buybacks with frictions

In this section, we present a formal model outlining our interpretation of the German buyback episode. We start from the baseline model presented in Broner, Martin, and Ventura (2010) which highlights the role of debt buybacks in helping to avert default by allowing asset trade between creditors and debtors. We then show how frictions in secondary markets represented by a foreign exchange shortage which restricts the access of debtors to secondary markets can limit buybacks and cause the persistence of the price differential between domestic and foreign valuation of debt.

3.1 Baseline model

Broner, Martin, and Ventura (2008) show that in the presence of weak enforcement institutions in primary markets, the presence of secondary markets restores efficiency. In secondary markets, assets are re-traded leading to the optimal amount of ex-ante asset trade. Secondary markets can thus help mitigate the particular form of the fundamental problem of exchange that arises due to sovereign risk. This occurs when a debtor government cannot credibly commit to enforce foreign payments. Crucially, the authors demonstrate that the role of secondary markets holds both when the debtor government acts opportunistically by not enforcing foreign debts and when the government is unable to enforce them due to a weak institutional environment. This framework is extremely relevant for many historical episodes (Dixit 2004), as well as current ones (European debt crisis?). It also has a bearing for the case discussed here. The Weimar Republic was a weak political entity and creditors were as preoccupied with German ability to pay as well as its willingness. For simplicity, however, we will only treat the first instance formally in this paper.

The gist of the model is the following. When a sovereign crisis ensues and the debtor government cannot credibly commit to enforce payments, creditors will be willing to sell their assets on secondary market at any positive price. Citizens of the debtor country, instead, will be willing to repurchase them at any price up to face value, since the government is expected to enforce payments between domestic citizens. If the debt is held internally in its entirety, not enforcing payments will only lead to a redistribution of income, not a net gain
resulting from foregone payments to foreigners. An essential assumption for this result is that governments cannot discriminate among debtors when they decide to enforce payments. This outcome resembles an ex-post prisoner’s dilemma: if debtors could collude and decide not to repurchase foreign debt, the country as a whole would be better off. Each single citizen of the debtor country, however, has an incentive to repurchase the debt since she can make a large riskless profit. As a result, if the debtor government had the chance, it would put sand in the wheels of private investors and interfere with the functioning of secondary markets (Broner, Martin, and Ventura, 2010).

The set up of the model is as follows. There are two countries: Debtor populated by the agents $i \in I^D$ and Creditor populated by $i \in I^C$. There are two time periods Today ($t = 0$) and Tomorrow ($t = 1$). Preferences are described by:

$$u_i(C_{i0}, C_{i1}) = u(C_{i0}) + u(C_{i1})$$

$C_{i0}$ and $C_{i1}$ denote consumption Today and Tomorrow, which means there is no time discount. The utility function $u(.)$ is monotonic, increasing and concave. The representative agent in each country has the following endowments:

$$y_{i0}, y_{i1} = \begin{cases} 
(y - \varepsilon, y + \varepsilon) & \text{for } i \in I^D \\
(y + \varepsilon, y - \varepsilon) & \text{for } i \in I^C 
\end{cases}$$

Creditors and Debtors, therefore, have idiosyncratic shocks $\varepsilon$ with probability 1 to their endowment $y$, and by trading internationally in assets they can increase their utility. The governments of the two countries only care about their own citizens and their only role is to decide whether to enforce payments. Their objective functions are:

$$W^D = \int u(C_{i1}) \text{ for } i \in I^D$$

$$W^C = \int u(C_{i1}) \text{ for } i \in I^C$$

In the absence of secondary markets, there will be no international trade in assets. The Debtor government will never enforce payments Tomorrow and, knowing this, Creditor citizens will never lend Today. If the debtor government, instead, only cared about enforcing
payments, creditors would purchase ε bonds at price 1 from Debtor citizens and there would be perfect consumption smoothing between the two countries: each agent would consume \( y \) in both periods.

Now assume the presence and frictionless functioning of secondary markets and the following timing of asset trade, endowments and enforcement decisions:

\[
\begin{array}{c}
\text{Endowments} \rightarrow \text{Primary Markets} \rightarrow \text{Consumption} \\
\text{Today} \\
\end{array}
\]

\[
\begin{array}{c}
\text{Endowments} \rightarrow \text{Secondary Markets} \rightarrow \text{Enforcement} \rightarrow \text{Consumption} \\
\text{Tomorrow} \\
\end{array}
\]

In case of full enforcement, there is no need to trade in secondary markets and bond holdings Tomorrow will equal bond holdings Today, \( \chi_{1i}^D = \chi_{0i}^D \). When the governments’ objective function described by equations 3 and 4 hold, instead, enforcement by the Debtor government will only take place towards the citizens of Debtor and not those of Creditor: \( e_j^D \in \{0, 1\} \) with \( e_C^D = 0 \) and \( e_D^D = 1 \). In this situation, Creditors will have an incentive to re-trade their bonds in the secondary markets and sell them for any positive price since, if they hold them, payments will not be enforced by the Debtor government and the debt will have a value of zero. Debtor citizens will have an incentive to purchase the bonds for any price up to their face value since any lower price translates into a riskless arbitrage profit. Eventually, all bonds will be bought back at face value by the citizens of Debtor. The intuition here is that if the bonds trade at face value, Debtors are indifferent to purchasing them, but if they trade even at a fractional discount, there will be untapped arbitrage opportunities. The equilibrium will be:

Bond prices:
\[
q_0^D = 1; \quad q_1^D = 1; \quad q_0^C = 1; \quad q_1^C = 1
\]  
(5)

Consumption:
\[
C_{0i} = C_{1i} \quad \text{for} \quad i \in I^D \cup I^C
\]  
(6)

Primary market bond holdings:
\[
\chi_{0i}^D = \begin{cases} 
-\varepsilon & \text{for} \ i \in I^D \\
\varepsilon & \text{for} \ i \in I^C 
\end{cases}
\]  
(7)
Secondary market bond holdings:  

\[ x_{i1}^D = \begin{cases} 
\delta_i & \text{for } i \in I^D \\
0 & \text{for } i \in I^C 
\end{cases} \]

where: \[ \int \delta_i = 0 \text{ for } i \in I^D \]  

Equations 8 and 9 say that Creditor citizens will sell all their bonds to Debtor citizens. The quantity bought by each Debtor citizen, \( \delta_i \), is not fixed; some can buy more, some less, some none at all. The final net bond holding position of both countries as a whole will be equal to 0.

