Selective default expectations[*]

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Abstract

This paper explores how selective default expectations affect the pricing of sovereign bonds in a historical laboratory: the German default of the 1930s. We analyze yield differentials between identical government bonds traded across various creditor countries before and after bond market segmentation. We show that, when secondary debt markets are segmented, a large selective default probability can be priced in bond yield spreads. Selective default risk accounted for one third of the yield spread of German external bonds over the risk-free rate during the 1930s. Selective default expectations arose from differences in the creditor countries' economic power over the debtor.

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Keywords: sovereign risk, debt default, secondary markets, creditor discrimination.

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Not all creditors are equal in sovereign debt default episodes. While default penalties are usually considered to be the main reason why sovereign debtors repay their external debts, creditors differ in their ability to impose costs on defaulting governments. So when facing repayment difficulties, a sovereign government might decide to discriminate between its various creditors. Such behavior is known as *selective debt default*. Selective debt defaults are a common phenomenon and become a salient option for sovereign governments when public debt burdens are high and domestic or international political factors can provide a basis for creditor discrimination.[1]

How do the resulting selective default expectations affect the pricing of sovereign bonds? In this paper, we study the incidence of selective default risk on the sovereign bond market in a historical laboratory: the German external default of the 1930s. Our analysis is based on a unique empirical setting. Exactly identical German government bonds (Dawes bonds) were traded continuously on European creditor countries' markets but residents of these different countries did not expect to receive the same treatment from Germany in case of default. In addition, as the prospect of a default became more concrete following the German government's announcement of a transfer moratorium in June 1934, creditor governments organized the geographical segmentation of secondary markets for German bonds and made it technically impracticable to arbitrage these bonds across borders. These exceptional conditions make this episode a unique case for studying selective default risk. Using a simple analytical framework, we show that, when secondary debt markets are integrated, no substantial probability of selective default can be priced in bond yield spreads. By contrast, when secondary markets are geographically segmented, the yields of identical bonds can significantly diverge across various creditor markets. In that case, the bond yield spread between markets reflects both a liquidity premium and a selective default probability.

We collect daily prices of the German External Loan of October 1924 (the Dawes loan) in London, Paris, Zurich, and Amsterdam from January 1930 to August 1939. We also assemble archival evidence on the volume of German Dawes bonds traded between these different markets. Prices for identical Dawes bonds were roughly equal across all European secondary markets between January 1930 and June 1934 (when markets were integrated) and large quantities of bonds were traded across markets. Prices of Dawes bonds then diverged between June 1934 and August 1939 (when markets were segmented) and there was no trading across markets. During those years, price differentials were both substantial and persistent. We show that only a very small share of these differences can be attributed to liquidity differentials between markets. Bond price differentials across European markets foremost reflected investors' selective default expectations.

[1] Gelpern and Setser (2004), Kohlscheen (2009), Erce and Díaz-Cassou (2010), Erce and Mallucci (2018), and D'Erasmo and Mendoza (2020) show that defaulting governments frequently discriminate between domestic and foreign creditors. Schlegl, Trebesch, and Wright (2019) show that they also often discriminate between different classes of foreign creditors. Chamon, Schumacher, and Trebesch (2018) show the extent of creditor discrimination during the Greek debt restructuring of 2012.

Our analysis first allows us to gauge the extent of selective default risk. Throughout the second half of the 1930s, bond market participants treated British creditors as if they had a senior claim relative to continental creditors. Dawes bonds traded at a significantly lower yield in London than in other European markets. For instance, the mean spread between the London and Paris Dawes bond yield-to-maturity was as high as 6.3 percentage points between June 1934 and August 1939 – even though the cash flow (coupon) for French and British bondholders remained identical until the outbreak of World War II. On each continental European market during that period, selective default risk accounted on average for around one third of the total yield spread of German government bonds over the risk-free rate.

Second, we analyze the determinants of selective default risk. Why did market participants expect bondholders from certain countries to be treated more favorably than bondholders from other countries? A historical narrative reveals that creditors' economic power vis-à-vis the debtor was a key determinant of their seniority rank. Investors' perceptions of a lower risk of default on British bondholders stemmed from Germany's economic dependence on the UK. Because London occupied a central position in the global trading and financial system of the 1930s and the German economy was strongly dependent on the British Empire's raw materials, the UK government could potentially inflict great economic damage on Germany. It follows that defaulting on British bondholders could have entailed much larger costs for the German government than would defaulting on continental European creditors. In addition, creditor countries' diverging policy responses to Germany's external debt problem contributed to reinforce investors' perceptions that the German government would treat British bondholders favorably. For these reasons, investors considered UK bondholders as the most senior creditors while the continental bondholders of France, the Netherlands, and Switzerland were perceived as junior.

We also analyze the drivers of selective default risk in an event study framework. We explore the effect of various news events on the risk of selective default in each junior creditor market. We distinguish between the unconditional probability of selective default (the probability that the debtor government will default on junior but not on senior creditors) and the conditional probability (the probability that, conditionally on there being any default, senior creditors will be spared). Consistent with the predictions of our analytical framework, we find that, on average, news about the debtor government's *general* ability or willingness to repay its external debts did not significantly affect selective default risk. By contrast, good news about the relationship between the debtor government and the senior creditor country (for example, positive news regarding the progress of debt settlement negotiations with the senior creditor country's government) increased conditional selective default risk. Finally, unconditional and conditional selective default risk in a given junior creditor country's market responded strongly to news about the bilateral relationship between that country and the debtor country.

Our paper makes several contributions to the literature on selective defaults. First, we present a novel methodology to identify selective default risk in sovereign bond yields. Our empirical setup featuring the presence of a same government bond continuously traded across different creditor countries' markets even when trading between these markets became prohibited allows us to directly measure selective default risk by making only minimal assumptions. Recently, a growing literature has emphasized how sovereign governments often discriminate between creditors by selectively defaulting on certain debt instruments (Gelpern and Setser, 2004; Kohlscheen, 2009; Erce and Díaz-Cassou, 2010; Erce and Mallucci, 2018; Schlegl, Trebesch, and Wright, 2019; D'Erasmo and Mendoza, 2020). Researchers have also analyzed how the risk of differential treatment affects yield differentials *between different bonds* issued by a same debtor government (Duffie, Pedersen, and Singleton, 2003; Waldenström, 2010; Simon, 2015; Du and Schreger, 2016; Krishnamurthy, Nagel, and Vissing-Jorgensen, 2017; Chamon, Schumacher, and Trebesch, 2018; Papadia and Schioppa, 2020).[2] Our paper differs from these empirical studies as we analyze yield differentials for a same government bond *between different foreign markets* before and after these markets became segmented. The advantage of our approach is that it does not require controlling for the various characteristics that generally differ between various non-fungible bonds issued by a same debtor (such as, for example, their currency of denomination, coupon, maturity or other specific clauses of the debt contract) and affect their pricing. To our knowledge, our paper is the first to directly measure selective default risk in such an empirical setting.

Secondly, while the literature on selective defaults has so far focused on discrimination between domestic and foreign creditors (Gelpern and Setser, 2004; Kohlscheen, 2009; Erce and Díaz-Cassou, 2010; Erce and Mallucci, 2018; D'Erasmo and Mendoza, 2020) or between official and private creditors (Schlegl, Trebesch, and Wright, 2019), our paper shows - based on an important historical episode - how debtor governments can also discriminate *between creditors from various foreign countries*. More generally, our case study illustrates how discrimination can occur even when all creditors hold perfectly identical debt instruments. The risk of such discrimination is generally not observable in bond yields as identical bonds held by different foreign creditors can usually be exchanged on secondary debt markets; hence, they have a unique market price. We however show that, when the different creditor countries' secondary markets are segmented, a large selective default probability can be priced in sovereign bond yields.

[2] Chamon, Schumacher, and Trebesch (2018) report evidence that sovereign bonds issued under a foreign jurisdiction trade at a premium compared to bonds issued by the same debtors under domestic law, indicating that a risk of selective default is priced in these bonds. Waldenström (2010) and Papadia and Schioppa (2020) study the yield spread between different bonds issued by the Danish and German governments, respectively, on domestic and foreign markets during the 1930s and 1940s. Duffie, Pedersen, and Singleton (2003) analyze the determinants of the yield spread between various Russian government bonds in the period surrounding the debt default of August 1998 - a famous case of selective default. Du and Schreger (2016) report evidence that Brazilian government bonds denominated in local currency trade at a lower credit spread than bonds denominated in foreign currency and attribute this difference to selective default risk. Krishnamurthy, Nagel, and Vissing-Jorgensen (2017) explore how the European Central Bank's policies during the debt crisis of 2008-2013 affected the yield differential between foreign-law, US dollar-denominated European government bonds and local-law, euro-denominated bonds issued by the same sovereigns. Simon (2015) identifies a selective default risk spread associated with inflation-indexed sovereign bonds (as opposed to nominal bonds) within the euro area during the same period.

Our research also speaks to a recent theoretical literature on sovereign debt and secondary markets (Guembel and Sussman, 2009; Broner, Martin, and Ventura, 2010; Broner et al., 2014). A central result of this literature is that secondary markets prevent discrimination among creditors. While in these models a seniority structure emerges where domestic creditors are senior relative to foreign ones, their above central result is easily transferable to a setting where senior and junior creditors are residents of various foreign countries. To this end, our paper offers a clean test of this literature's prediction about secondary markets and selective defaults based on an empirical setting in which secondary markets were first well-functioning and, then, disrupted.

Our paper is also related to an extensive literature—going back to Bulow and Rogoff (1989)—that links the sustainability of sovereign debt to creditors' threats of trade sanctions. Researchers have provided evidence on the use and effectiveness of trade sanctions by measuring the impact of defaults on trade flows between creditor and debtor countries (Rose, 2005; Borensztein and Panizza, 2010; Fuentes and Saravia, 2010; Martinez and Sandleris, 2011; Kuvshinov and Zimmermann, 2019) or by focusing on particular historical episodes (Weidenmier, 2005; Tomz, 2007). These studies have yielded mixed results. Our historical case study provides lessons for the relationship between trade sanctions and selective default risk. It shows that the perceived probability of default is lower on creditors whose government can inflict severe economic damage on the debtor but that policies detrimental to a debtor country's trade can also reduce its ability to repay and therefore increase default risk.

Finally, our paper is part of a literature that exploits historical episodes of market segmentation to provide empirical evidence on a variety of financial phenomena. For example, Koudijs (2015, 2016) focuses on periods in which bad weather conditions resulted in the suspension of information flows between the London and Amsterdam capital markets during the eighteenth century to study the effect of news and the incidence of insider trading on stock prices. Chambers, Sarkissian, and Schill (2018) examine the price of US railroad bonds cross-listed in New York and London during the first era of globalization of 1873-1913 to measure the effect of geography and partial market segmentation on firms' cost of capital. Waldenström (2010) uses the segmentation between the Swedish and Danish bond markets during the Second World War to test theoretical predictions regarding the costs of domestic versus external sovereign debt defaults. Chan, Menkveld, and Yang (2008) exploit the segmentation of the Chinese equity market between A-shares (reserved to domestic investors) and B-shares (reserved to foreign investors) prior to 2001 to measure the effect of asymmetric information on stock prices.

The remainder of the paper proceeds as follows. Section 1 provides the historical background to the German debt default of the 1930s. In Section 2, we quantify the selective default risk priced in German government bonds after the segmentation of secondary bond markets in 1934. Section 3 analyzes the determinants of selective default expectations and the factors affecting the perceived seniority structure of German government debt. Section 4 concludes.

1 The German default of the 1930s

Following the end of the First World War, Allied countries sought 132 billion marks in reparations from defeated Germany (around 2.5 times the GNP of 1913).[3] The perception in Germany that the requested amounts were too high translated into an unwillingness to pay. As a result, tax collection stalled, budget deficits widened, and their monetization set the stage for the hyperinflation that plagued the German economy in 1922 and 1923 (Ritschl, 2012). Germany's first international bond issue since the First World War was born from these circumstances. In 1924, the UK and US governments proposed a new plan to restore the German economy and monetary system. Through the Dawes Plan, victor countries agreed to reschedule reparation payments and promote an international loan that would enable Germany to stabilize its currency. The eponymous loan—officially called German External Loan of October 1924—was issued in October 1924 on nine different markets (see Appendix A.1.1 for details).

The Dawes loan led the way to an unprecedented foreign borrowing spree by the German public sector, private companies, and other private entities (Ritschl, 2002, 2012). The years 1924-1928 were characterized by a rebound in global economic activity, trade, and capital flows (Feinstein and Watson, 1995; Accominotti and Eichengreen, 2016).[4] This borrowing spree however came to a halt in 1928-1929 and foreign lending then slowed down dramatically.[5] The resulting sudden stop in German capital inflows evolved into a full-blown financial crisis in spring 1931 (James, 1985; Ferguson and Temin, 2003; Schnabel, 2004).

The ensuing change in default expectations is mirrored in the evolution of the price (and yield-to-maturity) of the Dawes bond across European markets (Figure 1). The falling price during the second quarter of 1931 reflects the deterioration of trust in the German government's ability to service its debt, culminating on July 15th when the government suspended convertibility of the Reichsmark and introduced capital controls.[6] The German government however continued to service its long-term external debts in full after the financial crisis of 1931 and bond prices then temporarily recovered. Yet that regain of trust was shattered by Hitler's ascension to power in January 1933 (Figure 1). With the Nazis in power, the path towards a default on sovereign debt became more evident. In May 1933, the German government communicated to its international creditors that foreign exchange reserves had

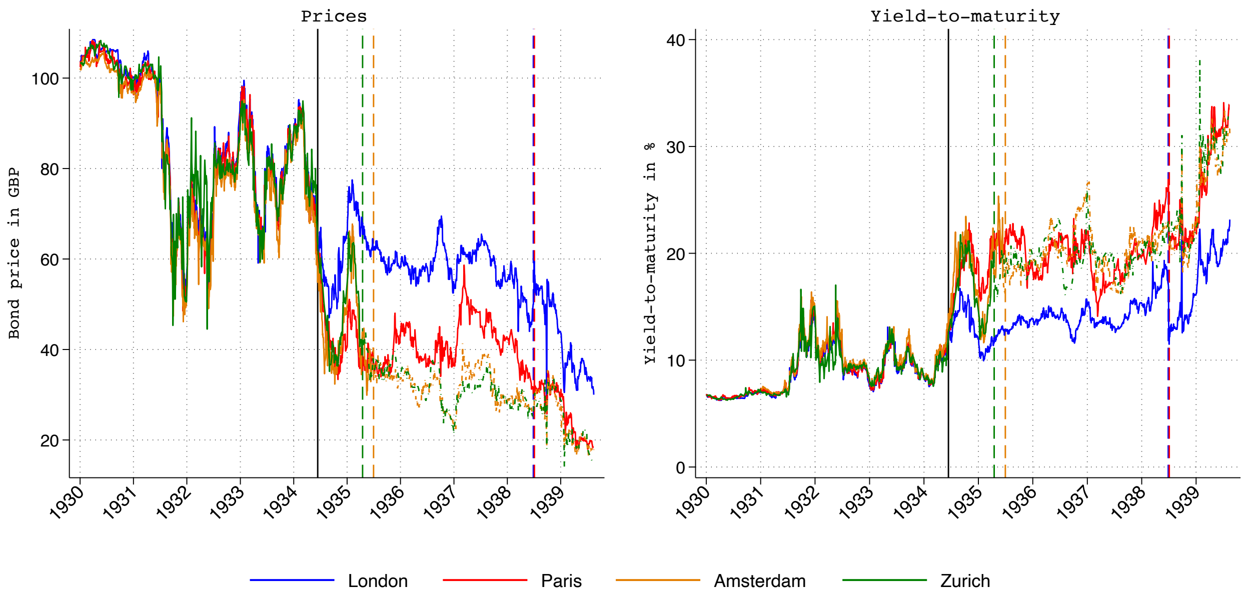
[3]See Ritschl (2012) for the corresponding numbers. The Allies never really expected Germany to repay the so-called C-bonds, which amounted to around one half of the total reparations.

[4]Despite the already high debt levels due to reparations, foreign investors were keen on lending to Germany under a special clause of the Dawes Plan that granted seniority to commercial debt service over reparations payments (Ritschl, 2012).

[5]The decline in global capital flows followed the tightening in US monetary policy in 1928 and stock market crash of October 1929. The sudden stop in German capital inflows resulted also from details of the Young Plan, which was written in early 1929 to replace the Dawes Plan and settle the reparations issue. The new plan, which was likewise accompanied by a bond issue, abolished the transfer protection clause of the Dawes Plan. As a consequence, foreign investors became increasingly wary of making new loans to the German government and private sector (Ritschl, 2012).

[6]These emergency measures were designed to prevent rapid repatriation of foreign capital, especially short-term assets, held in Germany. By the standstill agreement of September 19, 1931, Germany's banking creditors agreed to the freezing of their short-term assets in Germany in exchange for uninterrupted interest payments (Forbes, 1987; Accominotti, 2012, 2019).

Figure 1: Dawes bonds' price and yield-to-maturity, 1930-1939



Notes: The figure plots the daily prices and yields-to-maturity of Dawes bonds denominated in British pounds (GBP) on the London, Amsterdam, Paris, and Zurich markets from January 1930 to August 1939 (see Appendix A.1.2 for sources). The solid vertical lines mark the beginning of geographical market segmentation on June 14, 1934. The dashed vertical lines mark the date of the first coupon reduction for bondholders of each market central to this study (Zurich: April 17, 1935; Amsterdam: June 14, 1935; London: July 1, 1938; Paris: July 1, 1938; see also Appendix A.1.2 for details). French and UK bondholders received equal treatment from the German government throughout the period.

become so low that further orderly sovereign debt service would soon be impossible[7] and, on 14 June 1934, it finally announced a complete transfer moratorium on all long-term foreign liabilities, effective at the beginning of July (Clement, 2004).

The German default on the Dawes loan proceeded sequentially throughout the 1930s. First, the German government reduced the interest service on the American (US dollar) tranche of the Dawes loan by 25 percent (effective as of October 1934) but continued to fully service the coupon of the sterling tranche held on the markets of its European neighbors.[8] At the same time, Germany entered into separate debt settlement negotiations with each European creditor nation. Partial defaults on the sterling tranche of the Dawes loan did not occur until later. The dashed lines in Figure 1 mark changes in the interest payments that were the outcome of these negotiations. In April 1935, the German government reduced interest payments in British Pounds on all bonds held by Swiss residents from 7 to 4.5 percent.[9] In June 1935, the coupon on Dawes bonds in Dutch ownership was reduced to

[7] See 'Telegram for the Reichsbank to the Bank of England,' 15 May 1933, Bank of England archives, London, United Kingdom (BoE henceforth), G1-445. The long negotiations that ensued gave way to a two-tiered compromise whereby Germany continued to service central government loans (the Dawes and Young loans) in full but reduced payments on all provincial and municipal loans. Likewise, amortization payments into the sinking fund continued for the Dawes loan (Clement, 2004, p. 39). For the special status of the Dawes loan, see also 'Letter from the Chairman of the British Long Term and Medium-Term Creditor Committee to the Treasury', 19 October 1933. BoE, G1-445.

[8] Germany's bilateral trade balance was in surplus with all creditor countries but the United States, a state of affairs that the German government used as justification for discriminating against American bondholders. See 'U.S. Investors and Dawes Loan', *Financial Times*, 15 October 1934.

[9] The remaining 2.5 percent were scheduled to be paid in so-called Dawes Marks, which could only be used for purchasing German stocks and property as well as for covering travel expenses within Germany. Dawes Marks could however be converted into British Pounds on the Zurich

3.5 percent.[10] In August 1938, the German government reduced interest payments to French and UK bondholders to 5 percent.[11] Finally, all interest and principal repayments were suspended when the Second World War broke out in September 1939. Private bondholders had little legal recourse by which to recoup payment and, in contrast to the 2014 decision in *Republic of Argentina v. NML Capital Ltd.*, foreign courts considered they had no authority to enforce the equal treatment of all creditors.[12]

The sterling tranche of the Dawes loan had been floated in five foreign countries (Belgium, France, United Kingdom, the Netherlands, and Switzerland), and sterling Dawes bonds were subsequently quoted regularly on four of these five countries' markets (Amsterdam, London, Paris, and Zurich).[13] These bonds were identical in that they were all denominated in the same currency (GBP), had the same coupon (7%), were repayable at par in October 1949, and had no gold clause. However, Figure 1 shows that the prices (and yields) for these identical bonds diverged following announcement of the German external debt moratorium in June 1934. Dawes bonds traded at a systematically higher price in London than in any other continental market throughout the period. The difference between the London and Paris prices is particularly striking as the Dawes bond's cash flow remained identical for British and French creditors throughout the whole period under consideration. This suggests that investors considered that British bondholders were less likely to be defaulted upon than continental bondholders. Even after coupon payments to Swiss and Dutch bondholders were reduced in April and June 1935, respectively, the Dawes bond's yield-to-maturity remained lower in London than in Zurich and Amsterdam, suggesting that market participants still considered that UK bondholders were more likely to be preserved from further defaults. A note recovered in the archives of the German Finance Ministry confirms this interpretation. This document noted that London's quotation of the German Dawes bond was "the firmest and the highest" and that the bonds were "quoted significantly weaker on all other international stock exchanges (...) compared to London." The author also pondered the option that British residents be granted "preferential treatment" with regards to the amortization of their bonds, which suggests that the risk of a selective default was real.[14]

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stock exchange at a substantial discount (see Appendix A.1.3). The yields-to-maturity shown on the right panel of Figure 1 take account of coupon payments in both British Pounds and Dawes Marks.

[10] The remaining 3.5 percent were to be paid in Dawes Marks.

[11] This partial default on the coupon was not compensated by payments in Dawes Marks.

[12] Under the 'absolute immunity' doctrine (Weidemaier and Gulati, 2018), which was recognized by all jurisdictions at that time, creditors could not sue the German government in a foreign court in order to enforce their rights. In one famous case, a Swedish holder of German government (Young) bonds sued the bond trustee (the Bank for International Settlements) in a Swiss court for violating the *pari passu* clause when making interest payments to Germany's preferred bondholders. Although the court acknowledged that Germany had breached that clause, the bond trustee was not held responsible because it acted only as an intermediary in the debt contract and was therefore justified in following the German government's instructions. Thus, the bondholder lost the case (Kim, 2014; Gelpern, 2016).

[13] Additionally, around 0.7% of the overall sterling tranche was issued in Germany. Trading in Dawes bonds on the Brussels market was minimal and, by 1934, there was no active market for these bonds in Belgium. See Bundesarchiv, Berlin, Germany (BArch henceforth), R2.318, Sheet 121.

[14] "Englands Glaeubigerstellung gegenueber Deutschland", 10 November 1937, BArch, R2.320.

2 Measuring selective default risk

2.1 Selective default expectations with and without market integration

What was the role of selective default risk in explaining yield differentials across markets and what were its drivers? We first present a simple analytical framework to guide our empirical analysis. Our purpose here is not to develop a complete model of the pricing of selective default risk. Instead, the framework highlights the necessary conditions for eliciting this risk from bond yields and derives measures of the unconditional and conditional probabilities of selective default.

