The Price of Law: The Case of the Eurozone Collective Action Clauses

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We analyze the price effect of the introduction of Collective Action Clauses (CACs) in all newly issued sovereign bonds of Eurozone countries as of January 1, 2013. By allowing a majority of creditors to modify payment obligations, such clauses reduce the likelihood of holdouts while facilitating strategic default by the sovereign. Using a unique matching methodology, we find that CAC bonds trade, in the secondary market, at lower yields than otherwise similar no-CAC bonds. Such yield differential widens in countries with worse ratings and in those with stronger legal systems. The results suggest that Euro CACs are seen as pro-creditor provisions. (*JEL classifications:* F33, G12, H63, K12)

A key question in both law and finance is how contract provisions as well as contract enforcement matter for security pricing. This question has been tackled extensively in the context of corporate issuers, where it has been shown that contract terms are priced both domestically and internationally (e.g., Qian and Strahan (2007); and Bae and Goyal (2009)) and that the legal framework – both the issuer's jurisdiction and that of the country where contracts are enforced – affects corporate borrowing costs as well as governance (e.g., Doidge, Karolyi and Stulz (2004); and Ball, Hail and Vasvari (2018)). In this context, debt covenants and legal doctrines emerge as substitutes. For example, bonds issued in the US by firms incorporated in countries with stronger creditor rights have fewer covenants (e.g., Qi, Roth and Wald (2011)) and the use of restrictive covenants in weak credit protection countries is associated with lower cost of debt (e.g., Miller and Reisel (2012)). In a similar spirit, country characteristics such as legal protections for minority investors are found to be complements to firm-level governance in less developed countries, while they are susbtitutes in countries with high enough levels of investors protections (Doidge, Karolyi and Stulz (2007)).

We bring the question of the pricing of debt covenants and the interrelationship with the legal framework to the sovereign domain. The design of sovereign debt contracts has been at the forefront of the academic and policy debate since the mid-1990s, when provisions specifying the minimum vote to modify payments, so-called Collective Action Clauses henceforth abbreviated as CACs, were introduced into foreign-law bonds issued by emerging market nations as a contractual solution to avoid prolonged and costly battles with holdout creditors following defaults (see Panizza, Sturzenegger and Zettelmeyer (2009); Aguiar and Amador (2014); and Häseler (2009)).[1]

[1] The policy debate centered around an IMF proposal for a statutory sovereign debt restructuring mechanism. Failing to achieve consensus, the proposal for a sovereign bankruptcy scheme was shelved and the inclusion of CACs prevailed as the

Within the context of emerging markets sovereign issuers, the relevance of CACs on the pricing of debt was extensively discussed. On the one hand, CACs are viewed as pro-creditor provisions as they improve coordination among creditors through a reduction of the holdout problem, thus increasing investors' recoveries in case of sovereign default and ultimately lowering bond yields (e.g., Kletzer (2004); and Haldane, Penalver, Saporta and Shin (2005)). On the other hand, CACs are regarded as anti-creditor provisions since, by making restructuring easier, they encourage opportunistic behavior on the side of the borrower in terms of strategic default and thus lead to higher bond yields (e.g., Dooley (2000); and Shleifer (2003)).

In trying to assess which of these opposing effects matters more for bond pricing, the empirical literature has not yet reached a consensus. Some studies do not find pricing differences associated with CAC provisions (e.g., Richards and Gugiatti (2003)), while others document that their price impact depends on borrowers' creditworthiness. Among these, CACs are associated with lower yields for good quality issuers and higher yields for bad quality issuers (Eichengreen and Mody (2004)), lower yields for bad quality borrowers only (Bradley and Gulati (2014)), or lower yields for middle quality issuers only (Bardozzetti and Dottori (2014)). Although the foregoing empirical studies employ different samples (issuers and time periods, primary or secondary market data), they all share a focus on emerging market nations issuing bonds under foreign law. This bears on the analysis in important ways.

First, there is the matter of how to disentangle the covenant from the jurisdiction, i.e., the CAC provision from the governing law of the contract. Many authors use the latter as a proxy for the presence (or absence) of the former. The typical assumption, made particularly in early papers on the topic, was that bonds issued by emerging countries under English law had CACs, while those under New York law did not (e.g., Richards and Gugiatti (2003); and Eichengreen and Mody (2004)). Alternatively, Bardozzetti and Dottori (2014) were able to identify the CAC inclusion, but did not control for the laws under which the contracts were written. However, as shown in Bradley and Gulati (2014), jurisdictions differ in contractual terms other than the inclusion of CACs; and the qualified threshold of creditors required for amending payment terms in the CAC provision displays variation across contracts – even conditioning on the same law. This implies that the nexus between the covenant and the jurisdiction is

only viable solution to facilitate debt restructuring for emerging countries (Gelpern and Gulati (2009)). The need for a bankruptcy regime for sovereigns (similar to the one that applies to banks and non-financial firms) has recently gained renewed momentum (Bolton (2016)), along with proposals for a more explicit seniority structure (Chatterjee and Eyigungor (2015)).

nuanced: the law governing the bond cannot be taken as a straight proxy for the presence (or absence) of the provision, and the effect of the provision cannot be assessed abstracting from the governing law.

Second, there is the question of how to empirically identify the price impact of CACs. When issuing bonds under foreign law, the vast majority of countries make use of either English or New York law, but rarely both. Thus, even assuming that the applicable foreign law is a valid proxy for CAC provisions, the identification of the pricing effect comes from cross-country variation.

More recently, the empirical literature has focused on the role of the governing law in the pricing of developed countries' bonds. The argument behind these studies is the so-called "local law advantage": domestic-law bonds provide, relative to bonds issued under foreign law, weaker legal protection since the contract terms can, at least in principle, be altered retroactively by passing local legislation. In line with this, Chamon, Schumacher and Trebesch (2018) find that foreign-law bonds issued by eight Eurozone sovereigns with maturity between 2006-2013 trade at a premium, in distressed countries, compared to domestic-law bonds.[2] However, as mentioned above, bonds under foreign laws differ in terms of contractual terms other than CACs (see Bradley and Gulati (2014)), while domestic-law bonds issued by Euro area countries did not contain CAC provisions until 2013 and were identical in other respects other than the variations among the local laws in question. Thus, it is difficult to assess whether the cumulative evidence on the foreign-law premium is the byproduct of the better legal protection embedded in the (foreign) jurisdiction of issuance or stems from the included contract provisions.

Our goal in this paper is to study the pricing impact of CACs by making use of a unique event – the introduction of CACs in bonds of Eurozone countries as of January 1, 2013.[3] This initiative mandated the introduction of the *same* clause, which allows modification of the payment obligations subject to the approval of the same qualified majorities of creditors, to all Eurozone countries, irrespective of the characteristics of the issuer and the law governing the issuance.

Despite the Euro CACs applying to bonds issued under both foreign and domestic law, we focus our analysis only on the latter. We do this for three reasons. First, we want to keep the domestic law fixed (e.g., German or Irish law) so as to isolate the impact of the mandated CAC provision. Second, Eurozone countries issue the overwhelming majority of bonds under domestic law, while reverting to foreign law

[2] Other studies on the role of foreign versus domestic governing law include Choi, Gulati and Posner (2011), which focuses on a single pair of Greek bonds, one issued under English law and the other under domestic law, and Clare and Schmidlin (2014), which compares Eurozone countries (whose debt is issued predominantly under local law) with EU members that do not use the euro (whose debt is issued predominantly under foreign law).