This equilibrium is inefficient ex-post for the Debtor country. The efficient solution would be to collude Tomorrow and not repurchase the debt on secondary markets. However, each individual can make large capital gains by buying the bonds. Ex-ante, the presence and frictionless functioning of secondary markets are beneficial to both countries since they allow the existence of asset trade. Secondary markets ensure that assets are transferred from those who value them less (Creditors) to those who value them more (Debtors) and asset holdings are aligned with the preferences of the government who makes the enforcement decision.

The model has an alternative equilibrium, which arises when agents are pessimistic and believe the government will not enforce debts even when they are held by domestic citizens, i.e. \( e_D = 0 \). In this equilibrium asset prices in the Secondary market are equal to zero since Debtor citizens have no incentive to buy the bonds back and, as a result, there is no asset trade in primary markets either. However, the optimistic equilibrium is more robust. This is because if the domestic enforcement decision \( e_D \) entails a cost \( \gamma(e_D) \) (e.g. internal disruption of economic activity, political repercussions, uncertainty etc.), which is positive only in case of non-enforcement the Debtor government will not be indifferent anymore between enforcement and non-enforcement, no matter how small this cost is.

\[ W^D = \int u(C_{i1}) - \gamma(e_D) \text{ for } i \in I^D \text{ where } \gamma(0) > 0 \text{ and } \gamma(1) = 0 \]  

It is essential to clarify the assumptions this equilibrium rests on. First of all, as already anticipated, secondary markets work perfectly. In the presence of frictions (e.g. transaction costs) asset trade will be lower, but the main result will not change, unless the costs are
large. Secondly, agents behave competitively and there is no (or limited) collusion among Debtor country citizens. Finally, the government’s enforcement decision happens after the trade in Secondary Markets is concluded. If it takes place before, the government will not enforce payments and asset trade will be destroyed. As Broner, Martin, and Ventura (2010) show, these results also hold when there are many countries, time periods, shocks, sources of market incompleteness, and sources of heterogeneity within and between regions.

It follows from this model that, since the government cannot default outright by shutting down secondary markets unless it is willing to destroy international asset trade, it will try to put sand in the wheels of private investors in order to make the debt repurchases difficult.

3.2 Model with restricted access to secondary markets for Debtor country citizens

In the section, the model is expanded to explore the consequences of a friction represented by a foreign exchange shortage in the debtor country, which leads to the debtor citizens having restricted access to secondary markets for debt. This is what Germany experienced as a consequence of the sudden stop of 1929/30. As discussed, however, the limited access to secondary markets was not only the outcome of this event, but also the product of deliberate government intervention. The conclusions from this section’s model can thus be applied to the case when the government explicitly limits the access of debtors to secondary markets.

The set up is as follows. Now debtors can only use part of their resources to trade on secondary markets:

\[
\psi_{i1}^D = \varphi_{i1}(y + \varepsilon) \quad \text{where} \quad \varphi_{i1} \in [0, 1] \quad \text{for} \quad i \in I^D
\] (11)

Equation 11 says that the resources to trade on secondary markets - \( \psi_{i1}^D \) - depend on the share of Tomorrow’s income - \( \varphi_{i1} \) - which can be used to buy back bonds. For the time being, we assume that \( \varphi_{i1} \) takes a unique value between 0 and 1. Assume further that this restriction to market access takes place at the the start of period 1, so that in period 0 everything is the same as the optimistic equilibrium above:

Assume further that this change is not known to all creditors. There are two different types of creditors, a share \( \mu_1^C \) is ”informed” about evolutions in the debtor country while the rest
is not.

Given this set-up two main scenarios are possible. In the first scenario, the resources available to debtors to trade in secondary markets are insufficient to repurchase all the primary markets debt holdings of all informed creditors at face value. In equations:

\[ \int \psi_{1i}^D < \mu_1^C \int \chi_{j0}^D \text{ for } i \in I^D \text{ and } j \in I^C \]  

(12)

Given that informed creditors are willing to sell their bonds at any positive price and that debtors are willing to repurchase any bond up to face value, but are limited to their foreign exchange endowments, the secondary market price of the bonds will be:

\[ \frac{\int \psi_{1i}^D}{\mu_1^C \int \chi_{j0}^D} < 1 \text{ for } i \in I^D \text{ and } j \in I^C \]  

(13)

So that the secondary market of bonds depends on the resources of debtors and the share of informed creditors. The full equilibrium will be:

Bond prices: \( q_0^D = 1; \quad q_1^D = \frac{\int \psi_{1i}^D}{\mu_1^C \int \chi_{j0}^D}; \quad q_0^C = 1; \quad q_1^C = \frac{\int \psi_{1i}^D}{\mu_1^C \int \chi_{j0}^D}; \quad q_1^{C_I} = 0; \quad q_1^{C_U} = 0 \) for \( i \in I^D \text{ and } j \in I^C \)  

(14)

Consumption of Debtor Citizens

\( C_{it} = \begin{cases} 
  y & \text{at } t = 0 \\
  y + \varepsilon - \varepsilon \mu_1^{C_I} + \left( 1 - \frac{\int \psi_{1i}^D}{\mu_1^C \int \chi_{j0}^D} \right) \delta_i & \text{at } t = 1 \text{ for } i \in I^D \text{ and } j \in I^C 
\end{cases} \)

