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Selective Default Expectations

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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. (*JEL* F34, G12, G15, H63, N24)

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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 resultant 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

1 Gelpern and Setser (2004), Kohlscheen (2009), Erce and Díaz-Cassou (2010), Erce and Mallucci (2018), and D'Erasmo and Mendoza (2021) 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.

these differences can be attributed to liquidity differentials between markets. Bond price differentials across European markets foremost reflected investors' selective default expectations.

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 United Kingdom. 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 U.K. 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 U.K. 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 2021). 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 2023).[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 nonfungible bonds issued by a same debtor (e.g., 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.

Second, 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 2021) or between official and private creditors (Schlegl, Trebesch, and Wright 2019), our paper shows—based on an

[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 (2023) 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, U.S. 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.

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 usually can 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.

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 evidence on a variety of financial phenomena. For example, Koudijs (2015, 2016) focus 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 U.S. 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.

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 gross national product [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 borne out of these circumstances. In 1924, the U.K. and U.S. 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 Internet 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; Ritschl 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 dramatically.[5] The resultant 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 evolution of the price (and yield-to-maturity) of the Dawes bond across European markets mirrors the ensuing change in default expectations

3 See Ritschl (2012) for the corresponding numbers. The Allies never really expected Germany to repay 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 U.S. 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).

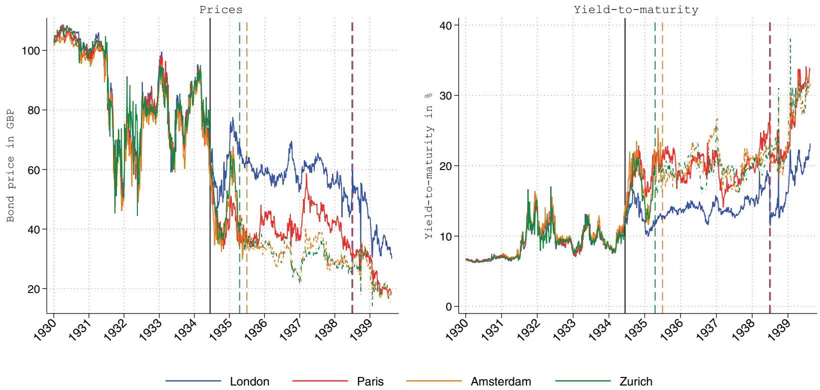

Figure 1
Dawes bonds' price and yield-to-maturity, 1930-1939
The panels plot the daily prices and yields-to-maturity of Dawes bonds denominated in British pounds (GBP) on the London, Amsterdam, Paris, and Zurich markets from January 1930 to August 1939 (see Internet Appendix A.1.2 for sources). The solid vertical lines represent the beginning of geographical market segmentation on June 14, 1934. The dashed vertical lines represent 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 Internet Appendix A.1.2 for details). French and U.K. bondholders received equal treatment from the German government throughout the period.

(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 toward a default on sovereign debt became more evident. In May 1933, the German government communicated to its international creditors that foreign exchange reserves had become so low that further orderly sovereign debt service would soon be impossible[7] and, on June 14, 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

6 These emergency measures were designed to prevent the rapid repatriation of foreign capital, especially short-term assets, held in Germany. By the standstill agreement on 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; Accominotti 2019).

7 See "Telegram for the Reichsbank to the Bank of England," May 15, 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 (p. 39 Clement 2004). 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," October 19, 1933. BoE, G1-445.

American (U.S. dollar) tranche of the Dawes loan by 25% (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 represent 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%.[9] In June 1935, the coupon on Dawes bonds in Dutch ownership was reduced to 3.5%.[10] In August 1938, the German government reduced interest payments to French and U.K. bondholders to 5%.[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 regularly quoted on four of the five respective 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

[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 *Financial Times* (1934a).

[9] The remaining 2.5% was scheduled to be paid in so-called "Dawes Marks," which could be used only for purchasing German stocks and property as well as for covering travel expenses within Germany. Dawes Marks, however, could be converted into British Pounds on the Zurich stock exchange at a substantial discount (see Internet 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% 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 all jurisdictions recognized 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, Belgium did not have an active market for these bonds. See Bundesarchiv, Berlin, Germany (BArch henceforth), R2.318, Sheet 121.