Let us suppose that a sovereign government has borrowed from creditors in two foreign countries $i = j, s$ by issuing one-period, zero-coupon bonds on their respective markets. The bonds issued in the two countries are denominated in pounds sterling and have a face value of £1. We work with risk-neutral measures and denote the risk-neutral probability of default on country j's bondholders as θ. We assume, for simplicity, that bonds have a zero recovery rate in case of default.[15] In the event of a default, risk-neutral investors expect the sovereign government to spare country s's bondholders with a positive probability $\pi \in (0, 1)$. Since $\theta(1-\pi) < \theta$, a seniority structure emerges where country s's bondholders are senior relative to those of country j. The sample space consists of three outcomes $\Omega = \{\text{No default, All default, Selective default}\}$.[16] *No default* corresponds to the case where the debtor government continues to service its debts to all creditors. *All default* corresponds to the case where the debtor government defaults on all bondholders. *Selective default* corresponds to the case where the debtor government defaults on country j's bondholders but spares country s's bondholders from the default. Hence, $\theta\pi$ is the risk-neutral, *unconditional* probability of selective default (ie. the probability of a selective default on country j's bondholders) while the *conditional* selective default probability (ie. the probability that, conditionally on there being a default, the debtor government will spare country s's bondholders) is π.

We denote the price of the bond in country i at time t as P_{it} and its yield-to-maturity as y_{it}. Let $p_{it} = ln(P_{it})$ be the bond's log price. With continuously compounded yields, it follows that $y_{it} = -p_{it}$. Let r_t be the risk-free interest rate and ψ_{it} be a liquidity premium. In continuous time, we can express bond yields in the junior creditor country j and senior creditor country

[15] In our setting, it is not possible to distinguish empirically between the two components of the expected loss on the Dawes bond (ie., the probability of default and loss given default) and this distinction would not affect our interpretation of the yield spread between markets as reflecting expectations of creditor discrimination. We therefore assume a loss given default of 100%, which allows us to interpret bond yield spreads as risk-neutral probabilities of default (after deducting liquidity premia).

[16] See Chamon, Schumacher, and Trebesch (2018) for this characterization of seniority in another context and Appendix B.1 for the corresponding probability tree.

s, respectively, as follows:[17]

$$y_{jt} = r_t + \theta_t + \psi_{jt} \tag{1}$$

$$y_{st} = r_t + \theta_t(1 - \pi_t) + \psi_{st} \tag{2}$$

Thus, the bonds' yield spread between country j and country s can be decomposed into an (unconditional) probability of selective default and a liquidity premium:

$$y_{jt} - y_{st} = \theta_t \pi_t + (\psi_{jt} - \psi_{st}) \tag{3}$$

We now consider two different cases, which correspond to the situations faced by investors during the two distinct subperiods that compose our empirical case study: a. the case of geographical integration of secondary bond markets and b. the case of geographical market segmentation.

The two countries' secondary bond markets are integrated when investors are free to purchase and sell the bond in either market. In that case, the two creditor countries' secondary markets are part of one single, global bond market and, since liquidity is a bond-specific characteristic, the bond's liquidity premium is the same in markets s and j ($\psi_{st} = \psi_{jt}$). In addition, market integration implies that the bond's yield is equalized across markets through arbitrage, ie. the yield differential $y_{jt} - y_{st}$ cannot be larger than the cost of arbitrage. Therefore, no substantial selective default risk can be priced in the yield spread when secondary markets are integrated.[18] The junior country's bondholders can always sell their bonds to senior country residents and this possibility effectively removes any significant selective default risk. This case mirrors the situation described in Broner, Martin, and Ventura's (2010) theoretical model where the presence of secondary bond markets erases the possibility of selective default.[19]

By contrast, if official trading restrictions prevent investors from arbitraging bonds between countries, the secondary bond

[17]Drawing on Duffie and Singleton (1999), Saunders and Allen (2010, Chapter 5) discuss liquidity and other components of the bond yield.

[18]Empirical evidence suggests that transaction costs were small on international financial markets during the period under consideration. For example, Keynes (1923, p. 128) and Einzig (1937, pp. 172-173) consider that covered interest rate parity deviations larger than 50 basis points induced arbitrage in the 1920s and 1930s. Peel and Taylor (2002) provide empirical evidence confirming the Keynes-Einzig conjecture. Note that 50 basis points lie within the range of transaction costs estimates (3 to 150 basis points) for today's US corporate bond market (Edwards, Harris, and Piwowar, 2007). Additionally, Figure 1 shows that cross-market price differentials for German government bonds were very small during the period when investors were free to trade those bonds in the various European bond markets. This suggests that the cost of moving bonds between markets was indeed minimal.

[19]In a related theoretical paper, Broner et al. (2014) consider a case where investors expect the debtor government to close secondary bond markets at some point in order to implement a selective default on foreign creditors. This possibility induces foreign (junior) creditors to sell their bonds to domestic (senior) ones while secondary markets are still functioning. Although our simple framework does not attempt to model trading volumes, we present empirical evidence below on the volume of German government bonds traded between creditor markets in the period before market segmentation, which is consistent with this theoretical prediction.

markets of s and j will be geographically segmented. For instance, in our case study, creditor countries' governments banned the sale of German government bonds that were not in the possession of a domestic resident at a specified date on their respective market and implemented these restrictions through the introduction of bond affidavits. When secondary markets are segmented, the same bond can trade at different yields in the senior creditor country s's and junior creditor country j's markets and a large selective default probability can potentially be priced in the yield spread $y_{jt} - y_{st}$. In addition, different liquidity premia can arise for the same bond across markets. Specifically, the risk-neutral, *unconditional* probability of selective default on country j's bondholders can be written as follows:

$$\theta_t \pi_t = y_{jt} - y_{st} - (\psi_{jt} - \psi_{st}) \tag{4}$$

By combining equations 1 and 4, we can also solve for the risk-neutral, *conditional* probability of selective default:

$$\pi_t = \frac{y_{jt} - y_{st} - (\psi_{jt} - \psi_{st})}{y_{jt} - r_t - \psi_{jt}} \tag{5}$$

This measure, to which we will return in our empirical analysis, corresponds to the probability that the senior country s's bondholders will remain unaffected *in the event of a default* and has intuitive appeal. The conditional probability of selective default converges to 1 when the bond yield in the senior country s's market approaches the risk-free rate (ignoring liquidity differentials). Conversely, when y_{st} converges to y_{jt}—indicating that investors attach similar probabilities to a default on countries s's and j's bondholders—the conditional probability of selective default converges to 0.

This simple analytical framework shows that substantial selective default risk can only be priced in sovereign bonds when the various creditor countries' secondary bond markets are geographically segmented. In order to measure unconditional and conditional selective default risk empirically, it is also necessary to decompose the yield spread between markets into a liquidity premium and a selective default probability.

2.2 Market segmentation

Measuring selective default risk first requires to find an empirical setup in which identical bonds are traded across various creditor countries' secondary debt markets and where these markets are strictly geographically segmented. The divergence of prices for identical Dawes bonds across markets in 1934-1939 provides a first indication that European secondary markets for these instruments were strictly segmented during this period (Figure 1). In the following, we discuss the legal aspects of this segmentation, conduct two statistical tests for its efficacy, and provide additional direct evidence on market segmentation based on descriptive data documenting the circulation of Dawes bonds on the various creditor markets before and after the adoption of trading restrictions.

Until the German government announced its intention to default on its external debt on 14 June 1934, physical arbitrage of Dawes bonds between countries was very common. On the Paris market, around 30 financial houses specialized in arbitraging securities with the London market while investment banks and credit institutions also generally had an arbitrage department (François-Marsal, 1931, p. 444). François-Marsal (1931, p. 442) describes how arbitrageurs frequently engaged in short-selling of securities on the London or Paris market while taking a corresponding long position on the other market.[20] The arbitrage of Dawes bonds across markets was so ordinary that this operation appeared as a practical example in a contemporary German textbook for bank apprentices to illustrate the logic and practicalities of cross-market security arbitrage (Kämpfe and Prater, 1928, p. 169).

Following the announcement of the German debt moratorium however, creditor countries' governments began to undertake separate debt settlement negotiations with Germany. Each creditor government attempted to secure the best terms for its residents. Differential treatment of various European bondholders could only occur if bondholders from different creditor countries were prohibited from exchanging their bonds with each other on secondary markets. Therefore, creditor countries' governments aimed to suspend international arbitrage by prohibiting the sale of German government bonds registered in a foreign country on their respective market. New trading regulations imposed that any bond traded on a given creditor country's market now had to be sold along with an affidavit certifying that the bond was in possession of a domestic resident at the date of the moratorium. Certified bonds could then be traded by any investor on the respective market.[21] Interestingly, the decision to segment bond markets was taken by the creditor countries' governments and not by the debtor government. This appears to run counter to the prediction of the recent theoretical literature on sovereign debt and secondary bond markets (Broner, Martin, and Ventura, 2010; Broner et al., 2014). These models describe a situation in which a debtor government imposes capital controls in order to prevent bond arbitrage and enable discrimination in favor of its own domestic residents (senior creditors) and against foreign residents (junior creditors). However, in the historical episode analyzed here, investors expected the debtor government to discriminate not between domestic and foreign creditors but between creditors from various foreign countries. In that context, the segmentation of secondary markets was primarily in the interest of UK bondholders (senior creditors) as opposed to continental ones (junior creditors). More generally,

[20] François-Marsal (1931, pp. 440-452) stresses how, due to the existence of modern technologies (ie., the telephone and telegraph) and strong competition between arbitrageurs, price differentials between markets were never substantial and always short-lived.

[21] See "Ban on sales of foreign-owned bonds," *Financial Times*, 22 June 1934. The UK Stock Exchange Committee for General Purposes ruled on 21 June 1934 that "until further notice no bonds of the Dawes and Young loans will be a good delivery unless accompanied by a declaration by a banker (British) or stock broker (member of London or Provincial Stock Exchanges) that they were on 15 June 1934 the property of a British subject." Other European countries introduced similar affidavit or certification requirements. For a comparison of affidavit regulations in October 1934, see BArch, R2501.6743, Sheets 78ff.

by imposing trading restrictions, creditor countries' governments ensured that their residents could benefit from the preferential debt settlement conditions they hoped to secure from Germany.

To what extent were these official trading restrictions effective at achieving the segmentation of secondary debt markets? A traditional approach towards characterizing the dynamics of asset prices across markets consists in measuring their comovement through correlations and impulse response functions (Chordia, Sarkar, and Subrahmanyam, 2005). This provides an indirect test of the effectiveness of arbitrage in the absence of data on the quantities of bonds moving between markets. In our setup, the interpretation of the resulting test statistics is facilitated by the fact that only one security (the Dawes bond) was affected by legal, cross-border trading restrictions while other securities could still be arbitraged across markets. Therefore, we can compare the comovement of Dawes bond yields across markets with that of another cross-listed security: the British Consol. The British Consol was considered an international safe asset during this period, comparable to a US government bond today. Both the Dawes bond and British Consol were denominated in pounds sterling and were traded in Paris and London in 1930-1934. However, whereas international arbitrage of German Dawes bonds was suspended as of June 1934, investors remained free to purchase and sell British Consols on both the Paris and London markets throughout the whole period. The British Consol therefore serves as an ideal control group to assess the effect of bond trading restrictions after 1934.

Table 1: Yield correlations between continental markets and London market

Period:	ρ_{Dawes} Paris	ρ_{Dawes} Amsterdam	ρ_{Dawes} Zurich	ρ_{Consol} Paris
Before segmentation	0.99***	0.99***	0.95***	0.99***
After segmentation	0.84***	0.84***	0.82***	0.99***

Notes: The table displays correlations of daily Dawes bond yields-to-maturity between each continental creditor market (Paris, Amsterdam, and Zurich) and the London market. The table also reports the correlation of daily yields-to-maturity for the British Consol between the Paris and London markets. 'Before segmentation' refers to the period from 1 January 1930 to 14 June 1934. 'After segmentation' refers to the period from 15 June 1934 to 31 August 1939.

Table 1 displays the pairwise correlations of yields-to-maturity between each of the continental markets (Paris, Amsterdam and Zurich) and the London market for the German Dawes bond as well as the Paris-London yield correlation for the British Consol before and after the imposition of legal restrictions on the cross-border trading of German government bonds. In the first period (1 January 1930-14 June 1934), pairwise yield correlations between London and the other markets are close to 1 for the Dawes bond and British Consol alike. In the second period however (15 June 1934-31 August 1939), pairwise correlations weaken substantially for the Dawes bond (to 0.82-0.84) while the Paris-London Consol yield correlation remains unchanged (0.99). This suggests that trading restrictions significantly impeded the arbitrage of German Dawes bonds while leaving arbitrage of other securities unaffected. The fact that cross-market comovement between Dawes bond yields remained positive in the period when markets were segmented is also consistent with the analytical framework presented above as bond yields in the senior and junior creditor countries y_j and y_s are both a function of the risk-neutral probability of default on country j's bondholders θ. The strength of the cross-market correlation depends on the relative size of general and selective default risk.

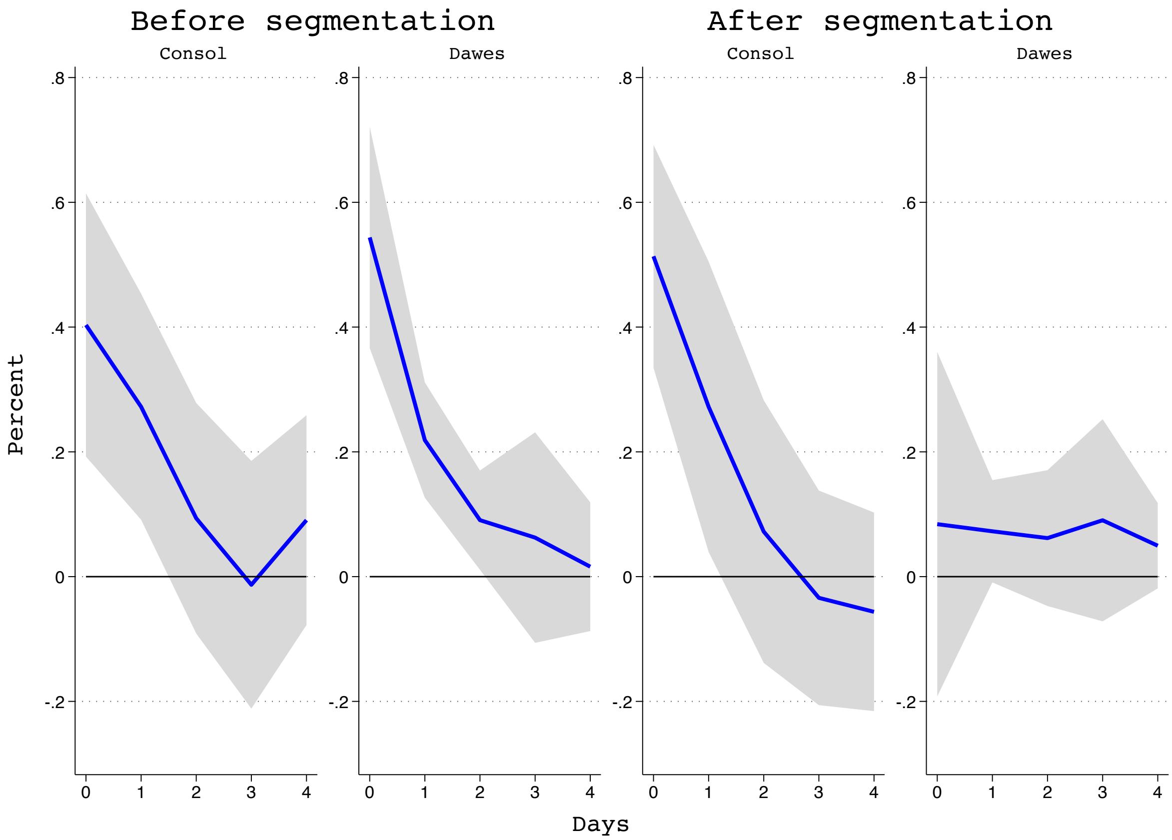
As a second test of market segmentation, we explore how bond yields adjusted in the very short run before and after the imposition of trading restrictions. While the correlations presented above focus on yield levels, we now apply Jordà's (2005) local projections method to the first difference of the Dawes bond and Consol yields on the London and Paris markets. If secondary markets are integrated, we would expect the yield of bond b in a given market to adjust quickly following a change in another market. Focusing on the yields' first differences allows us to explore the effectiveness of this high-frequency adjustment. We estimate impulse response functions based on a set of regressions with the horizon of a trading week (i.e., 5 days: $h = 0, ..., 4$):

$$\Delta y^{Paris}_{b,t+h} = \alpha_{b,h} + \sum_{l=0}^{L=4} \beta_{b,h,l} \Delta y^{London}_{b,t-l} + \sum_{l=1}^{L=4} \gamma_{b,h,l} \Delta y^{Paris}_{b,t-l} + \epsilon_{b,t+h} \tag{6}$$

Figure 2 reports the impulse responses of bond yields on the Paris market following a 1-percent shock to the respective bond yields in London. Before the legal segmentation of the Dawes bond market in June 1934, the Paris Consol and Dawes markets reacted similarly to a shock on the London market and both bonds' yields adjusted fully within three days. However, after June 1934, we observe marked differences in the impulse responses between the two securities. The adjustment for the Dawes bond is slower and not significant if we were to impose a 99% confidence interval (shaded areas in the graph). By contrast, trading restrictions did not apply to the British Consol (our control group) and Consol yields in Paris reacted in the same way to price changes in London before and after June 1934. This suggests that the measures adopted in June 1934 to organize the geographical segmentation of secondary markets for German government bonds were effective.

Last, it is possible to provide even more direct evidence on market segmentation by looking at the volumes of German Dawes bonds traded between European markets before and after the debt moratorium of June 1934. Sterling Dawes bonds had been initially issued in 1924 in five different tranches corresponding to the five countries of issuance. Interest payments were processed through designated paying agents and each bond had a unique identifier. Data contained in archival records allow us to compute the value of outstanding bonds of each tranche on seven European stock exchanges at various dates (see Appendix A.1.5). For example, we can compute the share of outstanding Dawes bonds of the French tranche which were held in the United Kingdom and vice versa.

Figure 2: Impulse response functions for Paris market in response to London shock



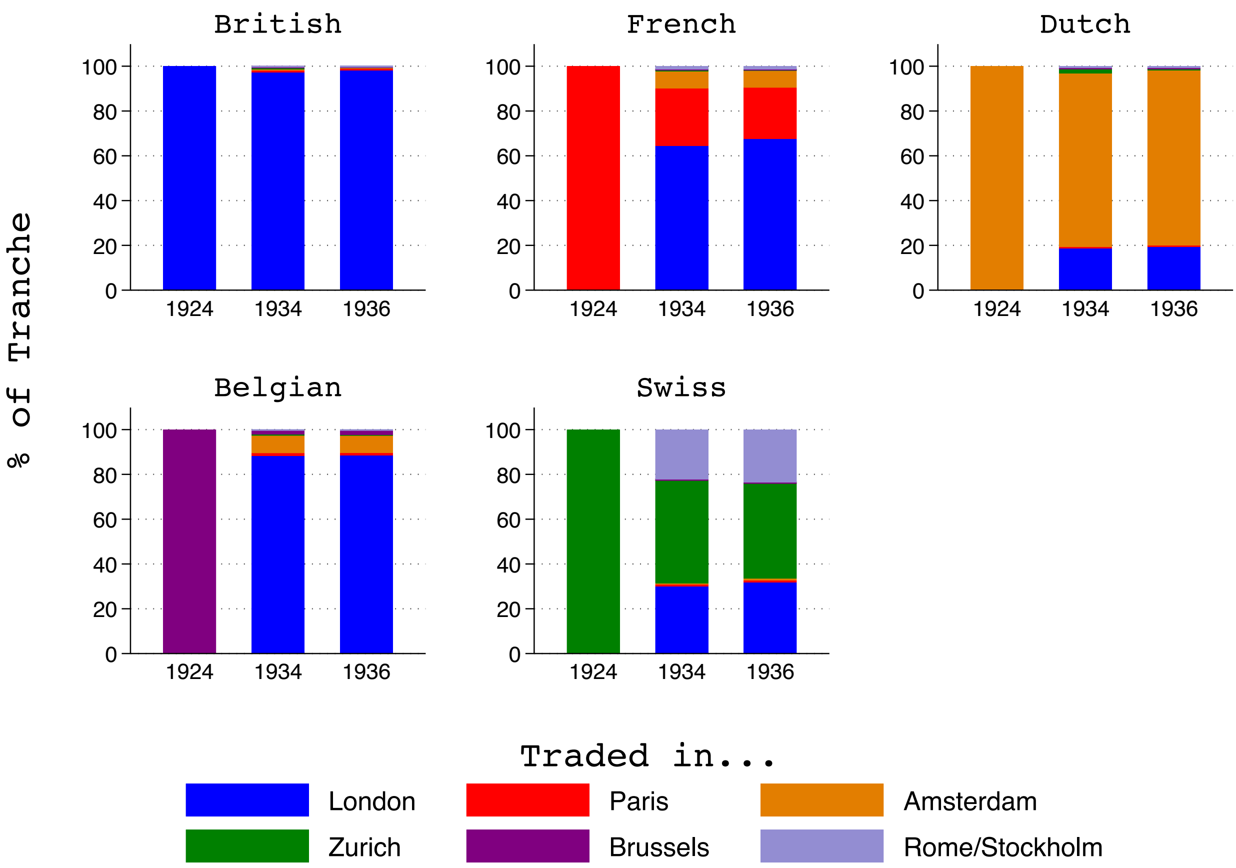
Notes: The figures depict impulse responses on the Paris market to a 1-percentage point shock on the Dawes bond's and Consol's yield-to maturity in London. The impulse responses are estimated using Jordà's (2005) local projections approach with a horizon of 5 days. Missing values in both data series are treated as if there was no trade and thus they are replaced with the most recent previously available value. 'Before segmentation' refers to the period from 1 January 1930 to 14 June 1934; 'After segmentation' refers to the period from 15 June 1934 to 31 August 1939. The grey-shaded areas reflect 99% confidence bands. For details on the bond yield data, see Appendix A.1.

Figure 3 reports the shares of sterling Dawes bonds of each tranche of issue (British, French, Dutch, Belgian and Swiss tranches) circulating on the various European secondary markets (London, Paris, Amsterdam, Zurich, Brussels, and Rome/Stockholm) in 1924, 1934 and 1936. The figure reveals that a substantial share of the Dawes bonds was traded across borders between the issue date (1924) and the announcement of the German debt moratorium (1934).[22] In contrast, no significant transfer of German government bonds occurred across countries between 1934 and 1936. This suggests that the affidavit and certification processes were extremely efficient at preventing arbitrage between markets. From 1934 onward, it became virtually impossible to transfer German government bonds across borders and secondary debt markets became segmented.

Interestingly, the data reveal that substantial transfers of German Dawes bonds from continental to British bondholders

[22]The absolute number of bonds (assuming the most common denomination of £100) in the respective markets was as follows. 1924 (at issuance): London (120,000), Paris (30,000), Amsterdam(25,000), and Zurich (23,600). In 1934 (after segmentation): London (107,432), Paris (6,591), Amsterdam (15,145), and Zurich (6,228). See Appendix A.1.5 for details on the calculation.