Consumption of Informed Creditor Citizens
\[
C_{kt} = \begin{cases} 
y & \text{at } t = 0 \\
y - \varepsilon + \chi_{D0}^{D} \left( \frac{\int_{U}^{C} \psi_{D}^{D}}{\mu_{i}^{C} \int_{U}^{D} \chi_{j0}^{D}} \right) & \text{Debt sold back, at } t = 1 \text{ for } i \in I^{D}, j \in I^{C} \text{ and } k \in I^{CI}
\end{cases}
\]

Consumption of Uninformed Creditor Citizens

\[
C_{jt} = \begin{cases} 
y & \text{at } t = 0 \\
y - \varepsilon & \text{for } t = 1 \text{ and } j \in I^{CU}
\end{cases}
\]

Primary market bond holdings:

\[
\chi_{i0}^{D} = \begin{cases} 
-\varepsilon & \text{for } i \in I^{D} \\
\varepsilon & \text{for } i \in I^{C}
\end{cases}
\]

Secondary market bond holdings of Debtor citizens: \( \chi_{i1}^{D} = \delta_{i} \) for \( i \in I^{D} \)

where: \( \int \delta_{i} = 0 - \int \psi_{i1}^{D} \) for \( i \in I^{D} \)

Secondary market bond holdings of Creditor citizens at market value:

\[
\chi_{i1}^{D} = \begin{cases} 
0 & \text{for } i \in I^{CI} \\
0 & \text{for } i \in I^{CU}
\end{cases}
\]

Secondary market bond holdings of Creditor citizens at face value:

\[
\beta_{i1}^{D} = \begin{cases} 
0 & \text{for } i \in I^{CI} \\
\varepsilon & \text{for } i \in I^{CU}
\end{cases}
\]

In BMV (2010, example 9, page 22), creditors know in advance that debtors do not have enough resources to repurchase all the debt that would be issued in the case of full enforcement. This set-up translates into lower trading in primary markets and lower consumption and welfare in both countries, as well as a discount price of bonds in secondary markets. Here, instead, this comes as complete surprise; this is why bonds in circulation are
the same as in the baseline case. Uninformed Creditors also do not know of which type other Creditors are and, therefore, there cannot be a signalling of informed creditors to uninformed ones. Moreover, informed creditors have no incentive to signal uninformed ones since this would reduce the value of the debt they hold as uniformed Creditors would scramble to sell their bonds to the Debtors left in the market. We also assume that debtors repurchase a fixed share of each debtors’ bonds.

The value of the debt for Debtors remains $q_D^1 = 1$, since the Debtor Government enforces payments between domestic citizens as in the baseline case. Therefore, they will be willing to repurchase the bonds at the market price $q_D^1 = q_{CI}^1$, since it guarantees riskless arbitrage profits. Being this price lower than the face value of the debt (i.e. 1), and unaware of the disruption in the functioning of secondary markets, uninformed Creditors will not be willing to sell their holdings.

As Debtors run out of resources, totally unexpectedly for the uninformed Creditors, the latter are left with their bonds unsold. At this point, they would be willing to sell at any positive price, but the resources at debtors disposal have been exhausted.

4 Descriptive Statistics

The main conclusion of the models presented in the Part 3 is that when secondary markets function well they contribute to avert default by allowing the re-trading of assets. When their working is disrupted, instead, the risk of default persists, trading in secondary markets is restricted and debt securities trade at a discount abroad, while commanding a higher price domestically. How well do these predictions fit with the German data? As we show in this section and the next, quite well.

4.1 Descriptive Statistics

It is important to have an idea of the size of the debt buybacks carried out by Germans between 1931 and 1938. The figures painstakingly reconstructed by Klug (1993), for the period 1932-1938, are reported in Table 5. The buyback figure for 1931 is an estimate we
have calculated using archival sources.\textsuperscript{22} The debt series is from Bundesbank (1976). Klug believed that the buybacks started in earnest in 1932, but the evidence shows that the practice was widespread already in 1931.\textsuperscript{23} As the author himself notes, however, some buybacks also took place in the 1920s.

<table>
<thead>
<tr>
<th>Year</th>
<th>Debt</th>
<th>Buybacks</th>
<th>Other Means of Debt Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1930</td>
<td>32.6</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>1931</td>
<td>26.6</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>1932</td>
<td>25.9</td>
<td>0.86</td>
<td>1.84</td>
</tr>
<tr>
<td>1933</td>
<td>23.2</td>
<td>1.18</td>
<td>3.92</td>
</tr>
<tr>
<td>1934</td>
<td>18.1</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td>N/A</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>1936</td>
<td>16.4</td>
<td>0.3</td>
<td>1.88</td>
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<td>0.75</td>
</tr>
<tr>
<td>1938</td>
<td>13.9</td>
<td>0.19</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: German foreign debt and means of debt reduction in billions of Reichsmarks

The price differential between German foreign debt traded at home and abroad has been cited in all discussions of German buybacks, but has never been documented extensively as done in this paper. Figure 2 presents weekly price data of the Dawes and Young bonds traded on the New York Stock Exchange between December 1929 (June 1930 for the Young series) and June 1940 we have manually collected from the New York Times publication \textit{The Annalist}\textsuperscript{24} as well as quotations of German Mortgage bonds on the Berlin Stock Exchange available in electronic format from Global Financial Data. At the time, New York was already the most important financial centre in the world together with London, and German

\textsuperscript{22}Germany Country File, Bank of England Archive; OV34/179: Germany Moratorium. Report of the committee appointed to examine and interpret the figures submitted by the Reichsbank, May 30th 1933.

\textsuperscript{23}Germany Country File, Bank of England Archive; OV34/148: Special advisory Committee Basel 1931 and OV34/179

\textsuperscript{24}\textit{The Annalist: A Journal of Finance, Commerce and Economics, Vol. 35 - Vol. 56 Published by The New York Times Company, January 1930 to October 1940
debt was held disproportionately more by residents of the United States than of any other country in the world, as shown in Part 2.