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 U.K. 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 regard to the amortization of their bonds, which suggests that the risk of a selective default was real.[14]

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 write 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

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

[15] In our setting, we cannot empirically distinguish between the two components of the expected loss on the Dawes bond (i.e., the probability of default and loss given default), a distinction that 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 premiums).

Ω = {No default, All default, Selective default}.[16] *No default* corresponds to the case in which 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 in which 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 (i.e., the probability of a selective default on country j's bondholders) while the *conditional* selective default probability (i.e., the probability that, conditionally on there being a default, the debtor government will spare country s's bondholders) is π.

We write 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 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, that is, 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

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

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

[18] 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. 172–3) consider that covered interest

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 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 premiums 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 zero.

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rate parity deviations larger than 50 basis points induced arbitrage in the 1920s and 1930s. Peel and Taylor (2002) provide 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 U.S. 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 in which 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 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.

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. 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 June 14, 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 (p. 444, François-Marsal 1931). 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

20 François-Marsal (1931, pp. 440–52) stresses how, because of the existence of modern technologies (i.e., the telephone and telegraph) and strong competition between arbitrageurs, price differentials between markets were never substantial and always short-lived.

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 U.K. bondholders (senior creditors) as opposed to continental ones (junior creditors). More generally, 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 toward 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 resultant 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 U.S. 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.

21 See *Financial Times* (1934b). The U.K. 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.

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***

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 January 1, 1930, to June 14, 1934. "After segmentation" refers to the period from June 15, 1934, to August 31, 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 (January 1, 1930, to June 14, 1934), pairwise yield correlations between London and the other markets are close to one for the Dawes bond and British Consol alike. In the second period however (June 15, 1934, to August 31, 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 the Jordà (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: $h=0,...,4$):

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

Figure 2 reports the impulse responses of bond yields on the Paris market following a 1% shock to the respective bond yields in London. Before the

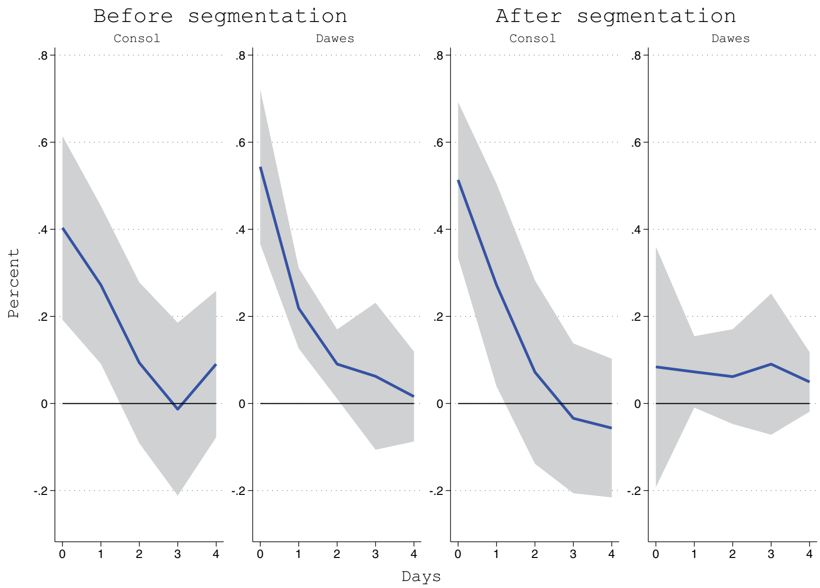


Figure 2
Impulse response functions for Paris market in response to London shock
The panels depict impulse responses on the Paris market to a 1-percentage-point shock on the Dawes bond's and Consol's yield-to maturity in London. The impulse responses are estimated using Jordà's (2005) local projections 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 January 1, 1930, to June 14, 1934, and "After segmentation" refers to the period from June 15, 1934, to August 31, 1939. The gray-shaded areas reflect 99% confidence bands. For details on the bond yield data, see Internet Appendix A.1.