Figure 3: Circulation of the various GBP Dawes bond tranches in European bond markets



Notes: This figure shows the share of outstanding German GBP Dawes bonds of each tranche of issue held in each foreign European creditor market in 1924 (issue date), 1934, and 1936. For each tranche and year, the blue, red, orange, green, dark purple, and light purple bars correspond to the share of bonds of each tranche held in London, Paris, Amsterdam, Zurich, Brussels, and Rome/Stockholm, respectively. The total volume of Dawes bonds circulating on foreign European markets decreased significantly between 1924 and 1934 as the German government progressively redeemed parts of the tranches and encouraged the repatriation of foreign bonds to Germany (see Klug, 1993; Papadia and Schioppa, 2020). The share of redeemed and repatriated bonds is not shown in the figure. Data for 1934 and 1936 were computed from the Bank of England archives: OV34/281 (interest payments), OA-26-2 (amounts outstanding). See Appendix A.1.5 for more details on the calculation.

took place during the period when markets were integrated. 64% and 88% of the outstanding bonds of the French and Belgian tranches circulating on foreign markets were held in London by 1934 and a significant portion of the Swiss and Dutch tranches (30% and 19%, respectively) were also in the hands of British investors. By contrast, only a tiny share (2.75%) of the outstanding bonds issued under the British tranche were held by continental European investors in 1934. Although our simple framework does not model the volumes traded across markets and can therefore not account for this phenomenon, we notice that the sale of bonds from junior (continental) to senior (UK) bondholders is consistent with the predictions of the recent theoretical literature on sovereign default risk and secondary debt markets. In particular, Broner et al. (2014) argue that the risk of future secondary market trading restrictions and selective default should induce junior (in our case, continental) creditors to sell their bonds to senior (in our case, UK) ones as we observe before June 1934.

2.3 Liquidity

When secondary debt markets are geographically segmented, a substantial yield spread can emerge for identical sovereign bonds between various creditor countries' markets. That spread reflects selective default risk (ie., expectations of differential treatment of bondholders from the various creditor countries) as well as liquidity differentials across markets. To what extent can liquidity differentials account for the yield spreads actually observed between European markets for German government bonds in 1934-1939?

Daily trading volume data and bid-ask spreads are unfortunately unavailable for sovereign bonds in the period under consideration. We therefore rely on Roll's (1984) implicit measure of effective bid-ask spreads to proxy for the liquidity of German Dawes bonds in the 1930s. This measure, which is derived from the serial covariance of bond returns, provides a good proxy for bond market liquidity in the absence of other direct indicators (Schestag, Schuster, and Uhrig-Homburg, 2016). For each creditor market i, Table 2 reports the Dawes bond's mean daily proportional bid-ask spread L_i (in %) for the period after the imposition of trading restrictions (June 1934-August 1939) as estimated using Roll's (1984) method.

Table 2: Implicit bid-ask spreads

	Mean effective bid-ask spread (in %)		
Dawes bond traded in:	L_i	$L_j - L_s$	$L_i - L_r$
London	0.60	-	0.33
Paris	0.89	0.30	0.63
Amsterdam	1.95	1.35	1.69
Zurich	1.52	0.93	1.26

Notes: This table reports the mean daily effective proportional bid-ask spread of the German Dawes bond in London, Paris, Amsterdam and Zurich, estimated using Roll's (1984) method over the 15 June 1934-31 August 1939 period (L_i). Following Roll (1984), we estimate the bid-ask spread in each market i as $L_i = 200 * \sqrt{-cov(R_{i,t}, R_{i,t-1})}$, where R_i is the log-difference of the bond price over the previous trading day. Serial covariance is calculated based on a 21-day time window as suggested by Roll (1984). The table also reports the bid-ask spread differential between each continental market j and the London market s ($L_j - L_s$) as well as the differential between the Dawes bond's bid-ask spread on each market i and the bid-ask spread of the British Consol ($L_i - L_r$). See Appendix A.1.4 for details on the calculations and for comparisons with an alternative liquidity proxy in the spirit of Lesmond, Ogden, and Trzcinka (1999).

German Dawes bonds were very liquid across all European markets when compared to other financial instruments available to investors at the time. Their mean bid-ask spread over the 1934-1939 years ranged from 0.60% in London to 1.95% in Amsterdam. By comparison, the average bid-ask spread on sovereign bonds traded on the London and New York markets was situated at around 2.5% in the second half of the 1930s (Meyer, Reinhart, and Trebesch, 2022, Figure X), while the mean bid-ask spread on Dow Jones stocks was around 1% (Jones, 2002, Figure 1). For each continental (junior) market j, Table 2 also reports the Dawes bond's mean bid-ask spread differential relative to the London (senior) market ($L_j - L_s$). Last, the table shows the bid-ask spread differential relative to the international safe asset or British Consol ($L_i - L_r$) for each market. The evidence indicates that liquidity differentials across markets were very moderate. Especially, the Dawes bond's bid-ask spread was only 0.30 pp. higher on the Paris than on the London market. Dawes bonds were also liquid when compared to the international safe asset. The bond's mean bid-ask spread differentials relative to the British Consol in London and Paris were only equal to 0.33 pp. and 0.63 pp., respectively. These conclusions are robust to using alternative liquidity proxies such as, for example, the frequency of non-zero return trading days (see Lesmond, Ogden, and Trzcinka, 1999) as shown in Appendix A.1.4.

It is unlikely that these moderate liquidity differentials can account for the large differences in yields observed in Figure 1. Accounting for coupon reductions, the Dawes bond yield spread (relative to London) was on average equal to 6.5%, 6.2% and 5.7% for Paris, Amsterdam and Zurich, respectively, during this period. By contrast, the corresponding bid-ask spread differential was only equal to 0.30%, 1.35% and 0.93%, respectively, for these three markets. For bid-ask spread differentials to fully explain the spread in yields-to-maturity between Paris and London, the elasticity of the bond yield spread with respect to the bid-ask spread differential would have had to be larger than 20.

In order to more precisely gauge liquidity premia across markets, we follow Beber, Brandt, and Kavajecz (2008) and estimate the elasticity δ of the Dawes bond yield spread between each continental market and London with respect to the bid-ask spread differential:

$$(y_j - y_s)_{jt} = \delta(L_j - L_s)_{jt} + \gamma_{jm} + \eta_t + \epsilon_{jt}, \tag{7}$$

where $(y_j - y_s)$ is the yield-to-maturity spread between the junior creditor country's market j (Paris, Amsterdam or Zurich) and the senior creditor country's market s (London). $(L_j - L_s)$ denotes the corresponding bid-ask spread differential. η_t is a fixed effect, which controls for shocks common to all three continental markets j on any given trading day t, and γ_{jm} is a market $\times$ month m fixed effect.

The fixed effect γ_{jm} allows controlling for changes in credit risk in each market. Since credit risk and liquidity are generally negatively correlated (Beber, Brandt, and Kavajecz, 2008; Pelizzon et al., 2016), not controlling for credit risk might bias our estimate of elasticity δ. We thus allow market-specific credit risk to vary every month.[23] To identify δ, we only employ data for the period from when markets became segmented in June 1934 until just before the first partial default and coupon reduction for Swiss bondholders in April 1935. This allows us to estimate the parameter on a consistent sample in which bond yields are all fully comparable.

The upper panel of Table 3 reports our estimates of elasticity δ. The point estimate of δ in column (1) amounts to 0.10

[23] Beber, Brandt, and Kavajecz (2008) use data on credit default swap (CDS) spreads to proxy for credit risk on the European sovereign bond market. However, the market for credit default swaps did not emerge until the 1990s.

Table 3: Liquidity differentials and bond yield spreads across markets

Elasticity estimate	Dependent variable: yield-to-maturity spread over London $(y_j - y_s)_{jt}$ **Sample**			
	(1) Without extrapolated data		(2) Last available yield extrapolation	
	Point estimate	90% CI	Point estimate	90% CI
δ (Bid-ask spread differential)	.10** (0.05)	[0.02; 0.18]	0.13**(0.06)	[0.03; 0.23]
Fixed effects				
Trading day	✓		✓	
Month i. S.× market	✓		✓	
Observations	463		636	
Adjusted R^2	.91		.90	
Implied liquidity premia	Mean implied liquidity premium over London: $\psi_j - \psi_s$, (in %)			
Paris Dawes	0.03	[0.01; 0.05]	0.04	[0.01; 0.07]
Amsterdam Dawes	0.14	[0.03; 0.24]	0.18	[0.04; 0.31]
Zurich Dawes	0.09	[0.02; 0.17]	0.12	[0.03; 0.21]

Notes: The table's upper panel reports the results of regressions of the daily Dawes bond yield-to-maturity spread (relative to London) on the corresponding bid-ask spread differential. The time window spans from the introduction of trading restrictions (June 15, 1934) just until before the negotiations about the partial default of Switzerland were concluded (April 15, 1935). Column (1) reports the results for a sample in which missing yield observations are treated as missing. Column (2) reports the estimates for a sample in which missing yield observations are replaced with the latest recorded values. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered on the day and on the "market" × "month in sample" dimension. The table's lower panel reports mean implied liquidity premia for Dawes bonds in each continental market (Paris, Amsterdam and Zurich) based on the corresponding estimates of elasticity δ (mid-point, lower, and upper bound). For any given day and market, an implied liquidity premium is obtained by multiplying the bid-ask spread differential $(L_j - L_s)$ with δ. The reported premia in the table correspond to the average over the 15 June 1934-31 August 1939 period.

with a 90% confidence interval ranging from 0.02 to 0.18. These estimates imply that a 1 percentage point rise in the bid-ask spread differential (relative to London) in a given market results in an increase in the Dawes bond yield spread of 0.02 to 0.18 basis points. The magnitude of the coefficient chimes with modern estimates of the elasticity of sovereign bond yield spreads with respect to bid-ask spread differentials. For example, Favero, Pagano, and von Thadden (2010, p. 128) report an estimate of δ of 0.05 based on data for euro-area countries' 10-year sovereign bond yields. In the second column, we report results for the same specification but replace any missing bond yield value with the last recorded value. The point estimate of δ rises slightly to 0.13 and the upper bound of the 90% confidence interval increases to 0.23.

Table 3's lower panel reports the implied liquidity premia for the Dawes bond in each continental European market relative to the London market for the 1934-1939 period.[24] These correspond to the expression $\psi_j - \psi_s$ in our analytical framework. The liquidity premium was the lowest for the Paris market where it ranged between 1 and 5 basis points only. At the other end of the spectrum, the Dawes bond's bid-ask spread differential and corresponding liquidity premium was the highest on the Amsterdam market. However, even for this market, the liquidity premium remained very moderate. Our most conservative estimate of the Amsterdam liquidity premium (relative to London) is situated just below 31 basis points, compared to a mean yield differential of 624 basis points during the same period. Overall, these results indicate that liquidity differentials only accounted for a minor share

[24] Following Beber, Brandt, and Kavajecz (2008), we multiply the estimates of δ with the mean bid-ask spread differential between each continental market and London to obtain the average liquidity premium in basis points.

of yield differentials observed for identical German Dawes bonds across European markets.

2.4 Quantifying selective default risk

We now return to the yield decomposition derived from our analytical framework (Section 2.1).[25] Combining definitions (2) and (3), we can represent the bond yield in each junior country's market j as follows:

$$y_j = r_t + \theta_t(1 - \pi_t) + \psi_{st} + \theta_t\pi_t + (\psi_{jt} - \psi_{st}) \tag{8}$$

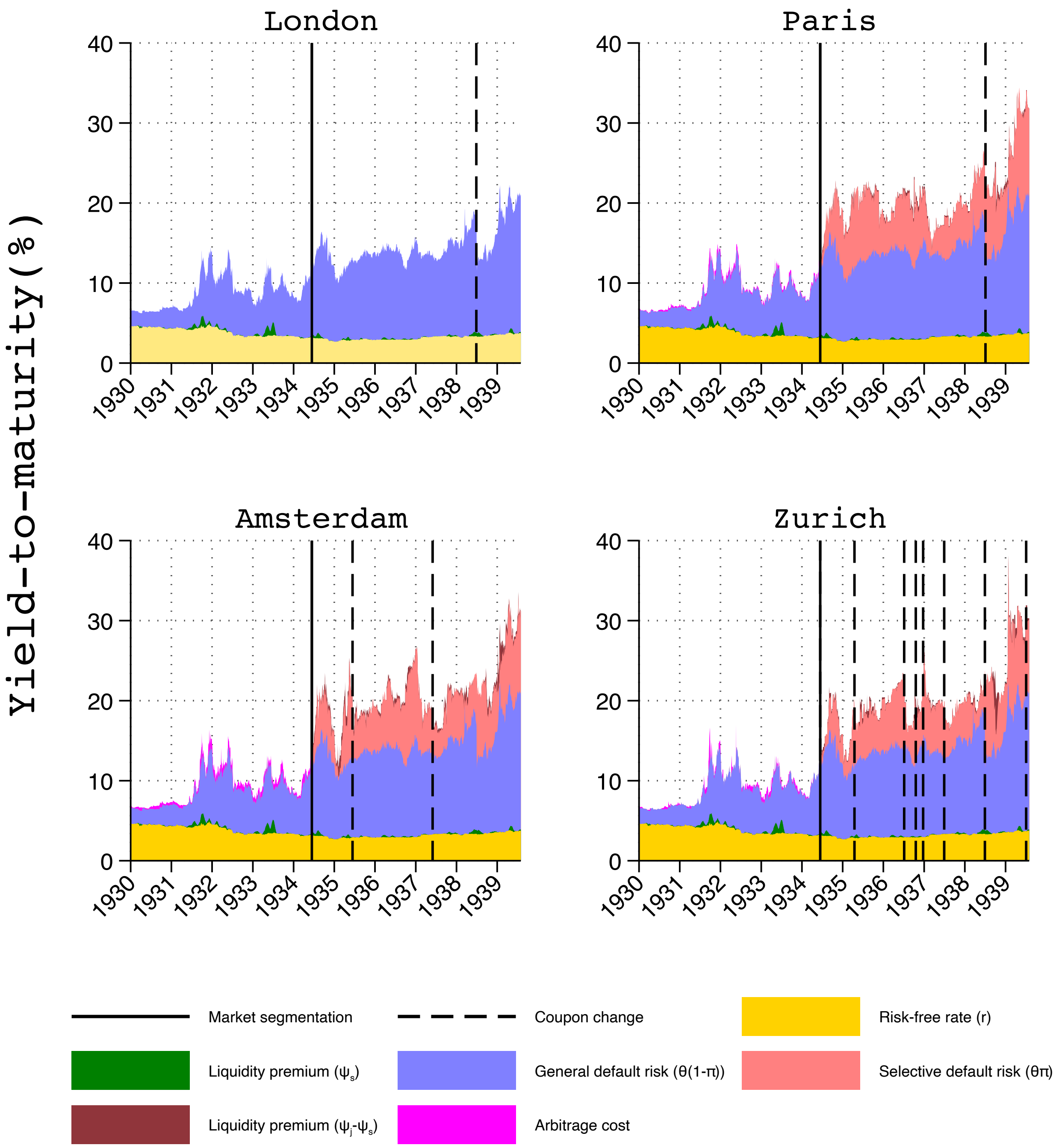
where $\theta_t\pi_t + (\psi_{jt} - \psi_{st})$ corresponds to the Dawes bond yield spread between the junior and senior country's markets. In our model, this spread reflects both a risk-neutral probability of selective default ($\theta_t\pi_t$) and a liquidity premium over the senior creditor market ($\psi_j - \psi_s$). In accordance with the previous section, we estimate the liquidity premium as the product of the bid-ask spread differential between junior market j and the London market s ($L_j - L_s$) and elasticity δ. We set $\delta = .23$, which corresponds to the upper bound of the 90% confidence interval of our estimate of δ in the most conservative specification. We then compute our empirical proxy for the probability of selective default on each country j's bondholders as the difference between the Dawes bond yield spread (over London) and the liquidity premium, i.e., $\theta_t\pi_t = y_{jt} - y_{st} - (\psi_j - \psi_s)$.[26]

In equation (8), the term $r_t + \theta_t(1 - \pi_t) + \psi_{st}$ corresponds to the yield-to-maturity in the senior creditor market (London). This yield reflects a risk-free rate r, a liquidity premium over the risk-free asset ψ_s, and a general default probability $\theta_t(1 - \pi_t)$. We use the yield on the principal British long-term government bond (the British Consol) as a proxy for the international risk-free rate r. To estimate the liquidity premium ψ_s, we employ the bid-ask spread differential between the Dawes bond on the London market (L_s) and the international risk-free asset (L_r) and use the same estimate of elasticity δ as for computing the markets j's liquidity premium (i.e., $\delta = .23$). Finally, we compute our empirical measure for the risk-neutral probability of default on the senior country s's bondholders as: $\theta_t(1 - \pi_t) = y_s - r - \psi_s$. In our model, a default on senior bondholders always comes last and therefore involves a general default. Hence, the bond yield in market s reflects the risk of a general default, i.e., the probability of a German default on all junior and senior bondholders.

[25]In Appendix B.2 we discuss and provide evidence against six alternative explanations for Dawes bond yield spreads across markets that lie outside of our framework: a differential perception of war risk, a home currency bias, different marginal investors across creditor countries, asymmetric information between bondholders of the different countries, differences in the market price of risk, and differences in the expected recovery rates.

[26]In our theoretical framework, the yield spread between market j and market s, netted of the liquidity differential, corresponds to the risk-neutral, unconditional probability of selective default on country j's bondholders. In reality, bond yield spreads can of course not be literally interpreted as default probabilities and we therefore use these as empirical proxies for the default probabilities defined in our model.

Figure 4: Decomposition of German government bond yields



Notes: This figure plots the decomposition of the yield-to-maturity of the sterling Dawes bond (German government bond) in London, Paris, Amsterdam, and Zurich from 1 January 1930 to 1 August 1939. In all four graphs, the vertical solid line marks the German debt moratorium of 14 June 1934 (and beginning of market segmentation). The dashed vertical lines correspond to changes in the coupon (see Appendix A.1.3 for details). Before 15 June 1934, European markets for German bonds were integrated and the bond yield spread between each continental market and London therefore corresponded to the transaction cost of arbitraging bonds between markets.

Figure 4 presents the decomposition of the Dawes bond yield in each European market (London, Paris, Amsterdam and Zurich) from 1930 to 1939. The solid vertical line marks the beginning of market segmentation while dashed vertical lines correspond to the dates of the announcement of coupon reductions for bondholders in each creditor country's market. While the German government did reduce coupon payments to French and British bondholders in 1938, the coupon reduction was of the same magnitude for both countries' bondholders so that Dawes bonds traded in Paris and London remained perfectly comparable throughout the entire sample period. As shown in our framework, when creditor countries' bond markets are integrated, no substantial selective default risk can be priced in bond yields and the liquidity premium on a given bond does not vary across markets. Therefore, until June 1934, Dawes bond yield spreads between markets only reflected the transaction costs associated with arbitraging bonds between the various creditor countries.

By contrast, selective default risk was priced in the yields in the period when secondary bond markets were geographically segmented and expectations of creditor discrimination were substantial.[27] From June 1934 to August 1939, our proxy for the mean risk-neutral probability of a selective default on French, Dutch and Swiss bondholders was equal to 6.3%, 5.9%, and 5.6%, respectively. By comparison, our empirical measure of the risk-neutral probability of a general default on all bondholders over the same period was equal to 11.4% and the risk-free rate to 3.2%. Hence, on average, selective default risk accounted for around one third of the total yield spread (over the risk-free rate) of German Dawes bonds on the continental markets. At the same time, in comparison to both general and selective default risk, liquidity differentials only accounted for a very small share of the Dawes bond's yield-to-maturity in each market.

Figure 4 also highlights that the bilateral debt settlement agreements reached between Germany and each creditor country were followed by a decline in selective default risk on the respective market even when these agreements resulted in coupon reductions. It appears that investors did not interpret a reduction in coupon payments to a given country's bondholders as a signal of Germany's increasing unwillingness to repay these bondholders but as a concession made by creditors in view of securing future repayments. This interpretation is confirmed by news reports as well as by the price changes that followed the announcement of these agreements. For example, the price of the Dawes bond increased by 6.6% on the Amsterdam market following the announcement of the Dutch-German agreement of June 14, 1935. Although the agreement involved a substantial reduction in coupon payments, newspapers reported that investors had expected "much larger sacrifices".[28] Similarly, during the bilateral debt negotiations between France and Germany in June 1938, rumors emerged in Paris that coupon payments might be reduced to zero

[27] Note that there is no transaction cost component in bond yields after June 1934 as no arbitrage could take place between markets.

[28] *Neue Zürcher Zeitung*, 3 July 1935 (morning issue), p. 3.

for French bondholders.[29] When it was eventually announced that the Dawes bond's coupon would be reduced to 5% and that French bondholders would continue to receive the same treatment as UK bondholders, the bond's price rose by 7.6% on the Paris market and newspapers reported that the terms of the agreement had exceeded French investors' expectations.[30] The simultaneous debt settlement with British creditors was also received enthusiastically in London, where the Dawes bond's price increased by 13.7%. Newspapers reported that British investors considered the treaty as a good compromise as the moderate reduction in the coupon was outweighed by the "prospect of a continued servicing of the debt".[31] Overall, investors appear to have considered that the bilateral debt settlements reached between Germany and the various creditor countries reduced the probability of a future more complete default on coupon and principal alike. Yields-to-maturity accordingly decreased on each respective market following the announcement of these agreements.

3 The determinants of selective default risk

3.1 Explaining seniority ranks

The evidence presented so far shows that investors considered British holders of German government bonds as senior relative to continental ones and that selective default risk was priced on the various European markets for German debt. Why did this seniority structure emerge? In the following, we explore the determinants of selective default expectations. To this end, we first present a brief historical narrative of the financial and commercial relationships between Germany and its creditors during the 1930s.[32]

Investors' perceptions that British bondholders had a senior status were inextricably linked to Germany's economic dependence on the United Kingdom. The Nazi government's primary economic objective during the 1930s was to purchase the (imported) raw materials necessary for rearmament (Ellis, 1941, p. 205; Tooze, 2006, p. 73). Since London occupied a central place in the global trading and financial system, German authorities realized that they were strongly dependent on the UK in order to achieve their aims. Among the countries central to this study, the British Empire remained Germany's chief supplier of raw materials, totaling between 15% and 19% of its imports throughout the 1930s (left panel of Figure 6(a)). Even when imported from elsewhere, raw material products often transited through the London commercial center and were financed by London City banks, which were

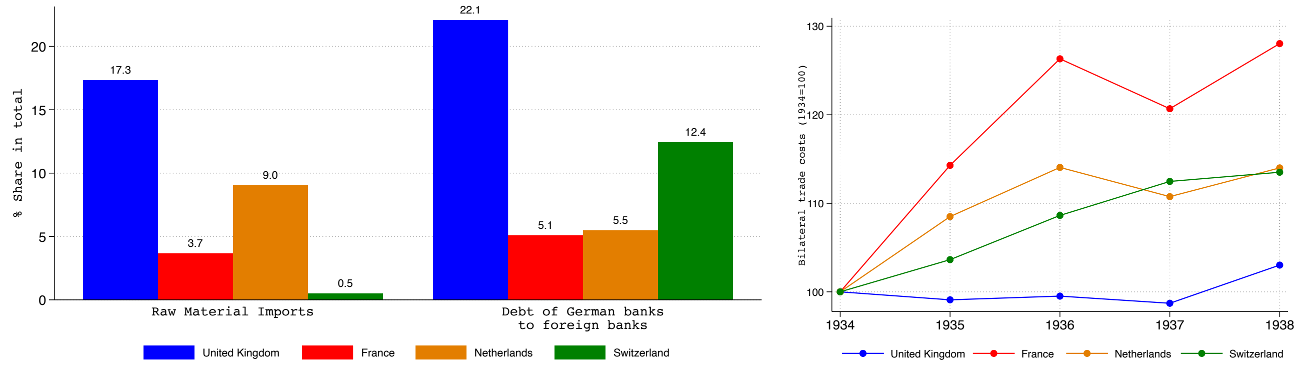
[29] *Neue Zürcher Zeitung*, 8 June 1938 (evening issue), p. 3.

