Foreign Law Bonds: Can They Reduce Sovereign Borrowing Costs?*

–PRELIMINARY–

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Abstract

The Greek debt restructuring of 2012 showed that the legal terms of sovereign bonds can protect creditors against losses, in particular the type of governing law. This paper studies whether sovereign bonds that are issued in foreign jurisdictions trade at a premium vis-á-vis domestic-law bonds. We use the Eurozone between 2007 and 2014 as a unique testing ground to assess this "legal safety premium" and collect secondary market bond yield data for the near-universe of Eurozone government bonds issued in foreign jurisdictions. Controlling for currency risk, liquidity risk, and term structure, we find that foreign-law bonds indeed carry lower yields on average. But a sizable premium only emerges for large values of credit risk (CDS spreads beyond 500bp). At those levels, a 100bp increase in CDS spreads is associated with a 30-80bp larger yield premium on foreign-law bonds. In contrast, we do not find a premium for countries that are perceived as low risk. These results indicate that sovereigns in distress can, at the margin, borrow at lower rates under foreign-law.

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1 Introduction

This paper studies the role of law in sovereign debt markets, in particular the price impact of different governing laws under which sovereign bonds can be issued. We test whether sovereign bonds that are placed in foreign jurisdictions, e.g. under English law or New York law, trade at a premium compared to domestic-law bonds. The intuition behind this test is simple. Domestic-law bonds can be easier amended ex post by domestic legislation, and there have been cases where their terms were altered retroactively by the debtor country by an act of parliament.[1] For instance, amendments could take the form of inserting additional covenants which make implementing a restructuring easier, changing the currency denomination, or even altering the payment terms. Thus, at least in principle, sovereigns are in a stronger bargaining position vis-a-vis the holders of their domestic bonds relative to bonds issued under a foreign jurisdiction. Foreign-law bonds are also increasingly prone to litigation and attachment orders in foreign courts, possibly making them better shielded against default and unilateral default (see IMF, 2013; Schumacher et al., 2014; Frankel, 2014). This paper explores the price impact of this "legal safety premium". How do markets value bonds that are protected by the rule of law abroad?

Our study is motivated by recent events, in particular the Greek restructuring of 2012, which showed that governing law can play a crucial role in sovereign debt markets. On February 23, 2012, the Greek parliament passed the "Greek Bondholder Act", which retroactively introduced collective action clauses (CACs) with aggregation features into its outstanding *domestic-law* sovereign bonds.[2] After the offer was launched, more than 66% of domestic-law bonds were tendered into the exchange. This forced minority holders to also restructure and accept the associated haircut, even if they voted against. In contrast, Greece had no possibility change the terms of its *foreign-law* bonds by domestic legislation, which allowed investors in those bonds to reject the exchange offer and hold out. The result was that more than 50% of Greek bonds under English, Swiss and Japanese law were not restructured and have since been serviced in full and on time.[3] The foreign-law clause thus protected these investors from deep losses, i.e. the 65% haircut suffered by all other investors (for a detailed assessment of the case see Choi et al., 2011; Gulati and Zettelmeyer, 2012a; IMF, 2013; Zettelmeyer et al., 2013).

After the Greek experience of 2012, many observers suggested that bonds with foreign

[1] Constitutions often prevent laws from retroactively impairing contract rights (in the US by Article I, section 10, clause I). Nevertheless, in a crisis or war situation, even constitutions can be altered.

[2] Greek law no. 4050/2012 "Rules of amendment of titles issued or guaranteed by the Hellenic Republic with the Bondholder's agreement", see Hellenic Republic Ministry of Finance Press Release (March 9, 2012), online available at http://www.minfin.gr/portal/en/resource/contentObject/id/baba4f3e-da88-491c-9c61-ce1fd030edf6.

[3] Holdouts made up a total of EUR 6.4bn in face value or 3.1% of total debt exchanged (Zettelmeyer et al., 2013).

governing laws are preferable from a creditor perspective. For example, the New York Times speculated that "investors might think twice before investing in those local-law bonds, no matter how high the yield" (Thomas, 2012). Similarly, the Wall Street Journal reported analyst recommendations to sell domestic-law Portuguese government bonds and buy foreign-law ones instead (Stevis, 2012). Gulati and Zettelmeyer (2012a,b) even suggest to use differences in governing law as a policy tool to address the debt overhang problem in crisis countries. Specifically, they propose voluntary debt restructurings in which holders of local-law bonds swap these against foreign-law bonds with longer maturities, i.e. with a present value haircut. Such voluntary swaps could be mutually beneficial since investors receive a safer asset while countries receive debt relief. A first application of this idea was the Greek debt exchange proposal itself, since all Greek-law bonds were exchanged into new English-law bonds – a carrot to induce investors' participation in the exchange.

The potential advantages of foreign-law bonds have also come to the attention of debt managers. Cyprus, Greece and Portugal all returned to the international bond market by issuing English law instruments in 2014, and other small crisis countries, such as Latvia or Slovenia also shifted their sovereign bond issuance patterns from domestic to foreign-law according to data by Dealogic. We generally find foreign-law bonds to account for a substantial share of public sector borrowing in the last decade, both in Europe and in Emerging Markets (see Figures 1 and 2).

Despite the widespread use of foreign-law bonds, there is still limited evidence on the price impact of legal clauses and governing law in sovereign debt markets. Few rigorous empirical studies exist and theory is ambiguous whether and how sovereign bond contract design matters. On the one hand, Roubini (2000) and Weinschelbaum and Wynne (2005) argue that contractual bond clauses such as CACs or governing law are likely to be irrelevant, both ex-ante and once the country enters financial distress.[4] On the other hand, the work by Bolton and Jeanne (2007, 2009) suggests that debt that is harder to restructure, in legal terms, will effectively be senior and therefore have lower yields ex-ante (a similar argument is made by Pitchford and Wright, 2007).[5] Our aim here is to exploit a large sample of bonds and standard fixed income techniques to understand whether foreign-law debt is indeed

[4] Roubini (2000) argues that initial contractual terms are likely to be irrelevant since creditors and sovereigns can find ways to work around them ex-post, as shown by a number of actual cases. Weinschelbaum and Wynne (2005) emphasize that governments have a variety of different debt contracts outstanding and that the relevance of contract design in individual portions of the debt will decrease the more diversified the debt stock is. Moreover, they argue that the implicit guarantee of official sector bailouts in case of distress makes investors ignore contractual clauses.

[5] There is a large related body of theory work studying the ex-ante and ex-post effects of easy versus hard to restructure debt and the economic consequences of sovereign bond contracts and creditor behavior during debt crises, see Miller and Zhang (2000), Ghosal and Miller (2003), Gai et al. (2004), Haldane et al. (2005), Engelen and Lambsdorff (2009), Bi et al. (2011), Lanau (2011), Pitchford and Wright (2012) and Ghosal and Thampanishvong (2013).

priced at a premium, and how large this premium is across countries and time.[6]

We use the Eurozone crisis as a laboratory since it provides the cleanest setting with which to study a premium on hard to restructure debt. Indeed, in emerging markets, it is very difficult to find local-law and foreign-law bonds denominated in the same currency. Disentangling the currency risk premium from a jurisdiction premium is further complicated because there is no domestic currency risk-free yield curve. This is not a problem in the case of the Euro area because we do have euro risk-free curves (e.g. Germany's) that can be used to separate currency from credit risk. Identification in our paper thus comes from comparing bonds from the same sovereign issued under different jurisdiction, e.g. an Italian local-law bond and one under New York law, and using local benchmark yield curves to correct for currency risk. More specifically, our approach accounts for term structure effects, bond liquidity, currency risk, and country-level default risk. Our time window is 2007-2014 and we cover the near-universe of foreign-law bonds in the Eurozone.

As an add-on to our main analysis, we also show two simpler case studies from emerging market countries, namely Argentina and Russia. These sovereigns are the only ones for which we could identify sovereign "twin bonds" (domestic-law and foreign-law bonds by the same government issued in US$) to proxy the jurisdiction premium, although in a more simplistic way than for the Eurozone.

Our main result is that a foreign-law premium exists, but it only becomes significant and sizeable in periods of severe debt distress, with a likely debt restructuring on the horizon. For the Eurozone we define "severe distress" as CDS spreads rising over 500bps. Under these circumstances, an increase in the CDS spread of 1 percentage point is related to an increase in the foreign law premium of 0.27%; this effect rises to 0.74% at CDS spreads of 1,000bps, and even more than 1% for very high risk levels with CDS spreads of about 1,500bps, before flattening out beyond this level. In contrast, during times of low CDS premia (below 5%), foreign-law bonds do not trade at a premium, ceteris paribus. We conclude that the legal features of sovereign bonds are not a dominant driver of bond prices and debt servicing costs in normal times, but they seem to matter in periods of distress and for countries with a high risk of default. Thus, we find that the ex-ante pricing effects of easy versus hard to restructure debt are limited, and only become relevant during crises. These results could be of relevance for debt managers, as well as investors holding distressed government bonds.

One interpretation of our findings is a "flight to safety" effect in the run up to a default

[6] Note that the focus is on debt issued in foreign-law, and not debt issued to foreigners. The resulting premium is likely to be the result of differences in a restructuring technology associated with foreign-law, but may also be affected by differences in the willingness to impose different losses on creditors situated in different jurisdictions. There have been cases in which governments discriminated against foreign investors in favor of domestic creditors. But this is not a general pattern, and there have been numerous cases in which the opposite was true (Erce, 2012). The eurozone restructurings in Cyprus and Greece both discriminated against domestic law bonds. Finally, jurisdiction is not perfectly related to domestic vs foreign ownership, as argued in Broner et al. (2010).

and/or debt restructuring (see e.g. Beber et al., 2009). In a high-risk environment, investors start valuing contractual terms, in particular the choice of jurisdiction. With increasing default risk, more and more investors exit local-law bonds: bonds issued in a foreign country may be less likely to be restructured, or subject to another value-depreciating action, such as currency redenomination (see Krishnamurthy et al., 2014). The result is a widening foreign-law premium as default approaches. Another, closely related interpretation of our findings is a change in the investor base. As yields continue to rise, buy-and-hold investors exit the market and professional distressed debt funds enter. These specialized investors may be more prone to value investor-friendly contract language such as foreign governing law, also because they may hold onto these bonds until the restructuring occurs and potentially hold out. Finally, there may also be a dilution effect at play, to the extent that foreign-law bonds are harder to restructure than their domestic law counterparts (Bolton and Jeanne, 2007, 2009).

The paper contributes to research in law and finance, in particular to the literature studying how legal conditions affect bond prices and lending.[7] In this body of work, there are only few studies on sovereign debt markets and almost all of them focus on one specific contractual dimension: CACs.[8] Early studies on the price impact of CACs exploit the cross-sectional variation in emerging market bonds, by comparing primary or secondary market yield spreads of English law bonds, which typically contain CACs, to those of New York law bonds, which did not contain CACs prior to 2003. Using this strategy and different data sources and samples, Becker et al. (2003), Richards and Gugiatti (2003) and Tsatsaronis (1999) do not find significant pricing impact of bonds that include CACs. In contrast, Eichengreen and Mody (2000, 2004), and the more recent bond-by-bond analyses by Bradley and Gulati (2013) and Bardozzetti and Dottori (2014) find that CACs significantly reduce bond yields, but that this result depends on the creditworthiness of countries.

To our knowledge, only two previous studies analyze the price impact of governing law choice in sovereign bonds. Choi et al. (2011) compare yields of a single pair of Greek bonds: one bond issued under English law (maturing in April 2016 and with a floating coupon of 6m EURIBOR + 0.075%) and one issued under Greek law (maturing in July 2016 with a coupon of 3.6%). They find that the English law bond trades about 200 basis points lower than its English law twin in mid-2009 and up to 400 basis point lower in mid-2010, and interpret this as evidence that markets price in a smaller likelihood of default for English-law governed bonds. The paper by Clare and Schmidlin (2014), written in parallel to our paper, uses a large sample of 400 European bonds, of which 64 are governed by foreign-law, including

7A large literature in finance studies how debt contract design, bond covenants and creditor rights influence borrowing and bond yields of firms. Two recent examples include Haselmann et al. (2010) and Miller and Reisel (2012) (see also references cited therein).

8Bradley et al. (2010) show evidence that bonds containing a pari passu provisions increased in price following the Elliott vs. Peru court ruling that implied a novel, creditor-friendly interpretation of the pari passu clause.

from non-Eurozone countries such as the Czech Republic, Sweden or Turkey. They then run cross-sectional regressions of bond yields on a set of explanatory variables, including bond maturity and a dummy for foreign-law bonds, for each quarter between Q3 2008 and Q4 2012. Identification in the paper largely comes from cross-country variation, since 7 out of the 14 countries feature only foreign-law bonds in the sample used.

We add to this literature by being the first to apply standard fixed income methods form the finance literature to study yield premia associated with contractual bond features in sovereign debt markets. This allows us to take into account the contribution of currency risk and maturity (given the country's yield curve) to the price of each foreign bond at every point time when constructing the jurisdiction premium. We use a large, representative sample of Eurozone sovereign bonds and identify effects from the within-country variation in sovereign bond issues. This reduces potential selection and endogeneity effects, such as to the choice of governing law.