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 3 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

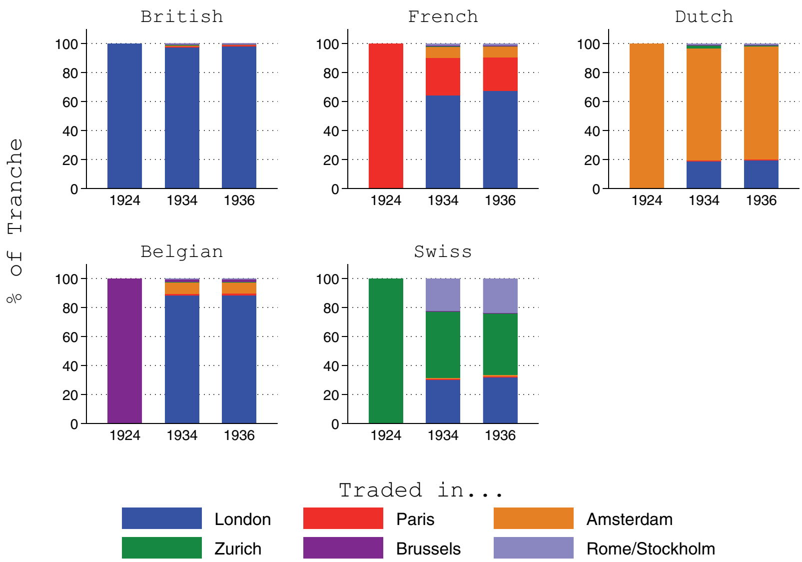


Figure 3
Circulation of the various GBP Dawes bond tranches in European bond markets
These panels show the share of outstanding German GBP Dawes bonds of each tranche of issue held in each foreign European creditor market in 1924 (issue date), 1934, and 1936. For each tranche and year, the blue, red, 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 2023). Shares of redeemed and repatriated bonds are 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 Internet Appendix A.1.5 for more details on the calculation.

of outstanding bonds of each tranche on seven European stock exchanges at various dates (see Internet 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 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

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 Internet Appendix A.1.5 for details on the calculation.

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 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 (U.K.) 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, U.K.) 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 (i.e., 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.

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

Table 2
Implicit bid-ask spreads

Dawes bond traded in:	Mean effective bid-ask spread (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

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 June 1934 15, to August 31, 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).

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, for example, the frequency of nonzero return trading days (see, Lesmond, Ogden, and Trzcinka 1999), as shown in Internet Appendix A.1.4.

These moderate liquidity differentials are unlikely to 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.

To more precisely gauge liquidity premiums 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:

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

Table 3
Liquidity differentials and bond yield spreads across markets

	Dependent variable: Yield-to-maturity spread over London $(y_j - y_s)_{jt}$			
Elasticity estimate	**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 premiums	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]

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. Standard errors are clustered on the day and on the "market" × "month in sample" dimension. The table's lower panel reports mean implied liquidity premiums for Dawes bonds in each continental market (Paris, Amsterdam, and Zurich) based on the corresponding estimates of elasticity δ (midpoint, lower, and upper bounds). 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 premiums in the table correspond to the average over the June 15, 1934, to August 31, 1939 period. $^{*}p<.1$; $^{**}p<.05$; $^{***}p<.01$.

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 × 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 with a 90% confidence interval ranging from 0.02 to 0.18. These estimates imply that a 1-percentage-point rise

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.

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 premiums 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 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:

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

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 ($\psi_{jt} - \psi_{st}$). 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

[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.

[25] In Internet 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.

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, that is, $\theta_t \pi_t = y_{jt} - y_{st} - (\psi_{jt} - \psi_{st})$.[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: $\theta_t(1-\pi_t) = y_{st} - r_t - \psi_{st}$. 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, that is, the probability of a German default on all junior and senior bondholders.

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 represents 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,

[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.