[30] *Neue Zürcher Zeitung*, 11 August 1938 (morning issue), p. 3.

[31] *Neue Zürcher Zeitung*, 5 July, 1938 (morning issue), p. 3.

[32] This narrative is based on several archival records (the UK National Archives, German Federal Archives, Bank of England archives and Bank of France archives) as well as on the historical literature.

Figure 5: Indicators of Germany's economic integration in the 1930s



(a) Raw material and financial integration (1932)

(b) German bilateral trade costs (1934-1938)

Notes: Panel (a) plots the share of the respective creditor country in the total of German raw material imports in 1932 (left) and the total debt of German banks to foreign banks as of November 30, 1932 (right). The overall exposure of German banks to foreign banks was substantial—about 6% of national income. Sources are detailed in appendices A.4.1 and A.4.2. Panel (b) shows annual bilateral trade costs between Germany and the four European creditor countries from 1934 to 1938. The data are from Jacks, Meissner, and Novy (2011) for the United Kingdom, France and the Netherlands. Data for Switzerland are our own estimate (see Appendix A.4.3).

large suppliers of short-term credits for Germany (right panel of Figure 6(a)). Berlin therefore feared that the UK could potentially cut Germany off from access to these essential products and cause it severe economic damage.[33]

Given its position, the UK could make a credible threat to impose economic sanctions on Germany and its bargaining power largely explains why investors viewed British bondholders as senior. Furthermore, as the Reich slipped towards default, measures adopted by creditor countries' governments had the effect of strengthening those initial expectations. All creditor countries threatened to impose commercial and financial sanctions on Germany.[34] However, creditors also realized that Germany's ability to repay its external debts hinged on its capacity to generate sufficient export revenues.[35] Following the announcement of the German debt debt moratorium, each European creditor nation therefore conducted comprehensive trade and debt settlement negotiations with the German government.[36]

These negotiations led to different outcomes. On the one hand, the United Kingdom ended up granting German exporters

[33]According to an internal memo of the German Economics Ministry, the City of London was "still today the world's leading commercial centre" and "a large share of German raw material imports transit[ed] through London." See 'Vermerk zur englischen Note', 23 June 1934, Politisches Archiv des Auswärtigen Amts, Berlin, Germany (PA AA henceforth), R117.265. On the importance to Germany of the British Empire's supply of raw materials, see also 'Zur Drohung Gross Britanniens mit einem Clearing gegen Deutschland', 19 June 1934, BArch, R2.318, Sheets 28ff.

[34]On 26 May 1934, for example, the French ambassador in Berlin notified Germany's Foreign Minister Von Neurath that the French government was considering the imposition of a new tariff on German imports in "reprisal" if the Reich interrupted the service of Dawes and Young bonds. See 'Note by Von Neurath', 26 May 1934, PA AA, R117.123. Within two weeks of Germany's announcement of a German moratorium, the British Parliament also passed a bill authorizing the government to impose a unilateral clearing and trade sanctions on Germany (Wendt, 1971, p. 190).

[35]See, for example, the mail exchange between the President of the Dutch Central Bank and Governor of the Bank of England on German debts. 'Letter from Leonardus Trip to Montagu Norman', 26 February 1934, BoE, G1/446.

[36]In the meantime, Germany continued to pay full interest to European holders of Dawes and Young bonds. This was ratified in the British case through the Anglo-German Transfer Agreement of 4 July 1934 (Wendt, 1971, p. 213).

increased access to the home market (Wendt, 1971; Forbes, 2000, p. 110). Signed on 1 November 1934, the Anglo-German Payments Agreement aimed at facilitating trade between the two countries and, in doing so, at allowing the Reich to generate substantial export revenues in order to guarantee debt servicing to British bondholders (Ellis, 1940, p. 57).[37] One analyst viewed this treaty as an "act of economic appeasement" and noted that Germany had secured "immense advantages" through it (Einzig, 1941, pp. 96-98). Yet the treaties concluded with continental creditors (France, Switzerland, and the Netherlands) were much less favorable to German exports as they all introduced restrictive bilateral clearing payment systems.[38] Figure 6(b) plots the evolution of Germany's bilateral trade costs with the four European creditors (see Jacks, Meissner, and Novy, 2011, for details on the measure). While Germany's bilateral trade costs with the UK remained relatively constant in the second half of the 1930s, trade costs with other creditors increased heavily. The ensuing reduced bilateral exports to continental countries jeopardized continued payments to bondholders under the clearing systems. These conditions ultimately led to the selective default on Dutch and Swiss bondholders in April and June 1935, respectively. At the same time, lesser obstacles in the trade with the United Kingdom manifested Britain's status as the senior creditor.

3.2 Event study analysis

The above narrative elucidates why, throughout the 1934-1939 period, investors considered the UK as Germany's most senior creditor. However, selective default risk also varied substantially over time and across the junior (continental) creditors (Figure 4). These changes must have been driven by the arrival of new information, which led investors to update their expectations. Employing an event study framework, we now explore how various types of news affected selective default risk across creditor markets.

To analyze the pricing of information across markets, we generate a list of potentially relevant news events from two distinct data sources: the *Financial Times (FT)* and the *Chronicle of International Events (Chronicle)*. In order to avoid biasing our selection, we first extract the universe of articles that contain the keyword "Dawes" from the *FT*. Our restriction to the keyword "Dawes" results in the omission of certain critical political events. Hence, we complement our data with Germany-related events from the *Chronicle*, which records all noteworthy international political events as well as all bilateral and multilateral treaties signed each

[37] See 'Anglo-German Payments Agreement', UK National Archives, London, United Kingdom, FO 93/36/139. As part of the agreement, the Bank of England also granted the Reichsbank a generous £400,000 loan for the liquidation of Germany's outstanding commercial debts (Forbes, 2000, pp. 110f).

[38] Under these clearing systems, a share of German bilateral export revenues was directly seized to reimburse creditors. For example, the French-German agreement of July 1934 stipulated that 15.75 % of the daily value of French imports from Germany were to be credited to a special Reichsbank account with the French-German Office for Commercial Payments and used to pay coupons of the Dawes and Young loans. See 'Franco-German Agreement on Commercial Payments', 28 July 1934, Banque de France archives, Paris, France, 1069199005/49.

month.[39] We record events on 146 days in our sample, often with multiple newspaper articles on a given day. We classify these event days according to whether there are positive or negative news for bondholders. Additionally, we categorize events into three types depending on which creditors were affected. If a given event corresponds to general news about Germany, we code it as affecting (i) all creditor countries. Among the events that pertain only to a subset of creditor countries, we further distinguish between two types: (ii) those affecting the most senior creditor country (UK) only and (iii) those affecting one or two of the three junior creditor countries (France, the Netherlands or Switzerland), but not the senior creditor country (UK).[40]

For each type of event, Table 4 provides the number of positive and negative news recorded (third column). The table also reports predictions for the direction of the effect of each type of news on unconditional and conditional selective default risk.[41]

Table 4: The events dataset

Type: Event affects...		pos./neg.	Number	Expected change in selective default risk: Unconditional	Conditional
(i) All creditors	$(j; s)$	pos.	24	$+/0/-$	$+/0/-$
		neg.	43	$+/0/-$	$+/0/-$
(ii) Most senior creditor only	(s)	pos.	27	$+$	$+$
		neg.	8	$-$	$-$
(iii) 1 or 2 of the 3 junior creditors	(j)	pos.	22	$-$	$-$
		neg.	9	$+$	$+$

Notes: This table presents the number of occurrences of various types of events included in the event study analysis. Events were identified using two sources: the *Financial Times (FT)* and the *Chronicle of International Events (Chronicle)*. See text for details.

(i) The first type of news we consider are news pertaining to all creditors. These include events that affect the likelihood of repayment to all foreign creditors such as, for example, news about Germany's overall ability to repay its external debts (e.g. news that a new German bond issue was oversubscribed) or general political events (e.g. when the League of Nations declared Germany's infringement of the Versailles Peace treaty).[42] These news are the most frequent among all classified events (50%). Such general news

[39]After removing duplicates that are recorded in both sources, we add four important political events in German history of the 1930s that escaped our data generating process, i.e., the passage of the Nuremberg laws, the Reichskristallnacht ('Night of Broken Glass'), the authorization of Goering's Four-Year Plan, and the order for Germany's naval expansion.

[40]There exist two more possible event categories. First, certain events affected one or two of the junior creditor countries (France, the Netherlands and Switzerland) as well as the senior creditor country (UK). We record 13 such events in our dataset including 6 negative news and 7 positive news. We employ these events later as a robustness check in our regressions. Second, there could hypothetically have been events affecting *all three* junior creditor countries but not the senior creditor country. However, we do not record such events in our data. Appendix A.3 contains a detailed description of all events and coding rules.

[41]Based on our framework (Section 2.1), the risk-neutral, unconditional probability of selective default is $\theta\pi = y_j - y_s - (\psi_j - \psi_s)$ whereas the conditional probability is $\pi = \frac{y_j - y_s - (\psi_j - \psi_s)}{y_j - r - \psi_j}$. To back out predictions of changes in unconditional and conditional selective default risk, we start from the expectation that bad (good) general news pertaining to all creditors should increase (decrease) both y_s and y_j, while bad (good) news pertaining to senior creditors only should increase (decrease) y_s, and bad (good) news pertaining to junior creditors only should increase (decrease) y_j. We then derive the corresponding expected change in $\theta\pi$ and π in response to each type of news.

[42]'Reich Bond Issue Oversubscribed', *Financial Times*, September 19, 1935; 'Germany and the League', Oct. 22, 1935, *Chronicle* (Jan 1936, p. 136).

affect default risk in the senior and junior markets alike and the respective yields y_s and y_j should move accordingly. Hence, the effect of general news on selective default risk is indeterminate and depends on the news' relative signal strength for the default risk faced by each type of creditor.[43] (ii) The second type of news consists of events that are relevant to the most senior creditor (UK) only and do not pertain to the other creditors. An example of such an event would be a newspaper report on Anglo-German talks about the service of the Dawes bond.[44] Such UK-specific news make up 26% of all news events. In principle, these events should only affect the default risk of senior bondholders reflected in y_s. Hence, the prediction of their effect on selective default risk is unambiguous. Positive (negative) news of this nature should increase (decrease) selective default risk. (iii) Last, we consider events that pertain to one or two of the junior (continental) creditor countries (France, Switzerland, or the Netherlands), but not the senior creditor country (UK). An example of such an event would be a report on the progress of Franco-German trade negotiations.[45] These news represent 23% of all classified events. Since these events only affect junior creditor countries, the prediction of their effect on selective default risk is unambiguous: Good (bad) news of this type will decrease (increase) selective default risk.

We first explore how (i) news relevant to all creditors (general news about Germany) and (ii) news specific to the the senior (UK) creditor country affect unconditional selective default risk (ie., the probability of a selective default on junior creditor countries' bondholders) and conditional selective default risk (ie., the probability that, in the event of a default, the senior creditor country's bondholders will be spared). Since these types of news affect all junior creditor countries, we can analyze their effect through a straightforward before-after comparison in an event study framework. We therefore estimate the following equation:

$$\text{SDR}_{jte} = \alpha + \beta_N \text{News}_t + \delta(L_{jte} - L_{ste}) + \gamma_{je} + \epsilon_{jte} \tag{9}$$

where SDR_{jte} is our measure of unconditional selective default risk $(y_{jte} - y_{ste})$ or conditional selective default risk $(\frac{y_{jte}-y_{ste}}{y_{jte}-r_{te}})$ measured in junior creditor market j (Paris, Amsterdam or Zurich market) at day t of event e. The dependent variable is therefore the Dawes bond yield spread in each continental market relative to London expressed either in absolute terms (unconditional risk) or as a share of the excess yield over the risk-free rate (conditional risk). The definitions of these measures correspond to those reported in equation 4 and 5 of our analytical framework when ignoring the liquidity terms.[46] The term $(L_{jte} - L_{ste})$ corresponds

[43] More precisely, based on our theoretical framework and assuming the risk-free rate r and liquidity premia ψ_s and ψ_j remain constant, the unconditional probability of selective default $\theta\pi$ increases if, in response to news, the bond yield increases more (decreases less) in the junior than in the senior market (ie. $\Delta y_s < \Delta y_j$). By contrast, unconditional selective default risk decreases if $\Delta y_s > \Delta y_j$ and remains constant if $\Delta y_s = \Delta y_j$. The conditional probability of selective default π increases if, in response to news, $\Delta y_s < \Delta y_j(1-\pi_0)$, decreases if $\Delta y_s > \Delta y_j(1-\pi_0)$, and remains constant otherwise. Note that $\pi_0 = \frac{y_{j,t=0}-y_{s,t=0}}{y_{j,t=0}-r_{t=0}}$.

[44] 'Dawes and Young Talks To-Day', *Financial Times*, June 27, 1934.

[45] 'The Franco-German Trade Pact', *Financial Times*, July 13, 1937.

[46] We prefer to include the liquidity term as a control in the regressions rather than to include it directly in the expressions for unconditional and

to the bid-ask spread differential between markets j and s as estimated above (Section 2.3). For each event e, we employ a symmetric event window: t indexes the 5 days prior to the arrival of the new information, the day the news arrives, and the 5 days following the news' arrival. γ_{je} is an event-creditor-country fixed effect. $News_t$ is a dummy variable taking the value 0 for all $t < 0$ and 1 for $t \geq 0$. Consequently, β_N measures the effect of news shocks on selective default risk compared to the period before the arrival of the news.

The third type of news are (iii) events that pertain to one or two junior creditor countries only. To measure the effect of this type of news on selective default risk, we can exploit the fact that these events do not affect all junior creditors. We therefore modify equation 9 to estimate a difference-in-differences specification of the following form:

$$\text{SDR}_{jte} = \alpha + \beta_{NT}\text{News}_t \times \text{Treated}_{je} + \eta_{Ne} + \gamma_{je} + \epsilon_{jte} \tag{10}$$

In contrast to the simple event study above, we introduce another set of fixed effects (η_{Ne}) which consist in the interaction of the indicator $News_t$ with an indicator variable for each event e. $Treated_{je}$ is a dummy variable taking the value one for creditor countries j that are affected by the news event e and zero for those unaffected. Consequently, the treatment effect β_{NT} measures the effect of news shocks on the treated markets relative to all untreated markets.[47] Compared to the other news types, in which all countries' measures of selective default risk are affected by the news, this particular setup allows us to best identify the effect of news. The fixed effect η_{Ne} also captures unobserved factors affecting all creditors as well as the general information content relevant to all creditors that a given news specific to a particular junior creditor may carry.

Table 5 reports the results for the effect of general news about Germany's overall creditworthiness (i) on unconditional (columns 1-4) and conditional (columns 5-8) selective default risk. Odd-numbered columns report the results for all junior creditor markets whereas even-numbered columns present the results obtained when restricting the sample to the Paris market only. This provides a robustness check as the German government continued to treat French and British bondholders equally throughout the entire sample period.

The results of the upper panel show that, *on average*, the effect of general news on unconditional and conditional selective default risk is not distinguishable from 0 at conventional levels of significance. This is in line with our prediction that news about Germany's overall creditworthiness have an ambiguous effect on selective default risk. At the same time, Table B.2 of the Appendix

conditional selective default risk (as in equations 4 and 5). Since our liquidity measure is itself an estimate, incorporating it into the dependent variable may lead to incorrect standard errors. As we show above, liquidity differentials between markets were minimal throughout the study period. Hence, the risk measures are not substantially affected by not including the liquidty term.

[47] Note that the interaction's constituent terms $News_t$ and $Treated_{je}$ are absorbed by the fixed effects η_{Ne} and γ_{je}, respectively.

Table 5: News pertaining to all creditors

	Panel A: Political, trade, and financial news							
	Unconditional risk ($y_j - y_s$) in pp.				Conditional risk ($\frac{y_j - y_s}{y_j - r}$) in pp.			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	-0.01	0.02	0.13	0.16	-0.15	0.20	0.09	0.21
	(0.09)	(0.15)	(0.10)	(0.14)	(0.39)	(0.65)	(0.44)	(0.63)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Paris data only		✓		✓		✓		✓
N (Observations)	368	151	689	266	368	151	689	266
N (Event-market)	62	22	104	39	62	22	104	39
Adjusted R^2	0.96	0.96	0.90	0.94	0.95	0.96	0.92	0.95
Within R^2	0.00	0.02	0.02	0.06	0.01	0.02	0.02	0.03

	Panel B: Financial news only							
	Unconditional risk ($y_j - y_s$) in pp.				Conditional risk ($\frac{y_j - y_s}{y_j - r}$) in pp.			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	-0.03	0.05	0.34**	0.39**	-0.44	-0.06	1.02*	1.41*
	(0.10)	(0.21)	(0.15)	(0.14)	(0.45)	(0.85)	(0.60)	(0.77)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Paris data only		✓		✓		✓		✓
N (Observations)	287	115	296	107	287	115	296	107
N (Event-market)	49	17	46	16	49	17	46	16
Adjusted R^2	0.95	0.96	0.88	0.97	0.95	0.96	0.91	0.95
Within R^2	0.00	0.01	0.05	0.27	0.02	0.01	0.04	0.21

Notes: This table presents the results of event study regressions for news pertaining to all creditors. The liquidity control corresponds to the implicit bid-ask spread differential between the London market s and continental market j estimated using Roll's (1984) method. See text for more details on the specification. Days for which the sources do not report prices are treated as missing. Appendix B.4 reports qualitatively similar results for regressions where missing observations are replaced with the last previously available yield on any given day. Two-way-clustered standard errors (Event-market & date dimension) are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

shows that bad general news about Germany did increase the risk of *overall* - as opposed to *selective* - default (although we do not find a symmetrical effect for good news). While a large number of these news appear to have cast doubt on Germany's general ability to honor its external debts, such news did not on average have a more pronounced effect on the probability to repay junior as compared to senior creditors. Therefore, they did not affect expectations of selective default.

In the the lower panel of Table 5, we focus on one particular category of events, ie. financial events. These include news relating to Germany's overall financial or external debt position.[48] It is possible that a deterioration in Germany's overall financial position (for example, a decline in foreign exchange reserves) increased the likelihood of a default on all creditors but that the probability of a default on junior creditors was impacted more as those bondholders would be the first to be defaulted upon in case the German government did not have sufficient financial resources to repay all its external debts. In that case, one would expect financial news to have a relatively higher signal strength for the risk of default on junior than on senior bondholders and

[48] An example for such news is Reichsbank president and economics minister Hjalmar Schacht making a negative statement about Germany's future ability to pay ('Heavy Decline in German Bonds'*Financial Times*, September 1, 1934).

these events would therefore affect selective default risk. The results confirm this hypothesis. In particular, negative news about Germany's overall financial position increase the Dawes bond yield spread between the senior (London) and junior (continental) markets by 34 basis points on average and by 39 basis points if we restrict the sample to the Paris market. Bad financial news are also associated with a 1.0-1.4 percentage points increase in our measure of conditional selective default risk.

Table 6: News pertaining to UK bondholders only

	Unconditional risk ($y_j - y_s$)				Conditional risk ($\frac{y_j - y_s}{y_j - r}$)			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	0.25*	0.15	0.15	0.07	2.76***	2.72**	1.51	1.65
	(0.14)	(0.16)	(0.20)	(0.20)	(0.88)	(1.12)	(1.16)	(1.14)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Paris data only		✓		✓		✓		✓
N (Observations)	420	164	112	46	420	164	112	46
N (Event-market)	68	24	18	7	68	24	18	7
Adjusted R^2	0.94	0.98	0.88	0.78	0.91	0.95	0.87	0.89
Within R^2	0.05	0.08	0.02	0.02	0.13	0.17	0.07	0.16

Notes: This table presents the results of event study regressions for news pertaining to UK bondholders only. The liquidity control corresponds to the implicit bid-ask spread differential between the London market s and continental market j estimated using Roll's (1984) method. See text for more details on the specification. Days for which the sources do not report prices are treated as missing. Appendix B.4 reports qualitatively similar results for regressions where missing observations are replaced with the last previously available yield on any given day. Two-way-clustered standard errors (Event-market & date dimension) are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 6 turns to the effect of news pertaining to UK bondholders only. Our framework offers clear predictions for this type of news: good (bad) news about the UK-German relationship should decrease (increase) the probability of a default on the most senior (UK) bondholders and therefore increase (decrease) the conditional risk of a selective default. Our empirical results are partially in line with these predictions. We find that positive news about the UK-German relationship have a strong, statistically significant effect on conditional selective default risk. However, we do not find a corresponding effect for bad news, possibly because of the small sample size as we record much fewer positive than negative news for this type of events. We also find that, on average, good news about the German-UK relationship only have a weakly statistically significant effect on unconditional selective default risk. This finding probably reflects the spillover effects of UK-specific news on the probability θ that any default takes place. For example, Dawes bond yields declined in all creditor markets following the signature of the November 1934 Anglo-German commercial agreement, which contained provisions for the continued service of German government bonds held by UK residents only. Investors might have received the news of the agreement as a signal of increased likelihood of positive debt settlements with other creditors.

Last, we analyze events that pertain specifically to one or two of the three junior creditor countries. Our framework delivers clear predictions for this type of events: good (bad) news about the relationship between a given junior creditor country and

Table 7: News pertaining to junior creditors only (1 or 2 out of 3)

	Unconditional risk ($y_j - y_s$) in pp.				Conditional risk ($\frac{y_j - y_s}{y_j - r}$) in pp.			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	-0.45**	-0.44***	0.51*	0.71***	-2.00**	-1.64**	2.21*	3.02***
	(0.20)	(0.15)	(0.26)	(0.20)	(0.89)	(0.62)	(1.14)	(0.85)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Larger sample		✓		✓		✓		✓
N (Observations)	269	354	113	200	269	354	113	200
N (Event-market)	44	56	20	34	44	56	20	34
Adjusted R^2	0.96	0.97	0.93	0.93	0.93	0.95	0.93	0.93
Within R^2	0.32	0.31	0.36	0.35	0.22	0.20	0.65	0.55

Notes: This table presents the results of event study regressions for news about Germany's relationship with each of the three continental creditor countries (France, the Netherlands and Switzerland). The liquidity control corresponds to the implicit bid-ask spread differential between the London market s and continental market j estimated using Roll's (1984) method. See text for more details on the specification. Days for which the sources do not report prices are treated as missing. Appendix B.4 reports qualitatively similar results for regressions where missing observations are replaced with the last previously available yield on any given day. Two-way-clustered standard errors (Event-market & date dimension) are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Germany should decrease (increase) the probability of discrimination against bondholders from that country relatively to the other junior creditor countries' bondholders. Table 7 reports the results of the corresponding regressions. Our identification strategy for this part of the analysis relies on comparing the effect of news on the *treated* junior creditor markets relatively to the *untreated* ones. Given this difference-in-differences setup, we cannot restrict the sample to the Paris market only. However, as an additional robustness check, we also provide results for a larger sample in the even-numbered columns. In this sample, we include events which affect one or two junior creditors as well as the senior creditor country (UK). While such news affect selective default risk through their effect on the probability of default on both senior and junior creditors, the additional fixed effect η_{Ne} that we include in our specification controls for changes in the probability of default on senior bondholders that may drive selective default risk in all junior creditor markets. Hence, adding these observations allows us to draw on a larger number of events while still identifying the effect of news on treated versus untreated junior creditor markets.