Figure 2: Young and Dawes bonds traded in New York and Mortgage bonds traded in Berlin

Although historical documents can offer valuable support to the arguments of this paper, they need to be taken with more than a grain of salt. Secrecy, lack of cooperation and double-dealing were defining characteristics of international relations during the interwar period. The internal political situation in Germany was no better, especially after the rise to power of the Nazis. Working with asset price data has at least two advantages: high frequency and reliability. The latter characteristic is due to the fact that stock market data is less prone to direct manipulation. It should be noted that, although the mechanisms described in this paper holds for both public and private debt, we will look at public debt only, for the purpose of the analysis in Part 5. However, it is fundamental to highlight that while we only look at a limited number of bond issues, all German bonds traded in New York and Berlin followed very similar paths, as demonstrated by Figure 3.\(^\text{25}\) In any case, the privileged status of Young and Dawes loans, which gave them a certain degree of seniority over other debts (Piet, 2004), also means that the bonds were less prone to fluctuation due

\(^{25}\text{Source: IFK, Jahrstatistiches Handbuch 1933 & 1936.}\)
to temporary shifts in economic conditions and policy, which serves well the purpose of our analysis.

Figure 3: German bonds traded in New York and Berlin
5 Empirical application

Our goal is to estimate the dates of multiple structural breaks in the time series of Dawes and Young bond prices. The idea is that these breaks reflect significant historical events. Thus, finding a correspondence between the breaks and episodes limiting the access of German citizens to secondary markets (whether due to Government intervention or other causes) would lend strong support to our theoretical framework and historical reconstruction. We treat the dates and number of breaks as unknown a priori, to be endogenously determined from the data. In this respect, we rely on two different estimation procedures: a simultaneous estimation procedure, following Bai and Perron (1998, 2003) and a sequential procedure based on Bai (1997a,b) and Chong (1995). This is done so to test the robustness of the estimations of the break dates. The two estimation procedures also imply different methods to select the number of breaks.

5.1 Simultaneous estimation

The simultaneous estimation procedure of Bai and Perron (1998, 2003) allows us to test for the number of breaks and estimate consistently the dates of multiple breaks in a partial structural change linear model. Following their notation, we consider the following univariate model for each of the bond series independently:

\[ y_t = \alpha_j + \rho_j y_{t-1} + \beta z_t + e_t \quad t = T_{j-1} + 1, \ldots, T_j \]  

for regimes \( j = 1, \ldots, m + 1 \) (with \( T_0 = 0 \) and \( T_{m+1} = T \)), where \( m \) is the number of breaks, \( y_t \) is the natural logarithm of the bond price at time \( t \), \( z_t \) is the natural logarithm of a measure of market performance and \( e_t \) is white noise. Parameters \( \alpha_j \) and \( \rho_j \) are allowed to change across regimes, whereas \( \beta \) is estimated for the whole sample. We assume the variance of the error term to be constant across regimes, in order to focus on the main features of the model. The main objective is to estimate the unknown break dates \( T_1, \ldots, T_m \) and, to a much lesser

\[ \text{26} \]  

It is important to note that allowing for more than one break requires different, and more complex, statistical procedures than in the well-known case of a single break. For an overview of the literature, the interested reader can refer to Hansen (2001) and Perron (2005).
extent, to estimate the model parameters.\(^{27}\) For each set of break dates \((T_1, ..., T_m)\), the estimates of the parameters \(\alpha_j, \rho_j\) and \(\beta\) are obtained by minimizing of the sum of squared residuals (SSR) for the whole sample, i.e. spanning all regimes:

\[
SSR = \sum_{j=1}^{m+1} \sum_{t=T_{j-1}+1}^{T_j} [y_t - \alpha_j - \rho_j y_{t-1} - \beta z_t]
\] (24)

Parameter estimates are therefore a function of the set of break dates: different partitions of the time line in \(m + 1\) regimes will generally lead to different parameter estimates. The estimated set of break dates is such that:

\[
(\hat{T}_1, ..., \hat{T}_m) = \arg\min_{T_1, ..., T_m} \sum_{j=1}^{m+1} \sum_{t=T_{j-1}+1}^{T_j} [y_t - \hat{\alpha}_{j[T_j]} - \hat{\rho}_{j[T_j]} y_{t-1} - \hat{\beta}_{j[T_j]} z_t]
\] (25)

where the hat denotes sample estimates and the subscript \([T_j]\) represents the dependence of the parameter estimates on the date of the breaks. This estimation method looks for the global minimizers of the SSR, a task that requires a number of operations by least squares of order \(O(T^m)\) if performed by standard grid search. When the number of breaks \(m\) is greater than two the procedure becomes computationally challenging. Bai and Perron (2003) propose an algorithm that is able to find the global minimizers of the SSR by using a number of least squares operations of order \(O(T^2)\). Their dynamic programming approach achieves this reduction in operations by efficiently selecting only the feasible partitions\(^{28}\) of the time line before starting the grid search. When a partial structural change model is estimated

\(^{27}\)The choice of a first-order autoregressive model permits us to use a reasonably flexible, yet easily tractable model. Bond prices are usually modeled in the literature as unit root processes, but other than this there would be no other reason for choosing a unit root process to analyse the data. Unit root tests typically found in the literature cannot be applied in this case, as we are considering possible multiple breaks: the appropriate test would be one which tests the null of a unit root with multiple breaks against the alternative of a stationary process with breaks. To our knowledge, such a test exists only for cases with one or two breaks (Lee and Strazicich (2003)) but not for an arbitrary number of breaks. We therefore assume stationarity of the series under each regime and will use standard methods to identify potential explosive behavior of the series after structural breaks have been accounted for.