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

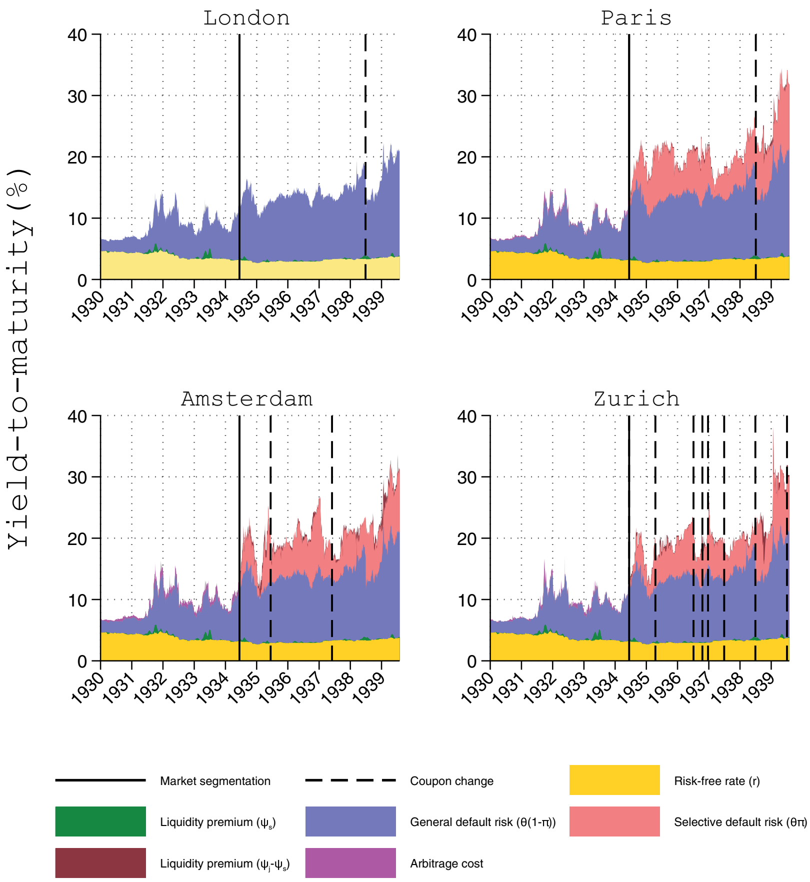


Figure 4
Decomposition of German government bond yields
These panels plot the decomposition of the yield-to-maturity of the sterling Dawes bond (German government bond) in London, Paris, Amsterdam, and Zurich from January 1, 1930, to August 1, 1939. In all four panels, the vertical solid line represents the German debt moratorium of June 14, 1934 (and beginning of market segmentation). The dashed vertical lines represent changes in the coupon (see Internet Appendix A.1.3 for details). Before June 15, 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.

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 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 U.K. 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

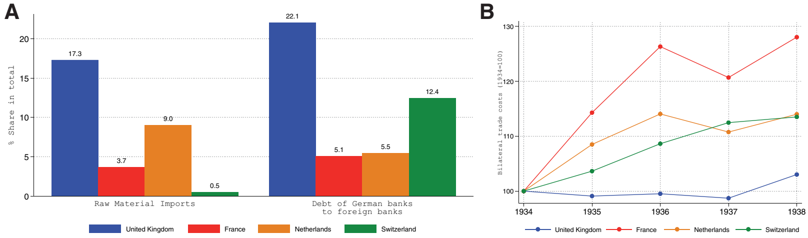
The evidence presented so far shows that investors considered British holders of German government bonds as senior relative to continental ones and that selective default risk was priced on the various European markets for German

28 *Neue Zürcher Zeitung* (1935).

29 *Neue Zürcher Zeitung* (1938a).

30 *Neue Zürcher Zeitung* (1938b).

31 *Neue Zürcher Zeitung* (1938c).



Raw material and financial integration (1932)

German bilateral trade costs (1934–1938)

Figure 5
Indicators of Germany's economic integration in the 1930s
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 at about 6% of national income. Sources are detailed in Internet Appendixes A.4.1 and A.4.2. Panel B shows the 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 estimates (see Internet Appendix A.4.3).

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 United Kingdom 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 side of Figure 5, panel 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 large suppliers of short-term credits for Germany (right side of Figure 5, panel A). Berlin therefore feared that the United Kingdom could potentially cut off Germany from access to these essential products and severly damage its economy.[33]

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

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," June 23, 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,' June 19, 1934, BArch, R2.318, Sheets 28ff.