2 Theoretical prior

This section gives a formal representation of our hypothesis by comparing the risk-neutral prices for a bond placed under domestic law with an otherwise equivalent bond governed by a foreign jurisdiction. We use prices instead of yields for simplicity. Consider first a domestic bond D with K annual coupon payments c at dates: $\tau_k, k = 1, 2, ...K$. Given a discount function $d(m)$ for each date m, we assume the price of that bond is given by the net present value of its payment stream consisting of K coupons and the principal:

$$P_D = \sum_{k=1}^{K} cd(\tau_k) + 100d(\tau_K) \tag{1}$$

Now compare this to a foreign-law bond F with the same coupon, principal, and maturity. Suppose that with probability π the country will repay its foreign-law bonds even as it defaults on the domestic law obligations, and with probability $1 - \pi$ those bonds will receive the same treatment as the domestic bonds. Moreover, for simplicity, suppose that this uncertainty over their treatment is resolved before the next coupon payment. That is, while the uncertainty over whether the country will default is not resolved before τ_1, the uncertainty related to a differentiated treatment of foreign bonds in the event of default is. The price of the foreign bond will then be given by a weighted average of the two possible payment streams. With probability π its future cashflows can be discounted by the risk-free discount function $d^{rf}(\cdot)$, and with probability $1 - \pi$ the cashflows are discounted by the same discount function $d(\cdot)$ used for the domestic bonds:

$$P_F = \pi \left(\sum_{k=1}^{K} c d^{rf}(\tau_k) + 100 d^{rf}(\tau_K) \right) + (1-\pi) \left(\sum_{k=1}^{K} c d(\tau_k) + 100 d(\tau_K) \right) \quad (2)$$

We assume that the risk-free discount rate is smaller for at least some dates during the lifetime of the bonds, i.e. $d(\tau) \leq d^{rf}(\tau)$ for all τ, with strict inequality for some τ_k. Intuitively, you can think of $d^{rf}(\tau) - d(\tau)$ as a function of the sovereign spread over a risk-free benchmark, where the difference increases with a country's government credit risk. Under these assumptions we can show:

Lemma 1 *The premium $P_F - P_D$ increases with credit risk $d^{rf}(\tau_k) - d(\tau_k)$ if $\pi > 0$.*

Proof Let P_F^A and P_D^A denote the initial prices under the discount function $d^A(\cdot)$. Consider a discount function $d^B(\cdot)$ where $d^B(\tau) \leq d^A(\tau)$ for all τ with strict inequality for some τ_k, hence $P_D^A > P_D^B$. Equations (1) and (2) imply:

$$P_F^A - P_F^B = (1-\pi)(P_D^A - P_D^B) \quad (3)$$

so:

$$P_F^B - P_D^B = P_F^A - P_D^A + \pi(P_D^A - P_D^B) \quad (4)$$

and since $P_D^A > P_D^B$, equation (4) implies:

$$P_F^B - P_D^B > P_F^A - P_D^A \quad (5)$$

which means that the premium is larger under discount function $d^B(\cdot)$ than under $d^A(\cdot)$, with a larger spread $d^{rf}(\tau) - d^B(\tau) \; \exists \; \tau$. ∎

Lemma 2 *B) The premium $P_F - P_D$ increases with the probability π.*

Proof Since $d(\tau) \leq d^{rf}(\tau)$ for all τ, with strict inequality for some τ_k, (2) implies $dP_F/d\pi > 0$. ∎

3 Data and methods

3.1 Data

We start by compiling a list of foreign-law bonds and consider all Eurozone countries. Our selection criteria are simple. First, we consider all bonds maturing after January 2006 and listed on Bloomberg. Second, we include bonds for which sufficient price information is available on Bloomberg. Third, we drop floating rate bonds. Table 11 shows the resulting sample of 100 fixed-rate foreign-law bonds outstanding by Eurozone countries between 2006 and 2014. As can be seen, most bonds in our analysis are from Southern European crisis countries: Greece, Italy, Spain and Portugal. But the sample also includes foreign-law bonds issued by Austria, Belgium, Finland, and Slovakia for which there was reasonable coverage in Bloomberg. For all other Eurozone countries, e.g. Germany, France or Ireland, we could not find foreign-law bonds to be included in the analysis.[9]

The data frequency is daily. Bond price data are based on mid prices (average of bid and ask) at market closing time. Wherever possible, we rely on transaction-based price data from the Bloomberg trading platform (CBBT). If these are not available, we use composite Bloomberg pricing data, i.e. the standard Bloomberg data that most researchers use. These are computed as an average of price quotes across dealers reporting to Bloomberg, but the quotes were not necessarily executed and are therefore not always based on actual transactions.

We also collect data on benchmark yield curves. For domestic yields, we rely on the benchmark zero curves constructed by Bloomberg and based on the most liquid bonds (which are all domestic bonds). For each country in our sample, the benchmark curve is available at a 3, 6, 9, 12 and 18 month maturities, and 2, 3, 4, 5, 10, 15, 20, and 30 year maturities. We use these benchmark curves when deriving the theoretical price of the bonds in the countries which we analyze. We also use the U.S., U.K., Germany, Switzerland and Japan benchmark curves when pricing bonds issued in foreign currency, as described in the next subsection.

3.2 Extracting foreign-law premia

For each of the bonds, we estimate the foreign-law premium by comparing the observed yield to maturity to a theoretically expected yield, by pricing a theoretical bond with the same characteristics as the foreign-law bond using the domestic-law benchmark yield curve. We discount the stream of payments given the foreign-law bond's maturity and coupon structure using the domestic benchmark yield curve, thus reflecting the country-specific credit risk.[10]

Since the benchmark curve is only available at given maturities we interpolate it when

[9] The only foreign-law bond issued by Ireland for which pricing data is available matures in early 2010, dropping Ireland from most of our sample period.

[10] One alternative to using that benchmark curve is to directly estimate a yield curve from the available bond price data. We tried estimating yield curves using the approaches described in Nelson and Siegel (1987) and Svensson (1994) but found the results to be noisy during times of distress. This is in line with Härdle and Majer (2014) who show that standard yield curve models perform badly in the recent Eurozone crisis. Given our focus on distress episodes we prefer using Bloomberg's benchmark curves as a simpler and more transparent way to price the bonds.

pricing the coupon and bond repayments. For example, if a bond has a coupon payment 8 months from the current date, the value of that payment is discounted using an interpolation of the 6 and 9 month benchmark yield. Similarly, if that bond matures in 7 years, that payment is discounted using an interpolation of the 5 and 10 year benchmark yield. Hence, the discounting yield is derived as:

$$Y_{i,j,t,m} = \frac{m - \underline{m}}{\overline{m} - \underline{m}} Y_{i,j,t,\underline{m}} + \left(1 - \frac{m - \underline{m}}{\overline{m} - \underline{m}}\right) Y_{i,j,t,\overline{m}} \tag{6}$$

$Y_{i,j,t,m}$ denotes the interpolated domestic yield for bond i, issued by country j, at date t, maturing on m, and $Y_{i,j,t,\underline{m}}$ and $Y_{i,j,t,\overline{m}}$ represent the corresponding yields on the benchmark curve with the closest available maturities before and after m.

Foreign-law bonds are often priced in a foreign currency. Of the 100 foreign-law bonds, only 18% are issued in EUR. The most common currency is the USD, which accounts for 49% of bonds issued, while the JPY, CHF and GBP account for 18, 11 and 4%, respectively. For these bonds, we construct a foreign currency benchmark yield for the country using the benchmark yields for countries whose bonds are considered risk-free in the respective currencies. Specifically, we rely on Germany as the risk-free EUR issuer; the U.S. as the risk-free USD issuer; Japan as the risk-free JPY issuer; Switzerland as the risk-free CHF issuer; and the U.K. as the risk-free GBP issuer. None of these countries has defaulted on their debt in the post-WW II era, and all are rated AA or above by the major rating agencies. For example, we construct the benchmark dollar yield for Spain by multiplying its benchmark EUR yield by the U.S. benchmark yield (risk-free yield in USD) and dividing by the German benchmark yield (risk-free yield in EUR). Generally,

$$Y_{i^*,j,t,m} = (1 + Y_{i,j,t,m}) \times \frac{1 + Y_{i,FC,t,m}}{1 + Y_{i,GER,t,m}} \tag{7}$$

Where $Y_{i,FC,t,m}$ denotes the yield to maturity date m for Germany, US, UK, Japan, or Switzerland in their respective currencies, and $Y_{i,GER,t,m}$ represents the German yield to maturity in EUR.[11] Note that for EUR denominated bonds, the second term reduces to 1 (i.e. no currency adjustment is necessary, and $Y_{i^*,j,t,m} = Y_{i,j,t,m}$.

We then use the so constructed bond-specific and currency-adjusted yield to discount all future cash flows on the foreign-law bonds. This net present value corresponds to the

[11]Using currency swaps would in principle provide a better measure of the market's price for converting a stream of payments across different currencies. But the liquidity of these swaps varies with the horizon. Using the benchmark curves for the U.S. and Germany provides an excellent approximation, and are likely a less noisy measure than swaps at longer horizons.

theoretical price of the bond:

$$P_{i,j,t}^{\text{theoretical}} = \text{Present Value}_{i,j,t} = \sum_{k=t}^{m} \frac{\text{Cash Flow}_k}{(1 + Y_{i^*,j,t,m})^k} \tag{8}$$

Since the benchmark yield curve is based on domestic bonds, the estimated net present value corresponds to the theoretical price in the domestic market of a bond with the same characteristics as the foreign-law bond.[12] By comparing that theoretical price with the actual bond price we can obtain a measure of the premium (or discount) associated with a foreign-law jurisdiction. Similarly, we can compute the yield to maturity based on that theoretical price and compare it to the yield to maturity based on the observed price. This difference in yield to maturity represents the annual premium placed on the different jurisdiction:

$$\text{Premium}_{i,j,t} = Y_{i,j,t,m}^{\text{theoretical}} - Y_{i,j,t,m}^{\text{observed}} \tag{9}$$

This premium is our variable of interest. It represents the interest rate that countries "save" on their foreign-law bonds, vis-á-vis a hypothetical identical bond placed under domestic jurisdiction. On average, this premium amounts to 0.24 percentage points; however, there are considerable differences between countries. For Austria, Belgium, Finland, Italy, and Spain, the mean premium is negative, ranging between -0.72 (Belgium) and -0.24 (Italy); only for Greece, Portugal, and Slovakia we observe a positive premium of between 0.14 (Slovakia) and 2.56 (Greece) percentage points.

Besides this cross-sectional variation, the foreign-law premium also changes considerable over time. Figure 3 plots the average premium by country (weighted by the bonds' principal) during 2010-14. For the early period of the crisis in 2010, the premium is close to zero for all countries and does not change much. However, the premium increases in line with the rising distress in the coming months, evidenced by rising CDS spreads particularly during 2011-12. The co-movement is particularly pronounced for Greece, Italy, Portugal, Slovakia, and Spain; the premium changes much less for Austria, Belgium, and Finland.

This considerable variance, both within as well as between countries, suggests that not only credit risk is driving the existence of the premium. Non-EUR denominated foreign-law bonds make up only a small segment of most Eurozone government borrowing (see Figure 1). This suggests that they are less actively traded than their domestic-law benchmark counterparts and subject to a liquidity premium, reducing the observed credit risk discount. Indeed, for foreign-law bonds, we find an average bid-ask spread of around 50 basis points relative to the mid-quote. In addition, foreign currency bonds were not eligible for use

[12] Note that even when we use benchmark curves of third countries, these are only used to adjust the risk-free currency risk between the euro and a foreign currency. Credit risk is entirely determined by the domestic benchmark yield curve.

as collateral with the ECB during a large part of our sample period (see Corradin and Rodriguez-Moreno, 2014). This further reduces the value of foreign-law bonds for market participants. Both market liquidity risk and the lack of ECB eligibility should lead us to underestimate the jurisdiction premium we find.

We do not have a theoretical prior to for the shape of the relationship between credit risk and the legal premium. We therefore employ a two-step approach: we first start with a visual exploration of the data by plotting non-parametrically and semi-parametrically estimated relationships, and then continue with a more systematic econometric analysis.

3.3 Data exploration

In order to get a visual representation of the relationship, we first estimate the relationship between the foreign-law premium and CDS spreads non-parametrically. Suppose that relationship is given by a function $f(\cdot)$:

$$\text{Premium}_{i,j,t} = f(CDS_{j,t}) + \varepsilon_{i,j,t} \tag{10}$$

where $\text{Premium}_{i,j,t}$ is the foreign-law premium at which bond i issued by country j trades at date t, and $\text{CDS}_{j,t}$ is the 5-year CDS spread for country j at t. We estimate $f(\cdot)$ using Fan's (1992) locally weighted regression, with quartic kernel weights. Our estimates at a point with CDS spread CDS_1 are based on a linear regression that weights an observation with spread CDS_2 by:

$$w_{\text{CDS}_1}(\text{CDS}_2) = \begin{cases} \frac{15}{16}\left(1 - \left(\frac{\text{CDS}_1 - \text{CDS}_2}{\lambda}\right)^2\right)^2 & \text{if } |\text{CDS}_1 - \text{CDS}_2| < \lambda \\ 0 & \text{otherwise} \end{cases} \tag{11}$$

We estimate this non-linear regression for each country, pooling observations from all of their bonds. We also estimate that relationship in a semi-parametric specification, controlling for differences in time to maturity (in years) and the percentage bid-ask spreads:

$$\text{Premium}_{i,j,t} = f(\text{CDS}_{j,t}) + \beta_{BA}\text{Bid-Ask}_{i,j,t} + \beta_{TM}\text{Time to Maturity}_{i,j,t} + \epsilon_{i,j,t} \tag{12}$$

We estimate the parametric terms β_{BA} and β_{TM} using the differencing method described in Yatchew (1998). We initially order the observations in increasing order of CDS. Let k denote that ordering. Under the assumption that $f(CDS_k) - f(CDS_{k-1}) \approx 0$, we can difference (12) in order to eliminate the non-parametric term and estimate:

$$\begin{aligned}&\text{Premium}_k - \text{Premium}_{k-1} = \\ &\quad \beta_{BA}(\text{Bid-Ask}_k - \text{Bid-Ask}_{k-1}) + \beta_{TM}(\text{Time to Maturity}_k - \text{Time to Maturity}_{k-1}) + v_k\end{aligned} \tag{13}$$

Once $\widehat{\beta}_{BA}$ and $\widehat{\beta}_{TM}$ have been estimated, we are ready to estimate the non-parametric term:

$$f(CDS_{i,t}) = \text{Premium}_{i,j,t} - \widehat{\beta}_{BA}\text{Bid-Ask}_{i,j,t} - \widehat{\beta}_{TM}\text{Time to Maturity}_{i,j,t} \tag{14}$$

Figure 4 reports the results for Greece, Portugal, Spain and Italy. Each panel presents a scatter plot of the Foreign-law premium and the CDS spreads, the estimated non-parametric relationship (solid black line) and the semi-parametric relationship that controls for differences in the bid-ask spread and time to maturity across bonds (solid red line). The dashed lines correspond to the bootstrapped 95 percent confidence interval.