\(^{28}\)Given a number of breaks \(m\), only a limited number of segments exist that can fit simultaneously on the time line. Other requirements are added, such as minimum length of each regime, minimum distance between regimes and other conditions at the beginning and end of the sample.
the global minimization algorithm is modified to include an iterative procedure whereby the parameter not affected by the structural change is estimated from the full sample\textsuperscript{29}.

The estimation procedure above requires knowledge on the number of breaks $m$. In practice, it is possible to repeat the simultaneous estimation procedure for each desired number of breaks. However, the results of the estimation will not contain any element that would help us decide between, say, $l$ or $l + 1$ breaks: it is not appropriate to simply compare the SSR of different models which differ only in the number of breaks allowed, as the SSR will not increase if an extra break is added to the model. For this reason, formal statistical tests are required. A number of test statistics can be used to infer $m$ from the data, and we use three of them in particular: i) a $supF_T$ test similar to that of Andrews (1993) and generalized by Bai and Perron (1998), which tests the null of no breaks against a fixed number of breaks $l$; ii) two double maximum tests (Bai and Perron (1998)) that test the null of no break against an unknown number breaks; iii) a test of the null of $l$ breaks (corresponding to the global minimizers of the simultaneous estimation) against $l + 1$ breaks (Bai and Perron (1998)), denoted $supF_T(l + 1|l)$, which tests if each of the $l + 1$ regimes can be broken down in two (i.e a single break test for each regime) by observing if the decrease in the global SSR is statistically significant.

The three tests outlined above yield different information about the number of breaks in the model. We use the first two tests to confirm our assumption that at least one break is present is present and to get some intuition on whether there might be ”few” breaks (up to three) or ”many” (more than three). The last test, $supF_T(l + 1|l)$, is applied sequentially, starting from $l = 1$, to formally determine the precise number of breaks for a chosen significance level.

\textsuperscript{29}This procedure demands some care in the choice of the starting value of $\beta$, due to the fact that in the case of a partial structural change model the algorithm does not necessarily converge to the global minimum for $\beta$. However, this an issue mainly for the estimation of the value of the optimal $\hat{\beta}$, as the estimated break dates are generally only slightly affected by this.
5.2 Sequential estimation

Sequential estimation of break dates, i.e. one by one, was developed and refined due its low computational cost and the asymptotic properties of the estimator. The procedure begins by performing a parameter constancy test for the whole sample. If the test indicates the presence of a break, one calculates the SSR as a function of a single break for the whole sample. The date $T_\alpha$ that minimizes the SSR is selected as a candidate break date, and the full sample is split in two subsamples at date $T_\alpha$. The procedure is then repeated for each subsample, until the parameter constancy test suggests that no other breaks are present on any of the subsamples. The key theoretical insight comes from Chong (1995), who proves that even in a misspecified model with an insufficient number of breaks, the estimator described above consistently estimates one of the true breaks, relying only on a number of least squares operations of order $T$. Bai (1997a) provides limiting distributions for the estimated break dates and shows that the procedure above also consistently estimates the number of breaks $m$.

Bai (1997a,b) introduced an improved version of the procedure that is also asymptotically efficient, which is referred to in the literature as iterative refinements or as repartition method. The refinement involves re-estimating all break dates identified by the standard sequential procedure described above: this can be done either at the end, when all break dates have been identified, or when only a number of them have been identified. If two breaks have been identified, say, $T_\alpha$ and $T_\beta$, with $1 < T_\alpha < T_\beta < T$, then $T_\alpha$ will be reestimated by applying the sequential procedure over the subsample $[1, T_\beta]$ (including the parameter constancy test) if $T_\alpha$ was the first break to be identified; otherwise $T_\beta$ will be reestimated over the subsample $[T_\alpha, T]$.

We illustrate the first steps of the repartition method in the following example. Figure 4 graphs the sum of squared residuals for the whole sample of the Dawes bonds as a function of a single break date. One can clearly discern a global minimum $T_\alpha$ for the week ending on 19/08/1939, denoted by an asterisk. Local minima are noticeable throughout the sample, denoted by circles. In the first step of the sequential procedure the sample will be split in two at the global minimum on 19/08/1939; we define $T_0 = 28/12/1929$ and $T = 15/06/1940$. In subsample $[T_0, 19/08/1938]$ a break is identified on 24/02/1934; in the
subsample [26/08/1939, \(T\)] no evidence is found in favour of a break, despite the presence of a local minimum identified in the first step: this is likely due to the closeness to the end of sample, together with the explosive behaviour of the series in that short subsample. We can now proceed to a refinement step by reestimating the first break in the subsample [03/03/1934, \(T\)].

![Figure 4: Sum of squared residuals as a function of a single break - Dawes bond series](image)

5.3 Results

We will now report the main results of the estimation procedures applied to (23).\(^{30}\) For the Dawes bond series there is strong evidence against the hypothesis of no break: both versions of the double maximum test are highly significant, and so is the \(\text{sup}_F\) test, repeated for a number of breaks up to 8. The \(\text{sup}_F(l + 1|l)\) test is significant at the 1% level for an additional break up to the sixth, turning to not significant after that point. The repartition procedure for the 2.5% significance level also estimates 6 breaks, and for this reason we select

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\(^{30}\) All calculations are obtained with modified versions of the Gauss and Matlab codes accompanying Hansen (2001) and Bai and Perron (2003).
for the Dawes series a number of breaks $m = 6$. Both the simultaneous and refined sequential estimation yield the same estimates of the break dates. The simultaneous estimation procedure with the selected number of breaks quickly converges (4 iterations) to a model with a SSR of 1.825; the fixed parameter that reflects the influence of the stock market on the bond series is not found to be significant.