[3] Article 12(3) of the ESM Treaty stated: "Collective Action Clauses shall be included, as of January 1, 2013, in all new euro area government securities, with maturity above one year, in a way that ensures that their legal impact is identical."

bonds only sporadically.[4] By focusing on domestic law, we are therefore able – in contrast with most of the previous studies – to adopt a matching methodology whereby we compare bonds with similar characteristics (*including* the law) except the new provision. In particular, given the large number of bonds issued by Eurozone countries under domestic law, we are able to match CAC bonds with no-CAC bonds issued by the same country, under the same law, denominated in the same currency and with almost similar residual maturities. This methodology enables us to identify the price effect of CACs *within* countries rather than *across* countries. Finally, focusing on domestic (as opposed to foreign) law bonds allows us to examine whether the impact of the CAC reform on yields is a function of the credibility of the legal system under which the contract provision is adopted.

We begin our analysis with a simple model of sovereign lending that illustrates the main trade-off involved in the introduction of CACs between more orderly restructuring in distress and greater incentives for the government to behave strategically.[5] The framework, based on Bolton and Jeanne (2009), has two main features. First, the sovereign is plagued by a classic "willingness-to-pay-problem", as in Eaton and Gersovitz (1981), due to weak contractual enforcement. Second, given the sovereign has outstanding creditors holding debt instruments with different contract terms (i.e., bonds with CACs and bonds without CACs), it has the option to treat them differently. The possibility of "selective default" implies that the two types of bonds may have different prices in equilibrium.

We show that the yield differential between CAC and no-CAC bonds depends on the likelihood of the sovereign engaging in a partial default (i.e., restructure the CAC bonds, while defaulting on the no-CAC bonds) versus strategic default (i.e., restructure the CAC bonds, while honoring the no-CAC bonds). When the former effect dominates, CAC bonds trade at higher prices/lower yields relative to no-CAC bonds, while the opposite is true when the latter is more relevant. Moreover, our model predicts the yield differential between the two types of bonds to be a function of the country rating and other country characteristics that affect the cost of defaulting for a government – such as the quality of the domestic legal system. In particular, the model predicts that the yield differential between no-CAC and CAC bonds

[4] For the Eurozone countries in our sample, many of whom issue between a half dozen and a dozen sovereign bonds a year, we observe only the following small number of foreign-law bond issuances between January 2013 and June 2014: Austria 0, Belgium 0, Finland 4, France 0, Germany 0, Ireland 0, Italy 0, Luxembourg 0, the Netherlands 0, Portugal 0, Slovakia 6, Slovenia 5, Spain 1 (sources: Bloomberg, Dealogic and Thomson One). Five key countries, i.e., Belgium, France, Germany, Luxembourg, and the Netherlands, did not issue any foreign-law bond in the five years before and five years after January 1, 2013, Ireland issued only 2 in 2017 (with a peculiar 46 and 47 years in maturity) while Finland issued 11 both before and after. The other countries issued a handful of foreign law bonds in seemingly random years.

[5] The idea that by relaxing the payment obligations, the borrower may have incentives to default strategically is also present in other contexts such as mortgage delinquency (see, e.g., Mayer, Morrison, Piskorski and Gupta (2014); Scharlemann and Shore (2016); and Gerardi, Herkenhoff, Ohanian and Willen (2017)).

widens for less creditworthy borrowers and for better legal systems provided that the incentives for the government to behave strategically remain contained.

To test these implications, we compare the secondary market yields of Eurozone bonds issued under domestic law after January 1, 2013 (i.e., bonds with CAC provisions) with those of bonds issued prior to that date (i.e., bonds without CAC provisions).

We find a significant yield differential: our estimates indicate that yields on CAC bonds are, on average, lower by 8 to 17 basis points (bps) than those of matched no-CAC bonds. Moreover, this yield differential is persistently negative and statistically significant throughout the sample period.

We then turn to test the model's predictions that relate the price impact of CACs to the sovereign's creditworthiness and quality of the legal system. To this end, we make use of cross-country heterogeneity in credit ratings and in quality of law indicators to examine whether the value of these contract provisions varies with investors' expectation concerning country creditworthiness and legal enforcement. Consistent with the model, we document that the yield differential on CAC bonds relative to no-CAC bonds widens in countries with worse ratings and in those with stronger legal systems.

Finally, we consider a falsification exercise where we assume that the Euro CAC initiative took place two years earlier than it actually did. To this end, we compare secondary market yields of pseudo-CAC bonds – i.e., Eurozone bonds issued under domestic law after January 1, 2011 – with those of same-issuer, same-law, same-currency bonds issued prior to that date (i.e., pseudo no-CAC bonds) that have similar residual maturities. Repeating all our analyses on this sample of bonds, we find no evidence of yield differentials across these bonds.

To sum up, we document that CAC provisions in the domestic-law debt issued by Euro area countries are viewed favorably by market participants so that bonds with CACs trade at higher prices (lower yields) than comparable bonds without CACs. We interpret this result as suggesting that the trade-off entailed by CAC provisions in terms of the benefits of more orderly creditor coordination versus the moral hazard costs from strategic default is resolved in favor of the former in our sample countries. Anticipating this, investors are ready to pay higher prices for CAC bonds. The price impact is more pronounced in countries with a sizable probability of (partial) default and, importantly, with a legal system of good quality. Overall, the findings are consistent with some recent papers in the sovereign debt area, suggesting that the likelihood of strategic default by sovereigns, and particularly those in the developed world with strong institutions, is low (see Yeyati and Panizza (2011); Collard, Habib and Rochet (2015); and Daniel (2019)).

Our analysis makes use of a legal event that encompasses a series of desirable features that are rare to find: it involves the modification of a single contract clause, this change is exogenous to any individual issuer, and the contracts with the new clause can be compared with otherwise identical (or at least similar) contracts. As such, the Euro CAC initiative constitutes a unique laboratory to address the question of whether, and to which extent, markets price contract terms in the sovereign domain. In this respect, our paper is the first that isolates the impact of the contract provision from that of the jurisdiction of issuance.

The paper is organized as follows. Section I provides the background on the Euro CAC initiative and sets forth our predictions with the use of a simple model. Section II describes the dataset construction. Section III presents the empirical findings on the average price impact of CAC provisions, while Section IV exploits country heterogeneity. Section V presents some further results in terms of falsification tests. Section VI concludes.

I. Background on the Euro CAC Initiative and Hypotheses

CACs are contract provisions that generally allow for a supermajority of creditors in a single bond, or across bonds, to vote on modifications of the payment obligations to the debtor (with the permission of the debtor). By doing so, the provisions permit the debtor and a majority of creditors to agree to a reduction in the amount that the debtor owes in a fashion that forces the deal on a minority of dissenting creditors, thereby reducing holdouts (Eichengreen and Portes (1995)). In this sense, CACs are seen as a way to ameliorate the inefficiencies caused by intra-creditor problems, thus allowing investors to recover more in case of default of the sovereign (e.g., Haldane, Penalver, Saporta and Shin (2005)). Yet, by facilitating restructuring, CACs may also exacerbate the "willingness to pay" problem (e.g., Eaton and Gersovitz (1981)), whereby the sovereign cannot commit to repay creditors independently on its true payment capacity and can therefore default strategically (e.g., Dooley (2000); and Shleifer (2003)). Given this trade-off, the effect of CACs on bond yields is ambiguous, as it ultimately depends on the ability of the sovereign to pay and the domestic political constraints under which the sovereign operates.

While being present in almost all foreign-law sovereign bonds since early 2000s, CACs have been absent in domestic-law bonds until the 2013 Euro CAC initiative. In this section, we describe the background of this initiative and then develop a simple model to derive predictions for our empirical analysis.

A. Euro CAC initiative

The sovereign debt crisis that hit the Eurozone in 2010-2013 developed in a number of stages culminating in the Greek sovereign debt restructuring. As a result, the Euro area policy makers put in place a number of measures including those aimed at ensuring that the resolution of future sovereign debt crises would not be so costly to the Euro system: CAC provisions were a key element of this policy response (Hofmann (2014)).