The plot for Greece (Panel A) indicates a relatively flat relationship for low levels of the CDS spread. But the premium starts rising once the CDS spread grows past around 7.5%. That relationship seems fairly linear until the CDS spread approaches 12.5%. Past that threshold, the plots continue to point to a linear relationship, but at a more moderate slope. The error bands are fairly tight around the central estimates except for large values of the CDS spread (where we have relatively few observations, and as a result, the error bands become fairly wide). The two estimated specifications move roughly in paralell to each other (with most of the difference between the two being a level effect).

The plot for Portugal (Panel B) also indicates no relationship between the foreign-law premium and CDS spreads for low levels of the latter, but a positive relationship once the CDS spread reaches around 4% for the non-parametric curve (black line), and around 10% for the semi-parametric curve that controls for changes in bid-ask spreads and time to maturity (red line). As discussed in the data section, our sample includes only two foreign-law bonds for Portugal, one of which had a substantially larger premium than the other (as illustrated by the two separate clusters of points in the scatter plots for large values of the CDS premium). The non-parametric results (black line) yield a curve that is an averaging of these two clusters. The semi-parametric results (red line) follow the lower cluster of points more closely, as part of the higher premium for one of the bonds is attributed differences in its bid-ask spread and time to maturity relative to the other bond. The latter specification also points to a flatter relationship. Whereas moving the CDS spread from 5 to 10% would raise the premium by 3.7% along the black curve, it would only raise it by 0.4% along the red line. But eventually both specifications point to a steeper relationship. For example, moving the CDS spread from 10 to 15% would raise the premia by 8.2 and 7.0%, along those two respective curves.

Panels D and C show the results for Spain and Italy. The results point to an essentially flat relationship (note the difference in the scale of the premium relative to the previous figures). The CDS spread for Spain never reached 6.5%, and the one for Italy never reached 6% in our sample. Thus, the lack of a relationship between the foreign-law premium and the spreads for these countries is consistent with our previous results for Greece and Portugal, where a clear relationship did not emerge until spreads reached higher levels.

3.4 Empirical strategy

We now move on to a more systematic econometric approach to the data and account for the potentially non-linear relationships in the data. As a first step, we estimate the following linear regression for a panel of bonds:

$$\begin{aligned}\text{Premium}_{i,j,t} = \beta_1 \text{CDS}_{j,t} + \sum_j \beta_{2,j} D_j \text{CDS}_{j,t} + \beta_3 \text{Bid-Ask}_{i,j,t} \\ + \beta_4 \text{Time to Maturity}_{i,j,t} + \theta_{i,j} + \epsilon_{i,j,t}\end{aligned} \tag{15}$$

D_j is a dummy for country j, which we interact with the CDS spread, and $\theta_{i,j}$ is a bond-level fixed effect. Our priors are that the foreign-law premium is positively correlated with the CDS spreads, since it can only make a difference in the event of a default; and a negative relationship with the bid-ask spread since all else equal, a less liquid bond is less attractive. In the case of a compounding default probability, a longer time to maturity foreign-law bond should have a larger premium. As a default becomes eminent, the premium should be larger for shorter-term bonds.[13]

The previously discussed non-parametric and semi-parametric visual inspections of the data hinted at a non-linear relationship between the premium and credit risk. We therefore also estimate a cubic model to capture this possibility:

$$\begin{aligned}\text{Premium}_{i,j,t} = \beta_1 \text{CDS}_{j,t} + \beta_2 \text{CDS}^2_{j,t} \beta_3 \text{CDS}^3_{j,t} + \sum_j \beta_{2,j} D_j \text{CDS}_{j,t} + \beta_3 \text{Bid-Ask}_{i,j,t} \\ + \beta_4 \text{Time to Maturity}_{i,j,t} + \theta_{i,j} + \epsilon_{i,j,t}\end{aligned} \tag{16}$$

There are potential concerns that the correlations between CDS spreads and the legal premium might be spurious, if both series are generated by a non-stationary process. Even though Fisher-type panel unit root tests lead us to reject the hypothesis that the series in all panels possess a unit root (see Table A1), this may be an overly permissive null (Ng, 2008). Since the foreign-law premium is fairly persistent, and we cannot reject that it is integrated

[13]For example, consider a case where creditors expect a 50 percent haircut on domestic bonds, but no restructuring of foreign bonds. If a default is eminent, domestic bond prices will converge to 50 cents on the dollar, and a 1 or a 10 year domestic bond will have similar prices if investors expect both to be accelerated and receive the same haircut. But the premium on short-term foreign bonds will be much larger than on long-term bonds. For example, a 1 year bond that is expected to be excluded from the restructuring could trade at a premium close to 100 percent, whereas a 10 year zero-coupon bond could at most trade at a premium of 7.2 percent (since that premium is compounded over a longer maturity).

of order one I(1), we also estimate equations (15) and (16) in differences:

$$\Delta\text{Premium}_{i,j,t} = \beta_1 \Delta\text{CDS}_{j,t} + \sum_j \beta_{2,j} D_j \Delta\text{CDS}_{j,t} + \beta_3 \Delta\text{Bid-Ask}_{i,j,t} + \beta_4 \text{Time to Maturity}_{i,j,t} + \theta_{i,j} + \epsilon_{i,j,t} \tag{17}$$

$$\Delta\text{Premium}_{i,j,t} = \beta_1 \Delta\text{CDS}_{j,t} + \beta_2(\Delta\text{CDS}_{j,t} \times \text{CDS}) + \beta_3(\Delta\text{CDS}_{j,t} \times \text{CDS}^2_{j,t}) + \sum_j \beta_{2,j} D_j \Delta\text{CDS}_{j,t} + \beta_3 \Delta\text{Bid-Ask}_{i,j,t} + \beta_4 \text{Time to Maturity}_{i,j,t} + \theta_{i,j} + \epsilon_{i,j,t} \tag{18}$$

A large increase in the premium, in the absence of a proportional adjustment in the CDS spreads, is likely to be reversed over time. In order to allow the specification to capture a richer dynamic relationship between these two variables, we include the lagged levels of the premium and CDS spread in the regression in differences:

$$\Delta\text{Premium}_{i,j,t} = \beta_1 \text{Premium}_{i,j,t-1} + \beta_2 \Delta\text{CDS}_{j,t} + \beta_3 \text{CDS}_{j,t-1} + \beta_4 \text{Bid-Ask}_{i,j,t} + \beta_5 \text{Time to Maturity}_{i,j,t} + \theta_{i,j} + \epsilon_{i,j,t} \tag{19}$$

This model yields the same point estimates as if we estimated the regression in first difference but including a lagged error correction term (from the residuals of the regression of the level of the premium on the level of the CDS), but performing the estimation in a single regression. Again, we also estimate the model in a cubic form (see Appendix XXX for details):

$$\Delta\text{Premium}_{i,j,t} = \beta_1 \text{Premium}_{i,j,t-1} + \beta_{2,j} \Delta\text{CDS}_{j,t} + \beta_3(\Delta\text{CDS}_{j,t} \times \text{CDS}) + \beta_4(\Delta\text{CDS}_{j,t} \times \text{CDS}^2_{j,t}) + \beta_5 \text{CDS}_{j,t-1} + \beta_6 \text{CDS}^2_{j,t-1} + +\beta_7 \text{CDS}^3_{j,t-1} + \beta_8 \text{Bid-Ask}_{i,j,t} + \beta_9 \text{Time to Maturity}_{i,j,t} + \theta_{i,j} + \epsilon_{i,j,t} \tag{20}$$

4 Results: Eurozone 2006-2014

Table 2 reports the first results. Columns 1-3 report the results for equations (15) and (16) in levels, whereas columns 4-6 show the results for equations (17) and (18) in first differences. In column 1, the model is estimated in a pooled sample of all countries, i.e. without the interaction of a country dummy with the CDS spreads. We find a positive, large and significant correlation between CDS spreads and the level of the premium of almost one – meaning that a one standard deviation increase in the CDS premium (5.3 percentage points) is associated with a 5.2 percentage point change in the difference between foreign and domestic-law bonds.

We are concerned that foreign-law bonds might be less liquid than their domestic benchmark counterparts, and therefore carry a liquidity premium. If that were the case, we would in fact underestimate the premium placed on jurisdiction, since the difference between the two types of bonds in terms of restructuring risk would be mitigated by the liquidity risk compensation. Since we include bond fixed effects in all regressions, any bond-specific average risk premia should already be accounted for; however, liquidity risk may well be time-varying. The coefficient on the bid-ask spread of foreign bonds turns out small and insignificant, further mitigating concerns about liquidity.

Column 2 shows a model including country-specific slopes, using Austria as the benchmark country. The results indicate that the relationship in column 1 was largely driven by Greece; but the joint effect of an increase in CDS spreads on the premium is still positive for most countries. The model also has a considerably better fit of the variance in the premium data.

The cubic model in column 3 performs even better, vindicating the visual impression from figure 4. The coefficients indicate a decreasing yet insignificant effect in the first power regressor, a significant increase in the second power, and a small significant decrease in the third power. This confirms the visual impression that the effect of an increase in the default probability on the foreign law premium becomes only relevant for higher levels of credit risk. Indeed, the marginal effect of a change in the CDS spread is insignifiant for low risk levels (CDS spread = 1%), about 0.27 for heightened risk (CDS spread = 5%), and 1.07 for very high credit risk (CDS spread = 15%). In this pooled sample, the marginal effect peaks with 1.28 at a CSS spread of ca. 25% before declining again.

Columns 4-6 show the results based on the difference equations (17) and (18). In line with the results in levels, an increase in default risk in form of a change in the CDS premium is correlated with a positive change in the premium. The magnitude of the coefficient with the differenced model is smaller than in columns 1 and 2, but the effect is more robust. This remains true even when we include country interaction terms for the change in CDS (column 5). The only country for which that interaction has a negative and significant effect is Slovakia (but the point estimate is small), and the joint effect taking into account any change in the CDS premium is insignificant. It is noteworthy that the point estimate for the interaction for Greece is relatively small (e.g. smaller than the one for Finland). But one must bear in mind that the magnitude of the change in spreads was much larger for Greece than for any other countries (so that a relatively small coefficient can lead to the large observed increase in foreign-law premium for Greece).[14] The interaction terms point to a stronger effect of spreads on the premium for Italy, Portugal and Spain, which are the other periphery countries that experienced heightened levels of distress. For robustness, we also estimate a specification in which we use the difference from $t-5$ business days to t. The

[14]The relationship between CDS spreads and the premium may weaken for very large values of the former. For example, as the risk of default becomes imminent, bonds are priced based on their expected recovery values which can have very different implications for the yields on short- vs long-term bonds.

results are similar to the ones in first differences (not reported). The cubic model in column 6 indicates that a change in the CDS premium has a fairly constant correlation with changes in the premium for all risk levels and does not change as the level of the spread increases.

The pooled results with interaction effects have displayed considerable country variation. As a next step, we therefore provide a series of estimations in a country-by-country setting. While Belgium, Finland and Portugal have only 3-5 foreign bonds outstanding, the other countries have up to 21 (Italy). Besides the time-series variation, this allows exploiting cross-sectional variation even within the country regressions.

Table 3 reports country-by-country results for Greece, Portugal, Italy and Spain (GIPS). For each country, we report a specification where the CDS spread has a linear effect on the foreign-law premium, as well as a specification where squared and cubic terms are included. We find the strongest effects on the linear model for Greece, but Portugal and Spain also have a positive and statistically significant effect. The non-linear specifications point to a stronger relationship for Greece and Portugal. For ease of illustration, Figure 5 plots the combined effect of the terms on the CDS, CDS^2 and CDS^3 terms for different values of the CDS spread (along with error bands for the 95% confidence interval). In the case of Greece, the combined effect only becomes statistically significant when the CDS spread grows past 10 percent. But the foreign-law premium eventually reaches a level close to 10 percent. For Portugal, the premium initially rises with the CDS spread, and is about 2 percent for most of the range of CDS spreads (until the CDS spread grows past 10 percent and the premium rapidly shoots-up). In the case of Italy, the foreign-law premium is typically small and negative, whereas for Spain the relationship is broadly flat with wide error bands. The results are very similar if we drop outlier observations (above/below the 99th and 1st percentile of the premium, reported in Table A3).

For the sake of comparison, Table 4 reports similar results for Austria, Belgium, Finnland and Slovakia (ABFS). There are only two instances of a positive and significant coefficient (quadratic term for Belgium, and linear specification for Slovakia), none of which would amount to a non-negligible premium given the spreads faced by those countries. This evidence further supports the hypothesis that markets only worry about the jurisdiction of issuance when credit risk becomes a consideration.