![Figure 5: Dawes bond log-price with estimated break dates; shaded areas are 90% confidence intervals](image)

Also for the Young bond series the statistical tests provide evidence of the presence of at least one break. The $supF(l + 1|l)$ test is significant at the 1% significance level for an additional break up to the fifth one; it remains significant, although at the 2.5% level, for a sixth break and then turns not significant. The repartition procedure finds $m = 5$ breaks at the 10% level and $m = 4$ at the 5% level. We select $m = 5$ breaks as a compromise choice. The dates selected by the simultaneous and repartition estimation are the same only for two dates. The simultaneous estimation, however, ends up selecting the same dates as the repartition procedure only for a model with 7 breaks. This indicates that the dates arising as the outcome of the repartition procedure can still be considered as very plausible break
dates. In tables 6 and 7 we associate to every date identified statistically an event likely to have had an impact on the series: all events identified can be interpreted as events that had an impact in terms of capital controls or on the overall risk of Germany defaulting its debt.

Figure 6: Young bond log-price with estimated break dates; shaded areas are 90% confidence intervals
<table>
<thead>
<tr>
<th>Break date</th>
<th>90% confidence interval</th>
<th>Mean</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/9/1931</td>
<td>07/3/1931 - 19/9/1931</td>
<td>51.4</td>
<td>At the end of July 1931 exchange controls were introduced amid political and economic turmoil (Ellis (1941)). August 1931 also saw the signing of the first Standstill Agreement, which froze 6.3bn Reichsmark of German short-term debt (Piet (2004)).</td>
</tr>
<tr>
<td>11/6/1932</td>
<td>23/4/1932 - 06/8/1932</td>
<td>67.3</td>
<td>The Lausanne conference was held from June 16 to July 9, 1932 and virtually put an end to reparations payments, while maintaining the service of the Dawes and Young bonds (Piet (2004)).</td>
</tr>
<tr>
<td>19/5/1934</td>
<td>05/5/1934 - 23/6/1934</td>
<td>28.1*</td>
<td>In July 1934 a complete transfer moratorium on foreign payments was enforced, which established the complete control of the Reichsbank on all foreign exchange operations.</td>
</tr>
<tr>
<td>04/9/1937</td>
<td>19/12/1936 - 25/9/1937</td>
<td>23.8</td>
<td>In May and September new capital controls are introduced.</td>
</tr>
<tr>
<td>12/11/1938</td>
<td>05/11/1938 - 10/12/1938</td>
<td>19.3</td>
<td>The four-power Munich agreement between Germany, Britain, France and Czechoslovakia was signed on the 30th of September.</td>
</tr>
<tr>
<td>26/8/1939</td>
<td>12/8/1939 - 09/9/1939</td>
<td>10.8</td>
<td>September 1st 1939: Germany invades Poland.</td>
</tr>
</tbody>
</table>

Table 6: Break dates with 90% asymmetric confidence bands and corresponding events for the Dawes bond price series. The reported mean is the mean of the estimated stationary AR(1) process for the regime starting at the respective break date. An asterisk denotes that one of the parameters was not found to be significant in that regime.
<table>
<thead>
<tr>
<th>Break date</th>
<th>90% confidence interval</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>03/3/1934</td>
<td>27/1/1934 - 05/5/1934</td>
<td>In July 1934 a complete transfer moratorium on foreign payments was enforced, which established the complete control of the Reichsbank on all foreign exchange operations.</td>
</tr>
<tr>
<td>04/9/1937</td>
<td>02/1/1937 - 09/10/1937</td>
<td>In May and September new capital controls are introduced.</td>
</tr>
<tr>
<td>26/11/1938</td>
<td>29/10/1938 - 17/12/1938</td>
<td>The four-power Munich agreement between Germany, Britain, France and Czechoslovakia was signed on the 30th of September.</td>
</tr>
<tr>
<td>26/8/1939</td>
<td>12/8/1939 - 16/9/1939</td>
<td>September 1st 1939: Germany invades Poland</td>
</tr>
</tbody>
</table>

Table 7: Break dates with 90% asymmetric confidence bands and corresponding events for the Young bond price series. Means of the estimated $AR(1)$ process are not reported as many of the parameters are found to be not significant.

6 Discussion

Any study of the German buyback episode must be able to explain why the buybacks started in earnest in 1931, the reason for the appearance and persistence of the price differential between German bonds at home and abroad, and the behaviour of the German authorities. This paper provides a coherent framework within which such an explanation can be provided.

Why did the buyback start in earnest in 1931?

The fundamental mechanism was outlined in Part 3. During sovereign debt crises, domestic investors value the debt more because they have a higher chance of repayment. Why?
When the debt is held internally the gains from default and repudiation in terms of foregone transfers to foreigners disappear. Moreover, domestic citizens are in a privileged position to obtain repayment due to, among other things, the ease with which they can interact with the local legal system, for example through bankruptcy procedures (Eaton, Gersovitz, and Stiglitz, 1986). In 1929-31, political and economic chaos invested Germany. Commercial debtors saw their credits endangered by the Young Plan, which made their claims junior with respect to reparations (Ritschl, 2012a), and this spurred foreign bondholders to sell their holdings and domestic ones to purchase them. Indeed, although foreign bondholders publicly deprecated buybacks, their private stance was much more favourable, and interferences in the functioning of secondary markets were seen with hostility (Eichengreen and Portes, 1990a).

The justifications for the repurchases put forward in the previous literature on episode are essentially two: export subsidization and debt overhang reduction. The first explanation was popular among contemporaries (Einzig, 1934; Heuser, 1934), but has been contested by authors such as Ellis (1941), Balogh (1938) and Klug (1993). Klug, in particular, cites evidence from the German Economic Ministry, which highlights that German authorities did not believe the differential between debt prices in Germany and abroad to be high enough, at least until 1934, for the buybacks to be an efficient tool of export subsidisation in a foreign-exchange-strapped country such as Germany. To the extent that the exports subsidised were genuinely additional, however, this argument should not apply. In any case, this framework does not explain why the buybacks started as a spontaneous private initiative. Balogh (1938), Childs (1958) and Ellis (1940) claim that the buybacks became a real policy tool only during the course 1932, and that the Reichsbank managed to impose its complete monopoly on the practice only after the complete transfer moratorium of 1934. In fact, the Reichsbank president prior to Schacht, Hans Luther, expressed disappointment for the failure of the German authorities to curb debt repurchases more effectively while the economics ministry, although viewing the practice with more favour, was also eager to keep it under strict control (James, 1985).