The Euro CAC initiative provides for the mandatory inclusion of standardized and identical CACs in all new Eurozone sovereign bonds issued after January 1, 2013 with maturities greater than one year. The CACs apply to all new issues, irrespective of the governing law. In other words, issuers cannot engage in jurisdiction shopping (i.e. issuing under different laws) in order to escape having to use CACs. The CAC provisions describe the majorities required to modify the payment terms for a single series of bonds (66.67 percent) as well as a cross-series modification (75 percent across all the series).[6] In sum, the Euro CAC initiative engineered what was likely the single biggest change to sovereign bond contract terms ever (Gelpern and Gulati (2013)).[7]

The Euro CAC initiative was intended to ensure private sector involvement in future sovereign restructurings by improving creditors' coordination (Gelpern and Gulati (2013)).[8] However, it was unclear how the provision would play out given that the introduction of CACs could potentially worsen the "willingness-to-pay" problem of sovereigns. At the margin, after all, making it easier for a sovereign to restructure its debt might also make it more tempting to do so in a strategic manner even when the sovereign crisis is not acute enough to justify such action.[9]

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[6] See *2012 Linklaters, "EU publishes mandatory Collective Action Clause for use in eurozone sovereign bonds from 1 January 2013"*, May.

[7] In shaping the CACs, Euro area policy makers borrowed from a US Treasury department initiative in the early 2000s, which focused on emerging market countries issuing bonds to foreign investors under New York law. The Euro area version of the initiative, however, was more ambitious in three ways. The size was larger (it applied to a multi-trillion dollar market as compared to one that was a few hundred billion), the scope was wider (applied via the local laws of every Euro member nation as opposed to a single one, New York), and the CAC provisions in question were more powerful (applying in an aggregated fashion across a full set of a nation's bonds, as opposed to on a bond-by-bond basis).

[8] Certain specificities of the Euro area setting may also affect the impact of the Euro CACs. In particular, the sharing of the same currency among countries is likely to induce certain holders of a sovereign's bonds such as other Eurozone sovereigns or institutions to vote in favor of a restructuring proposal in order to avoid disruptive consequences that may affect the value of the currency itself. This should reduce the importance of holdouts in restructuring of Euro area bonds.

[9] As of this writing, in 2019, policy makers in the Euro area have decided to enhance the effectiveness of the existing CACs in Euro area sovereign bonds, so as to further reduce the likelihood of holdout problems in future debt restructurings. Some EU members resisted this this reform, on the grounds that making it easier for sovereigns to restructure would raise their cost of borrowing at an inopportune moment (Zettelmeyer (2018)).

To test the impact of Euro CACs on bond yields, we first develop a simple model to illustrate the main ideas and predictions arising from the introduction of CACs. The framework borrows two key features from Bolton and Jeanne (2009). First, the sovereign is assumed to be subject to the "willingness to pay" problem as in Eaton and Gersovitz (1981) whereunder it cannot credibly commit to repay creditors. Second, there can be selective default in that the sovereign can treat creditors differently across different types of bond contracts. This second feature helps us understand the Euro area context where there is a coexistence of CAC and no-CAC bonds.

B. The Model

We develop a simple two-period (t= 1, 2) framework where a sovereign has, for simplicity, one outstanding unit of no-CAC bonds and one of CAC bonds. Both bonds have to be repaid in period 2, but differ in terms of the creditors ability to act collectively and negotiate a debt reduction with the sovereign, as we explain below. The sovereign uses the funds raised at date t=1 to invest in a productive investment returning a stochastic output y at date 2, which is distributed according to the probability distribution function $f(y)$ over $[\underline{y},\overline{y}]$. The government maximizes output net of the repayments to bondholders.

Lenders are risk neutral and require the same expected return, which is normalized to zero. The sovereign debt market is assumed to be perfectly competitive, which means that the sovereign can extract all the surplus at time 1 and the creditors make zero returns in expectation. We denote by D_i the promised repayment on debt issued at date 1, where i = N, C indicates, respectively, no-CAC and CAC bonds. Debt is repaid at date 2 when the output is realized.

The promise to repay $D_N + D_C$ is credible only if it is in the sovereign's interest to repay its debt obligations ex post. As typical in the sovereign debt literature, we assume that the sovereign repays only as a way to avoid a costly default. As in Bolton and Jeanne (2009), we model the cost of default as a proportional output loss, which can be interpreted as a loss of reputation and consequently of market access during protracted and coordinated legal actions by creditors. Importantly, the default cost is increasing in the size of the default, that is in the amount of debt on which the government defaults.

Creditors can avoid default by negotiating a debt reduction, but their ability to act collectively depends on the type of bonds they hold. In particular, as no-CAC bonds require unanimity of consensus for any payment modification, they are more difficult to be restructured than CAC bonds requiring only a minimum vote threshold. For simplicity, we then assume CAC bondholders can be coordinated at no cost around a debt restructuring agreement in which they accept a payment, denoted as lower than D_C, and

the sovereign incurs no default cost. By contrast, no-CAC bondholders are too widely dispersed, and thus it is impossible for them to reach an agreement acceptable to everyone in a timely fashion and to avoid free riding by holdout creditors.[10] This assumption, which relies on the idea that sovereigns can selectively default on different types of bonds, implies that debt restructuring, if it occurs, involves the CAC bonds only, so that no-CAC lenders obtain either *0* or the promised repayment D_N. In line with this, we assume that the output loss is equal to γy with $\gamma > 0$ when the government defaults only on the no-CAC bonds and to $\alpha\gamma y$ with $\alpha > 1$ when both types of bonds are defaulted upon.[11]

The sovereign has therefore the following options at date 2:[12]

a) *Full repayment*: repay both types of lenders the promised repayment D_i, with i = N, C, and obtain $y - D_N - D_C$.
b) *Strategic default*: restructure CAC bonds for a return η_S and repay the no-CAC lenders the promised repayment D_N. In this case, there are no output losses and the sovereign obtains $y - \eta_S - D_N$.
c) *Partial default*: restructure CAC bonds in exchange for a return η_P, while pay *0* to no-CAC lenders, thus incurring the output loss γy and obtaining $(1 - \gamma)y - \eta_P$.
d) *Full default*: pay *0* to both CAC or no-CAC lenders and incur the output loss $\alpha\gamma y$ so to obtain $(1 - \alpha\gamma)y$.

The table below summarizes the payoffs of the different players.

[10] Bolton and Jeanne (2009) formalize the creditor coordination problem in the absence of a restructuring mechanism such as CACs by assuming that there is a very small amount of sovereign's assets, ε, that all creditors may try to get hold of by litigating in court in order to be able to seize it first.

[11] Given we have assumed that the government has one unit of each type of bonds, we could simply set α=2. Assuming a generic value α>1 simply leaves it open the possibility that the reputation loss for a government differs depending on the type of bonds it defaults upon. In particular, α>2 captures the case where defaulting on bonds having ex-ante pre-specified restructuring rules is more costly than defaulting on bonds which do not have them.

[12] One may ask whether these assumptions – typical in the analysis of the foreign law context – are justified here given that a sovereign has control of the local law and can, at least in principle, alter it for any bonds where there are too many holdouts. This is what is referred to as the "local law advantage" in the literature and was crucial to the Greek restructuring in 2012 and the Barbados restructuring in 2018 (Buchheit and Gulati (2018)). However, this local law advantage has significant limitations on it, as a function of litigation costs and circumstances when it can be justified as in the case of the Greek restructuring of 2012 (Grund (2017)). Thus, for purposes of the model, we disregard the possibility of using the local law advantage. Rather, given also that we are interested in the yield differential between CAC and no-CAC bonds issued under the same jurisdiction, we focus on the fact that the likelihood of the sovereign behaving strategically will depend only on the size of the parameter γ representing the constraints imposed by the domestic legal system.