The empirical results for this type of news are fully aligned with our predictions. Our findings indicate that good news about the relationship between Germany and a given junior creditor country decrease the unconditional risk of selective default by around 45 basis points on average, while negative news increase selective default risk by 51-71 basis points. Positive news also decrease our measure of the conditional probability of a selective default by 1.6-2.0 percentage points while bad news increase it by around 2.2-3.0 percentage points on average.

In sum, our analysis of the pricing of new information reveals that the various types of news distinctly affected selective default risk. Good news for senior bondholders increased the probability that junior creditors would be discriminated against in the event of a default. Good (bad) news for junior bondholders decreased (increased) both unconditional and conditional selective default risk. By contrast, general news about Germany did not systematically influence selective default expectations in one or the other direction. The effect of such general news on selective default risk indeed depends on whether they have a larger impact on the probability of default on junior than on senior bondholders. Our results indicate that this was the case for bad news about Germany's overall financial position.

4 Conclusion

This paper presents empirical evidence on selective default risk with the aid of a unique historical laboratory: the German debt default of the 1930s. Identical German government bonds were traded in various European creditor countries, but the secondary markets for those bonds were geographically segmented and liquidity differences across markets were negligible. These unique circumstances allow us to measure selective default expectations. We show that selective default risk was priced in German bonds on continental markets during 1934-1939, even when the German government continued to service those bonds fully. Selective default risk accounted for around a third of the total yield spread of Dawes bonds over the risk free rate. Our analysis reveals that market assessment of the seniority ranking of various bondholders depended on the extent of Germany's commercial and financial dependence on each creditor country and thus on the economic damage those countries could potentially inflict on the German economy. Finally, we analyze the dynamics of selective default risk and find that it responded strongly to news about the bilateral relationship between each creditor country and Germany.

Our results provide empirical support to recent theories of selective defaults (Guembel and Sussman, 2009; Broner, Martin, and Ventura, 2010; Broner et al., 2014). In particular, we show that selective default risk cannot be priced in sovereign bonds when senior and junior creditors can exchange them on a secondary market. At the same time, the historical case study we analyze illustrates how creditor and debtor governments can effectively organize the geographical segmentation of sovereign debt markets to enable the possibility of selective defaults. Even without the technology available nowadays, authorities had the power to suspend international bond arbitrage and orchestrate a selective default on international bondholders. In today's world characterized by extreme levels of public debts and increasing geopolitical tensions, debtor governments may increasingly resort to selective defaults. The evidence from the 1930s—an era characterized by debt overhang and extreme geopolitical tensions—elucidates why sovereigns might discriminate between their creditors and how the resulting selective default expectations affect the pricing of sovereign bonds in financial markets.

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Appendix to
'Selective default expectations'

Contents

A Data

A.1 Dawes bond

A.1.1 The tranches of the Dawes bond

Table A.1: Tranches of the Dawes bond

Currency	Country of issuance	Amount issued	Amount in GBP	% of overall amount	Amount in RM
US-Dollar	United States	USD 110,000,000	22,602,585	48.9%	461,770,810
Swiss Franc	Switzerland	CHF 15,000,000	561,658	1.2%	11,474,669
Italian Lira	Italy	ITL 100,000,000	47,150	0.1%	963,267
Swedish Krona	Sweden	SKR 25,200,000	1,362,438	2.9%	27,834,600
Sterling	Germany	GBP 320,000	320,000	0.7%	6,537,600
	United Kingdom	GBP 12,000,000	12,000,000	25.9%	245,160,000
	France	GBP 3,000,000	3,000,000	6.5%	61,290,000
	Switzerland	GBP 2,360,000	2,360,000	5.1%	48,214,800
	Belgium	GBP 1,500,000	1,500,000	3.2%	30,645,000
	Netherlands	GBP 2,500,000	2,500,000	5.4%	51,075,000
Totals			46,253,830	100%	944,965,745

Notes: All data on bond issuances are from Glaesemann (1993); For conversions of the amount into pound sterling/Reichsmark, we employ the compilation of exchange rates from the Federal Reserve Board (1943).

A.1.2 Sources for daily price data of Dawes bond

Primary sources for daily bond price data Daily Dawes bond prices for London and Zurich were hand-collected from daily issues of the *Handelsteil* of the *Neue Zürcher Zeitung*. At the time, the *Neue Zürcher Zeitung* published three daily issues on weekdays. From Monday to Friday, daily closing prices for Zurich are reported in the evening issue of the same day and closing prices for London are reported in the morning edition of the following day. The prices for the Saturday market are reported in the Monday morning issue. We verified the London prices collected in *Neue Zürcher Zeitung* by cross-checking quotes in the *Financial Times* at regular intervals. Prices for Amsterdam were collected directly from the official exchange price list, the *Officiele prijscourant der Vereeniging voor de Effectenhandel*.[1] Similarly, daily closing prices for Paris are from the *Bulletin de la Cote (Compagnie des Agents de Change de Paris)*. Digital copies of the *Bulletin de la Cote* were kindly made available by Riva and Hautcoeur (2015, 2018).

Trading days During the period under consideration, the stock exchanges of Paris, Amsterdam and Zurich were regularly open from Monday to Saturday. The London Stock exchange opened regularly on Saturdays starting on September 19, 1931, for the first time in 14 years.[2] After May 26, 1934, however, it returned permanently to being open only from Monday to Friday.[3]

[1] From October 15, two prices are recorded: one for bonds with a kettingverklaring (affidavit) about residency and one without it. We use the price for those with an affidavit for comparability.

[2] *Financial Times* of Monday, September 21, 1931, "Stock Exchange Saturday Opening".

[3] *Financial Times* of Saturday, May 26, 1934, "The Question of Saturdays".

Currency conversion Making Dawes bond prices comparable across the four markets requires converting daily prices on continental markets into pounds sterling. In order to reflect the contractual terms of the Dawes Loan, we use daily spot exchange rates from Accominotti et al. (2019).[4]

Pound sterling-denominated bonds were quoted in different ways on the various continental exchanges. In Paris, bond prices were quoted in French Francs.[5] We thus convert Paris prices into pounds sterling by dividing the original price by the spot GBP/FRF exchange rate ($XR_{GBP,FRF}$); i.e. :

$$P_{GBP,Paris} = \frac{P_{FRF,Paris}}{XR_{GBP,FRF}} \tag{1}$$

On the Amsterdam and Zurich markets, prices of pound sterling-denominated Dawes bonds were quoted as a percentage of the pound sterling par. To obtain the bond's price in local currency, investors had to multiply the quoted percentage Q_i by a fixed exchange rate (NLG 12 = GBP 1 for Amsterdam[6] and CHF 25.25 = GBP 1 for Zurich[7]). The bond prices in Dutch guilders and Swiss francs could then be converted into pounds sterling at the current GBP/NLG and GBP/CHF spot exchange rates. We thus convert Amsterdam and Zurich quotations of the GBP Dawes bond into pounds sterling as follows:

$$P_{GBP,Amsterdam} = \frac{Q_{Amsterdam} \times 12}{XR_{GBP,NLG}} \tag{2}$$

and

$$P_{GBP,Zurich} = \frac{Q_{Zurich} \times 25.25}{XR_{GBP,CHF}} \tag{3}$$

Figure A.1 shows that these conversions are correct. First, we do not observe a break in the price differentials after the UK devalued the GBP in September 1931. Second, since markets were not segmented until June 14, 1934, we would expect the differences between Dawes bond prices converted into pounds sterling across the different markets to be minimal (as it was possible to arbitrage these bonds between markets). This conjecture is verified in the data.

Figure A.1: Bond prices in GBP across markets

[4]In October 1934, the Bank for International Settlements described the contractual terms of the Dawes Loan in the following words: "It is to be noted that most tranches are issued in £ and that currently these bonds' coupons are payable in any place at the choice of the holder and at the current spot exchange rate. The other tranches are entirely national and, therefore, are only paid in local currency" (our translation from French). See BArch R2501.6743, Sheet 78 ff.

[5]See Compagnie des Agents de Change de Paris, *Bulletin de la Cote*.

[6]*Officiele prijscourant der Vereeniging voor de Effectenhandel*, Amsterdam.

[7]*Schweizerischer Bankverein*, Jahreskursblatt. Beilage zum Bericht No. 1/1932.

A.1.3 Coupon changes and yield-to-maturity calculation

Coupon changes As discussed in the main text, bilateral agreements between Germany and the various creditor countries resulted in coupon reductions for Dawes bonds traded on the Zurich market (from April 17, 1935) and Amsterdam market (from June 14, 1935). A few years later, the German government reduced coupon payments on Dawes bonds traded in London and Paris from 7% to 5% (July 1, 1938). Table A.2 reports all changes in the coupon rate of the Dawes bond in each market.

Table A.2: Coupon changes

Market	Date of change	Coupon changes (cash transfers)	Further particulars on coupon	Citizenship/resident rule	Source & other comments
London	July 1, 1938	$7\% \rightarrow 5\%$	The reduction in the interest is to be used for amortisation.	British owners: In return for concessions, this definition includes all owners of London-issued sterling denominated bonds (rather than British citizens only).	Hofmann (1938)
Paris	July 1, 1938 / August 3, 1938	$7\% \rightarrow 5\%$	The equal treatment with British creditors is confirmed by internal documents from the Reichsfinanzministerium (dated July 11, 1938), even though the change in the the treaty (August 3, 1938) makes no special reference to the Dawes bond.	French residents: The legal definition excludes bonds that were not held by French residents in July 1933.	Bundesarchiv Lichterfelde Akte R2/278, p. 3; Deutsches Reich (1938)
Amsterdam	June 14, 1935	$7\% \rightarrow 3.5\%$	The remaining 3.5% are paid in Dawes Mark	Dutch residents: The legal definition excludes bonds that were not held by Dutch residents in July 1933.	*Financial Times* of June 15, 1935 "Dutch-German Transfers"; Officially signed on June 17, 1935 Reichsstelle fuer Devisenbewirtschaftung (1936, p. 678); No change in conditions for Dawes bond through treaty of June 5,1936 Reichsstelle fuer Devisenbewirtschaftung (1936, p. 678)
	June 1, 1937	$3.5\% = 3.5\%$	2% paid in Dawes Mark		Reichsstelle fuer Devisenbewirtschaftung (1937, p.787); No change in conditions for Dawes bond through treaty of September 13, 1938 Müller (1938, p. 1014)
Zurich	April 17, 1935	$7\% \rightarrow 4.5\%^{\dagger}$	Remainder payable in Dawes Mark.	Swiss residents: The day effective for this rule was moved from the 15th to 30th of June 1934 in the 1935 treaty	Lussy et al. (2001, p. 61) BArch, R2501.6743, Sheet 72, Vaninni (1943, p. 91), Kellenberger (1942, p. 184), Ferralli (1955, p. 20)
	July 6, 1936	$4.5\% \rightarrow 2\%$	Remainder payable in Dawes Mark		Vaninni (1943, p. 92), Kellenberger (1942, p. 189)
	October 18, 1936	$2\% \rightarrow 0\%$	Full 7% payment in Dawes Mark		Kellenberger (1942, p. 189)
	December 23, 1936	$0\% \rightarrow 2.5\%$	Implicit that remainder of 4.5% was paid in Dawes-Mark.		Kellenberger (1942, p. 192; 195)
	June 30, 1937	$2.5\% = 2.5\%$	3% in Dawes-Mark		Vaninni (1943, p. 97) Kellenberger (1942, p. 195)
	June 30, 1938	$2.5\% \rightarrow 4\%$	1.5% in Dawes-Mark (implicit in text)		Kellenberger (1942, p. 197)
	July 5, 1939	$4\% \rightarrow 2.75\%$	2.75% paid in Dawes-Mark		Kellenberger (1942, p. 200)

Note: †: During this time, the Dawes bond was privileged (after another bond) and a cash payout of 4.5% contractually agreed if funds existed. The remainder was paid in Dawes Mark. It appears that between April, 1 1935 and December 31, 1935 all payments were de facto made in Dawes Mark (Vaninni, 1943, p. 90). However, this was only known ex-post to the Swiss creditors.

Treatment of non-GBP transfers after partial defaults The German government defaulted selectively on Swiss and Dutch bondholders from 1935 onwards. As can be seen in Table A.2, these defaults consisted in a reduction in coupon payments in GBP while the remaining part of the coupon was paid in devalued *Dawes Marks*. The Dawes Mark was a type of "blocked mark", ie. a currency that could only be used for purchasing German stocks and property as well as for covering travel expenses within Germany (Frech, 2001, p. 267). The blocked mark system was adopted as part of the foreign exchange restrictions implemented by the German government from 1931 onwards. Since the decision to pay part of the coupon in a devalued currency rather than in GBP constituted a breach of the debt contract, we consider it as a partial default. By contrast, the reduction in coupon payments in GBP for British and French bondholders in July 1938 was not associated with any compensation in the form of Dawes Mark payment.

To calculate the yield-to-maturity on Dawes bonds traded on the Zurich and Amsterdam markets after the partial defaults of 1935, we need to convert coupon payments in Dawes Marks into their GBP cash equivalent. A note from the German Economics Ministry published in the *Devisenarchiv* (Müller, 1938, p. 114) reveals that Dawes Marks were equivalent to another type of blocked marks called *Registermark* and were traded as such.[8] Blocked marks were also exchanged against other currencies on the Zurich and Amsterdam market and their

[8] This is confirmed by an article in the *Neue Zürcher Zeitung*: "Durchführung des schweizerisch-deutschen Verrechnungsabkommen", *Neue Zürcher Zeitung*, May 9, 1935. This newspaper was presumably read by most Swiss investors at the time.

exchange rates were reported in newspapers.[9] Rather than transcribing these data from newspapers, we located a document authored by the *Deutsche Golddiskontbank* (titled "Kursabschläge von Sperrguthaben an ausländischen Börsenplätzen") in the German National Archive (Lichterfelde Akte R/182/630). It contains the daily discount of the Registermark vis-à-vis the German Reichsmark on the Amsterdam and Zurich exchanges. Figure A.2 displays the value of the Dawes Mark as a percentage of the Reichsmark in 1935-1939. Note that the gold value of the Reichsmark had remained constant since Germany readopted the gold standard in 1924. The figure shows that the Registermark declined in value over this period. Since Dawes Marks always traded far below par relative the actual Reichsmark (see Figure A.2), paying part of the Dawes bonds' coupon in Dawes Marks effectively resulted in a reduction of coupon payments.

Figure A.2: Market Value of the Dawes Mark (or Registermark) relative to the Reichsmark (in %, daily data)

Note: A market value of 50 indicates that 1 Dawes Mark is valued at 0.5 Reichsmarks on the market. The data are from the German National Archives (Lichterfelde Akte R/182/630). Rare missing values are replaced by the value of the previous day.

To calculate the value of coupon payments to Swiss and Dutch bondholders in Dawes Marks, the German government first converted the corresponding GBP value ($C^{GBP}_{\text{non-cash}}$) into Reichsmarks using the *de jure* GBP-Reichsmark exchange rate, i.e., the ratio of the two currencies' official gold parities ($e_{\text{RP}} = \frac{\text{Reichsmark}}{\text{GBP}}$). The resulting Reichsmark value of the coupon was then converted into Dawes Marks at the rate of 1:1, i.e., $e^{\text{FIXED}}_{\text{RD}} = \frac{\text{Dawes Mark}}{\text{Reichsmark}} = 1$. However, as can be seen in Figure A.2, on the exchange market, the Dawes Mark traded at a substantial discount relative to par. In other words, the market exchange rate between the Dawes Mark and the Reichsmark differed from its official value $e^{\text{FIXED}}_{\text{RD}}$. Let us denote the market price of the Dawes Mark in terms of Reichsmark as ζ. In practice, converting Dawes Marks into GBP involved converting the Dawes Marks into Swiss Francs on the Zurich exchange at the exchange rate $e_{\text{FR}} = \frac{\text{Franc}}{\text{Dawes Mark}}$ and then converting the Swiss Francs into GBP at the market exchange rate $e_{\text{PF}} = \frac{\text{GBP}}{\text{Franc}}$. Accordingly, the market value of the coupon payment in GBP (C^{GBP}_{total}) is given by:

$$C^{GBP}_{\text{total}} = C^{GBP}_{\text{cash}} + C^{GBP}_{\text{non-cash}} \cdot e_{\text{RP}} \cdot e^{\text{FIXED}}_{\text{RD}} \cdot \zeta \cdot e_{\text{FR}} \cdot e_{\text{PF}} \tag{4}$$

or simply:

$$C^{GBP}_{\text{total}} = C^{GBP}_{\text{cash}} + C^{GBP}_{\text{non-cash}} \cdot \zeta \tag{5}$$

Yield-to-maturity calculation To calculate the yield-to-maturity, we rely on Matlab's *bndyield* function. At each date, we employ the coupon as documented in Table A.2, including the conversion of non-GBP parts of the coupon after the partial defaults discussed above. In line with the bond's characteristics, the payment at maturity is set to 100 and the final maturity date is set to October 1949.

[9]For example, the *Neue Zürcher Zeitung* reported these exchange rates and commented on their evolution. See for example: "Nochmaliger Rückgang der Registermark", *Neue Zürcher Zeitung*, October 27, 1935.

A.1.4 Liquidity

Liquidity measure Our measure of liquidity follows Roll's (1984) proxy for the bid-ask spread:

$$\text{bid-ask} = 200 * \sqrt{-cov(R_t, R_{t-1})} \tag{6}$$

where the R is the log-difference of the bond price over the previous trading day. As suggested in Schestag et al. (2016), we set 'bid-ask' to zero for all cases where $cov(R_t, R_{t-1}) >= 0$. The window for estimating the serial covariance is 21 days as suggested by Roll (1984).

We estimate Roll's liquidity measure for the Dawes bond in each creditor market i (L_i) as well as for for the British Consol (L_{RF}) on the London market. This allows us to estimate the Dawes bond's liquidity in each market relative to the safe asset ($L_i - LRF$). As expected, the Consol was much more liquid than the Dawes bond. The imputed bid-ask spreads before and after market segmentation for the Consol were 0.31 and 0.26, respectively, and much lower than corresponding values for the Dawes bond (reported in the table below). This result of a higher liquidity of the safe asset is in line with our expectations and serves as an indirect validation of Roll's liquidity measure.

Table A.3: Implicit bid-ask spreads

	Mean effective bid-ask spread (in %)		
Dawes bond traded in:	L_i	$L_j - L_s$	$L_i - L_{RF}$
	pre-market segmentation (3 January 1930-14 June 1934)		
London	0.90	-	0.59
Paris	0.77	-0.13	0.46
Amsterdam	1.08	0.17	0.76
Zurich	1.48	0.58	1.17
	post-market segmentation (15 June 1934-31 August 1939)		
London	0.60	-	0.33
Paris	0.89	0.30	0.63
Amsterdam	1.95	1.35	1.69
Zurich	1.52	0.93	1.26

Notes: This table reports the mean daily effective proportional bid-ask spread of the German Dawes bond in London, Paris, Amsterdam and Zurich, estimated using Roll's (1984) method. Following Roll (1984), we estimate the bid-ask spread in each market i as $L_i = 200 * \sqrt{-cov(R_{i,t}, R_{i,t-1})}$, where R_i is the log-difference of the bond price over the previous trading day. Serial covariance is calculated based on a 21-day time window as suggested by Roll (1984). The table also reports the bid-ask spread differential between each continental market j and the London market s ($L_j - L_s$) as well as the differential between the Dawes bond's bid-ask spread on each market i and the bid-ask spread of the British Consol ($L_i - L_{RF}$).

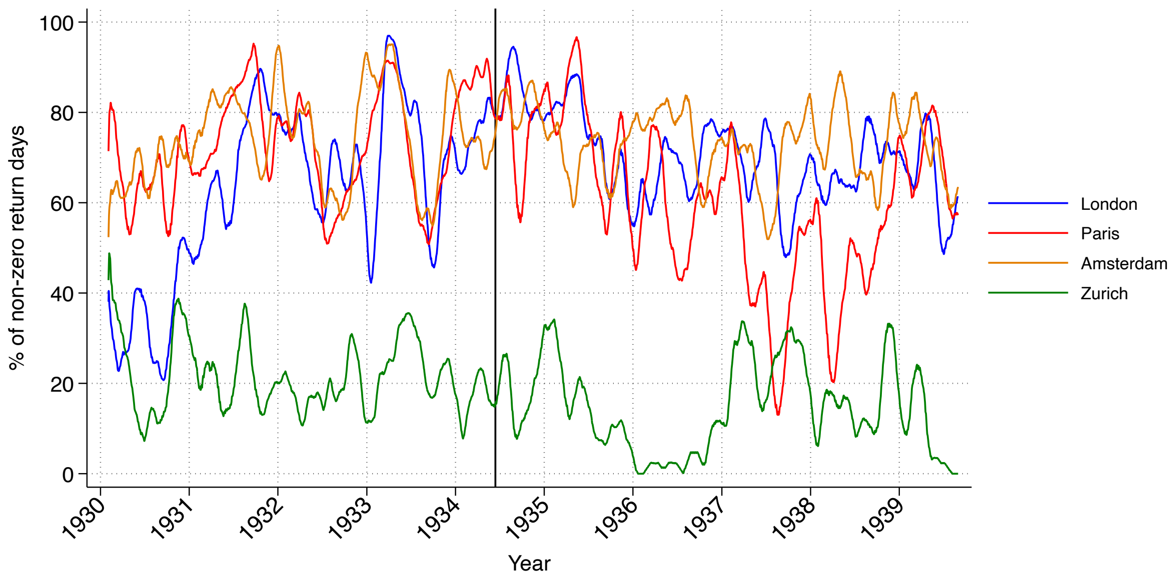
Non-zero trading days According to Schestag et al. (2016), the Roll measure outperforms alternative liquidity proxies based on the number of active trading days. Yet, such alternative measures may nevertheless provide a good indication of general trading activity throughout the sample.

Hence, we compute an alternative liquidity measure in the spirit of Lesmond et al. (1999). Specifically, we measure the number of non-zero-return trading days over the past 21 trading days:

$$\text{Non-zero trading days} = \frac{\sum_{i=-9}^{0} \mathbf{1}_i}{21} \tag{7}$$

where $\mathbf{1}_i$ is an indicator function that is 1 if the return for lag i is non-zero and 0 otherwise. When applied to historical data, this measure underestimates actual trading activity for two reasons. First, newspapers often did not report the price of bonds when that price had not changed compared to the previous day. In the absence of any recorded change in the bond price on a given day, we assume that no trade had taken place that day even though it cannot be entirely ruled out that a trade did take place at the previous price (Campbell et al., 2018). Second, such non-reporting makes it impossible to identify 'true missings': days when the price did change but newspapers failed to report it. By assumption, these days are treated as if no trade had occurred.