Klug saw the buybacks as a tool for reducing the debt overhang. The author cited the fact that the German authorities were always on the lookout for ways to reduce Germany’s
external debt, including unconventional ones (to use an euphemism) like the swap of German Jews for debt reduction. German foreign debt did indeed fall sharply during the 1930s. Commercial debt was more than halved, going from 32.6 billions in 1930 to 13.9 in 1938. However, buybacks represented a small part of this debt reduction. Devaluations of debt denominated in foreign currencies following the departure of the USA, Great Britain (and eventually Gold Bloc countries such as France, the Netherlands, etc.) from the Gold Standard and direct repayments amounted to around 80% of the debt reduction with the buybacks accounting for the rest (Table 5). With the rapid growth of German GDP in the second half of the 1930s, the debt burden became also lighter. In this context, the use of buybacks for debt reduction purposes does not appear realistic, especially for a country heading for political and economic isolationism and marching in rapid steps towards war. Buybacks, especially of Austrian debt, took place until 1944, in the full swing of the war (Klug, 1993). The reasons why the German government would want to reduce the debt overhang of Austria in the midst of a world war is unclear. Moreover, debt buybacks imply a mechanism that, although formalised by Bulow and Rogoff only in the 1980s, must have been known to the German authorities: as foreign debt is bought back, the residual debt will increase in value, everything else equal. This means that the reduction in face value of the debt will be offset by the increase in its market value. Indeed, Klug himself calculated that if the buybacks led to any reduction in the market value of the debt, then this was minimal. The supposed mobilisation of thousands of individuals and companies as well, as billions of Reichsmarks, to bring about a minimal reduction in the value of the foreign debt does not appear realistic.

What explains the price differential between German bonds traded at home and abroad?

Some contemporaries attributed the price differential to an "irrational panic" (TheAnnalist, 1932). Ellis (1941) cited the financial repression introduced in Germany in the early 1930s. Klug hypothesized that the price differential was due to a different valuation of debt between creditors and debtors. According to the author, this could be the result of asym-

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31 Apart from what has already been discussed in Part 2, on the 3rd of October 1931 the free publication of foreign quotations of German securities was suppressed. On the 2nd of November of the same year, the trading of German securities issued abroad was put under the strict direct control of the Devisen (Foreign Exchange) Offices.
metric information between creditors and debtors regarding Germany’s desire to repudiate its foreign debt. An alternative explanation is that default had a higher cost for debtors compared to creditors. The explanation entailed in our framework is much simpler. Creditors abroad valued German debt less than German citizens because debts held domestically had a much higher probability of repayment. Both the willingness and ability to enforce payments of the German government concerned foreign bondholders disproportionately more than domestic ones. In addition, residents of a country are in a privileged position to obtain repayment from domestic debtors compared to their foreign counterparts, not least, due to the ease with which they can interact with the domestic legal system or example through bankruptcy procedures (Eaton, Gersovitz, and Stiglitz, 1986).

In the presence of frictionless markets, riskless arbitrage opportunities will be seized upon immediately. In the presence of disruptions to the functioning of these markets, instead, the discount can persist and the arbitrage opportunities will not be exploited. The sudden stop of 1929/30, exchange controls, Schacht’s transfer moratorium, growing political isolationism and the threat of war dealt successive blows to the chances of repayment for foreign bondholders and the discount became ever larger. The strict control of the German authorities on the buybacks meant that this could not be offset. As argued by Ellis (1940), the exchange control system was the principal reason why the price differential between German bonds abroad and at home persisted, and thus also the principal reason for the perpetuation of the system itself.

*How is the behaviour of the German authorities explained?*

The behaviour of the German government represents, perhaps, the most puzzling part of the story. If, as argued in this paper, the buybacks were detrimental for the country as a whole and the German government was aware of this, and if macro objectives such as systematic export subsidisation and debt reduction were not the goals of this practice, why did the German government not completely suppress them? Why were some resources put aside for debt repurchases?

We argue that limited and tightly controlled buybacks were a useful policy tool. By limiting the availability of foreign exchange and controlling its use, the German authorities were able to extract some accessory benefits from the buybacks, without suffering any major
detrimental effects. First of all, genuinely additional exports - which would not have taken place without the possibility of buybacks - were a source of foreign exchange, rather than a leakage. Foreign exchange was of essential importance to Germany, both to meet its debt service and to acquire raw materials and other capital goods abroad. Moreover, key industries benefitted significantly from this hidden subsidies (James, 1985).

Secondly, buybacks might have played a role as a debt reduction tool and source of riskless arbitrage profits for specific industries, individuals and companies. It is well known that there were strong connections between the Nazi party and groups of industrialists - these have been recently documented, together with their economic implications by Ferguson and Voth (2008) - and previous German governments had strong connections with interest groups such as the powerful Junkers. It is not outlandish to imagine that granting the possibility of repurchasing foreign debt could be another mean of favouring supporters and strengthening alliances. Klug documents how the Miag Muhlebau Industriegesellschaft was granted foreign currency in order to buy back a foreign debt that bore a particularly heavy interest burden. The repurchase of foreign debt for the individual gain of influential individuals and organisations has also been widely documented. Hermann Josef Abs, an important figure in post-war Germany and a Deutsche Bank director in the 30s, made large personal profits by purchasing German debt abroad and selling it for higher prices in Germany (James, 2004). The finance Minister Lutz Graf Schwerin, tried to carry out a similar operation in November 1933, but was only granted around half of the foreign exchange he requested (Klug, 1993). Klug also recounts how the Nazi party itself, in a period when it was particularly cash-strapped (between autumn 1933 and spring 1934), employed some intermediaries to buy German debt in Europe and make profits by selling it at home.