Table 5 reports country-by-country results for the regression in first differences for the GIPS countries. We consider specifications where a change in the CDS spread affects the change in the premium (eq. 17), as well as specifications where the change in the CDS spread is interacted with the level and the squared level of the CDS (eq. 18). All of the regressions without this interaction point to a positive and statistically significant effect, with point estimates of 0.20, 0.49, 0.70 and 0.55 for Greece, Italy, Portual, and Spain, respectively. The regressions where the change in the CDS is interacted with its level point to a stronger relationship in changes for Greece and Portugal, which then declines as the

CDS spread rises. These specifications point to weaker or non-existent effects for Italy and Spain, possibly because there is not much non-linearity in the relationship at the levels of spreads experienced by those countries. For ease of illustration, Figure 6 plots the estimated relationship in changes for different levels of the CDS spread. The results are similar (and quantitatively stronger) if we use a 5-day difference (not reported). The results are also robust to dropping outlier observations (Table A4).

Table 6 is analogous to Table 5 but presents the results for the ABFS countries. As expected, the estimated relationship tends to be much weaker (and never amounts to a substantial foreign-law premium given the much lower CDS spreads for these countries).

The different strands of evidence point to the result that the foreign-law premium is mainly relevant for countries experiencing significant financial distress; in "normal" times, and for perceived safe issuers, the correlation between default risk and jurisdiction premium is small.

The sharper results from the regression in differences are consistent with the descriptive evidence from the summary plots. Those plots showed a strong tendency for co-movement between the premium and CDS spreads, particularly for high-risk countries, which is consistent with the results in the differences regressions. However, those plots also point to periods where the premium was high (or low) regardless of the evolution of the CDS spreads, e.g. when the two lines (in different scales) would cross. This is consistent with the weaker results for the level regressions.

Table 7 presents the results from first difference regressions where we control for dynamic features of the series by including a lagged term for both the dependent variable as well as the CDS spreads. This is essentially equivalent to an error correction model in which the short-run and equilibrium relationship can be inferred from the first-differenced and level coefficients. Notably, the results with respect to the correlation between changes in the CDS spread and changes in the foreign-law premium remain almost identical to those obtained from equation (6), both in the pooled sample as well as in the country by country regressions. The presence of an equilibrium relationship between credit risk and the foreign-law premium is further backed by a set of panel co-integration results, all of which clearly reject the null hypothesis of no co-integration between the two variables (see Table A2). We follow the test-procedure suggested by (Westerlund, 2007). Intuitively, we test the hypothesis that there is no error correction in model (19), and hence no long-term relationship exists.[15] We find that in all specifications (w/o trend and drift) the tests reject the null of no error correction,

[15] Formally, note that we can write equation 19 as

$$\Delta \text{Premium}_{i,j,t} = \beta_1(\text{Premium}_{i,j,t-1} - \beta_3^*\text{CDS}_{j,t-1}) + \beta_{2,j}\Delta\text{CDS}_{j,t} + \beta_4\text{B-A}_{i,j,t} + \beta_5\text{Time Mat.}_{i,j,t} + \theta_{i,j} + \epsilon_{i,j,t}$$

for $\beta_3 = -\beta_1\beta_3^*$. Then β_1 corresponds to the error correction rate with which the model converges to the equilibrium relationship after a shock of $(\text{Premium}_{i,j,t-1} - \beta_3^*\text{CDS}_{j,t-1})$ (Westerlund, 2007, p. 712). The tests reported in Table A2 test if the error correction rate β_1 is different from zero.

which is evidence of a structural long-term equilibrium relationship.

Further evidence of a cointegrating relationship is given in Figure 7, which plots for every quarter in 2006Q1-2014Q1 the results of a regression of the CDS spreads on the foreign-law premium using only observations from the corresponding quarter. The figure plots the coefficients for each bond in our sample for Greece, Italy, Spain and Portugal. The specification is analogous to that in Table 3. Only coefficients that are significant at the 5-percent level are plotted. Prior to 2009, the coefficients are widely dispersed, and do not suggest any consistent pattern. These results seem purely driven by noise.[16] However, from 2009 onwards, the coefficients on the bonds move tightly closer. The median coefficient from 2009Q1 onwards is 0.57 (0.53 if we exclude Greece). This suggests that once credit risk became non-negligible, a stable relationship emerges between credit risk and the foreign-law premium.

We should bear in mind that there are additional contractual differences between foreign and domestic law bonds beside whose courts have jurisdiction over legal proceedings. While we have focused our discussion of that premium on the potential benefits in the event of a default, foreign-law bonds tend to be less liquid. This is partly captured in our regressions by the bid-ask spreads. But one dimension of liquidity that is not captured by that measure is the ease with which the bonds can be used for discounting/repo-operations, and in particular for ECB discounting/collateral. While bonds denominated in USD, pound sterling, and yen issued and held in the euro area could benefit from the SMP/LTRO programs, many of the foreign-law bonds considered likely fell outside the scope of those programs. These considerations can have a substantial effect on the demand for, and hence the premium, of foreign-law bonds. Indeed, Corradin and Rodriguez-Moreno (2014) show that a large spread emerged between EUR and USD denominated bonds issued by the same euro area country. They attribute that spread to ECB liquidity facilities and non-standard monetary policy measures that impacted euro and foreign currency denominated bonds differently.

We therefore estimate the empirical models controlling for the bonds' collateral eligibility with the ECB. Specifically, we use a monthly binary indicator if a bond was eligible to be used as collateral in credit operations with the ECB between April 2010 and September 2013.[17] In this period, Italian foreign law bonds were never eligible central banking collateral, which is why we cannot estimate the adjusted model for Italy. Table 8 shows the results in levels. The results for Greece and Portugal remain similar to before, but the results for Spain using the cubic specification become much more similar to the results obtained for Portugal. This is in line with our argument above that an omission of a liquidity variable should bias the results against finding a significant correlation between credit risk and the foreign law

[16] There was very limited variation in credit risk prior to the crisis, so a large coefficient could result from a small uptick in credit risk that coincides with an increase in the foreign-law premium.

[17] Data are from the ECB's website. Longer back dating information is unfortunately not publicly available.

premium.

In any case, these considerations would have a much more muted effect on the regression in changes. For example, large one-off shifts to the foreign-law premium for reasons other than credit risk (e.g. liquidity and ease of discounting) will weaken the estimated relationship to the CDS spreads. But the same one-off shifts will be confined to relatively few observations when the regression is estimated in differences, and as a result have a more modest impact on the estimated relationship with the change in the CDS spreads. Indeed, the results in table 9 obtained from the corresponding specification support this reasoning and show less of a difference to the results in table 5 (without eligibility control variable).

Finally, table 10 shows that our findings remain robust when credit ratings are used as a measure of credit risk instead of CDS spreads. A regression of ratings on the foreign-law premium indicates that lower ratings are associated with an increase in the foreign-law premium. The results are statistically significant both for the regression in levels and in differences.

5 Emerging Markets: the case of Argentina and Russia

We do not attempt to estimate foreign-law premia in emerging market (EME) bonds in a rigorous way. This is because it is challenging, if not impossible, to disentangle currency risk from legal risk in these countries. Moreover, most emerging markets lack a domestic benchmark yield curve, especially in the 1990s and early 2000s, when most EME crises occurred.[18]

Despite this, we conducted an extensive search for "twin bonds", i.e. bonds issued in the same currency and with a similar maturity, but with different governing laws. To do so, we gathered a dataset of all EME sovereign bonds issued since the early 1990s from the comprehensive Dealogic database and used Bloomberg to search for yield data of promising bond pairs. Ultimately, we only found "twin bonds" with reasonable pricing data in two countries: Argentina and Russia. Both countries floated domestic-law bonds in USD in the wake of sovereign debt restructuring agreements and this allows us to extract approximate foreign-law premia. Specifically, for Russia, we focus on an English-law, USD-denominated Eurobond issued in 1997 and maturing in 2007 (ISIN: US78307AAB98) and compare its yield to the average yield of two Russian-law, USD denominated instruments due in 2006 and 2008: the "MinFin5" and "MinFin6" bonds with ISINs of RU0001337966 and RU0004146083, respectively. For Argentina, we use an even cleaner bond pair, since the country issued

[18] A recent paper by Du and Schreger (2013) estimates local currency risk-free curves for Emerging Markets beginning in 2005. In theory, their analysis could be extended to the late 1990s/early 2000s. But the noise involved is likely larger than the jurisdiction premium we are trying to recover (particularly since debt crises tend to coincide with currency crises).

exactly the same instruments in both domestic and foreign law in its 2005 bond restructuring. Specifically, we compare the yields of the so called "Discount Bonds" under New York law with the yield of that same series under Argentinian law (both due 2033 and with ISINs: US040114GL81 and ARARGE03E097, respectively). Another perfect pair are the USD "Par Bonds" due 2033, which were also partly issued under New York law and partly under Argentinian law.

The resulting yield differences between local-law and foreign-law USD bonds are plotted in Figure 8. The upper panel shows the premium of the Russian foreign-law Eurobond vis-a-vis their respective domestic-law instruments. The approximate foreign-law premium is largest in 2000-2003, a period with high yields in which Russia was still recovering from its own 1998-1999 default. The premium then decreases from more than 400bp to close to zero in the boom years of 2004-2006. For Argentina, the lower two panels show the evolution of the foreign-law premium by comparing the yields of New York law bonds with those of their domestic-law twin. The premium is highest after the outbreak of the 2008 financial crisis, reaching up to 600bp. It then decreases strongly and even turns negative after Oct. 26, 2012, when the New York Second Circuit Court of Appeals announced a surprise ruling in favor of the hedge fund NML (a subsidiary of Elliott) which made forwarding payments on the New York law bonds illegal for US intermediaries.

Taken together, these two case studies thus confirm our findings for the Eurozone: the foreign-law premium is typically small, but it can become quite sizable during periods of debt distress.

6 Conclusion

This paper has estimated the jurisdiction premium associated with foreign-law debt. Our estimates indicate that the premium is small when credit risk is small, but it can become very large in crisis times. In calm times, when risk is low, an increase in credit risk does not go along with a significant increase in the foreign-law premium. However, during crisis times, when CDS premia rise beyond 10%, a change in the CDS spread of 100bps is associated with an increase in the foreign law premium of 74bps. We also find a notable foreign-law premium following the sovereign debt restructurings of Russia 2000 and of Argentina 2005. Our results thus indicate that distressed countries can borrow, at the margin, at more favorable terms by issuing bonds in a foreign jurisdiction. As we have stressed above, the results may be due to a flight-to-safety into harder to restructure debt when a default becomes likely. Moreover, distressed debt investors may enter the market and push up the price for foreign-law bonds which are more suitable for holdout strategies.

In crisis times, the findings are thus consistent with the view that issuing foreign-law bonds acts as a commitment device: by issuing under foreign jurisdictions and thereby making the debt harder to restructure, sovereigns send a signal that they are unlikely to default on this newly issued bonds. Dilution considerations also contribute to a lower yield of foreign-law bonds. As shown by Bolton and Jeanne (2009), the larger the stock of harder to restructure debt (e.g. foreign-law bonds) the higher the expected haircut on the easier to restructure debt (e.g. domestic-law bonds). However, there are limits to a dilution strategy, since the higher the share of foreign-law debt, the lower the likelihood that it will be spared in the event of a default. In that regard, the estimated premium for peripheral Europe, where the bulk of the debt was issued domestically, may be larger than what we would observe for an emerging market (where the share of foreign currency debt is higher to begin with).

In normal times, however, countries do not seem to pay more when issuing debt with easier to restructure debt. The small foreign-law premium that we observe for low to moderate levels of credit risk suggests that the ex-ante benefits of issuing hard to restructure debt are small. These results speak to the literature on sovereign default and debt restructuring procedures, in which ex-ante vs. ex-post considerations play a central role (see e.g. Dooley, 2000; Pitchford and Wright, 2007; Bolton and Jeanne, 2007, 2009).

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Tables

Table 1: Descriptive statistics

	Observations	Mean	SD	Min	Max
Premium	81,824	0.242	5.201	-33.374	98.860
ΔPremium	81,724	0.005	0.467	-67.617	25.066
CDS	79,261	2.409	5.326	0.019	50.474
ΔCDS	79,164	0.006	0.279	-15.118	9.985
Bid-ask	77,778	0.489	1.156	0.000	29.952
ΔBid-ask	77,678	0.000	0.320	-18.381	27.787
Time to maturity (years)	81,824	5.619	5.992	0.003	35.060
Distress period	81,824	0.124	0.329	0.000	1.000

Table 2: Pooled results

The table reports results from regressions based on equations 15 and 16. All models include bond fixed effects, and Hubert-White standard errors are reported in parentheses below the coefficients. The dependent variable in columns 1-3 is the legal premium in levels as in eq. 15. Column 1 presents pooled results of all countries. Column 2 reports country-specific results by interacting the CDS premium with a country dummy. Column 3 is the cubic model as in eq. 16. In columns 4-6, the dependent variable is the first difference of the premium as in eq. 17. Column 4 shows pooled results and column 5 results with interactions and between the countries and CDS spreads. Column 6 reports results from the first-differenced cubic model as in eq. 18.