Figure A.3: Percent of non-zero trading days



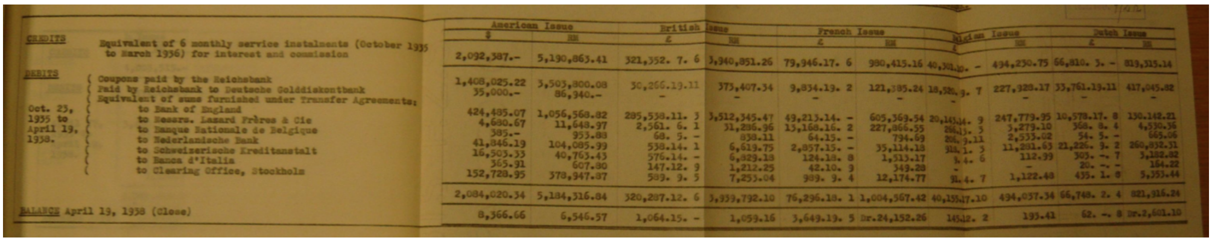
Notes: This figure plots our alternative measure of liquidity of the sterling Dawes bond in London, Paris, Amsterdam and Zurich. The indicator corresponds to the percentage of the previous 21 trading days for which the quoted price changed. To increase comparability, we only treat Monday-Fridays as trading days, although continental markets were typically open on Saturdays as well. For presentation purposes, the liquidity indicator is smoothed using a 60-day moving average.

Figure A.3 plots this alternative liquidity indicator for the Dawes bond in each creditor market. The figure shows that trading activity remained generally high after the various markets for the Dawes bond became geographically segmented in June 1934.

A.1.5 Bond volumes data

In 1938, the Bank for International Settlements sent the Bank of England an overview of the Reichsbank's accounts with regards to the Dawes Loan (Bank of England Archives, OV34/281). It appears that the BIS had previously acquired this document from the German government. For each biannual tranche, the overview documents the German government's total coupon payments to holders of Dawes bonds. Coupon payments are broken down by tranche *and* paying agent. Paying agents were responsible for processing the payment of the coupons. For example, the Bank of England and Lazard Frères were the designated paying agents of the Dawes Loan in London and Paris, respectively.

Figure A.4: Source for interest payments (excerpt)



	American Issue $	American Issue RM	British Issue £	British Issue RM	French Issue £	French Issue RM	Italian Issue £	Italian Issue RM	Dutch Issue £	Dutch Issue RM
CREDITS Equivalent of 6 monthly service instalments (October 1935 to March 1936) for interest and commission	2,092,387.-	5,190,863.41	321,352. 7. 6	3,940,851.26	79,946.17. 6	980,415.16	40,301.10. -	494,230.75	66,810. 3. -	819,315.14
DEBITS Coupons paid by the Reichsbank	1,408,025.22	3,503,800.08	30,266.19.11	373,407.34	9,834.19. 2	121,385.24	18,520. 9. 7	227,928.17	33,761.19.11	417,045.82
Paid by Reichsbank to Deutsche Golddiskontbank	35,000.-	86,940.-	-	-	-	-	-	-	-	-
Equivalent of sums furnished under Transfer Agreements:										
Oct. 23, 1935 to April 19, 1938. to Bank of England	424,485.07	1,056,568.82	285,538.11. 3	3,512,345.47	49,213.14. -	605,369.54	20,143.14. 9	247,779.95	10,578.17. 8	130,142.21
to Messrs. Lazard Frères & Cie	4,680.67	11,648.97	2,561. 6. 1	31,286.96	13,168.16. 2	227,866.55	266.13. 5	3,279.10	368. 8. 4	4,530.36
to Banque Nationale de Belgique	385.-	953.88	68. 5. -	838.11	64.15. -	794.69	206. 9.11	2,533.02	54. 5. -	665.06
to Nederlandsche Bank	41,846.19	104,085.99	538.14. 1	6,619.75	2,857.15. -	35,114.18	918. 1. 5	11,281.63	21,226. 9. 2	260,832.31
to Schweizerische Kreditanstalt	16,503.33	40,763.43	576.14. -	6,829.18	124.18. 8	1,513.17	3. 4. 6	112.99	303. -. 7	3,182.82
to Banca d'Italia	365.91	607.80	147.12. 9	1,212.25	42.10. 9	349.28	-	-	20. -. -	164.22
to Clearing Office, Stockholm	152,728.95	378,947.87	589. 9. 5	7,253.04	989. 9. 4	12,174.77	91. 4. 7	1,122.48	435. 1. 8	5,353.44
	2,084,020.34	5,184,316.84	320,287.12. 6	3,939,792.10	76,296.18. 1	1,004,567.42	40,155.17.10	494,037.34	66,748. 2. 4	821,916.24
BALANCE April 19, 1938 (Close)	8,366.66	6,546.57	1,064.15. -	1,059.16	3,649.19. 5	Dr.24,152.26	145.12. 2	193.41	62. -. 8	Dr.2,601.10

Figure A.4 presents an excerpt from this source, detailing the interest payments processed for April 1936. For each tranche of issue, it documents the amount paid to each paying agent. Dividing the respective interest payments by the corresponding coupon allows us to estimate the total face value of Dawes bonds of each tranche held in each market.[10] We use this method for October 1934 and April 1936 (details on minor adjustments are provided in the replication files). To arrive at the shares reported in Figure 3, we exclude repatriated bonds (i.e., bonds bought back by German residents on foreign European markets) whose coupons were paid by the Reichsbank.[11]

We also report estimates of the number of £100 denomination bonds circulating in each market in 1924 and 1934. The estimated numbers for 1924 are obtained by dividing the amount issued in GBP in each market by 100 (see Table A.1). For 1934, we divide the estimated face value of bonds circulating in each market by 100. There also existed £1,000 denomination Dawes bonds. These bonds traded at the same yield as £100 denomination bonds as we know from the French listings in the *Bulletin de la Cote (Compagnie des Agents de Change de Paris)*. For simplicity, we therefore show the estimated number of £100-equivalent Dawes bonds.

A.2 British Consol price in London and Paris

Daily British Consol prices in London and Paris were hand-collected from the following sources:

- London: *Commercial and Financial Chronicle*, an American weekly newspaper listing stock and bond prices on the US and foreign markets. This source is available online in pdf format through FRASER (administered by the St. Louis FED).
- Paris: *Bulletin de la Cote (Compagnie des Agents de Change de Paris)*. Data in pdf format including listings of foreign securities (among which, the British Consol) were made available to us by Riva and Hautcoeur (2015, 2018).

[10]The initial bi-annual coupon was 3.5% (= 7% annual). Coupon reductions for the Amsterdam and Zurich markets are documented in Table A.2. The only implicit assumption is that individuals do not cross borders to obtain their coupon payments; we assume, for example, that a bondholder located in London does not travel to Paris to obtain her coupon payment but instead prefers to walk to the Bank of England. This appears to be a fairly reasonable assumption.

[11]To check the validity of our computations, we add the estimated volume of outstanding bonds of each tranche circulating on the various foreign markets to the estimated volume of repatriated bonds. For each tranche, the sum of the two volumes perfectly matches the total number of outstanding bonds. Additional adjustments have to be made to validate our estimates for 1936 as the Reichsbank received payments for making additional transfers in blocked marks (Dawes Marks) to foreign bondholders. This, however, does not at all affect our estimate of the volumes of Dawes bonds of each tranche circulating on each foreign market.

A.3 Events data

A.3.1 Sources and search terms

Our events dataset draws on two sources: the *Financial Times* and the *Chronicle of International Events*. These sources are complements rather than substitutes. The former has a special focus on financial news. The latter lists all important commercial and political news.

Financial Times To cover the universe of financial news relevant to the movement of Dawes bonds, we rely on the archive of the *Financial Times* (provided by the Gale group). We search for all newspaper articles published between June 1934 and August 1939 that contained the term "Dawes". We then asked a research assistant (Timo Stieglitz) not involved in any other way in our research (and who thus looked at these articles with an external eye) to code each article according to the following characteristics:

- Erroneous match - does not relate to Dawes bonds (yes/no)
- Contains price description only (yes/no). We drop those giving no explanation for the movement of the price.
- Overall positivity of the article - (positive, negative, neutral)
- Contains financial news including news about German reserves and debt negotiations (yes/no)
- Concerned party (creditor country)
  - Article relates specifically to one or more of the following four creditor countries:
    - United Kingdom
    - France
    - Netherlands
    - Switzerland
  - Article relates to all creditor countries because...
    - ... it concerns all of the four above countries.
    - ... it is an unspecific/general article on Germany.
    - ...it concerns another country (different from the four countries above) in which Dawes bonds are traded (e.g. United States or Sweden)

Chronicle of International Events For general political events, trade treaties and financial treaties, we rely on the universe of articles relating to Germany in the *Chronicle of International Events*. This chronicle was regularly published in the *The American Journal of International Law* and listed all important international events with a short description and further reference. The chronicle can be accessed through Jstor. We coded the events recorded in the *Chronicle* using the same procedure as for those identified in the *Financial Times*.

A.3.2 Further information on merging the event lists and coding rules

In a first step, we determined for each of the sources and each day whether there were positive, negative, or neutral news. When there were multiple news of different tones for the same date, we relied on a simple majority rule (two positive and one negative news make a 'positive' news day). When merging data from the *Financial Times* and the *Chronicle*, we ensured to remove duplicates by hand. Finally, we checked the list manually and added four events that we considered of historical relevance, but which remained unidentified using the above criteria. These are the passage of the Nuremberg laws, the Reichskristallnacht, the authorization of Göring's 4-year plan, and the order for Germany's naval expansion.

Table A.4 reports the sources for each coded event. Column (1) shows the event date, column (2) shows whether the news was positive or negative, column (3) reports whether the news was financial or not, and columns (4) to (7) show which countries were affected. Column (8) reports all the sources used for making our judgment on each event. The text reported in the column corresponds to the title of the newspaper articles returned by the search engine for the *Financial Times*. For the *Chronicle* and idiosyncratically added historical events (*HIS*), the text reported corresponds to our own short description of the corresponding event.

Table A.4: Sources - Coding of events

Date	Positive / Negative	Financial	Affected creditor				Name of event/newspaper article & source
			UK	FR	NLD	CH	
15-Jun-1934	(−)	✓	✓	✓	✓	✓	German Loans Drop at Amsterdam (*FT*), Germany's Defiant Action (*FT*), Germany's New Default (*FT*), Government Attitude (*FT*), Home Railways Dull (*FT*), Exchanged notes on private debts of Germany (*CHR*), Little Surprise in the City (*FT*), Salient Points from the News (*FT*), Six Months' Moratorium on All Loans (*FT*)
16-Jun-1934	(+)	✓	✓	✓			Britain's Reply to Germany (*FT*), British Government Warns Germany (*FT*), Kaffirs Slump at Paris (*FT*)
18-Jun-1934	(+)				✓	✓	German Debt Comments (*FT*), German Debt Comments (*FT*)
19-Jun-1934	(−)		✓	✓	✓	✓	Germany Loses More Gold (*FT*)
20-Jun-1934	(+)	✓	✓	✓	✓	✓	Emphatic Note to Germany (*FT*)
21-Jun-1934	(+)		✓				German Reply to Protest (*FT*), German Reply to Protest (*FT*)
22-Jun-1934	(+)	✓	✓				Ban on Sales of Foreign-Owned Bonds (*FT*), Clearing Offices Bill (*FT*), Exchange Clearing Bill (*FT*), Improvement in India Loans (*FT*), Salient Points from the News (*FT*), Setting-Up of Debts Clearing Offices (*FT*), The Contango Agreement (*FT*)
23-Jun-1934	(+)	✓	✓				An Olive Branch for Germany (*FT*), Government Says Default is Not Justified (*FT*), Text of British Reply (*FT*)
25-Jun-1934	(+)	✓	✓				Berlin's Olive Branch (*FT*), Germany to Talk over Debts with Britain (*FT*)
26-Jun-1934	(+)	✓	✓				Mr. Chamberlain Tells of Reichsbank Device (*FT*), Reich Offer Awaited (*FT*)
27-Jun-1934	(+)	✓	✓				Dawes and Young Talks To-Day (*FT*), Debt Clearing Offices Bill Passed (*FT*), Declaration (*FT*), London Talks Open To-Day (*FT*), Further Strong Advance in British Funds (*FT*)
03-Jul-1934	(−)			✓			German Bonds Fall at Paris (*FT*)
04-Jul-1934	(+)	✓	✓				Transfer Agreement (*CHR*)
05-Jul-1934	(+)	✓	✓				Dawes and Young (*FT*), Exchange Agreement Move (*FT*), Full Interest on Dawes and Young Loans (*FT*), German Loans Rally (*FT*), Reich Ready to Negotiate Exchange Pact (*FT*), Salient Points from the News (*FT*), The Anglo-German Transfers (*FT*)
06-Jul-1934	(+)	✓	✓	✓	✓	✓	Better Tone at Amsterdam (*FT*), British Funds Make Progress (*FT*), Dawes and Young Bonds Rise (*FT*), Stocks End around the Day's Best (*FT*)
09-Jul-1934	(+)	✓	✓			✓	Bankers Meet at Basle (*FT*)
10-Jul-1934	(−)	✓			✓		German Transfers (*FT*)
11-Jul-1934	(+)	✓	✓	✓	✓	✓	Part Interest to Be Paid (*FT*), The Reichsbank Weekly Statement (*FT*)
12-Jul-1934	(+)				✓		Dawes & Young Loans (*FT*)
14-Jul-1934	(−)	✓	✓	✓	✓	✓	Reich Debt Default (*FT*)
16-Jul-1934	(+)			✓			Franco-German Loans Pact (*FT*)
17-Jul-1934	(+)		✓	✓	✓	✓	New German Money Ban (*FT*)
18-Jul-1934	(−)	✓	✓	✓	✓	✓	Pledged Revenues Order to Be Ignored (*FT*), Salient Points from the News (*FT*), Transfer Pact with France (*FT*)
19-Jul-1934	(−)	✓	✓	✓	✓	✓	Dawes Loan Stir (*FT*), Salient Points from the News (*FT*)
20-Jul-1934	(−)	✓	✓	✓	✓	✓	Dawes and Young Loans (*FT*)
24-Jul-1934	(−)			✓			Franco-German Commerce (*FT*)
26-Jul-1934	(+)	✓	✓	✓		✓	Dawes & Young Loans (*FT*), German Note Cover Unchanged (*FT*), Mark Devaluation Fears (*FT*)
28-Jul-1934	(+)	✓		✓			Signed series of commercial and financial agreements in Berlin (*CHR*)
30-Jul-1934	(+)	✓		✓			Dawes and Young Obligations (*FT*), Salient Points from the News (*FT*)

31-Jul-1934	(+)			✓			Reich Trade Pact (*FT*)
02-Aug-1934	(+)					✓	Swiss Clearing Agreement (*FT*)
09-Aug-1934	(+)	✓			✓		Holland Yields to Germany (*FT*)
18-Aug-1934	(+)	✓	✓	✓	✓	✓	German Loans and Credit (*FT*)
31-Aug-1934	(−)	✓	✓	✓		✓	Dr. Schacht's Plea for Full Moratorium (*FT*), Dr. Schacht's Plea for Full Moratorium (*FT*), Dr. Schacht's Plea for Full Moratorium (*FT*), Dr. Schacht's Plea for Full Moratorium (*FT*), Financial agreement signed with NDL (*CHR*), Germany and Its Debts (*FT*), Investment Support for British Funds (*FT*)
01-Sep-1934	(−)	✓	✓	✓	✓	✓	Deplorable Impression (*FT*), Heavy Decline in German Bonds (*FT*)
03-Sep-1934	(+)	✓			✓		German-Dutch Transfers (*FT*)
21-Sep-1934	(−)	✓	✓	✓	✓	✓	Debt Moratorium (*FT*), Signed agreement for clearing system under control of Reichsbank (*CHR*)
04-Oct-1934	(+)	✓	✓	✓	✓	✓	German Loan Interest (*FT*), Salient Points from the News (*FT*)
08-Oct-1934	(−)	✓	✓	✓	✓	✓	Bank Chiefs Meet at Basle (*FT*)
10-Oct-1934	(+)	✓	✓	✓	✓	✓	Rise in Reichsbank Gold Holdings (*FT*)
12-Oct-1934	(+)	✓	✓				A Return of Confidence (*FT*), British Funds Quiet with Firm Tone (*FT*), Markets Shake off Fears (*FT*)
13-Oct-1934	(+)	✓	✓		✓		Dawes and Young Loan Interest (*FT*), Interest on Dawes Loan (*FT*), Interest on Dawes Loan (*FT*), Salient Points from the News (*FT*), Subdued Week in Stock Markets (*FT*)
15-Oct-1934	(−)	✓	✓	✓	✓	✓	U. S. Investors and Dawes Loan (*FT*)
17-Oct-1934	(−)	✓	✓	✓	✓	✓	Multiple News Items (*FT*)
01-Nov-1934	(+)	✓	✓				Initial agreement for settling trade dispute and liquidation of outstanding debt (*CHR*)
02-Nov-1934	(+)		✓				Dawes Loan (*FT*), Full Interest on Dawes and Young Loans (*FT*), Germany's Trade Debts to Be Met within a Year (*FT*), New Anglo-German Trade Plan (*FT*), Salient Points from the News (*FT*)
06-Nov-1934	(−)	✓	✓	✓	✓	✓	Hope of Moderate Roosevelt Policy after Elections (*FT*)
16-Nov-1934	(−)	✓			✓		Clearing agreement lapses denounced by Netherlands (*CHR*)
03-Dec-1934	(+)			✓			Saar plebiscite - Franco-German agreement (*CHR*)
05-Jan-1935	(+)		✓	✓	✓	✓	Swedish-German Clearing (*FT*)
15-Jan-1935	(+)		✓				85 Per Cent. For Germany (*FT*)
30-Jan-1935	(+)			✓			Saar convention signed (*CHR*)
05-Feb-1935	(+)	✓	✓	✓			German Bonds in Demand (*FT*)
11-Feb-1935	(+)			✓			Singed agreement regarding change of customs regime in the Saar (*CHR*)
25-Feb-1935	(−)			✓			Causes of Francogerman Hitch (*FT*)
28-Feb-1935	(−)		✓	✓	✓	✓	Memel conflict escalating - exchange of notes (*CHR*)
16-Mar-1935	(−)		✓	✓	✓	✓	German rearmament proclaimed - notes of protests (*CHR*)
17-Apr-1935	(−)	✓	✓				Budget Imparts Strength to British Funds (*FT*), Dawes Bond Service (*FT*)
20-Apr-1935	(−)	✓	✓	✓	✓		Dawes Loan Protest (*FT*), German-Swiss Clearing (*FT*)
21-May-1935	(−)		✓	✓	✓	✓	Hitler's foreign policy decleration (*CHR*)
07-Jun-1935	(+)		✓				Exchanged notes for reciprocal recognition of load line certificates (*CHR*)
18-Jun-1935	(+)		✓				Note exchange on naval rearmament (*CHR*)
09-Jul-1935	(−)	✓	✓	✓	✓	✓	Settlements Bank (*FT*)
01-Aug-1935	(+)		✓				German Debts (*FT*)
15-Sep-1935	(−)		✓	✓	✓	✓	Nuremberg laws passed (*HIS*)
16-Sep-1935	(+)	✓	✓	✓	✓	✓	Dawes and Young Loans Interest (*FT*)
17-Sep-1935	(+)	✓	✓	✓	✓	✓	Dawes and Young Loans Service (*FT*)
19-Sep-1935	(+)	✓	✓	✓	✓	✓	Reich Bond Issue Oversubscribed (*FT*)
15-Oct-1935	(−)	✓	✓	✓	✓	✓	Settlements Bank (*FT*)
21-Oct-1935	(−)		✓	✓	✓	✓	Germany ends LON membership (*CHR*)
06-Dec-1935	(+)		✓				Clearing Offices Act to Continue (*FT*)
13-Jan-1936	(+)	✓	✓	✓	✓	✓	Mobilisation of Credits (*FT*), Salient Points from the News (*FT*)
20-Feb-1936	(+)	✓	✓	✓	✓	✓	Standstill agreement extended (*CHR*)
07-Mar-1936	(−)		✓	✓	✓	✓	Hitler repudiates Locarno pact (*CHR*)

02-Apr-1936	(+)		✓	✓	✓	✓	Markets Encouraged by Revenue Surplus (*FT*)
13-Apr-1936	(−)		✓	✓	✓	✓	LoN formally declares Germany's infringement of Versailles (*CHR*)
08-May-1936	(−)	✓	✓				German Bond Interest (*FT*)
13-May-1936	(+)	✓	✓				Better Economic Position (*FT*)
30-Jun-1936	(+)	✓	✓				German Debt Service (*FT*)
07-Aug-1936	(−)	✓	✓				Germany's External Credit Problem (*FT*)
27-Aug-1936	(+)	✓		✓			Possibility of Improving Political Relations (*FT*)
29-Aug-1936	(+)	✓	✓	✓			Home Railways Firm (*FT*)
11-Sep-1936	(−)		✓				Cheerful in Tone (*FT*), French Franc Respite (*FT*)
14-Sep-1936	(+)	✓	✓	✓	✓	✓	The Flow of Investment (*FT*)
30-Sep-1936	(+)	✓	✓	✓	✓	✓	Schacht declares that currency will not be devalued (*CHR*)
18-Oct-1936	(−)		✓	✓	✓	✓	Göring given authority to implement Four Year Plan (*HIS*)
24-Oct-1936	(+)	✓	✓	✓	✓	✓	German External 1924 Loan (*FT*)
04-Nov-1936	(−)	✓	✓	✓	✓	✓	Order: Holders of non-quoted German bonds have to offer them to the German government (*CHR*)
18-Nov-1936	(−)		✓	✓	✓	✓	Germany recognises Franco (*CHR*)
02-Dec-1936	(+)		✓				Parcel agreement signed (*CHR*)
26-Jan-1937	(+)		✓				Dawes & Young Bonds (*FT*)
08-Feb-1937	(−)	✓	✓	✓	✓	✓	Multiple News Items (*FT*), Salient Points from the News (*FT*), Settlements Bank Relations (*FT*)
09-Feb-1937	(+)	✓	✓	✓	✓	✓	British Funds Develop Renewed Weakness (*FT*), Salient Points from the News (*FT*), Settlements Bank and Germany (*FT*)
21-Feb-1937	(+)	✓	✓	✓	✓	✓	Extension of debt standstill (*CHR*)
15-Apr-1937	(+)		✓				Extension of trade agreement to British Dominions (*CHR*)
26-May-1937	(−)			✓			Dr. Schacht in Paris (*FT*)
31-May-1937	(−)			✓			New Scheme to Replace the Clearing Agreement (*FT*)
05-Jul-1937	(−)					✓	New German-Swiss Payments Pact (*FT*)
10-Jul-1937	(+)	✓		✓			Trade agreement (*CHR*)
12-Jul-1937	(+)			✓			Increased Imports to Be Put on Cash Basis (*FT*)
13-Jul-1937	(+)			✓			The Franco-German Trade Pact (*FT*)
17-Jul-1937	(+)		✓				Naval agreement (*CHR*)
09-Sep-1937	(−)		✓	✓	✓	✓	Generally Dull, but Close above Worst (*FT*)
16-Oct-1937	(−)		✓	✓	✓	✓	Germanny refuses invitation to nine-power conference (*CHR*)
10-Nov-1937	(+)		✓				Air transport taxation (*CHR*)
04-Dec-1937	(−)		✓	✓	✓	✓	Hitler makes himself minister of war (*CHR*)
13-Dec-1937	(+)	✓	✓	✓	✓	✓	Standstill agreement extended (*CHR*)
16-Dec-1937	(+)			✓			Frontier agreement on Saar (*CHR*)
12-Mar-1938	(−)		✓	✓	✓	✓	Invasion and Annexation of Austria (*CHR*)
11-Apr-1938	(−)		✓	✓			Austro-German Loans Abroad (*FT*)
03-May-1938	(−)	✓	✓	✓	✓	✓	German moratorium applied to Austrian debts (*CHR*)
17-May-1938	(−)		✓				Austrian Loans (*FT*)
18-May-1938	(−)		✓	✓	✓	✓	Note exchange with the US over Jewish Property decree (*CHR*)
02-Jun-1938	(−)	✓	✓	✓	✓	✓	Austrian Loan Talks Adjourned (*FT*), U. S. Concern (*FT*), Young and Dawes Loans Service (*FT*)
03-Jun-1938	(+)	✓	✓	✓	✓	✓	Fresh Advance in British Funds (*FT*)
04-Jun-1938	(+)	✓	✓				Germany's Debt Position (*FT*)
07-Jun-1938	(−)	✓	✓	✓			Protest against German non-payment of Austrian loans (*CHR*)
09-Jun-1938	(−)		✓				London Meeting on Austrian Loans (*FT*), New and Old Loans (*FT*)
13-Jun-1938	(−)	✓	✓	✓	✓	✓	Large Gold Turnover (*FT*)
17-Jun-1938	(−)		✓	✓			Clearing with Germany (*FT*), Index and News Summary (*FT*), Political Debts Condemned (*FT*), Principle of Responsibility Repudiated (*FT*)
18-Jun-1938	(−)	✓	✓	✓	✓	✓	U. S. & Austria Loans (*FT*)
23-Jun-1938	(−)	✓	✓	✓			London Talks on Austrian Debt (*FT*)
30-Jun-1938	(−)	✓	✓				Austria Debt Talks (*FT*), Naval treaty (*CHR*)
01-Jul-1938	(−)	✓				✓	German Bonds Held Abroad (*FT*), Swiss Pact with Reich Likely Interest Cut Sought (*FT*), Transfer Agreement (*CHR*)
02-Jul-1938	(+)		✓				Anglo-German Agreement (*FT*), Anglo-German Debts Agreement (*FT*), Austro-German Debt (*FT*), City View of the Agreement (*FT*), Country Bank Clearings (*FT*)