	Sovereign	no-CAC lenders	CAC lenders
Full repayment	$y - D_N - D_C$	D_N	D_C
Strategic default	$y - D_N - \eta_S$	D_N	η_S
Partial default	$(1 - \gamma)y - \eta_P$	0	η_P
Full default	$(1 - \alpha\gamma)y$	0	0

The table highlights the presence of a trade-off in terms of creditor protection between CAC and no-CAC bonds. CAC bonds protect lenders in partial default, but they also expose them to the possibility of being restructured in a strategic default. By contrast, no-CAC bonds do not protect investors in partial default, but are not subject to restructuring in a strategic default. Importantly, as in Bolton and Jeanne (2009), CAC creditors are modelled as having all the bargaining power during the restructuring negotiations. This means that following a default, CAC creditors can thus make a take-it-or-leave it offer equal to $\eta_j \leq D_C$, with $j=P,S$, to the sovereign. They will ask for $\eta_j = D_C$ whenever possible and for $\eta_j < D_C$ only to preempt a costly default that reduces their repayment.

1) Repayment Game

We can now determine when the sovereign repays its debt at date 2 and when it does not, taking D_i, with i = N, C, as given. The sovereign chooses the action that maximizes its return at date 2. Thus, assuming it defaults, the sovereign prefers partial default over full default if

$$(1-\gamma)y - \eta_P \geq (1-\alpha\gamma)y, \tag{1}$$

that is, if it accepts the offer η_P from the CAC bondholders, which is the case if and only if

$$\eta_P \leq (\alpha - 1)\gamma y. \tag{2}$$

CAC bondholders always prefer a positive repayment to a full default so that, given they have all the bargaining power, they set η_P at the level that makes the sovereign indifferent between a partial and a full default, that is:

$$\eta_P = (\alpha - 1)\gamma y. \tag{3}$$

Similarly, the sovereign prefers strategic default over partial (or full) default if:

$$y - D_N - \eta_S \geq (1-\gamma)y - \eta_P, \tag{4}$$

that is for:

$$\eta_S \leq \gamma y + \eta_P - D_N. \tag{5}$$

Substituting η_P from (3) implies that the CAC bondholders can now make an acceptable offer if and only if:

$$\alpha\gamma y \geq D_N, \tag{6}$$

or, equivalently, if:

$$y \geq \frac{D_N}{\alpha\gamma}. \tag{7}$$

Using again η_P as in (3) and solving (5) with equality given CAC bondholders have all the bargaining power, we then have:

$$\eta_S = \alpha\gamma y - D_N. \tag{8}$$

Finally, the sovereign prefers full repayment over strategic (partial or full) default if:

$$y - D_N - D_C \geq y - D_N - \eta_S, \tag{9}$$

that is when η_S becomes larger than D_N. Substituting then η_S as in (8) into (9), full repayment is preferred for:

$$y \geq \frac{D_N + D_C}{\alpha\gamma}. \tag{10}$$

We then obtain the following result characterizing the equilibrium in the repayment game.

Proposition 1: The sovereign's debt repayment strategy is as follows:

a. Full repayment: if $y \geq \frac{D_N + D_C}{\alpha\gamma}$, the sovereign fully repays both types of debt.

b. Strategic default: if $\frac{D_N}{\alpha\gamma} \leq y < \frac{D_N + D_C}{\alpha\gamma}$, the sovereign fully repays the no-CAC bonds, while it restructures the CAC bonds in exchange for η_S.

c. Partial default: if $y < \frac{D_N}{\alpha\gamma}$, the sovereign defaults on the no-CAC bonds, while it restructures the CAC bonds in exchange for η_P.

Proof: See the discussion above. ■

This proposition, which is illustrated in Figure 1, highlights the importance of different contractual clauses for creditors' repayment. For low levels of output, the CAC bondholders are more protected than no-CAC bondholders as the latter cannot coordinate on a restructuring. For intermediate values of output though, the possibility for the sovereign to default strategically and restructure the CAC bonds hurts the CAC bondholders relative to the no-CAC bondholders, who are instead repaid in full. Creditors anticipate the different treatment at date 2 when pricing their debt at date 1. It follows that the difference between

the promised repayments D_N and D_C on no-CAC and CAC bonds will depend on the likelihood of strategic versus partial default. We turn to this next.

2) Creditors' Repayments

We can now turn to date 1 and analyze debt pricing. As the sovereign debt market is competitive at date 1, the sovereign extracts all surplus and sets the promised repayments at date 1 on both bonds just to satisfy creditors' participation constraint. Given Proposition 1, no-CAC bondholders' participation constraint is given by:

$$\int_{\frac{D_N}{\alpha\gamma}}^{\overline{y}} D_N f(y)dy \geq 1\,, \tag{11}$$

since they obtain nothing for $y < \frac{D_N}{\alpha\gamma}$, while they are fully repaid otherwise. By contrast, CAC bondholders' participation constraint is given by:

$$\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}} \eta_P f(y)dy + \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}} \eta_S f(y)dy + \int_{\frac{D_N+D_C}{\alpha\gamma}}^{\overline{y}} D_C f(y)dy \geq 1\,.$$

Substituting η_P and η_S from (3) and (8) above, this expression simplifies to:

$$\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}} (\alpha-1)\gamma y f(y)dy + \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}} (\alpha\gamma y - D_N) f(y)dy + \int_{\frac{D_N+D_C}{\alpha\gamma}}^{\overline{y}} D_C f(y)dy \geq 1, \tag{12}$$

where the terms represent, in order, the expected payoffs in the case of partial, strategic and no default.

It can be seen from (11) and (12) that the difference in the promised repayments D_N and D_C (and thus in yields) can be either positive or negative depending on the relative importance of the regions of partial and strategic default. To see this, we can equate (11) and (12) since they both have to be satisfied with equality in equilibrium and, after rearranging the terms, obtain:

$$\int_{\frac{D_N+D_C}{\alpha\gamma}}^{\overline{y}} (D_N - D_C) f(y) dy$$

$$= \int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}} (\alpha - 1)\gamma y f(y) dy + \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}} (\alpha\gamma y - D_N) f(y) dy - \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}} D_N f(y) dy. \quad (13)$$

The LHS of (13) represents the difference in the expected repayments D_N and D_C in the region of full repayment, while the terms on the RHS represent, in order, the expected repayment to CAC bondholders in partial and strategic default and the expected payment to no-CAC bondholders in the case of strategic default. We have the first immediate result.

Proposition 2: The promised repayment on CAC bonds is lower than that on no-CAC bonds, i.e., $D_N - D_C > 0$, if and only if:

$$\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}} (\alpha - 1)\gamma y f(y) dy > \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}} D_N f(y) dy - \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}} (\alpha\gamma y - D_N) f(y) dy. \quad (14)$$

The proposition suggests that CAC bonds entail lower yields than no-CAC bonds if the higher expected repayment that CAC bondholders obtain in the partial default region compensates them for the lower expected repayment they obtain in the strategic default region where they incur a restructuring while no-CAC bondholders are fully repaid.

The relative importance of the partial and default regions depends, in turn, on the probability distribution $f(y)$ and the size of the default cost as represented by the parameter γ. We can then derive some comparative statics results on how the difference in the repayments $D_N - D_C$ varies with them. We have the following results.