	Premium			ΔPremium		
	1	2	3	4	5	6
CDS	0.98***	0.18	-0.35*			
	(0.18)	(0.11)	(0.20)			
CDS^2			0.07***			
			(0.02)			
CDS^3			-0.00***			
			(0.00)			
ΔCDS				0.22***	0.09**	0.55***
				(0.06)	(0.04)	(0.06)
CDS $\times$ΔCDS						-0.01
						(0.01)
$CDS^2 \times$ ΔCDS						0.00
						(0.00)
Bid-ask	0.09	0.33	0.33			
	(0.25)	(0.29)	(0.31)			
ΔBid-ask				-0.08	-0.08	-0.08
				(0.08)	(0.08)	(0.08)
Time to maturity	0.45***	0.13	-0.05	-0.00**	-0.00**	-0.00**
	(0.12)	(0.10)	(0.06)	(0.00)	(0.00)	(0.00)
CDS or ΔCDS $\times$						
Belgium		-0.37			0.04	
		(0.28)			(0.06)	
Finland		-0.16			0.14*	
		(0.23)			(0.08)	
Greece		0.81***			0.11*	
		(0.16)			(0.07)	
Italy		-0.08			0.41***	
		(0.08)			(0.05)	
Portugal		-0.06			0.62***	
		(0.13)			(0.04)	
Slovakia		-0.05			-0.10*	
		(0.11)			(0.06)	
Spain		-0.27*			0.46***	
		(0.14)			(0.08)	
Constant	-4.55***	-2.01**	-0.26	0.02***	0.02***	0.02***
	(1.13)	(0.80)	(0.44)	(0.01)	(0.01)	(0.01)
R2 B	0.32	0.51	0.56	0.01	0.01	0.01
R2 W	0.52	0.55	0.56	0.02	0.02	0.03
R2 O	0.33	0.44	0.54	0.02	0.02	0.03
Obs	75247	75247	75247	75150	75150	75150
No. Bonds	96	96	96	96	96	96

Note: $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Table 3: Country results: GIPS (levels)

The table shows results from country-by-country regressions similar to the linear model in equation 15 (results in uneven column numbers) and the cubic model in equation 16 (results in even column numbers), but dropping the country interaction term. The dependent variable is the foreign law premium in levels. All regressions include bond fixed effects, and inference is based on Hubert-White standard errors.

	Premium							
	Greece		Italy		Portugal		Spain	
	1	2	3	4	5	6	7	8
CDS	1.05***	-0.43	-0.08***	-0.89***	0.19***	1.21***	0.13**	1.23
	(0.20)	(0.39)	(0.02)	(0.14)	(0.00)	(0.06)	(0.05)	(1.15)
CDS^2		0.07***		0.27***		-0.20***		-0.32
		(0.02)		(0.05)		(0.01)		(0.38)
CDS^3		-0.00***		-0.03***		0.01***		0.03
		(0.00)		(0.01)		(0.00)		(0.04)
Bid-ask	0.60	0.66	0.22***	0.11	-0.16***	-0.12***	0.10	0.10
	(0.63)	(0.69)	(0.05)	(0.07)	(0.00)	(0.00)	(0.07)	(0.07)
Time to maturity	1.10*	-0.46	-0.07***	-0.18***	0.06**	0.10**	0.29	0.46*
	(0.56)	(0.53)	(0.02)	(0.02)	(0.02)	(0.02)	(0.17)	(0.23)
Constant	-11.75**	0.82	0.22*	1.38***	-0.50***	-1.24***	-3.04*	-5.06*
	(4.67)	(3.17)	(0.12)	(0.22)	(0.03)	(0.06)	(1.41)	(2.40)
R2 B	0.17	0.55	0.01	0.01	0.03	0.03	0.06	0.05
R2 W	0.56	0.57	0.08	0.17	0.19	0.30	0.10	0.14
R2 O	0.29	0.56	0.00	0.01	0.09	0.04	0.07	0.07
Obs	12560	12560	22002	22002	2346	2346	10111	10111
No. Bonds	18	18	21	21	4	4	12	12

Note: $^{*}p < 0.1$,** $p < 0.05$,*** $p < 0.01$.

Table 4: Country results: ABFS (levels)

The table shows results from country-by-country regressions similar to the linear model in equation 15 (results in uneven column numbers) and the cubic model in equation 16 (results in even column numbers), but dropping the country interaction term. The dependent variable is the foreign law premium in levels. All regressions include bond fixed effects, and inference is based on Hubert-White standard errors.

	Premium							
	Austria		Belgium		Finland		Slovakia	
	1	2	3	4	5	6	7	8
CDS	0.00	-0.96	-0.23	-1.83*	0.11	-1.63	0.12*	-0.42
	(0.12)	(1.43)	(0.23)	(0.61)	(0.07)	(1.08)	(0.07)	(0.40)
CDS^2		0.86		1.02*		3.97		0.26
		(1.21)		(0.32)		(2.07)		(0.36)
CDS^3		-0.20		-0.18		-2.70*		-0.03
		(0.29)		(0.06)		(1.20)		(0.09)
Bid-ask	0.68	0.48	-3.13	-2.08	0.00	0.00	-0.06	-0.05
	(0.76)	(0.52)	(2.53)	(2.25)	(0.01)	(0.01)	(0.07)	(0.06)
Time to maturity	-0.02	-0.06	0.40**	0.20***	0.08	0.08	0.01	-0.03
	(0.08)	(0.14)	(0.07)	(0.00)	(0.06)	(0.05)	(0.02)	(0.03)
Constant	-0.48*	-0.12	-2.50**	-0.92	-0.70	-0.46	0.03	0.47*
	(0.27)	(0.72)	(0.43)	(0.84)	(0.37)	(0.44)	(0.09)	(0.23)
R2 B	0.00	0.08	0.62	0.54	0.75	0.75	0.68	0.44
R2 W	0.01	0.04	0.16	0.18	0.18	0.19	0.05	0.08
R2 O	0.00	0.03	0.21	0.17	0.44	0.43	0.00	0.14
Obs	15983	15983	2116	2116	2922	2922	7207	7207
No. Bonds	20	20	3	3	5	5	13	13

Note: $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Table 5: Country results: GIPS (first differences)

The table shows results from country-by-country regressions similar to the linear model in equation 17 (results in uneven column numbers) and the cubic model in equation 18 (results in even column numbers), but dropping the country interaction term. The dependent variable is the foreign law premium in first differences. All regressions include bond fixed effects, and inference is based on Hubert-White standard errors.

	ΔPremium							
	Greece		Italy		Portugal		Spain	
	1	2	3	4	5	6	7	8
ΔCDS	0.20***	0.66***	0.49***	0.28*	0.70***	1.85***	0.55***	0.31
	(0.06)	(0.11)	(0.04)	(0.15)	(0.00)	(0.08)	(0.08)	(0.22)
CDS ×ΔCDS		-0.02*		0.02		-0.43***		-0.02
		(0.01)		(0.09)		(0.02)		(0.13)
$CDS^2 \times \Delta CDS$		0.00		0.01		0.03***		0.02
		(0.00)		(0.01)		(0.00)		(0.02)
ΔBid-ask	-0.23	-0.24	-0.00	-0.00	0.04***	0.04***	0.01	0.01
	(0.27)	(0.27)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Time to maturity	-0.02*	-0.02*	-0.00	-0.00	-0.02*	-0.01	-0.00	-0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
Constant	0.15**	0.15**	0.00	0.00	0.03*	0.03	0.00	-0.00
	(0.06)	(0.07)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
R2 B	0.05	0.05	0.00	0.00	0.08	0.08	0.03	0.09
R2 W	0.03	0.04	0.06	0.07	0.10	0.13	0.02	0.02
R2 O	0.02	0.03	0.06	0.07	0.10	0.13	0.02	0.02
Obs	12542	12542	21981	21981	2342	2342	10098	10098
No. Bonds	18	18	21	21	4	4	12	12

Note: $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Table 6: Country results: ABFS (first differences)

The table shows results from country-by-country regressions similar to the linear model in equation 17 (results in uneven column numbers) and the cubic model in equation 18 (results in even column numbers), but dropping the country interaction term. The dependent variable is the foreign law premium in first differences. All regressions include bond fixed effects, and inference is based on Hubert-White standard errors.

	ΔPremium							
	Austria		Belgium		Finland		Slovakia	
	1	2	3	4	5	6	7	8
ΔCDS	0.09**	-0.28***	0.12	-0.17	0.20**	0.27	-0.02	0.17
	(0.04)	(0.08)	(0.06)	(0.23)	(0.05)	(0.41)	(0.05)	(0.14)
CDS ×ΔCDS		0.42***		0.33		-1.02		-0.12
		(0.13)		(0.16)		(1.31)		(0.22)
$CDS^2 \times \Delta CDS$		-0.10*		-0.08		1.34		0.01
		(0.05)		(0.03)		(1.06)		(0.07)
ΔBid-ask	0.02	0.02	-0.24	-0.24	-0.02***	-0.02***	0.01	0.01
	(0.06)	(0.06)	(0.44)	(0.44)	(0.00)	(0.00)	(0.02)	(0.02)
Time to maturity	-0.00	-0.00	-0.00	-0.00	0.00**	0.00**	-0.00	-0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Constant	0.00	-0.00	0.01	0.01	-0.00**	-0.00**	0.00	0.00
	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)
R2 B	0.11	0.06	0.95	0.94	0.03	0.04	0.27	0.35
R2 W	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00
R2 O	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Obs	15963	15963	2113	2113	2917	2917	7194	7194
No. Bonds	20	20	3	3	5	5	13	13

Note: $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Table 7: Error correction model

The table shows results from the cubic error correction model in equation 20. The dependent variable is the foreign law premium in first differences. All regressions include bond fixed effects, and inference is based on Hubert-White standard errors.

	ΔPremium			
	Greece	Italy	Portugal	Spain
	1	2	3	4
Premium(t-1)	-0.01*	-0.10***	-0.09	-0.11
	(0.00)	(0.02)	(0.04)	(0.09)
ΔCDS	0.80***	0.07	1.67***	0.32
	(0.11)	(0.18)	(0.06)	(0.24)
ΔCDS×CDS(t-1)	-0.04***	0.17	-0.35***	-0.01
	(0.01)	(0.11)	(0.01)	(0.15)
ΔCDS × CDS^2(t-1)	0.00***	-0.01	0.02***	0.02
	(0.00)	(0.01)	(0.00)	(0.02)
CDS(t-1)	-0.02***	-0.12***	0.18	0.12
	(0.01)	(0.03)	(0.09)	(0.15)
CDS^2(t-1)	0.00***	0.04***	-0.03	-0.03
	(0.00)	(0.01)	(0.01)	(0.05)
CDS^3(t-1)	-0.00***	-0.00***	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
ΔBid-ask	-0.24	-0.00	0.04***	0.01
	(0.27)	(0.01)	(0.00)	(0.01)
Time to maturity	-0.01	-0.02***	-0.00	0.04
	(0.00)	(0.00)	(0.01)	(0.04)
Constant	0.03	0.17***	-0.15	-0.49
	(0.03)	(0.04)	(0.09)	(0.44)
R2 B	0.01	0.00	0.19	0.00
R2 W	0.04	0.11	0.15	0.08
R2 O	0.04	0.01	0.05	0.01
Obs	12542	21981	2342	10098
No. Bonds	18	21	4	12

Note: $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 8: ECB eligibility (levels)

The table reports a similar specification to the one used in table 3. The dependent variable is again the foreign law premium in levels. The only difference is that we include a binary indicator if a bond was eligible for credit operations with the ECB in a given month. Since this data is only publicly available from April 2010 onwards, the sample period is restricted to this period. None of the Italian foreign law bonds in this period were eligible as collateral with the ECB, which is why we cannot estimate results using Italian data. The pooled, Greece, and Spain regressions include bond fixed effects; since only one Portuguese foreign law bond was pending in this period, the Portuguese model cannot include a fixed effect. Inference in all regressions is based on Hubert-White standard errors.

	Premium							
	Pooled		Greece		Portugal		Spain	
	1	2	3	4	5	6	7	8
CDS	1.00***	-0.35*	0.92***	-4.67***	0.22***	1.47***	0.06	2.53***
	(0.21)	(0.20)	(0.26)	(1.08)	(0.02)	(0.18)	(0.05)	(0.63)
CDS^2		0.07***		0.21***		-0.23***		-0.76***
		(0.02)		(0.05)		(0.03)		(0.20)
CDS^3		-0.00***		-0.00***		0.01***		0.07***
		(0.00)		(0.00)		(0.00)		(0.02)
Bid-ask	0.07	0.33	0.38	0.43	-0.15***	-0.11***	0.06	0.08
	(0.23)	(0.31)	(0.58)	(0.65)	(0.04)	(0.04)	(0.06)	(0.06)
Time to maturity	0.15	-0.05	-2.26	-12.62***	0.07***	0.10	0.65**	0.67**
	(0.12)	(0.06)	(2.43)	(2.34)	(0.02)	(0.08)	(0.26)	(0.26)
ECB eligible	0.24		-1.52	-1.30	0.37***	0.11	0.29	0.29
	(1.16)		(5.32)	(5.25)	(0.02)	(0.08)	(0.18)	(0.17)
Constant	-4.60***	-0.26	8.56	123.23***	0.03	-3.42	-6.03**	-8.67***
	(1.53)	(0.44)	(20.77)	(20.32)	(0.03)	(0.44)	(2.12)	(2.58)
R2 B	0.49	0.56	0.22	0.11	n/a	n/a	0.13	0.13
R2 W	0.49	0.56	0.52	0.56	0.23	0.34	0.25	0.27
R2 O	0.43	0.54	0.35	0.09	0.23	0.34	0.09	0.09
Obs	35603	75247	5847	5847	892	892	5518	5518
No. Bonds	68	96	13	13	1	1	10	10

Note: $^{*}p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Table 9: ECB eligibility (first differences)

The table reports a similar specification to the one used in table 5. The dependent variable is again the foreign law premium in first differences. The only difference to the previous model is that we include a binary indicator if a bond was eligible for credit operations with the ECB in a given month. Since this data is only publicly available from April 2010 onwards, the sample period is restricted to this period. None of the Italian foreign law bonds in this period were eligible as collateral with the ECB, which is why we cannot estimate results using Italian data. The pooled, Greece, and Spain regressions include bond fixed effects; since only one Portuguese foreign law bond was pending in this period, the Portuguese model cannot include a fixed effect. Inference in all regressions is based on Hubert-White standard errors.