7 Conclusion

We have studied a relatively little-explored aspect of German economic history in the interwar period: the large repurchases of foreign debt, carried out by Germans between 1931 and 1939. The poisonous economic and political climate - both within Germany and worldwide have made the study of this episode both interesting and difficult. The considerations of contemporaries who observed and studied the episode, such as Balogh (1938), Bonnel (1940),
Ellis (1941), Einzig (1934), Harris (1935) and Heuser (1934), were critically assessed together with more recent studies by historians and economists, including Childs (1958), James (1985) and Klug (1993). Modern economic thinking and recent advances in sovereign debt theory - particularly the investigation by Broner, Martin, and Ventura (2008, 2010) of the role of secondary markets in mitigating sovereign risk - were employed in combination with econometric analysis based on both primary and secondary sources. These different tools were used to disentangle this complex historical and economic event. Published and unpublished historical documents and archival sources were used to add depth and consistency to the arguments made.

The theoretical models presented in Part 3 described the framework used to think about debt buybacks in this paper. Contrary to the literature that emerged as a result of the 1980s debt crisis\(^{32}\), buybacks were not treated as the result of a planned government intervention, but rather as the natural outcome of market activity given the incentives of investors in the debtor and creditor countries. It was shown that, in the event of a sovereign debt crisis, citizens of the debtor country have an incentive to repurchase the foreign debt, while creditors are willing to sell it. The behaviour of the government of the debtor country was also explained coherently within the framework presented. Due to the fact that debt repurchases are inefficient ex-post for the debtor country, the government has an incentive to make trading in secondary markets, and therefore debt repurchases, difficult. This intervention can lead to the foreign debt not being bought back in its entirety and to debt securities trading at a strong discount abroad, while trading at face value at home.

As demonstrated throughout the paper, this framework applies extremely well to the German episode. Soon after buybacks began as a private initiative in the economic and political chaos of 1931, they were put under strict control by the German authorities. In the summer of 1931, exchange controls were introduced, which gave the German central bank (the Reichsbank) a virtual monopoly over all operations in foreign exchange. With the rise to power of the Nazis and the introduction of Hjalmar Schacht’s Transfer Moratorium in the late spring of 1934, however, the control over the allocation and use of foreign exchange, and thus debt repurchases, by the German authorities became complete.

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\(^{32}\)For example Bulow and Rogoff (1988, 1991); Froot (1989); Kenen (1991); Krugman (1988, 1989); Sachs (1988a,b)
These events were reflected on the price of German bonds at home and abroad. The empirical analysis of Part 5, studied in detail the behaviour of the price of German bonds in New York and in Berlin by uncovering structural breaks in the series. Looking at asset prices has at least two advantages: high frequency, and reliability. The former was guaranteed by the manual collection of ten years’ worth of weekly price of Dawes and Young bonds traded on the New York stock exchange and an by an electronically available series of German Mortgage bonds traded in Berlin. The reliability consists in the fact that stock market data is likely to be free from direct manipulation, an aspect that bears much importance in the interwar period, when double-dealing and secrecy were defining characteristics.

The breaks identified econometrically were assigned a precise time horizon based on asymmetric confidence intervals and connected to key political and economic events. The results support the arguments made. Government interventions and other events which hampered the functioning of secondary markets and made buybacks difficult had sharply negative effects on the price of bonds. Other episodes such as the unilateral elimination of the gold clause by the German government and various other reductions in the debt service did not lead to any break, hinting that secondary market trade was regarded as an element of foremost importance by foreign creditors. The price of German bonds in Germany followed a different course: after the tumult of 1931 and the closure of the Berlin stock exchange for almost a year until April 1932, bonds in Berlin recovered their value rapidly, trading close to face value for the rest of the decade. This indicates an extremely different valuation of the bonds depending on where they were held, confirming that foreign and domestic bondholders faced a different probability of repayment.

The buybacks, however, were not suppressed altogether because they allowed the pursuit of specific micro-tools for the German authorities. Key industries, companies and influential individuals benefitted from the repurchases in several ways. These could be employed as a hidden subsidy to promote exports, as a tool to reduce debts or as a way to make large arbitrage profits. At the same time, their use as a systematic macro-tool was ruled out by the fact that it would have led to excessive debt repayment and welfare losses for the German economy as a whole.

This paper suffers from the shortcomings common to many studies of the interwar period.
The issue of data availability has been partly mitigated by the reliance on primary sources and a dataset put together directly by the authors. The exceptional political and economic climate of the interwar years made the use of both official and private statements and other documents problematic. These were used to corroborate the arguments made, but have to be taken with more than a grain of salt. Given that the reasoning behind the decisions of German and foreign investors as well as the German authorities could be observed directly, economic reasoning and econometric analysis were deemed to be the most effective tools of investigation.

This study of the German buyback episode has not exhausted all research possibilities. These could evolve in at least two directions. First, a more precise breakdown of the buybacks both geographically and temporarily could open the way to a detailed analysis of the effect of buybacks on bond prices. Second, studying the evolution of the price of German bonds in creditor countries other than the US would probably enrich and strengthen the case made in this paper, due to the similar evolution of German bond prices in all creditor countries. Future studies might also employ completely different strategies to explore the episode or present new interpretations and answers for the three main questions of in this paper: 1) why did the buybacks start in earnest in 1931? 2) why did the price differential between German bonds traded at home and abroad first appear and persist? 3) how can the behaviour of the German authorities be explained? Nonetheless, this study’s extensive consideration of primary and secondary sources, as well as its detailed empirical analysis, contributes to a better understanding of the phenomenon of German buybacks in the interwar period and to the large literature on foreign debt and sovereign risk, thus opening the way for related future research. Given the recent wave of sovereign debt crises in Europe, the interwar period may yet yield some more lessons for today.
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