Proposition 3: Assume an initial level of $D_N - D_C > 0$. Then:

i) For given γ, the difference $D_N - D_C$ increases as the mass of the probability distribution *f(y)* in the interval $[\underline{y}, \frac{D_N}{\alpha\gamma}]$ increases relative to the mass in the interval $[\frac{D_N}{\alpha\gamma}, \frac{D_N+D_C}{\alpha\gamma}]$;

ii) For given *f(y)*, the difference $D_N - D_C$ is increasing in the parameter γ if:

$$\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}} (\alpha - 1) y f(y) dy + \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N + D_C}{\alpha\gamma}} \alpha y f(y) dy - (\alpha - 1) \frac{D_N^2}{\alpha^2 \gamma^2} f\left(\frac{D_N}{\alpha\gamma}\right) > \frac{D_N^2}{\alpha\gamma^2} f\left(\frac{D_N}{\alpha\gamma}\right). \quad (15)$$

Proof: See the Appendix.

Part (i) of the proposition states that the difference in the promised repayments on no-CAC and CAC bonds increases as the mass of the distribution function *f(y)* shifts so that the region of partial default, where CAC bonds are restructured while no-CAC bonds are defaulted upon, becomes more likely relative to that of strategic default, where CAC bonds are restructured but no-CAC bonds are fully repaid.

Part (ii) of the proposition establishes the conditions under which the difference $D_N - D_C$ increases with the parameter γ. The first two terms on the LHS of (15) represent the marginal increase in the expected payoff CAC bondholders obtain in the regions of partial and strategic default as γ increases, while the last term captures the reduction in the probability of being in the partial default region. The term on the RHS of (15) captures instead the increased probability of being in the strategic default region as γ increases where no-CAC bondholders are fully repaid. Thus, condition (15) states that the difference in the promised repayments $D_N - D_C$ increases with γ when the benefits for CAC creditors in terms of higher repayments in case of restructuring (that is, both in partial and strategic default) dominate both the lower probability of the partial default region and the advantage for no-CAC bondholders in terms of the higher probability of the strategic default region where they obtain already their promised repayment.

3) Empirical Predictions

We can use Propositions 2 and 3 to generate some empirical predictions. First, we should expect the yield differential between the no-CAC and the CAC bonds to be positive for those sovereigns that do not have strong incentives to engage in strategic default. It is for these countries that the CAC provision is mostly useful to protect creditors in the case of partial default – i.e., when the output of the sovereign is sufficiently low and no-CAC creditors obtain nothing due to their inability to coordinate on an orderly restructuring. To characterize the countries where we expect this to occur and in particular where we then expect the yield differential between no-CAC and CAC bonds to be larger, we can then measure the

shape of the distribution *f(y)* with the rating of a country. The idea is that worse issuer ratings correspond to more right-skewed distributions than better ratings.

Second, the parameter γ can be seen as a measure of a country's quality of law. As explained above, this parameter represents the proportion of output lost upon default. This can be interpreted as deriving from a reputation loss or sanctions imposed by creditors and can thus be considered an increasing function of the quality of the legal system – better laws and courts will provide better protection to investors against expropriation by the government. The idea that the quality of the legal system affects the enforcement of contracts borrows from the literature on the role that strong local institutions can play in protecting against expropriation attempts by local governments (North and Weingast (1989); Stasavage (2002); Acemoglu and Johnson (2005); and Breen and McMenamin (2013)).

In line with these arguments, we have the following predictions provided that the probability distribution *f(y)* is skewed enough and the quality of law of the country is good enough so that the sovereign does not engage much in strategic default:

1) the yield differential between the no-CAC and the CAC bonds as represented by the difference $D_N - D_C$ is decreasing in the sovereign's creditworthiness.
2) the yield differential between the no-CAC and the CAC bonds as represented by the difference $D_N - D_C$ is increasing in the quality of law of a country if this entails a greater advantage to CAC bondholders in terms of higher expected payments in partial and strategic default relative than that it entails to no-CAC bondholders in strategic default.

II. Dataset Description

In our analyses we will make use of two samples of bonds: bonds with CAC provisions issued after January 1, 2013 ("CAC bonds"), and bonds without CAC provisions issued before January 1, 2013 that have similar characteristics to CAC bonds ("Matched no-CAC bonds"). Our primary source of information is Bloomberg.

CAC bonds are selected according to the following criteria: issued by national governments belonging to the Eurozone as of January 2013 (Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovakia, Slovenia and Spain); denominated in Euro; with issuance between January 1, 2013 and June 30, 2014; with maturity (at issuance) between 1 and 30 years; with strictly positive amount issued; being either zero coupon or having a fixed coupon; noncallable, nonputtable, nonsinking fund, nonconvertible and not inflation

linked. At this stage we select 106 bonds issued by 15 Eurozone countries.[13] We further require bonds to be flagged by Bloomberg as including CACs, thus dropping four bonds (three issued by Belgium and one from Malta) for which this data field is missing.[14] We finally resort to Bloomberg, Dealogic and Thomson One to identify the governing law of these bonds, and supplement information from these sources with hand-collected data drawn from the offering circulars and prospectuses. We are able to find the governing law of 93 bonds issued by 14 Eurozone countries,[15] out of which we identify 89 as domestic-law bonds.

To build the sample of matched no-CAC bonds we first identify in Bloomberg the pool of bonds using criteria similar to the ones described above, with the sole exception that we now consider bonds issued before January 1, 2013 that mature after that date. We then retrieve the governing law of these bonds using the three data sources mentioned above. Again we check that bonds issued under local law are not flagged by Bloomberg as having CAC provisions.[16] We perform a matching (without replacement) for each CAC bond with one bond in this pool conditioning on same issuer and same currency, and select the bond with the closest maturity date to that of the CAC bond we consider. For example, we match the 5YR Euro-denominated 1 percent French CAC bond issued on January 28, 2014 (with an International Securities Identification Number equal to FR0011708080, maturity May 25, 2019) with the 15YR Euro-denominated 4.25 percent French no-CAC bond issued on June 10, 2003 (ISIN FR0000189151, maturity April 25, 2019). Our matching procedure enables us to form 83 pairs of CAC and matched no-CAC bonds issued by 13 countries.[17]

Table 1 provides the country breakdown at each stage of our data construction procedure. The country split for CAC issuances is in line with that observed for Euro-denominated long-term bonds in previous periods,[18] where Belgium, France, Italy and Spain account for more than 50 percent of issuances. In economic terms, the largest issuers are France, Germany, Italy and Spain, which represent about 80

[13] There are no bond issuances that meet our criteria for Estonia, while Greece issued only short term bonds, i.e., with maturities less than a year, during our sample period.
[14] The rationale for this filter is to exclude bonds issued after January 1, 2013, but that were operating under a pre-existing MTN and were therefore exempt from the Euro CAC mandate.
[15] We drop bonds issued by Malta because we cannot retrieve their governing law.
[16] In principle, prior to the Euro CAC initiative sovereigns could have voluntarily included CAC provisions in domestic-law bonds. However, this was almost never the case. From a combination of Bloomberg and our hand coding, we were able to identity only two local-law bonds issued prior to January 1, 2013 with CACs. Both were for a single sovereign, Slovenia.
[17] The matching procedure drops all CAC bonds issued by Cyprus since before 2013 Cyprus issued bonds under English law only. We further discard the 15YR 2.25 percent bond issued by Luxemburg on March 13, 2013 (ISIN LU0905090048) because the only bond we could match it with has a very different maturity (ISIN XS0506445963, maturity date May 18, 2020).
[18] We have identified new issuances of Euro-denominated bonds with zero or fixed coupon and maturity at issuance between 1 and 30 years between January 1, 2009 and June 30, 2010, and get country breakdowns that are similar to those documented in Table 1 for our CAC bonds.

percent of the total outstanding amount of CAC bonds by the end of 2014. The country breakdown we uncover using CAC bonds' outstanding amount (see the last column in Table 1) is in line with what one obtains using central government long-term debt securities during the last quarter of 2014.