	ΔPremium							
	Pooled		Greece		Portugal		Spain	
	1	2	3	4	5	6	7	8
ΔCDS	0.22***	0.55***	0.20***	0.73***	0.69***	1.87***	0.58***	1.07***
	(0.06)	(0.06)	(0.06)	(0.11)	(0.09)	(0.51)	(0.08)	(0.23)
CDS ×ΔCDS		-0.01		-0.02**	-0.01	-0.44***		-0.41**
		(0.01)		(0.01)	(0.01)	(0.16)		(0.13)
$CDS^2 \times \Delta CDS$		0.00		0.00	-0.01	0.03***		0.07***
		(0.00)		(0.00)	(0.02)	(0.01)		(0.02)
ΔBid-ask	-0.08	-0.08	-0.24	-0.24		0.04	0.01	0.01
	(0.08)	(0.08)	(0.28)	(0.28)		(0.03)	(0.01)	(0.01)
Time to maturity	-0.01***	-0.00**	-0.12***	-0.13***		-0.01	-0.00***	-0.00**
	(0.00)	(0.00)	(0.03)	(0.03)		(0.01)	(0.00)	(0.00)
ECB eligible	-0.04		-0.10	-0.10	0.04	-0.00	-0.00*	-0.00
	(0.03)		(0.08)	(0.08)	(0.03)	(0.02)	(0.00)	(0.00)
Constant	0.07***	0.02***	0.94***	1.03***	0.03	0.02	0.03***	0.02*
	(0.02)	(0.01)	(0.22)	(0.22)	(0.03)	(0.03)	(0.01)	(0.01)
R2 B	0.01	0.01	0.07	0.07	n/a	n/a	0.02	0.02
R2 W	0.02	0.03	0.03	0.04	0.18	0.22	0.16	0.18
R2 O	0.02	0.03	0.01	0.01	0.18	0.22	0.14	0.16
Obs	35581	75150	5847	5847	892	892	5514	5514
No. Bonds	68	96	13	13	1	1	10	10

Note: $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 10: Ratings

The table reports regressions as in 15 and 16, but replacing the CDS spread with credit ratings by Standard and Poor's, linearly transformed to a numerical scale. The regressions also do not include country-specific constants. Column 1 reports results in levels, and column 2 in first differences.

	Premium	ΔPremium
Rating	-1.42***	
	(0.34)	
ΔRating		-0.13***
		(0.04)
Bid-ask	0.51	
	(0.47)	
ΔBid-ask		-0.08
		(0.08)
Time to maturity	0.51***	-0.00**
	(0.16)	(0.00)
Constant	22.02***	0.02***
	(5.25)	(0.01)
R2 B	0.25	0.01
R2 W	0.28	0.00
R2 O	0.14	0.00
Obs	77778	77678
No. Bonds	99	99

Note: $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table 11: Foreign law bonds

Country	ISIN	Issue date	Maturity date	Coupon (%)	Amount issued (USD m)	Governing law	Currency
Austria	XS0048303423	02/03/1994	02/03/2009	3.75	590	England	JPY
Austria	CH0008375153	01/27/1998	01/27/2006	3.25	2,519	Switzerland	CHF
Austria	XS0092819753	01/05/1999	10/05/2009	5.25	1,700	England	USD
Austria	CH0006111394	04/21/1999	08/21/2009	3.00	1,287	Switzerland	CHF
Austria	XS0096779417	04/28/1999	04/28/2006	5.50	1,000	England	USD
Austria	XS0136383733	09/28/2001	12/04/2006	4.50	750	England	USD
Austria	CH0013587024	01/25/2002	01/25/2012	3.38	1,120	England	CHF
Austria	XS0143275252	02/22/2002	02/22/2012	5.50	600	England	USD
Austria	XS0143683612	03/07/2002	08/31/2007	5.00	600	England	USD
Austria	CH0014100918	05/14/2002	05/14/2007	3.00	560	England	CHF
Austria	XS0153786974	08/30/2002	08/30/2010	4.38	1,200	England	USD
Austria	XS0155222671	10/04/2002	10/04/2006	3.00	750	England	USD
Austria	XS0163904617	03/06/2003	03/30/2007	2.63	400	England	USD
Austria	XS0167894616	05/12/2003	05/12/2010	3.50	500	England	USD
Austria	XS0170724479	06/25/2003	06/25/2013	3.25	3,100	England	USD
Austria	XS0186999743	03/03/2004	05/27/2011	3.63	1,250	England	USD
Austria	US052591AR54	05/19/2004	05/19/2014	5.00	1,300	England	USD
Austria	XS0372004761	06/25/2008	06/25/2013	3.25	300	England	USD
Austria	CH0103325715	07/14/2009	07/14/2016	2.50	1,008	England	CHF
Austria	US052591AW40	06/17/2011	06/17/2016	1.75	1,000	England	USD
Austria	XS0749005186	02/21/2012	10/19/2029	3.56	148	England	EUR
Austria	XS0749005343	02/21/2012	10/19/2029	2.45	29	England	EUR
Belgium	XS0026163435	06/28/1990	06/28/2010	9.20	500	England	USD
Belgium	BE0364162249	04/05/2002	04/05/2022	0.00	68	England	EUR
Belgium	BE6254011339	06/14/2013	06/17/2048	3.60	68	Germany	EUR
Finland	US317873AY36	02/29/1996	02/15/2026	6.95	300	New York	USD
Finland	US317873BD89	03/06/2002	03/06/2007	4.75	1,500	New York	USD
Finland	XS0410355365	01/27/2009	05/16/2011	1.50	2,000	England	USD
Finland	US31788DAA28	10/19/2010	10/19/2015	1.25	2,000	England	USD
Finland	US31788DAB01	03/17/2011	03/17/2016	2.25	2,000	England	USD
Finland	FI4000068663	09/04/2013	09/15/2018	1.13	6,802	Germany	EUR
Greece	GB0000766039	09/06/1985	09/06/2010	10.75	128	England	GBP
Greece	JP530000CQB3	11/16/1994	11/16/2009	7.10	197	Japan	JPY
Greece	JP530000CR76	07/14/1995	07/14/2015	5.80	197	Japan	JPY
Greece	JP530000AS10	01/31/1996	01/31/2006	4.20	394	Japan	JPY
Greece	JP530000BS19	01/31/1996	02/01/2016	5.25	295	Japan	JPY
Greece	JP530000CS83	08/22/1996	08/22/2016	5.00	394	Japan	JPY
Greece	XS0071095045	11/08/1996	11/08/2016	4.50	394	England	JPY
Greece	XS0078057725	07/03/1997	07/03/2017	4.50	295	England	JPY
Greece	XS0079012166	08/08/1997	08/08/2017	3.80	492	England	JPY
Greece	XS0079012679	08/08/1997	08/08/2007	2.90	492	England	JPY
Greece	US423324AC66	03/04/1998	03/04/2008	6.95	1,750	New York	USD
Greece	XS0085654068	03/31/1998	03/31/2008	5.75	2,720	England	EUR
Greece	XS0097010440	04/30/1999	04/30/2019	3.00	246	England	JPY
Greece	XS0110307930	04/14/2000	04/14/2028	6.14	272	England	EUR
Greece	CH0018062676	03/18/2004	03/18/2011	2.38	560	Switzerland	CHF
Greece	XS0191352847	04/30/2004	07/17/2034	5.20	1,360	England	EUR
Greece	CH0021839524	07/05/2005	07/05/2013	2.13	728	Switzerland	CHF
Greece	XS0372384064	06/25/2008	06/25/2013	4.63	1,500	England	USD
Italy	US465410AH18	09/27/1993	09/27/2023	6.88	3,500	New York	USD
Italy	XS0108238543	02/23/2000	02/23/2010	1.80	984	New York	JPY
Italy	US465410AW84	02/22/2001	02/22/2011	6.00	2,000	New York	USD
Italy	US465410AX67	04/05/2001	04/05/2006	5.25	2,000	New York	USD
Italy	XS0136860920	10/10/2001	10/10/2006	0.38	1,968	New York	JPY

continues on next page

Table 11: Foreign law bonds (continued)

Country	ISIN	Issue date	Maturity date	Coupon (%)	Amount issued (USD m)	Governing law	Currency
Italy	XS0137815246	10/25/2001	10/25/2006	4.38	5,000	New York	USD
Italy	US465410BA55	03/01/2002	06/15/2012	5.63	3,000	New York	USD
Italy	US465410BD94	09/04/2002	09/14/2007	3.63	3,000	New York	USD
Italy	US465410BG26	02/27/2003	06/15/2033	5.38	2,000	New York	USD
Italy	US465410BF43	02/27/2003	06/15/2013	4.38	2,000	New York	USD
Italy	US465410BH09	07/03/2003	07/15/2008	2.50	2,000	New York	USD
Italy	US465410BK38	03/03/2004	05/15/2009	3.25	2,000	New York	USD
Italy	US465410BM93	06/30/2004	12/14/2007	3.75	2,000	New York	USD
Italy	US465410BN76	01/21/2005	01/21/2015	4.50	4,000	New York	USD
Italy	US465410BP25	05/09/2005	06/16/2008	4.00	3,000	New York	USD
Italy	US465410BQ08	01/25/2006	01/25/2016	4.75	2,000	New York	USD
Italy	US465410BS63	06/12/2007	06/12/2017	5.38	2,000	New York	USD
Italy	US465410BT47	06/04/2008	07/15/2011	3.50	2,500	New York	USD
Italy	US465410BU10	10/05/2009	10/05/2012	2.13	2,500	New York	USD
Italy	US465410BV92	01/26/2010	01/26/2015	3.13	2,500	New York	USD
Italy	US465410BW75	09/16/2010	09/16/2013	2.13	2,000	New York	USD
Portugal	GB0006964760	05/20/1986	05/20/2016	9.00	257	England	GBP
Portugal	FR0000108359	05/13/1996	05/13/2008	6.63	829	France	EUR
Portugal	FR0000583429	04/03/1997	04/03/2007	5.63	1,114	France	EUR
Portugal	XS0082026054	11/20/1997	03/26/2008	5.75	617	England	EUR
Portugal	XS0498724888	03/25/2010	03/25/2015	3.50	1,250	England	USD
Slovakia	DE0003525804	09/28/1999	09/28/2006	9.50	163	Luxembourg	EUR
Slovakia	DE0001074763	04/14/2000	04/14/2010	7.38	680	England	EUR
Slovakia	XS0192595873	05/20/2004	05/20/2014	4.50	1,360	England	EUR
Slovakia	XS0249239830	03/27/2006	03/26/2021	4.00	1,360	England	EUR
Slovakia	XS0299989813	05/15/2007	05/15/2017	4.38	1,360	England	EUR
Slovakia	XS0430015742	05/21/2009	01/21/2015	4.38	2,720	England	EUR
Slovakia	CH0181915585	04/25/2012	04/25/2022	2.75	196	Switzerland	CHF
Slovakia	CH0181379774	04/25/2012	04/25/2018	2.13	364	Switzerland	CHF
Slovakia	US831588AB47	05/21/2012	05/21/2022	4.38	1,500	England	USD
Slovakia	CH0206594498	04/16/2013	10/16/2019	1.38	448	Switzerland	CHF
Slovakia	CH0206594506	04/16/2013	10/16/2023	2.13	196	Switzerland	CHF
Slovakia	JP570300AD69	06/25/2013	06/24/2016	0.72	254	Japan	JPY
Slovakia	JP570300BD68	06/25/2013	06/25/2018	0.99	41	Japan	JPY
Spain	GB0008326562	02/27/1985	03/24/2010	11.75	103	England	GBP
Spain	XS0075681345	04/17/1997	04/17/2017	3.13	197	England	JPY
Spain	XS0075723360	04/21/1997	04/21/2017	3.10	197	England	JPY
Spain	XS0089378938	07/28/1998	07/28/2008	5.88	1,500	England	USD
Spain	XS0096272355	04/06/1999	04/06/2029	5.25	342	England	GBP
Spain	XS0225227528	07/20/2005	07/20/2010	4.13	1,000	England	USD
Spain	XS0363874081	05/14/2008	06/17/2013	3.63	2,000	England	USD
Spain	XS0416150950	03/05/2009	03/05/2012	2.75	1,000	England	USD
Spain	US84633PAA12	09/17/2009	09/17/2012	2.00	2,500	England	USD
Spain	XS0565340758	12/02/2010	12/02/2030	2.92	197	England	JPY
Spain	XS0619977258	05/06/2011	05/06/2036	5.60	456	England	EUR
Spain	US84633PAB94	02/27/2013	03/06/2018	4.00	2,000	England	USD

Table A1: Unit root tests

Reported are panel unit root tests as suggested by Choi (2001). Ho in all tests is that all bonds are I(1). The hypothesis is tested using the Dickey-Fuller procedure with 3 lags.

	Premium					
	No trend, no drift		Trend		Drift	
	Statistic	p	Statistic	p	Statistic	p
Inverse χ^2	758.82	0.00	710.93	0.00	1255.17	0.00
Inverse normal	-13.80	0.00	-12.27	0.00	-20.02	0.00
Inverse logit t	-18.96	0.00	-17.64	0.00	-28.05	0.00
Modified inv. χ^2	28.43	0.00	26.01	0.00	53.50	0.00
	CDS					
	No trend, no drift		Trend		Drift	
	Statistic	p	Statistic	p	Statistic	p
Inverse χ^2	127.79	1.00	126.46	1.00	447.05	0.00
Inverse normal	3.96	1.00	3.51	1.00	-9.41	0.00
Inverse logit t	3.93	1.00	3.38	1.00	-8.46	0.00
Modified inv. χ^2	-3.28	1.00	-3.34	1.00	13.19	0.00

Table A2: Cointegration tests

The table reports results from cointegration tests as suggested by Westerlund (2007) and Persyn and Westerlund (2008). The test statistics G_τ and G_α are group-mean tests, which test the null that the legal premium and CDS spread is cointegrated for at least one bond. The panel statistics P_τ and P_α impose that the cointegrating relationship is common across all bonds.