Given its position, the United Kingdom 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 toward 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 increased access to the home market (Wendt, 1971; Forbes, 2000, p. 110). Signed on November 1, 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 5, panel B, plots the evolution of Germany's bilateral trade costs with the four European creditors (for details on the measure, see Jacks, Meissner, and Novy 2011). While Germany's bilateral trade costs with the United Kingdom remained relatively constant in the second half of the 1930s, trade costs with other creditors increased heavily. The ensuing reduced

[34] On May 26, 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," May 26, 1934, PA AA, R117.123. Within 2 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," February 26, 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 July 4, 1934 (Wendt 1971, p. 213).

[37] See "Anglo-German Payments Agreement," U.K. 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,' July 28, 1934, Banque de France archives, Paris, France, 1069199005/49.

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 United Kingdom 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)*. 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 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 (a) all creditor countries. Among the events that pertain only to a subset of creditor countries, we further distinguish between two types: (b) those affecting the most senior creditor country (the United Kingdom) only and (c) those affecting one or two of the three junior creditor countries (France, the Netherlands or Switzerland), but not the senior creditor country (the United Kingdom).[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

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[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, that is, 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 (the United Kingdom). We record 13 such events in our data set, including 6 negative news and 7 positive news. We employ these events later as a robustness check in our regressions. Second, hypothetically, there could 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. Internet Appendix A.3 describes all events and coding rules in detail.

Table 4
The events data set

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	+	+

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.

direction of the effect of each type of news on unconditional and conditional selective default risk.[41]

(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, 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 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 (the United Kingdom) only and do not pertain to the other creditors. An example would be a newspaper report on Anglo-German talks about the service of the Dawes bond.[44] Such U.K.-specific news make up 26% of all news events. In principle, these events

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 See *Financial Times* (1935); *Chronicle* (1936, p. 516).

43 More precisely, based on our theoretical framework and assuming the risk-free rate r and liquidity premiums 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 (i.e., $\Delta y_s < \Delta y_j$). 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 See *Financial Times* (1934c).

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 (the United Kingdom). 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 (a) news relevant to all creditors (general news about Germany) and (b) news specific to the the senior (the United Kingdom) creditor country affect unconditional selective default risk (i.e., the probability of a selective default on junior creditor countries' bondholders) and conditional selective default risk (i.e., 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 Equations (4) and (5) of our analytical framework when ignoring the liquidity terms.[46] The term $(L_{jte} - L_{ste})$ corresponds 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.

45 See *Financial Times* (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 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.

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:

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

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 Internet Appendix 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, that is, financial events. These include news relating to Germany's

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

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

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	.95	.96	.88	.97	.95	.96	.91	.95
Within-R^2	.00	.01	.05	.27	0.02	.01	.04	.21

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 the Roll (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-wayclustered standard errors (Event-market & date dimension) are in parentheses. $^{*}p<.1$; $^{**}p<.05$; $^{***}p<.01$.

overall financial or external debt position.[48] It is possible that a deterioration in Germany's overall financial position (e.g., 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 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)

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 (*Financial Times* 1934d).

Table 6
News pertaining to U.K. 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	.94	.98	.88	.78	.91	.95	.87	.89
Within-R^2	.05	.08	.02	.02	.13	.17	.07	.16

This table presents the results of event study regressions for news pertaining to U.K. 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. Internet 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. $^{*}p<.1$; $^{**}p<.05$; $^{***}p<.01$.

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 is also associated with a 1.0- to 1.4-percentage-point increase in our measure of conditional selective default risk.

Table 6 turns to the effect of news pertaining to U.K. bondholders only. Our framework offers clear predictions for this type of news: good (bad) news about the U.K.-German relationship should decrease (increase) the probability of a default on the most senior (U.K.) 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 U.K.-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-U.K. relationship only have a weakly statistically significant effect on unconditional selective default risk. This finding probably reflects the spillover effects of U.K.-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 U.K. 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

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	.96	.97	.93	.93	.93	.95	.93	.93
Within-R^2	.32	.31	.36	.35	.22	.20	.65	.55

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. Internet 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. $^{*}p<.1$; $^{**}p<.05$; $^{***}p<.01$.

junior creditor country and 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 (the United Kingdom). 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 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 resultant selective default expectations affect the pricing of sovereign bonds in financial markets.

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