Figure 2 displays the issuance activity (amount at issuance as well as the number of issuances) of CAC bonds between January 2013 and June 2014. Within six months from the inception of the Euro CAC initiative, all countries but Luxembourg had issued at least one bond with CACs. Figure 3 plots the time-series of the amount outstanding (sum of amount at issuance and reopenings) of CAC bonds,[19] both in absolute terms and relative to the overall amount of long-term government debt. Figure 3 reveals that by the end of June 2014 about 13 percent of long-term bonds included the new Euro CAC provision.[20] The joint message of Figures 2 and 3 is that CAC bonds have gained importance, over time, in the context of Eurozone sovereign debt markets.

For these CAC bonds we collect from Bloomberg daily mid-yields, prices (mid, ask and bid), amount outstanding and volume,[21] between January 1, 2013 (or the issue date, for bonds issued later than January 1, 2013) and December 30, 2014 (or the maturity date, for bonds maturing before December 30, 2014). For the sample of matched no-CAC bonds we collect the same variables between January 1, 2013 and December 30, 2014 (or the maturity date). We compute Macaulay duration, convexity, and percentage bid-ask spreads from daily prices. We create the variable $Dur_{i,c,t} = Macaulay\ Dur_{i,c,t} - 0.5 \times \frac{Conv_{i,c,t}}{100}$, which corrects Macaulay duration by bond convexity.[22] To reduce the measurement error that may contaminate daily data, we carry out our analyses at the weekly level and derive weekly variables as simple averages of daily values, dropping weeks with negative or zero yields.

Table 2 reports descriptive statistics of bond-level variables for the CAC and the matched no-CAC samples, for all countries in Panel A and by country in Panel B. Here, we consider only those weeks where both the CAC bond and the matched no-CAC bond have available bond-level information. To

[19] After issuing a new bond, governments can raise additional debt by reopening already existing securities. Reopenings are quite common: during our sample period, 70 (out of 83) bonds have been reopened and, at the end of June 2014, they represent about 60 percent of the aggregate outstanding amount of CAC bonds.

[20] For each country, we define long-term government debt as the sum of general government long-term residual maturities (over 1 year) and short-term residual maturities (up to 1 year), in all currencies (source: *ECB Statistical Data Warehouse*).

[21] Bloomberg contains volume data separately for each exchange where a bond is listed. On average, bonds in our sample are listed on four exchanges, with considerable variation across countries – mean values range from 1.33 exchanges for Slovenian bonds to 9.1 exchanges for German bonds. Turnover is defined as total traded volume (i.e., aggregated across all exchanges) scaled by amount outstanding and winsorized, at the bond level, at the upper 95 percentile since for some bond-weeks turnover figures seemed implausibly high (i.e., well above 80 percent).

[22] In principle, we could include convexity as an additional measure of bond risk. However, in our sample, Macaulay duration and convexity are highly collinear (the linear correlation equals 0.934). We therefore opt for an alternative measure of bond price risk – which we label simply as "duration". Our results are unchanged when using Macaulay duration alone.

illustrate, we include the 15YR Euro-denominated 4.25 percent French no-CAC bond issued on June 10, 2003 from the fifth week of 2014 onwards, since the CAC bond with similar residual maturity is issued at the end of January 2014. This ensures that our panel dataset has the same number of weekly observations for CAC and matched no-CAC bonds. On average, CAC bonds have higher duration, smaller amount outstanding and turnover, and lower bid-ask spreads,[23] while their maturities do not differ from those of matched no-CAC bonds. Figure 4 plots the histogram of the absolute distance (in months) between maturities in the two samples. For 50 bond pairs (representing about 60 percent of our sample) the difference in maturities is less than 6 months, and for 69 pairs (representing more than 80 percent of our sample) it is less than one year.

III. CAC Provisions and Yield Differentials

We start by investigating the impact of CAC provisions on bond yields. To this end, we compare the yields of CAC bonds with those of matched no-CAC bonds. Our empirical strategy is to estimate the following random-effects model:

$$y_{i,c,t} = \alpha + \beta CAC_i + \gamma X_{i,c,t} + \theta_i + \varepsilon_{i,c,t}, \qquad (16)$$

where θ_i is a bond-level random component, $y_{i,c,t}$ is the log of the mid-yield (in percent) for bond i (issued by country c) during week t,[24] CAC_i is our main variable of interest (an indicator equal to one for a CAC bond and zero for a matched no-CAC bond), and $X_{i,c,t}$ is a vector of control variables. The vector $X_{i,c,t}$ includes time (i.e., week) fixed effects that capture co-movement in Eurozone yields, and bond- as well as country-specific variables (definitions of the explanatory variables are collected in Appendix Table A1).

We map country Standard & Poor's long-term issuer credit ratings (observed on Fridays) to a numeric scale and proxy country creditworthiness by means of $Rating_{c,t}$. Higher values of $Rating_{c,t}$ indicate worse credit ratings: during our sample period, this variable ranges from 1 (AAA rating) to 12 (BB rating). Although we have matched CAC to no-CAC bonds along a number of dimensions (i.e., issuer,

[23] Many of these features are robust on a country-by-country basis as Panel B in Table 2 shows: CAC bonds have, on average, significantly larger (resp., smaller) durations in seven countries (resp., one country), and lower (resp., larger) amounts outstanding in nine (resp., three) countries.

[24] We take the logarithm of the bond yields to mitigate the effect of potential outliers. However, results in our main analysis are unaffected if we use yields (in level).

currency, law, and residual maturity), other bond-level characteristics impinge on risk and, in turn, on yields. As a proxy for bond interest rate risk we include duration ($Dur_{i,c,t}$), which is affected, among others, by the coupon structure (rate and frequency of payment). Moreover, since by construction matched no-CAC bonds are off-the-run while CAC bonds are on-the-run,[25] we control for liquidity risk by means of bond $Size_{i,c,t}$, i.e., the log of outstanding amount (in Euro mln), bid-ask spread (in percent), $BAS_{i,c,t}$, and turnover (exchange-traded volume scaled by amount outstanding). Note that bond size is usually time-varying, at the bond level, due to reopenings.

The research question that is our focus motivates our choice to use unit-specific (i.e., bond) random effects, as opposed to fixed effects: our variable of interest – the inclusion of CAC provisions – is multicollinear with bond fixed effects. Bae and Goyal (2009) for example offer similar considerations when examining the relation between legal protection and bank loan characteristics in 48 countries: since their variables of interest – creditor and property rights indexes – show little within-unit (i.e., country) variation, they opt for random effects instead of fixed effects which "soak up some of the explanatory power of these slowly changing variables" (*op. cit.*, p. 839). Random effects therefore emerge as a (partial) remedy to omitted variables, at least those that are uncorrelated with our covariates. As an alternative to the random-effects estimation, we use pooled OLS after replacing the bond random components θ_i in specification (16) with bond-*pair* fixed effects. Also in this case we can come up with an estimate for the coefficient of interest, β, which is robust to omitted variables – although at a higher level of aggregation – correlated with our covariates. We will return to the issue of bond-level omitted variables in Section V as well.

Table 3 reports random-effects (RE) and pooled OLS estimation results for several specifications. Standard errors are adjusted for clustering at the level of the matched bonds in the sample.[26] Columns 1 and 3 in Table 3 refer to the baseline specification (16) and highlight that yields increase with bond-level interest rate risk, while liquidity risk measures are overall insignificant. This lack of significance is not surprising in light of the mixed evidence on the role of liquidity for Euro area government bonds: Favero, Pagano and von Thadden (2010) for example find that liquidity differentials are priced only for a subset of EMU countries, while Beber, Brandt and Kavajecz (2009) show that liquidity matters only in times of economic distress. Random-effects estimation results futher establish that bond yields are inversely

[25] The positive yield differential between off- and on-the-run treasuries is well documented for the US market (e.g., Warga (1992) and Pasquariello and Vega (2009)), while we are unaware of similar studies for European sovereigns.
[26] Clustering at the country level (which spans bonds level clustering, see e.g., Cameron, Gelbach and Miller (2011)) leaves our main findings unaffected.

related to the issuer creditworthiness, while country ratings are not significant in column 3 – this happens because ratings show relatively little within-country variation during our sample period and bond-pair fixed effects absorb time-invariant country characteristics.