	No trend, no drift		Drift		Trend	
	Statistic	p	Statistic	p	Statistic	p
G_τ	-3.58	0.00	-3.90	0.00	-4.12	0.00
G_α	-58.70	0.00	-65.45	0.00	-73.76	0.00
P_τ	-27.64	0.00	-35.02	0.00	-36.60	0.00
P_α	-15.59	0.00	-21.73	0.00	-23.59	0.00

Table A3: Excluding outliers (levels)

The table shows results from regressions based on equations 15 and 16 in samples restricted to exclude outliers. Specifically, for each country, we drop the 1st and 99th percentile of the premium. All regressions include bond fixed effects, and inference is based on Hubert-White standard errors.

	Premium							
	Greece		Italy		Portugal		Spain	
	1	2	3	4	5	6	7	8
CDS	0.90***	-0.46	-0.10***	-0.82***	0.19***	1.21***	0.09**	0.83
	(0.12)	(0.33)	(0.02)	(0.12)	(0.00)	(0.06)	(0.04)	(1.00)
CDS^2		0.06***		0.26***		-0.19***		-0.21
		(0.02)		(0.05)		(0.01)		(0.34)
CDS^3		-0.00***		-0.03***		0.01***		0.02
		(0.00)		(0.01)		(0.00)		(0.03)
Bid-ask	-0.05	0.02	0.21***	0.11*	-0.16***	-0.12***	0.09	0.09
	(0.14)	(0.17)	(0.04)	(0.06)	(0.00)	(0.00)	(0.06)	(0.06)
Time to maturity	1.30***	-0.13	-0.07***	-0.17***	0.06**	0.10**	0.23	0.35*
	(0.32)	(0.36)	(0.01)	(0.02)	(0.02)	(0.02)	(0.15)	(0.18)
Constant	-11.36***	0.09	0.29***	1.24***	-0.49***	-1.23***	-2.53*	-3.97*
	(2.56)	(2.59)	(0.10)	(0.20)	(0.03)	(0.06)	(1.17)	(1.84)
R2 B	0.20	0.59	0.01	0.01	0.02	0.02	0.06	0.06
R2 W	0.63	0.65	0.09	0.19	0.20	0.30	0.10	0.12
R2 O	0.30	0.65	0.01	0.01	0.09	0.04	0.10	0.09
Obs	12262	12262	21562	21562	2345	2345	9905	9905
No. Bonds	18	18	21	21	4	4	12	12

Note: $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

Table A4: Excluding outliers (first differences)

The table shows results from regressions based on equations 17 and 18 in samples restricted to exclude outliers. Specifically, for each country, we drop the 1st and 99th percentile of the premium's first differences. All regressions include bond fixed effects, and inference is based on Hubert-White standard errors.

	ΔPremium							
	Greece		Italy		Portugal		Spain	
	1	2	3	4	5	6	7	8
ΔCDS	0.21***	0.70***	0.47***	0.21	0.70***	1.86***	0.55***	0.33
	(0.06)	(0.10)	(0.03)	(0.14)	(0.00)	(0.08)	(0.08)	(0.19)
CDS ×ΔCDS		-0.02*		0.08		-0.44***		-0.03
		(0.01)		(0.08)		(0.02)		(0.11)
$CDS^2 \times \Delta CDS$		0.00		-0.00		0.03***		0.02
		(0.00)		(0.01)		(0.00)		(0.02)
ΔBid-ask	-0.18	-0.19	-0.01	-0.01	0.04***	0.04***	0.01	0.01
	(0.25)	(0.26)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Time to maturity	-0.02	-0.02	-0.00**	-0.00**	-0.02	-0.01	0.00	0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
ECB eligible	0.16**	0.15*	0.01**	0.00**	0.04*	0.03*	-0.02	-0.02
	(0.07)	(0.07)	(0.00)	(0.00)	(0.01)	(0.01)	(0.02)	(0.02)
Constant	0.21***	0.70***	0.47***	0.21	0.70***	1.86***	0.55***	0.33
	(0.06)	(0.10)	(0.03)	(0.14)	(0.00)	(0.08)	(0.08)	(0.19)
R2 B	0.03	0.03	0.00	0.01	0.10	0.10	0.06	0.06
R2 W	0.04	0.05	0.08	0.08	0.11	0.14	0.03	0.04
R2 O	0.02	0.03	0.08	0.08	0.11	0.14	0.03	0.03
Obs	12244	12244	21541	21541	2341	2341	9892	9892
No. Bonds	18	18	21	21	4	4	12	12

Note: $^{*} p < 0.1,^{**} p < 0.05,^{***} p < 0.01$.

Figures

Figure 1: Foreign law bonds in European countries

This figure shows the share of foreign law bonds in total public sector bond issuance between 2003 and July 2014 for EU countries and according to the Dealogic database. The shares are based on issuance amounts in US$ and are calculated from sovereign and quasi-sovereign debt, i.e. bonds placed by the central government and by government owned companies. Only instruments with maturity above 1 year are included.

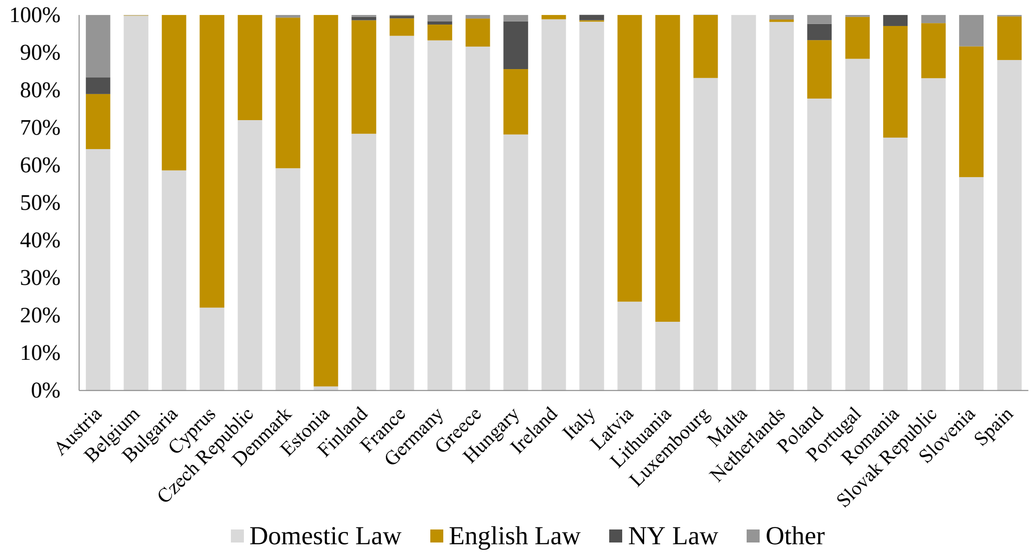

Figure 2: Foreign law bonds in EMEs

This figure shows the share of foreign law bonds in total public sector bond issuance between 2003 and July 2014 for selected emerging markets and according to the Dealogic database. The shares are based on issuance amounts in US$ and are calculated from sovereign and quasi-sovereign debt, i.e. bonds placed by the central government and by government owned companies. Only instruments with maturity above 1 year are included. The Argentina numbers include the 2005 restructured bonds.

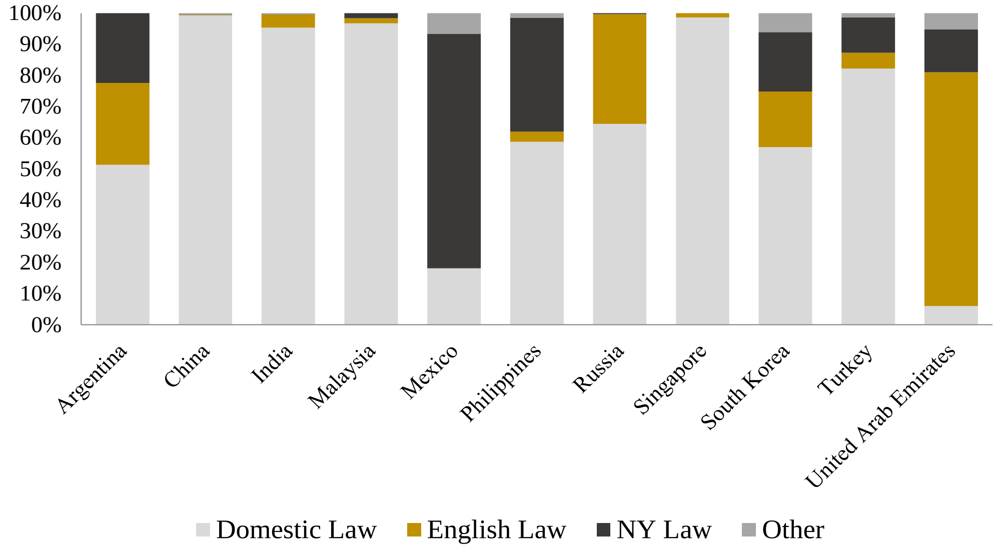

Figure 3: Foreign law premia and CDS spreads

This figure shows the estimated legal premium on foreign law bonds (country averages weighted by issue amount) and the country-level CDS spread.

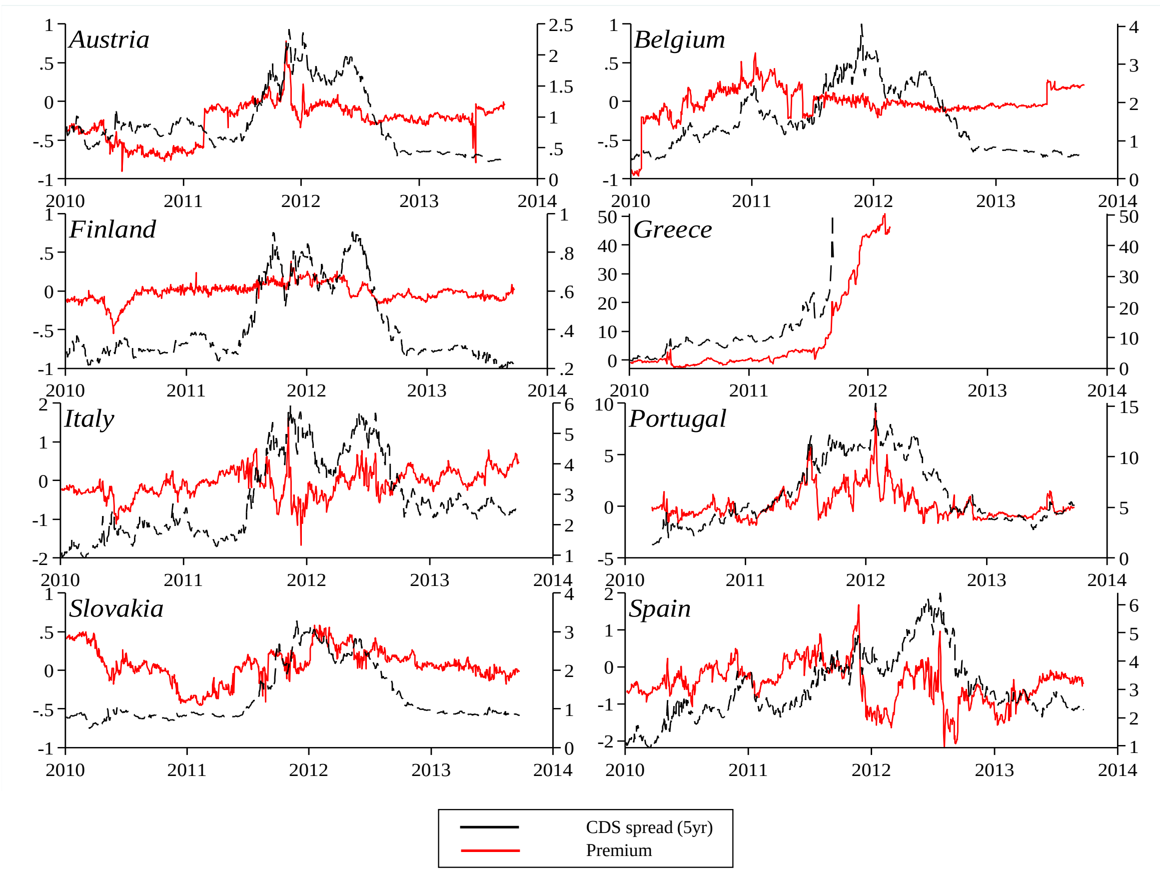

Figure 4: Non-parametric relationship between foreign-law premium and CDS spread

This figure shows non-parametric estimates of the relationship between the Foreign-Law Premium and the CDS spreads using a locally-weighted linear regression with quartic kernel weights for Greece, Italy, Portugal and Spain, respectively (black line). The red line corresponds to a semi-parametric estimation that controls for differences in the bid-ask spread and time to maturity. Estimates for Greece, Portugal, Spain and Italy based on a bandwidth of 300, 250, 100, and 100bp, respectively. Dashed line corresponds to the bootstrapped 95 percent confidence interval. Scatter plot excludes some outlier observations.