05-Jul-1938	(+)	✓		✓			Paris Talks on Austria Loans (*FT*)
06-Jul-1938	(+)		✓				Anglo-German Payments Agreement (*FT*)
30-Jul-1938	(+)	✓		✓			German Offers on Austria Debts (*FT*)
17-Aug-1938	(−)		✓	✓	✓	✓	Escalation of Czeckslovak question (*CHR*)
30-Sep-1938	(+)		✓	✓			Munich pact (*CHR*)
29-Oct-1938	(−)		✓	✓	✓	✓	Germany request colonies back (*CHR*)
09-Nov-1938	(−)		✓	✓	✓	✓	Kristallnacht (*HIS*), Debt Amortisation (*FT*)
12-Nov-1938	(−)		✓	✓	✓	✓	Confiscation of Jewish property (*CHR*)
17-Nov-1938	(−)		✓	✓	✓	✓	Dispute with the US over Austrian debts (*CHR*)
18-Nov-1938	(−)		✓	✓	✓	✓	Escalation of diplomatic feud with the US (*CHR*)
06-Dec-1938	(+)			✓			Non-aggression declaration signed at Paris, by which Germany (*CHR*)
21-Jan-1939	(−)	✓	✓	✓	✓	✓	Result of Opposition to Nazi Finance (*FT*)
27-Jan-1939	(−)		✓	✓	✓	✓	Germany orders naval expansion (*HIS*)
10-Feb-1939	(−)		✓				German Standstill Debt Problems (*FT*)
15-Feb-1939	(+)			✓			Trade agreement with France (*CHR*)
03-Mar-1939	(+)		✓	✓	✓	✓	Germany offers non-agression pacts to some European countries (*CHR*)
15-Mar-1939	(−)		✓	✓	✓	✓	German annexation of Bohemia - ensuing political rift with UK and France (*CHR*)
23-May-1939	(+)	✓	✓	✓	✓	✓	Inability of the British Government to bar transfer to the German Reichsbank Czech gold (*CHR*)
23-Jun-1939	(+)	✓	✓				Anglo-Reich Transfer Pact Extended (*FT*)
21-Jul-1939	(+)			✓			Service on Dawes & Young Loans (*FT*)

Notes: For the following days, we deviate from our above coding rules to resolve duplicate issues and coding clashes: 15-Jun-1934: Duplicate removed. 21-Jun-1934: Article documents positive effect for the UK, negative for others. We take the positive effect for the UK only. 27-Jun-1934: There is a positive and a negative article reporting on the same event (London talks). We give the positive one preference. 09-Aug-1934: Duplicate removed. 21-Sep-1934: Duplicate removed. 13-Oct-1934: Article positive for the UK, negative for all others. We keep the positive for the UK. 02-Nov-1934: A news specific to the US is excluded here. 02-Nov-1934: Duplicate removed. 11-Sep-1936: We go for the negative event. There is also some positive sentiment in the "Cheerful in Tone" article of the same day. 09-Jun-1938: We take this meeting as the main news, not the article on 'New and Old Loans' of the same day which has a postive outlook for the UK. 30-Jun-1938: There is also a Navy treaty signed by the UK that day (Chronicle). We give precedence to 'Austria Debt Talks' in the FT 09-Nov-1938: We give the Reichskristallnacht priority over an article on debt amortisation (FT, 'Debt Amortisation').

A.4 Trade and financial integration

A.4.1 Financial integration data

Data on the German banks' exposure to foreign banks is from *Bundesarchiv (Koblenz), Nachlass Kastl Ludwig, N 1138/27*. The total amount of debt owed by German banks to foreign banks is 2425.7 million Reichsmark or 5.8% of national income (national income is taken from Ritschl, 2002).

A.4.2 Trade data

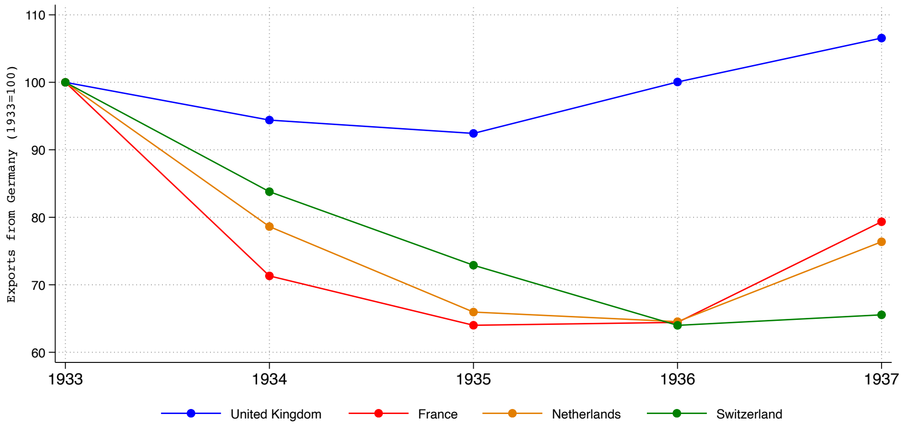
Data on Germany's bilateral, disaggregated trade are from the following sources:

- 1930-1934: Statistisches Reichsamt (ed.). *Monatliche Nachweise über den auswärtigen Handel Deutschlands, Der Spezialhandel (Reiner Warenverkehr) nach Ländern*, Reimar Hobbing. Berlin
- 1935-1939: *Wirtschaft und Statistik*, Monthly issues April 1930 to January 1939;
- 1913-1938: League of Nations, *Memorandum on International Trade and Balances of Payments*.

A.4.3 Trade costs estimates

To measure Anglo-German, Franco-German, and Dutch-German bilateral trade costs, we use the data estimated by Jacks et al. (2011). Jacks et al. (2011)'s dataset does not report Swiss-German bilateral trade costs and we therefore estimate them. We rely on Statistisches Reichsamt (1937, 1939, p. 10 and 16, respectively) to obtain Swiss-German bilateral trade data. All the other necessary inputs to estimate Swiss-German trade costs are in Jacks et al. (2011)'s dataset. The original Swiss trade data are in Reichsmarks. To keep them comparable with the data for the other country pairs from Jacks et al. — which are all converted into 1990 US dollars —we calculate the ratios of Swiss over British exports and imports. We multiply these ratios with the respective value of British imports and exports in 1990 USD. This gives us the value of German-Swiss bilateral trade in 1990 USD.

Figure A.5: Germany's bilateral exports

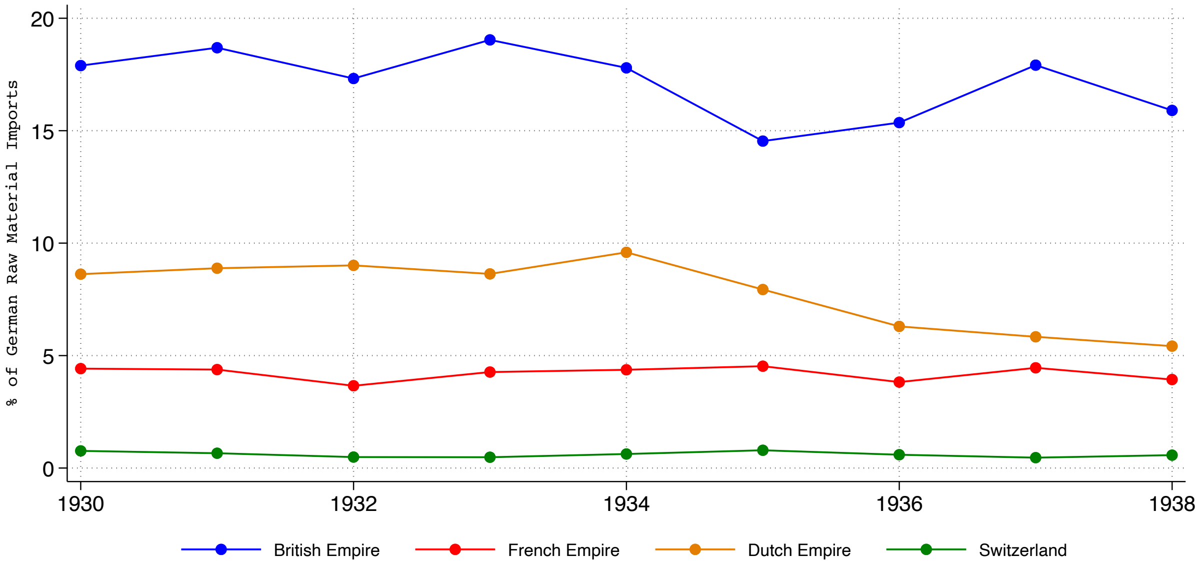


Notes: Data are from Statistisches Reichsamt (1937, 1939, p. 10 and 16 respectively).

To verify the plausibility of the trade cost estimate, a comparison with 'raw' trade data is useful. Indexing nominal trade data (in Reichsmark) to 1933, Figure A.5 shows the evolution of German exports to the four countries of interest. The figure confirms the pattern observed for the bilateral trade cost measure (reported in the main text). However, in comparison to the analysis of exports only, the trade cost measure has the advantage of accounting for changes in GDP. This is particularly important here as these countries' economic growth trajectory differed greatly since they did not all recover from the Great Depression at the same time and at the same pace.

A.4.4 Trade in raw materials

Figure A.6: Gemany's raw material imports



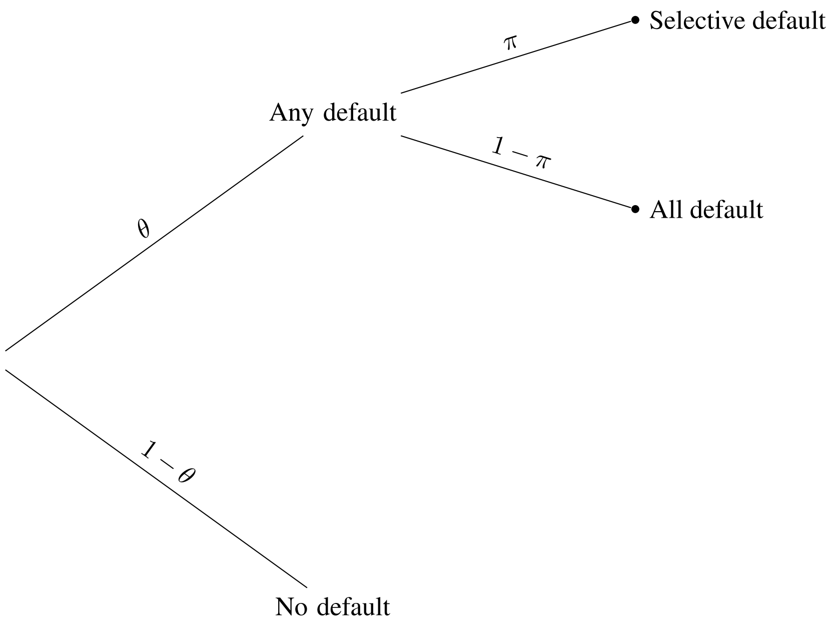
Notes: Empire data are aggregated over colonies (and dominions in the British case). Source is *Monatliche Nachweise über den auswärtigen Handel Deutschlands, Der Spezialhandel (Reiner Warenverkehr) nach Ländern* (multiple issues).

B Additional material, results, and robustness

B.1 Probability tree for selective default

Figure B.1 presents a probability tree that describes the different default events and corresponding probabilities in our model. Selective default is defined as a default on junior creditors but not on senior creditors. In the model, θ corresponds to the risk-neutral probability of default on junior creditors and π is the risk-neutral probability that senior creditors will be spared in the event of a default (see text for details).

Figure B.1: Selective default in a probability tree



$\Omega = \{\text{No default, All default, Selective default}\}$

$P(\text{No default}) = 1 - \theta$

$P(\text{junior default}) = P(\text{any default}) = \theta$

$P(\text{Selective default}) = \theta \cdot \pi$

$P(\text{All default}) = P(\text{senior default}) = \theta \cdot (1 - \pi)$

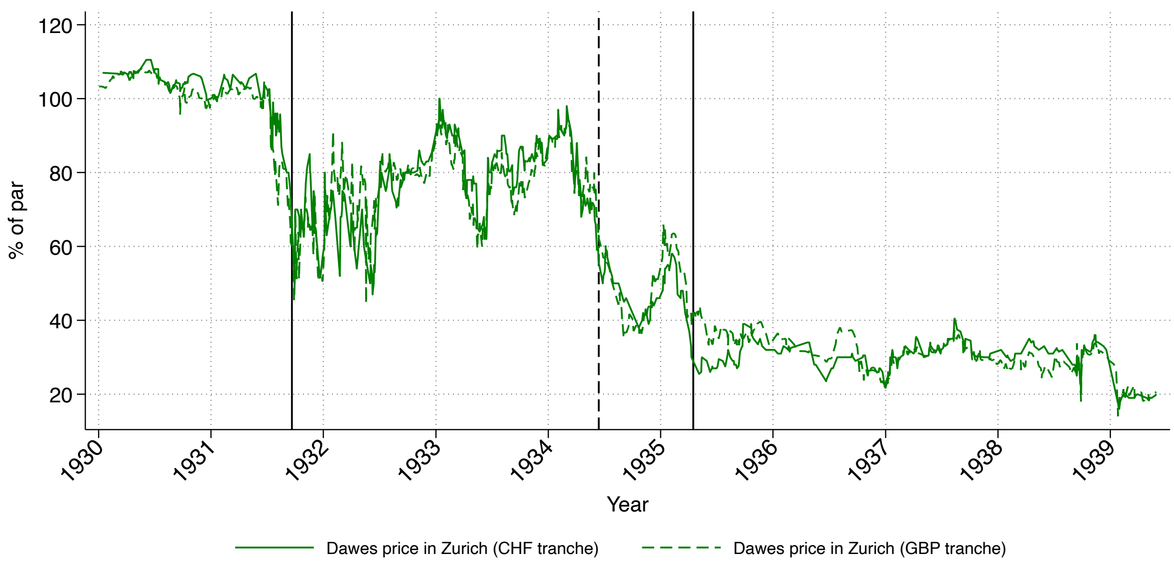
B.2 Alternative explanations for yield spreads

Following from our analytical framework, we interpret the Dawes bond yield spread between each continental market and the London market as the risk-neutral probability of selective default. There are six potential alternative explanations that lie outside of our theoretical framework: (1) war risk differentials, (2) home currency bias, (3) differing marginal investors across creditor countries, (4) information asymmetries between bondholders of the different creditor countries, (5) changes in the market price of risk, and (6) differences in expected recovery rates. Below we discuss the relevance of each of these alternative explanations. None of them appears to be a likely explanation of the bond yield spread across markets.

(1) Different war risks It could be argued that investors of the various creditor countries were facing different risks should a war break out because of different likelihoods of a German invasion. In this case, selective default risk would be connected to war risk—a different risk from the one we aim to measure. However, this is not a plausible interpretation of the yield spreads from a historical perspective. First, invasion was not yet a major concern at the beginning of our sample period. Second, while the Dawes bond yield was higher in Paris than in London, it was similar across continental markets. For the war risk to be a relevant explanatory factor, however, yields should have been much lower in Zurich and Amsterdam: Given their neutrality in World War I, they were less likely to be invaded by Germany in the event of a war.

(2) Home currency bias Second, because all bonds we consider were issued and payable in sterling, non-UK Dawes bondholders held securities denominated in a currency other than their home currency. Even though foreign exchange markets were operational, investors might have had a home currency bias (as shown by Maggiori et al., 2020, for modern data). This bias might explain the lower yield observed for identical sterling-denominated bonds in London than in continental markets.

Figure B.2: Value of Dawes bonds in Zurich



Notes: The graph shows two Dawes bonds in Zurich, one from the CHF tranche (and thus CHF-denominated) and one from the GBP-tranche (and thus GBP-denominated). All prices are daily and reported as a percentage of par. The vertical bars mark the devaluation of the pound sterling on 21 September 1931 (first bar), the German debt moratorium of 15 June 1934 (second bar), and the date of the Swiss-German clearing agreement marking the end of special treatment of the Dawes bonds (third bar). For details on the bond tranches, see Appendix A.1.

Fortunately, it is possible to rule out this explanation. While a large share of the Dawes Loan was denominated in sterling, several tranches had been issued in other currencies on European markets (see Appendix A.1.1 for an overview). On the Zurich market, two types of Dawes bonds were traded: CHF-denominated bonds and GBP-denominated bonds. The two types of bonds had the exact same characteristics except for their currency of denomination. Figure B.2 compares the prices of the GBP- and CHF-denominated Dawes bonds (expressed as a percentage of par) in Zurich from January 1930 to August 1939. The first vertical line marks the devaluation of the Pound Sterling in September 1931. From that date onward, any potential home currency bias should have become apparent as the pound sterling depreciated sharply relative to the Swiss Franc (the Swiss Franc was not devalued until late 1936). However, there was almost no difference between the prices of the GBP- and CHF-denominated Dawes bonds even after the pound's devaluation. We also do not observe any price premium for CHF-denominated bonds between the German debt moratorium of June 1934 (dashed line) and the first partial default on Swiss bondholders (second solid line). The two bonds differed only in their currency of denomination but were otherwise identical. Therefore, if investors' home currency bias accounted for the price differentials between GBP-denominated Dawes bonds across the various creditor markets, one should have observed a decline in the Zurich price of the GBP-denominated bond relative to that of the CHF-denominated bond following the segmentation of secondary debt markets. However, we do not observe such a pattern. This evidence shows that there was no home currency bias premium priced in the bond yield.

(3) Different marginal investors One possible explanation for the Dawes bond yield differential between markets is that marginal investors differed across the various segmented markets. In the absence of detailed statistics on sovereign bond ownership in the UK versus continental markets, it is not possible to provide direct evidence on the micro-structure of the respective markets. It is however unlikely that the presence of different marginal investors can account for the observed yield spread across markets for the three following reasons, which we present in more detail below: (i) the diversity of bondholders and the absence of a specific class of investors such as large pensions funds dominating the sovereign bond market during the period under consideration , (ii) the large size of the Dawes bond yield spread across markets compared to a benchmark obtained for another period of market segmentation, and (iii) evidence that the valuation of coupon income did not differ between the London and Paris markets.

First, archival evidence shows that bondholders formed a very diversified group. When British holders of Dawes bonds had to register to benefit from the terms of the Anglo-German debt settlements, many bondholders wrote to the Bank of England to inquire on whether they were eligible to qualify as British residents. Part of these letters are accessible at the archives of the Bank of England (BoE archives AC30-556). This correspondence reveals that bondholders were very diverse and included private individuals and retail investors, banks, national and international corporations and insurance companies. There is no evidence that one large investor class dominated the market such as pension funds in the UK equity market nowadays (Bell and Jenkinson, 2002).

Second, while it is not possible to rule out that marginal investors' risk aversion differed across markets given the absence of individual data on marginal investors' portfolios, we nevertheless notice that Dawes bond yield differentials across markets were very substantial in the period when secondary bond markets were segmented. For such large yield spreads to have emerged in the absence of selective default risk, the various countries' marginal investors would have had to have radically different risk appetites. There is no indication that this was the case. On the contrary, historical evidence from World War I suggests that cross-listed Russian government bonds traded broadly at the same price in London and Paris during World War I—even after wartime restrictions made it impossible to arbitrage bonds between the two markets (Bernal et al., 2010). With the same available information, British and French investors priced Russian bonds in a similar way until the Russian Revolution of 1918.

Third, we can provide indirect evidence on the marginal investors' valuation of coupon income in the spirit of Elton and Gruber (1970) and Bell and Jenkinson (2002). In the case of equity, Elton and Gruber (1970) look at the 'price-drop-to-dividend-ratio' as an indicator of the marginal investor's valuation of dividend income.[12] Analogously, we define the 'price-drop-to-coupon-ratio' (PR) as: $PR = \frac{P_c - P_e}{C}$, where P_c is the bond price on the day before coupon payment, P_e is the bond price on the day after coupon payment and C is the bond's coupon. We compute this ratio for the Dawes bond on the Paris and London markets in the periods before and after these markets became segmented. In general, we should expect the price-drop-to-coupon-ratio to be close to one in both markets as marginal investors selling their bond just before the date of coupon payment should

[12] See Bell and Jenkinson (2002) for a review of potential issues with this measure. However, most of these relate to the problem of comparing the price-drop-to-dividend-ratio across different stocks given that the denominator (the dividend size) varies significantly across firms. Since we compare identical bonds with the same coupon, our analysis will not be affected by these issues. Compared to the Bell-Jenkins approach the advantage of the Elton-Gruber measure lies in the ease of interpretation.

be fully compensated for renouncing coupon income. However, if marginal investors on the Paris and London markets differed with respect to their valuation of coupon income relative to capital gains (for example, due to these investors facing different tax rates in their respective markets), one might observe significant differences between the 'price-drop-to-coupon-ratio' in the two markets in the period of market segmentation.