Turning to our main variable of interest, CAC provisions significantly and negatively affect bond yields:[27] our estimates indicate that yields on CAC bonds are, on average, about 8-10 percent lower than those of matched no-CAC bonds, i.e., 8.06 percent $= 1 - \exp(-0.084)$ and 10.6 percent $= 1 - \exp(-0.112)$ and; or equivalently they are lower by 13-17 bps.

The baseline specification is pooled across all issuers, so that all our control variables (as well as the constant term) are estimated across countries. Thus, one potential concern is whether cross-country heterogeneity affects our findings. This concern may apply both to bond-specific characteristics as well as variables that are common to all Eurozone countries – captured by the week fixed effects. For instance, there is evidence that bond-level liquidity risk differs across the maturity spectrum (Beber, Brandt and Kavajecz (2009)). Moreover, the empirical findings on the ECB (unconventional) monetary policy are suggestive that yields on sovereign bonds issued by different countries react differently to these interventions, while the response of the yield curve to ECB (conventional) monetary policy is quite homogeneous across countries.[28]

To address these concerns, we consider a saturated model that includes the interactions between country fixed effects and bond-level variables (52=13×4 interactions) as well as the interactions between country and time fixed effects (1,339=13×103 interactions).[29] This saturated model, in essence, maintains only one panel restriction, i.e., the CAC indicator. Columns 2 and 4 in Table 3 report regression results for the saturated model. Yields continue to be negatively associated with CAC provisions, although both the economic magnitude and the statistical significance of this effect are lower than those documented for the baseline specification: point estimates in column 2 (resp., 4) would translate into an 8 bps (resp., 15 bps) yield wedge between CAC and matched no-CAC bonds.

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[27] We indicate the corresponding significance levels with a series of stars and, to facilitate the reading of the significance levels for the estimated CAC coefficients, especially in Panels B of Tables 4 and 6, we also employ corresponding shades of grey.

[28] The implementation of the ECB's Securities Markets Programme (SMP) has successfully driven down yields of the countries under the programme, with reductions ranging from -1 to -2bps (Italy) up to -17 to -21bps (Greece) per €1 bln of bond purchases (Eser and Schwaab (2016); and Ghysels, Idier, Manganelli and Vergote (2016)). Altavilla, Giannone and Lenza (2016) document that the ECB Outright Monetary Transactions (OMT) announcements lowered bond yields in Italy and Spain while leaving yields on French and German bonds largely unaffected. The same authors find that a tightening in the stance of euro-area-wide (conventional) monetary policy exerts fairly homogeneous effects on yield curves across countries.

[29] We do not include country fixed effects as well as their interactions with country ratings as these are collinear with the (country × week) interactions.

The data-pooling used in panel estimation may mask a time-varying response of bond yields to CAC provisions. To address this issue, we perform OLS cross-sectional regressions for each week. The equation estimated at each time t is the same as in specification (16), dropping the bond random components θ_i and the time fixed effects. We start our analysis from the last week of February 2013 because we have at least 30 observations (15 CAC and 15 matched no-CAC bonds) from then onwards. The adjusted R-squared ranges between 0.62 and 0.94, with an average value of 0.79. The point estimates for the coefficient on the CAC indicator are plotted in Figure 5 (solid blue line) together with their 99 percent confidence intervals (shaded grey area). As the figure reveals, we can exclude the possibility that yields between CAC and no-CAC bonds are identical for a substantial number of cross-sections (67 out of 96 weeks). Overall, the yield differential between CAC and matched no-CAC bonds is persistently negative and statistically significant throughout the sample period.

IV. Country Heterogeneity

We now shed light on how the yield differential varies across countries by interacting the CAC indicator in specification (16) with country fixed effects. Panel A in Table 4 reports random-effects estimation results (see column 1). This specification produces, for each country, estimates for average (log-)yields on CAC and matched no-CAC bonds – after controlling for country- and bond-level covariates, and the time fixed effects. Instead of reporting these coefficients (26 in total), we show in Panel B for each country the difference between these coefficients – what we label as the "net impact of CAC provisions" – together with its standard error (in brackets), and the percentage of bond-week observations in a given country (in square brackets). According to Panel B, there is no country where CAC bonds trade at significantly higher yields than matched no-CAC bonds. In light of the model, this result suggests that there is a low likelihood of strategic default in our countries of interest relative to the likelihood of a partial default.[30] And that results in no-CAC bonds having higher yields. For a subset of countries (six countries that represent about 40 percent of the sample), CAC provisions negatively affect bond yields: estimates indicate that yields on CAC bonds are, on average, about 8 percent (Italy) to 22 percent (Portugal) lower than those of matched no-CAC bonds. We now turn to disentangle the effect of CAC provisions according to the two variables that the model highlights as important drivers of the CAC and no-CAC yields (see Section I.B): issuer creditworthiness and quality of the legal system.

[30] This finding is consisted with the view articulated by a number of recent papers in the sovereign debt area, suggesting that the likelihood of strategic default by sovereigns, and particularly those in the developed world with strong institutions, is low (see Yeyati and Panizza (2011); Collard, Habib and Rochet (2015); and Daniel (2019)).

A. CAC Provisions and Creditworthiness

First, we investigate how the CAC vs. no-CAC yield differential changes across the credit ratings spectrum.[31] To this end we add to specification (16) the interaction between the CAC indicator and $Rating_{c,t}$, and estimate:

$$y_{i,c,t} = \alpha + \beta_0 CAC_i + \beta_1 CAC_i \times Rating_{c,t} + \gamma X_{i,c,t} + \theta_i + \varepsilon_{i,c,t}. \quad (17)$$

It is worth mentioning that the coefficients on the constitutive terms CAC_i and $Rating_{c,t}$ in the multiplicative model (17) cannot be interpreted as unconditional or average effects. We therefore follow Brambor, Clark and Golder (2006) in making inference from our interaction model.[32] What we are interested in is the net impact of CAC provisions, which, according to specification (17) is equal to $\beta_0 + \beta_1 Rating_{c,t}$. The coefficient β_0 would therefore be informative of the marginal effect of CACs for the unique case when in which $Rating_{c,t} = 0$ – a case we never observe since we code the best rating, AAA, as $Rating_{c,t} = 1$ and $Rating_{c,t}$ increases with worse credit quality.[33] What is more, it is possible for the marginal effect of CACs to be significant for a meaningful range of country ratings *even if* the coefficient β_1 is insignificant (see Brambor, Clark and Golder (2006), p. 74). We therefore complement regression results for specification (17) in Table 4 (see Panel A, second column) with the marginal effects of CACs across the country ratings spectrum we observe in our sample (see Panel B).

Similar to our findings in Table 3, yields increase with interest rate risk, and those of matched no-CAC bonds get larger with worse credit ratings. The net impact of CACs is always negative, and its magnitude as well as statistical significance increases as issuer creditworthiness deteriorates: the marginal effect of CAC provisions is significant at the 1 percent level for countries with AA rating or worse (about 75 percent of bond-week observations), where it ranges from a 6.5 percent (rating AA, Belgium and France) to a 11.5 percent (rating BB, Portugal) yield reduction.

Overall, these findings support the prediction that the yield differential between CAC and no-CAC bonds is larger for issuers with worse credit quality.

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[31] The existing empirical literature (e.g., Bardozzetti and Dottori (2014); and Bradley and Gulati (2014), and references cited therein), has dealt with the effect of CAC provisions in foreign-law bonds issued by countries with different creditworthiness, however, reaching mixed results.