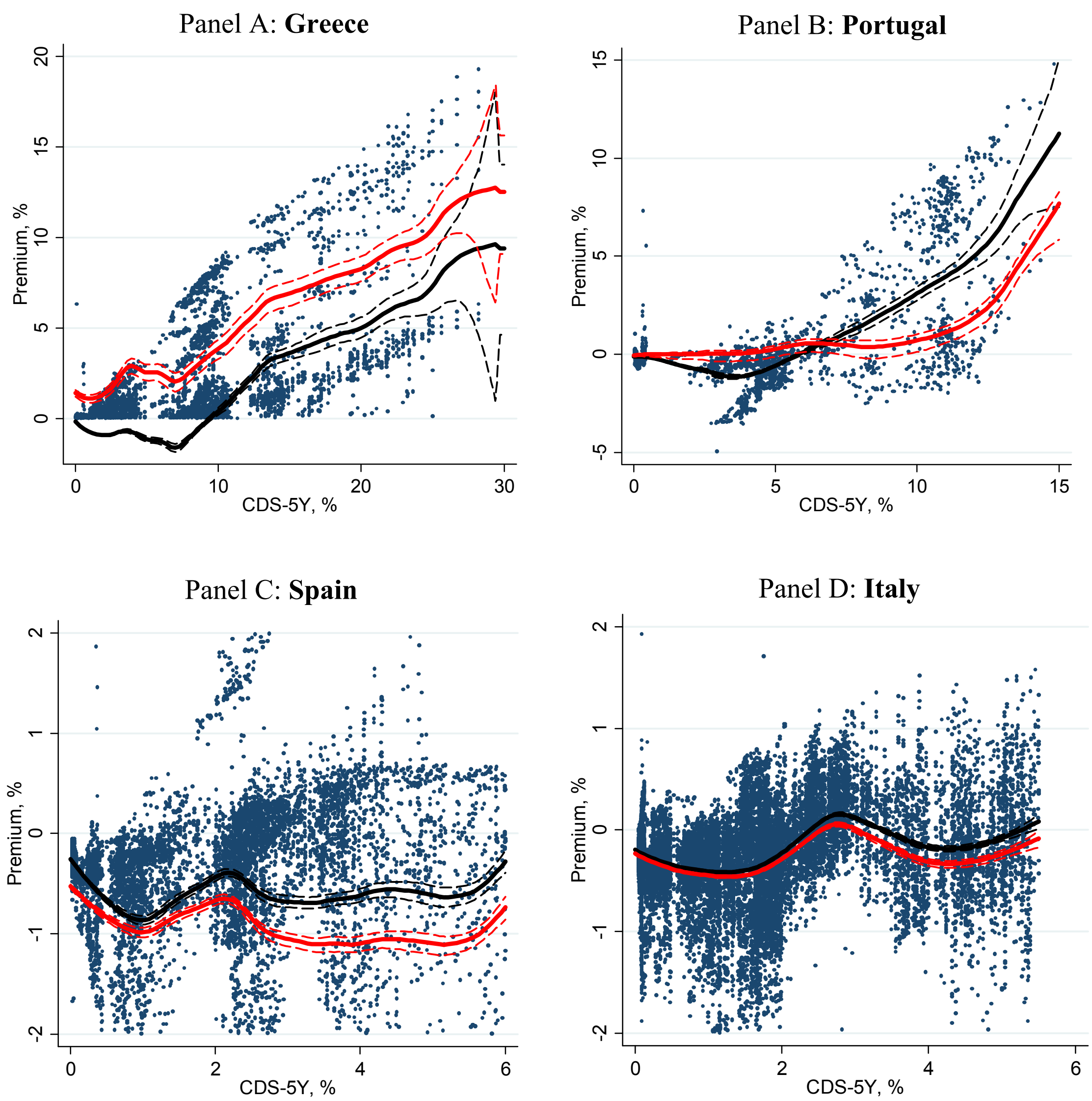

Figure 5: Estimated cubic relationship between foreign-law premium and CDS spread

This figure plots linear combinations of the coefficients from the regressions in levels for different values of CDS spreads. For example, in panel A, this means that a shift in the CDS spread from 0 to 10% has no significant effect; from 0 to 15, it raises the premium by ca. 5%; from 0 to 20, by ca. 8%. The analogous interpretation holds for the other countries.

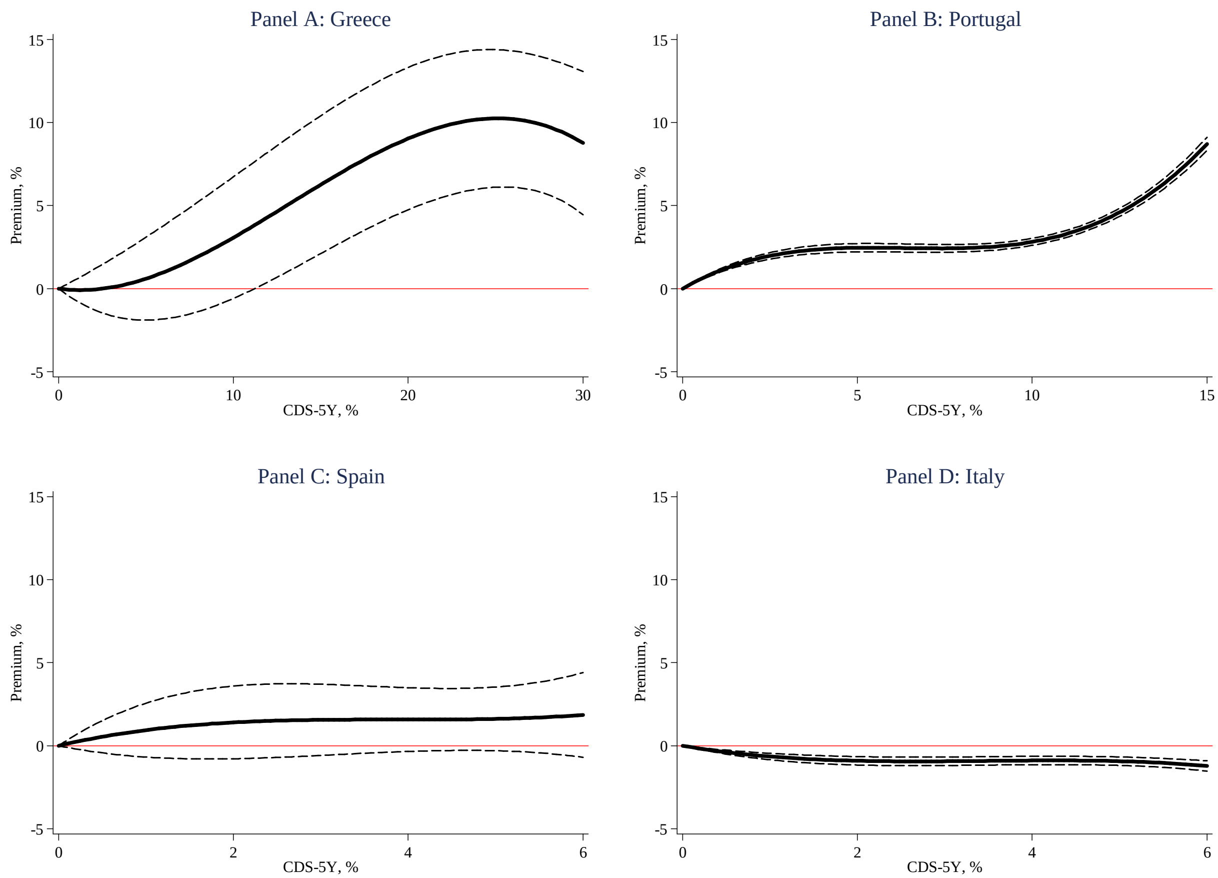

Figure 6: Estimated non-linear relationship between change in foreign-law premium and change in CDS spread

This figure plots linear combinations of the coefficients from the regressions in differences for different values of CDS spreads. For example, in panel A, this means that a shift in the CDS spread at a CDS level of 0% has a smaller effect (ca. 0.2) than at a CDS level of 12% (ca. 0.25). The analogous interpretation holds for the other countries.

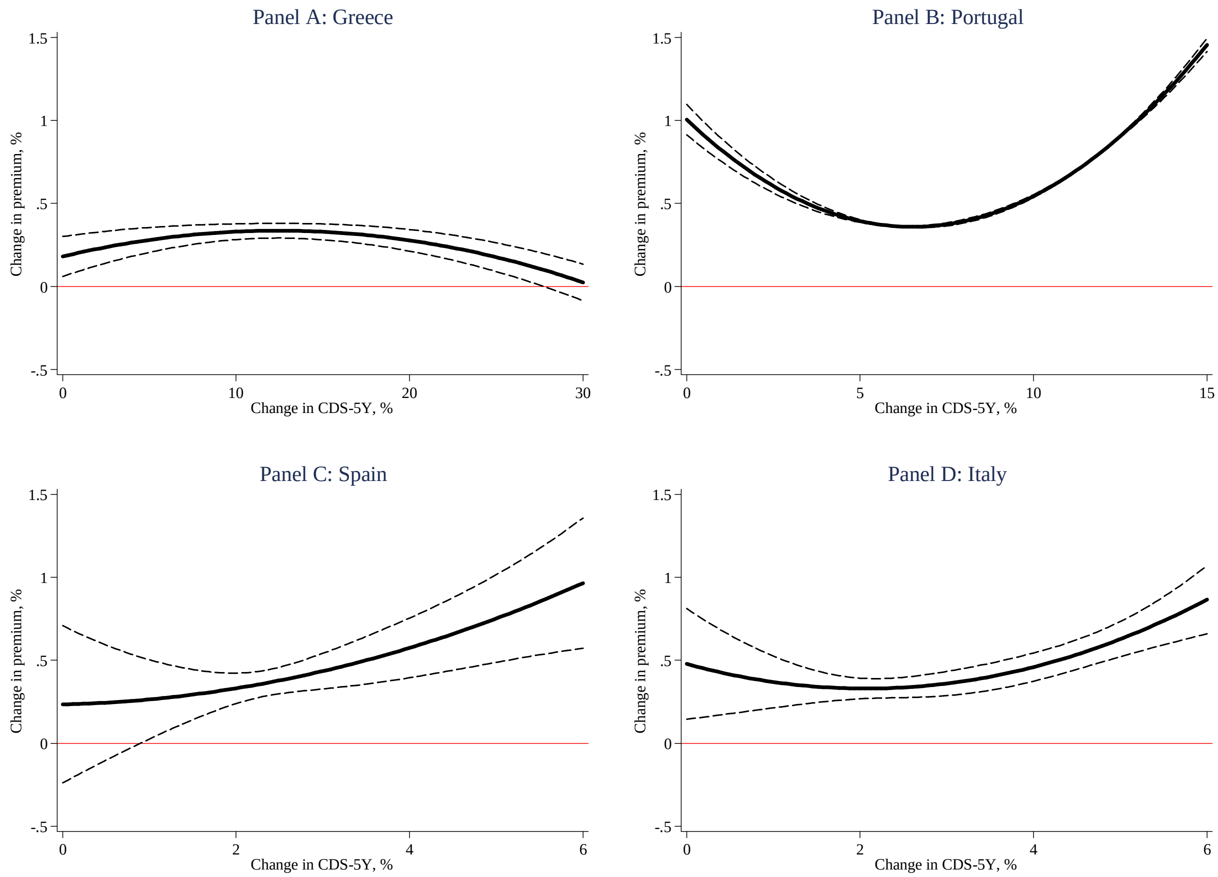

Figure 7: Bond-by-bond relation between credit risk and legal premium

This figure plots the coefficients on the CDS spread from bond-by-bond regressions according to model 15 (with the premium as well as the CDS spread in levels). The coefficients are estimated using only the data for the current quarter. Only coefficients significant at the 95% level are shown.

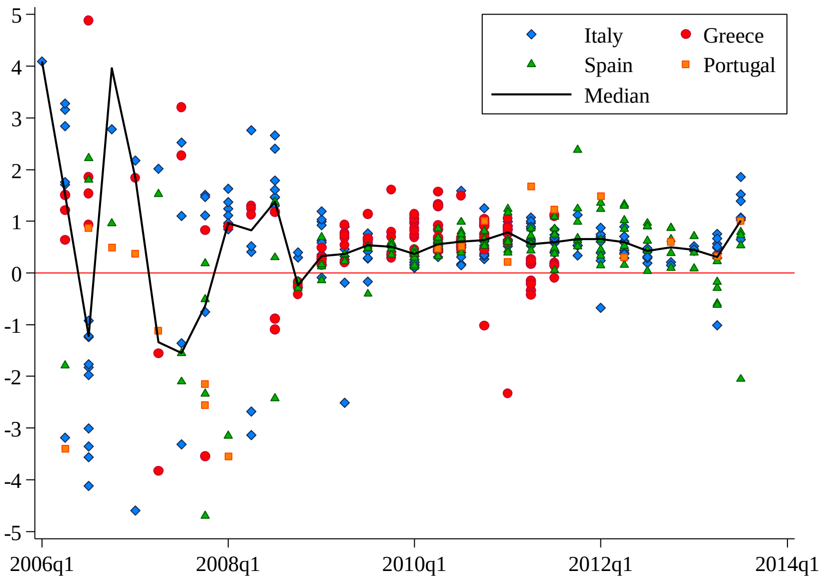

Figure 8: Foreign law premia in Russia and Argentina

This figure shows the yield difference between bonds issued by the same government under different jurisdictions. For Russia, the yield difference is computed between the English-law, USD-denominated Eurobond (US78307AAB98, due 2007) and the respectively imputed yields of Russian-law, USD denominated MinFin6 (RU0001337966, due 2006) and MinFin5 (RU0004146083, due 2008) bonds. The bonds for Argentina are the USD denominated exchange bonds from the 2005 debt restructuring (Discounts due 2033: local law ARARGE03E113, New York law US040114GL81; Par due 2038: local law ARARGE03E097, New York law US040114GK09).