Table B.1: Price-drop-coupon-ratios around 19 coupon payments

Market	Mean price-drop-coupon-ratio		
	pre-market segmentation		post-market segmentation
	incl. outlier (April 1933)	excl. outlier (April 1933)	
London	1.09	0.97	0.75
Paris	1.15	1.04	0.81
Difference in means: Paris-London	0.064	0.064	0.067
(p-value)	(0.83)	(0.82)	(0.67)

Note: This table displays the mean 'price-drop-to-coupon ratio' (PR) for the Dawes bond in Paris and London in 1 January 1930- 14 June 1934 (pre-market segmentation) and 15 June 1934-31 August 1939 (post-market segmentation). The 'price-drop-to-coupon ratio' defined as': $PR = \frac{P_c - P_e}{C}$. This measure is derived from 19 coupon payments for each market (10 of which are for post-market segmentation period). The table's last row displays the difference in the mean ratio between London and Paris. For the computation of the the p-value, we regress the 'price-drop-to-coupon ratio' on a Paris-market dummy variable.

Table B.1 reports the 'price-drop-to-coupon-ratio' for the Dawes bond in Paris and London in 1 January 1930-14 June 1934 (pre-market segmentation) and 15 June 1934-31 August 1939 (post-market segmentation). For the computation of the ratio, we compare the trading days before and after coupon payment.[13] The underlying data cover 19 coupon payments for each market (9 before and 10 after market segmentation). In the second column of Table B.1, we exclude the April 1933 coupon payment, which is an outlier in the data. The price drop surrounding the April 1933 coupon payment was twice as large as the value of the coupon in both London and Paris, presumably because concomitant political events in Germany (ie. the accession of the Nazis to power and their first political actions as the ruling party) spurred a substantial decline in Dawes bond prices.

When excluding this outlier, the mean 'price-drop-to-coupon-ratio' is close to 1 (0.97 in London and 1.04 in Paris) in the period before market segmentation, suggesting that investors were indifferent between income from capital gains and coupon payment. The 'price-drop-to-coupon' ratios fell substantially in the period when markets were segmented, potentially because the Dawes bond became a more speculative asset following the German government's announcement that it was now considering defaulting on this bond. However, the ratio remained broadly the same between the Paris and London markets (0.75 in London versus 0.81 in Paris). The final row of Table B.1 shows that the difference in the mean 'price-drop-to-coupon-ratio' between London and Paris was very small and statistically insignificant during both the pre-market segmentation and post-market segmentation periods. This evidence shows that there was no difference in the marginal investors' valuation of coupon income between the Paris and London markets.

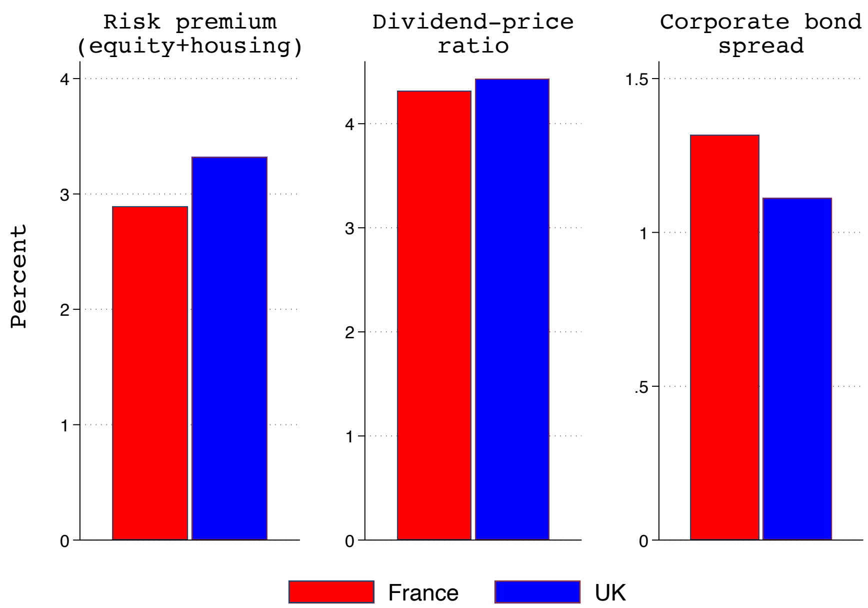
(4) Asymmetric information between bondholders in the different markets Chan et al. (2008) explore the role of informational asymmetries between domestic and foreign investors in explaining the spread between A- and B-shares on the Chinese stock markets. Before 2001, A-shares could only be traded by Chinese residents, whereas B-shares could only be traded by foreign residents. The authors attribute close to 50% of the spread between A- and B- share prices to information asymmetries. It is however unlikely that informational asymmetries could have accounted for the observed Dawes bond yield spread between London and continental markets during the period under consideration. First, knowledge about German government bonds was much more widespread in the 1930s than knowledge about various Chinese stocks at the beginning of the 2000s. Rather than representing the valuation of a specific company, the market price of the Dawes bond reflected the ability of the sovereign government of one of the largest economies of the time to repay its debts. In the aftermath of World War I, the international press regularly commented on the German government's actions and financial position. Second, whereas Chan et al.

[13]The coupon payment typically took place on the 15th of April and 15th of October of each year. We therefore typically compare the closing prices on the 14th and 15th of the respective month. When the market was closed on these days—for example due to Easter holidays or weekends—we use instead the closest day at which markets were open.

document the existence of asymmetric information between domestic and foreign investors, we show that a large yield spread emerged for identical Dawes bonds across various foreign creditor markets. We do not consider it plausible that British investors were better informed than continental ones about the German government's ability and willingness to repay its external debts. All four European creditor countries had a good-quality specialist financial press and newspapers published in the various creditor countries were also available in the others. In addition, large banks in the different countries typically had close correspondent relationships with each other and shared news about the various countries' economic and financial position through phone or cable. Language barriers are also unlikely to have played a role here. German was spoken in a large part of Switzerland (including Zurich). The Dutch language is also typically considered closer to German than the French and English languages. Yet, Dawes bonds traded at higher yields in Zurich and Amsterdam than in London.

(5) Different market prices of risk Another possible explanation is that the market price of risk was different on the continental creditor markets versus the London market. It is worth noting here that trading prohibitions aiming at the suspension of bond arbitrage between markets only applied to German government bonds. Market participants remained free to arbitrage other risky securities between the different creditor countries' markets. Nevertheless, differences in the market price of risk could have emerged between markets if investors did not diversify their portfolios globally or if market integration in other securities than the Dawes bond was imperfect. These differences could in turn have affected the Dawes bond yield spread between the junior and senior creditor markets. Below, we show that differences in the market price of risk between markets are an unlikely explanation for the observed Dawes bond yield differentials. We first compare indicators of risk aversion for the two main creditor markets of London and Paris. Second, we leverage newly collected data on the excess return of risky securities cross-listed in these two markets.

Figure B.3: Average risk premia, dividend-price ratios, and corporate bond spreads (1930-1938)



Notes: The graphs depict averages of the respective measures between 1930 and 1938. The data sources are the following: risk premium (Kuvshinov and Zimmermann, 2021); dividend-price ratio (Jordà et al., 2019); corporate bond spread (Kuvshinov, 2022).

Figure B.4 reports several measures of risk aversion computed from data for France and the UK during the 1930-1938 period: a. the mean risk premium for equity and housing, b. the mean dividend-price ratio of stocks, and c. the mean corporate bond spread.

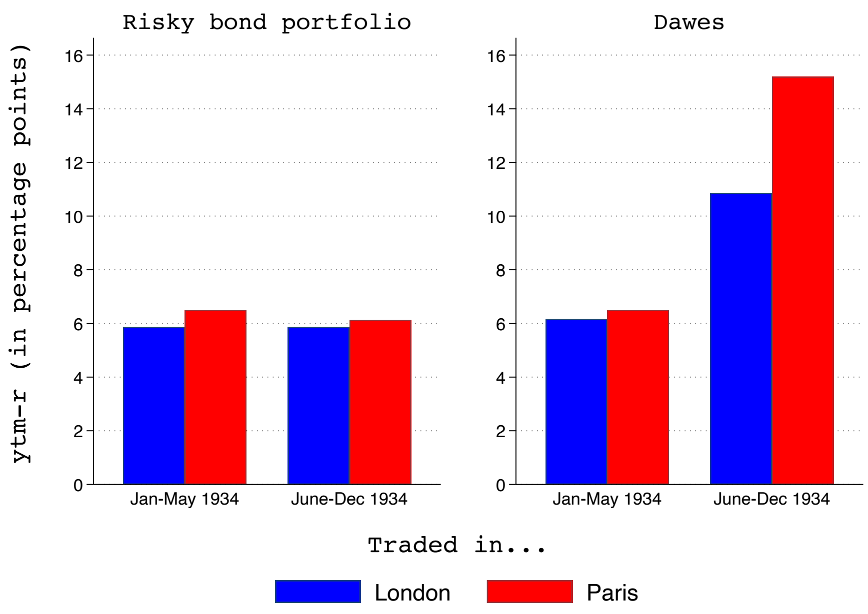
(a) The risk premium estimate is from Kuvshinov and Zimmermann (2021) who draw on long-run data for 17 countries from 1870 onward and carefully construct risk premia based on data for the housing (prices and rents) and stock markets (dividends and prices). These data show that differences in the equity and housing risk premium between France and the UK were very minor. If anything, it appears that, on average, British investors required a slightly higher risk premium than French investors. This suggests that differences in the average level of risk aversion between the two creditor countries cannot account for why the Dawes bond's yield-to-maturity was higher on the Paris than on the London market.

(b) The mean dividend-price ratio (or equity yield) is based on Jordà et al. (2019) and provides an approximate lower bound estimate for the long run expected return on equity (Kuvshinov and Zimmermann, 2021, p. 2). The data therefore suggest that there was no significant difference between UK and French investors' expected return on equity.

(c) Data from Kuvshinov (2022) show that there was no sizable difference in the corporate bond spread between France and the UK - the difference in the mean corporate bond spread between the two countries is lower than 25 basis points for the 1930-1938 period. Overall, these three indicators suggest that the market price of risk did not differ substantially between the London and Paris markets.

We can also explore whether the compensation required by investors for holding risky bonds was different on the Paris and London markets. As explained above, trading restrictions resulting in the effective segmentation of the London and Paris markets only pertained to German government bonds. By contrast, investors could continue to arbitrage other cross-listed securities between the two markets. To compare the yields of risky government bonds across markets, we select four identical, GBP-denominated sovereign government bonds other than the Dawes bond that were cross-listed on the Paris and London exchanges in the year 1934: (1) Argentina's 4% Rescission bond of 1896, (2) Brazil's 4% bond of 1889, (3) China's 5% Reorganisation bond of 1913, and (4) Portugal's 3% of 1902. For each of these four bonds, we collect their price on the Paris and London markets on the last trading day of each month of the year 1934 as well as information on their coupon and maturity date.[14] Weighting these bonds by their outstanding volume allows constructing a portfolio of cross-listed securities whose yield-to-maturity approximates that of the Dawes bond.[15]

Figure B.4: Excess yield-to-maturity for risky bonds in Paris and London in 1934



Notes: This figure displays the mean excess yield-to-maturity on a) a portfolio of cross-listed, GBP-denominated, risky government bonds and b) the Dawes bond in the London and Paris in the months before (January-May 1934) and after (June 1934-December 1934) the Paris and London markets for Dawes bonds became segmented. The excess yield on the risky bond portfolio is calculated as the weighted average (ie. weighted by the outstanding amount of each corresponding bond issue in 1927 as weights) of the yields-to-maturity on four cross-listed GBP-denominated bonds: (1) Argentina's 4% Rescission bond of 1896, (2) Brazil's 4% bond of 1889, (3) China's 5% Reorganisation bond of 1913, and (4) Portugal's 3% bond of 1902. Bonds in the risky portfolio are weighted by the outstanding amount of each corresponding issue in 1927. Yields-to-maturity are computed based on the bonds' price on the last trading day of each month.

Figure B.4 reports the mean excess yield-to-maturity for this (weighted) risky bond portfolio on both the Paris and London markets and compares it to the German Dawes bond excess yield-to-maturity in the months before

[14] Price data for London and Paris are from the *Financial Times* and the *Journal des finances*, respectively. Data on the maturity and outstanding amount of the bonds are from (Moody's Investors Service , 1927).

[15] Note that these were not the only bonds cross-listed on the Paris and London markets as other corporate and government bonds also traded in both markets. The presence of cross-listed bonds in itself suggests that differences in the market price of risk were limited between Paris and London.

(January-May 1934) and after (June 1934-December 1934) the markets for German government bonds became segmented. The difference in excess yields between London and Paris was minimal for both the risky bond portfolio and the Dawes bond in January-May 1934. However, while the Paris-London yield differential remained minimal for the risky bond portfolio in June-December 1934, the Dawes bond yield differential increases to over 4 percentage points. Overall, the evidence suggests that there were no major differences in the market price of risk between London and Paris throughout this period as differences in the price of other risky securities were arbitraged away and such arbitrage should have resulted in equalizing the market price of risk between the two markets. This evidence is also in line with qualitative evidence from contemporaries, which suggests that security arbitrage was indeed very substantial between the London and Paris markets during this period (Armstrong 1934, p. 163; François-Marsal 1931, p. 445). The data also reveal that the geographical segmentation of the German government bond market in June 1934 did not affect arbitrage in other risky securities. Market segmentation therefore did not lead to the emergence of large differences in the market price of risk between the two markets.

(6) Differences in expected recovery rates Another alternative explanation is that the different countries' bondholders did not expect the same recovery rate in case of default. The expected loss on the Dawes bond can be decomposed into a probability of default (PD) and a loss given default (LGD). In our analytical framework, we assume that bonds have a zero recovery rate in case of default so that the loss given default is 100%. This simplification allows us to decompose the bond yield spread between markets into a liquidity premium and a risk-neutral probability of selective default. While we assume yields to have the structure $y_t = r_t + PD_t$, an alternative presentation including the LGD in continuous time would be $y_t = r_t + [PD_t \times LGD_t]$ (Saunders, 2010, p. 106).

While it is not possible to determine empirically whether the higher yield observed on junior creditor countries' markets reflected a higher PD or a higher LGD, we do not consider this to be an issue for our interpretation as both correspond to an expectation of discrimination between creditors. For example, a debtor government might discriminate against certain creditors by repaying them a lower share of the principal (relative to other creditors) in case of default, which would correspond to a higher LGD for those bondholders. If investors expected bondholders from a given creditor country to receive lower principal repayment from Germany in the event of a default, these expectations of differential treatment would be reflected in the selective default risk spread.

There is however one hypothetical scenario, under which differences in the expected LGD for different countries' bondholders would not reflect creditor discrimination by the debtor government, ie. when investors expect the creditor countries' government to compensate bondholders for their losses. For example, it could be that the UK government had implicitly committed to compensate British holders of Dawes bonds *to a larger extent* than the French government in case of default. This situation would result in a lower LGD for British bondholders than for French bondholders but this difference would not be related to selective default risk. However, we consider this scenario as extremely unlikely. Having read through numerous newspaper articles and archival documents relating to Germany's external debts and the service of the Dawes bonds in the 1930s, we have never found any single mention of an implicit guarantee by any of the the creditor countries' governments. Given the absolute and relative size of the Dawes bond issues in the different markets, it is very unlikely that any of the creditor countries' bondholders expected a bail-out from their government and it is even more unlikely that British bondholders expected to receive a comparatively higher compensation from their government than French bondholders. Overall, there is no evidence that bondholders expected a bail-out from their respective governments in case of a default on the Dawes bond.

B.3 The effect of general news shocks on overall default risk

Our regression results indicate that general news about Germany's overall ability or willingness to repay its external debts (ie. news pertaining to all creditors) do not affect the risk of selective default (Table 5). This finding is consistent with our theoretical prediction that the direction of the effect of general news on selective default risk is indeterminate. However, it is possible that the lack of signal strength in the general news we record in our dataset produces the estimate of no effect. To elicit whether this result is due to a lack of signal strength in the news data, we also estimate the effect of general news on overall (as opposed to selective) default risk.

More precisely, in our framework, the probability that *any default* takes place (i.e. the probability of a default on either junior and senior creditors alike OR on junior creditors only) is defined as θ. This probability corresponds to the bond's yield-to-maturity in the junior market (y_j) net of the risk free rate (r) and of the liquidity premium in the junior market (ψ_j):

$$\theta_t = y_{jt} - r_t - \psi_{jt} \tag{8}$$

The probability that a *general default* takes place (i.e. the probability of a default on all -junior and senior-bondholders) is defined as $\theta(1-\pi)$. This probability corresponds to the bond's yield-to-maturity in the senior creditor country's market (y_s) net of the risk free rate (r) and of the liquidity premium in the senior market (ψ_s):

$$\theta_t(1-\pi_t) = y_{st} - r_t - \psi_{st} \tag{9}$$

While our prediction for the effect of general news on the risk of *selective* default is indeterminate, our prediction for their effect on overall default risk in unambiguuous: bad (good) general news about Germany should increase (decrease) both the risk that *any* default takes place and the risk of a *general* default on all creditors.

Table B.2 reports the estimated effects of general news on the two corresponding risk measures $y_j - r$ (risk of *any default*) and $y_s - r$ (risk of a *general* default). In line with our other specifications, we control for liquidity in the regressions but do not deduct the liquidity term directly from our default risk measures (as this term is estimated). When considering the risk of *any default*, we report results obtained for all junior creditor markets j (Paris, Amsterdam and Zurich) as well as results obtained when restricting the sample to the Paris market.

Table B.2: Effect of general news on risk of *any* default and risk of *general* default

	Dependent variable:					
	Risk of *any* default ($y_j - r$)				**Risk of *general* default ($y_s - r$)**	
	pos. news		neg. news		pos. news	neg. news
	(1)	(2)	(3)	(4)	(5)	(6)
News shock	0.05	-0.01	0.44***	0.50***	0.06	0.27**
	(0.11)	(0.17)	(0.11)	(0.12)	(0.07)	(0.12)
Liquidity control	✓	✓	✓	✓	✓	✓
Paris data only		✓		✓		
N (Observations)	368	151	689	266	182	335
N (Event-market)	62	22	104	39	24	43
Adjusted R^2	0.97	0.97	0.94	0.96	0.97	0.94
Within R^2	0.01	0.05	0.07	0.21	0.01	0.08

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ The liquidity control corresponds to the implicit bid-ask spread differential between the London market s and continental market j estimated using Roll's (1984) method.

The results indicate that bad general news about Germany's creditworthiness increase the risk that any default takes place by 44-50 basis points on average and the risk of a general default on all bondholders by 27 basis points. These results are fully aligned with our predictions. By contrast, we do not find a symmetrical effect for positive news. Therefore, while we cannot preclude the possibility that the low signal strength of positive (general) news accounts for the no-effect of this type of news on selective default risk, the results indicate that negative (general) news do have a very strong signal strength. Consistent with our predictions, we find that such negative news about Germany's creditworthiness have a strong effect on overall default risk but do not affect selective default risk (Table 5).

B.4 News regressions with yield data interpolation

The following tables reproduce the tables of Section 3.2 using interpolated data. In the baseline results, we treat yield data as missing when no bond price is recorded for a given day in the original source or when the price has not changed compared to the previous day. For the regression tables below, we have replaced missing price data on any given day with the last available price.

Table B.3: Effect of general news (interpolated data)

	Panel A: Political, trade, and financial news							
	Unconditional risk ($y_j - y_s$) in pp.				Conditional risk ($\frac{y_j - y_s}{y_j - r}$) in pp.			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	0.03	-0.04	0.15	0.16	-0.10	-0.20	0.07	0.17
	(0.11)	(0.20)	(0.12)	(0.19)	(0.42)	(0.82)	(0.49)	(0.84)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Paris data only		✓		✓		✓		✓
N (Observations)	472	167	819	306	472	167	819	306
N (Event-market)	62	22	104	39	62	22	104	39
Adjusted R^2	0.94	0.94	0.87	0.90	0.94	0.95	0.90	0.92
Within R^2	0.00	0.01	0.02	0.04	0.01	0.00	0.02	0.02
	Panel B: Financial news only							
	Unconditional risk ($y_j - y_s$) in pp.				Conditional risk ($\frac{y_j - y_s}{y_j - r}$) in pp.			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	-0.01	-0.03	0.34*	0.23	-0.39	-0.57	0.82	0.68
	(0.11)	(0.26)	(0.20)	(0.22)	(0.49)	(1.06)	(0.70)	(1.14)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Paris data only		✓		✓		✓		✓
N (Observations)	373	129	358	125	373	129	358	125
N (Event-market)	49	17	46	16	49	17	46	16
Adjusted R^2	0.94	0.93	0.84	0.93	0.94	0.94	0.89	0.92
Within R^2	0.01	0.00	0.04	0.08	0.02	0.01	0.03	0.07

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ This table reproduces Table 5 of the paper with interpolated data. See main text for further information. We treat weekends (at which no trading occurred) as missing in the 11-day window, which is why the number of observations does not equal $N(Event - market) \times 11$.

Table B.4: News pertaining to UK bondholders only (interpolated data)

	Unconditional risk ($y_j - y_s$) in pp.				Conditional risk ($\frac{y_j - y_s}{y_j - r}$) in pp.			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	0.29**	0.09	0.18	0.11	2.95***	2.37**	1.71	1.98
	(0.14)	(0.16)	(0.21)	(0.19)	(0.88)	(1.07)	(1.17)	(1.10)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Paris data only		✓		✓		✓		✓
N (Observations)	502	177	128	50	502	177	128	50
N (Event-market)	68	24	18	7	68	24	18	7
Adjusted R^2	0.94	0.97	0.90	0.79	0.90	0.95	0.88	0.88
Within R^2	0.05	0.08	0.02	0.06	0.13	0.14	0.08	0.16

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$ This table reproduces Table 6 of the paper with interpolated data. See main text for further information. We treat weekends (at which no trading occurred) as missing in the 11-day window, which is why the number of observations does not equal $N(Event - market) \times 11$.

Table B.5: News pertaining to (1/2 out of 3) junior creditors only (interpolated data)

	Unconditional risk ($y_j - y_s$) in pp.				Conditional risk ($\frac{y_j - y_s}{y_j - r}$) in pp.			
	pos. news		neg. news		pos. news		neg. news	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
News shock	-0.34*	-0.37***	0.77*	0.83***	-1.26*	-1.15**	2.97**	3.33***
	(0.17)	(0.14)	(0.41)	(0.26)	(0.73)	(0.56)	(1.38)	(0.96)
Liquidity control	✓	✓	✓	✓	✓	✓	✓	✓
Larger sample		✓		✓		✓		✓
N (Observations)	335	434	151	255	335	434	151	255
N (Event-market)	44	56	20	34	44	56	20	34
Adjusted R^2	0.97	0.97	0.93	0.93	0.94	0.95	0.93	0.93
Within R^2	0.29	0.29	0.44	0.42	0.18	0.19	0.67	0.59

Notes: Standard errors in parentheses. $^{*}\ p < 0.1$, $^{**}\ p < 0.05$, $^{***}\ p < 0.01$ This table reproduces Table 7 of the paper with interpolated data. See main text for further information. We treat weekends (at which no trading occurred) as missing in the 11-day window, which is why the number of observations does not equal $N(Event - market) \times 11$.

Appendix References

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