[32] Finance applications include Georgarakos and Pasini (2011) for the effect of trust and sociability on stock ownership and Carrieri, Chaieb and Errunza (2013) for the effect of openness and implicit barriers on globalization.

[33] Similarly, the coefficient on country ratings would be revealing of the impact of issuer creditworthiness on (log-)yields of matched no-CAC bonds *only*.

B. CAC Provisions and Quality of Law

We now analyze how the yield differential associated with CAC provisions depends on the strength of the legal system. We first screen the empirical literature on legal protection and financial outcomes (most notably Bae and Goyal (2009); Qi, Roth and Wald (2011); Miller and Reisel (2012); and Karolyi (2015), and the references therein) to identify the proxies for a country's quality of law. We select six indicators: the formalism index (Djankov, La Porta, Lopez-de-Silanes and Shleifer (2003); abbreviated as *DLLS*), the judicial efficiency index (La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998); *LLSV(EJ)*), the property rights index (Heritage Foundation; *Heritage*), the law and order index (PRS Group/ICRG Political Risk Rating; *PRS*), and two rule of law indexes (*LLSV(RL)* and World Bank Worldwide Governance Indicator, abbreviated as *World Ban*k). These indicators are broadly related to the quality of law, both in terms of the law on-the-books and law enforcement.[34] In light of the model of Section I.B, we view these as proxies for the parameter γ – larger values for γ are associated with better legal systems. In order to empirically investigate the effect of a country's quality of law on bond yields we add to specification (16) $Quality\ of\ law_{c,t}$ and its interaction with the CAC indicator, and estimate:

$$y_{i,c,t} = \alpha + \beta_0 CAC_i + \beta_1 CAC_i \times Quality\ of\ law_{c,t} + \gamma X_{i,c,t} + \theta_i + \varepsilon_{i,c,t} \qquad (18)$$

where the vector of covariates $X_{i,c,t}$ includes $Quality\ of\ law_{c,t}$ on top of all the variables used in specification (16) – week fixed effects, country ratings, and bond-level variables. Regression results are reported in columns 3-8 in Table 4-Panel A, separately for each quality of law measure. We confirm previous findings that bond yields are positively associated with duration – our proxy for interest rate risk – and, overall, negatively associated with the issuer creditworthiness. Columns 3-5 further offer some evidence that bond yields decrease with bond size, consistent with the idea that liquidity risk is priced.[35]

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[34] Some of these indicators – DLLS, LLSV(EJ) and LLSV(RL) – are, by construction, purely cross-sectional since they are observed only once, while the others are, at least in principle, time-varying. During our sample period, however, only the World Bank Rule of Law index shows some (little) variation, at the country level, over time. With the sole exception of DLLS, which ranges from good to bad, all indicators assign larger values to countries with better quality of law. DLLS and the LLSV indicators are not available for some countries in our sample – see Panel B in Appendix Table A1 for further details. We also report all actual index values by country, their correlations and the ratings-related variance inflation factors (to assuage any concerns of lack of within-sample variation and multicollinearity) in Appendix Table A2-Panels A to C.

[35] As noted in Subsection IV.A, the coefficient β_0 is informative of the marginal effect of CACs in a country with $Quality\ of\ law_{c,t} = 0$, a case we never observe in our sample. For the proxies in columns 4-7 a value of 0 would indicate a with a country with extremely low quality of law, which is not observed even in the entire sample of countries for which these

According to specification (18), the net impact of CAC provisions is given by $\beta_0 + \beta_1 Quality\ of\ law_{c,t}$, which we report in Table 4-Panel B for the values of the quality of law indicator(s) that we observe in our sample.[36] Numbers in square brackets refer to the percentage of the sample (bond-week observations) that falls into each value. According to the DLLS formalism index, these marginal effects are significantly negative at the 1 percent level for more than 85 percent of our sample – with the sole exception of the effect associated to the largest value of 5.25 (Spain) which is insignificant – and increase from left to right. Countries with the lowest DLLS values (Ireland, Belgium, and the Netherlands) witness the largest yield differential between CAC and matched no-CAC bonds. Since DLLS sorts countries from good to bad, this evidence is consistent with a negative yield differential associated to CAC provisions that widens with the quality of the legal system. Different from DLLS, the other five indicators assign *larger* values to better quality of law countries. The marginal effects in Panel B associated to each of these indicators are always negative and decrease from left to right. These marginal effects are all significant at the 1 percent level, with the exception of countries with relatively worse quality of law that are significant at the 5 percent level.[37]

In sum, the evidence on the interplay between CAC provisions and the quality of law is consistent with the idea that the incentives to default strategically are weaker in countries with better legal systems.

V. Further Results: Falsification Exercise

One potential concern with the evidence cumulated so far is omitted variables at the bond-level that are correlated with both CAC provisions and bond yields. To check for the possibility that the relationship between CACs and yields is spurious, we conduct a falsification exercise assuming (wrongly) that the Euro CAC initiative took place on January 1, 2011. Making use of the same filtering criteria detailed in Section II, we identify a placebo sample consisting of 73 bonds issued between January 1, 2011 and June 30, 2012 ("pseudo CAC bonds"), which we match with closest-maturity bonds issued prior to January 1,

proxies are available: the lowest value for LLSV(EJ) is 2.5 (Indonesia), for LLSV(RL) is 1.9 (Sri Lanka), for PRS is 0.83 (Somalia), and for Heritage is 0.5 (North Korea, Turkmenistan and Venezuela). The rule of law index from the World Bank takes a value very close to zero for Montenegro (0.007), and reaches its lowest value at -2.45 (Somalia). On the contrary, since DLLS ranges from good to bad, a value of 0 would indicate a country with extremely high quality of law – according to Djankov, La Porta, Lopez-de-Silanes and Shleifer (2003) the best country is Hong Kong with a formalism index of 0.73.

[36] For the World Bank rule of law index we report marginal effects evaluated at the 2013 values.

[37] Finland and the Netherlands are those countries that, across all these quality of law measures, rank invariably at the very top, together with Luxembourg (for which LLSV values are not available). Italy and Slovakia are at the other end of the spectrum for *Heritage*, *PRS* and the *World Bank* proxies; Portugal (resp., Ireland and Spain) ranks worst according to *LLSV(EJ)* (resp., *LLSV(RL)*).

2011 ("pseudo no-CAC bonds").[38] Given that the real CAC initiative took place later, the appropriate null hypothesis for our falsification test is that the coefficient of the newly estimated (pseudo) CAC variable equals zero.

We then replicate our analyses using this placebo sample. In Table 5 we report random-effects estimation results for: 1) our baseline specification (16) (see column 1), and, 2) the saturated model that retains the pseudo CAC indicator as the sole panel restriction while interacting all other variables with country fixed effects (see column 2). Column 1 corroborates the evidence that bond yields are positively associated with bond-level interest rate risk and country credit risk (see Table 3-Column 1). Additionally, it suggests that liquidity risk is priced in bond yields: larger bonds and those with smaller bid-ask spreads have lower yields, while it is worth recalling that these variables were overall insignificant so far. These findings are contradictory only at a first sight: they are indeed consistent with the evidence in Beber, Brandt and Kavajecz (2009) that liquidity matters only during times of heightened uncertainty – and there is little doubt that sovereign debt markets were in turmoil during the years 2011-12.

Most importantly, neither column in Table 5 certifies significant changes in yields associated with the pseudo CAC indicator. We then perform OLS cross-sectional regressions of specification (16) dropping the bond-specific random components θ_i and the time fixed effects for each week from April 4, 2011 – the first week for which we have 15 bond pairs – to December 28, 2012. Figure 6 depicts the point estimates for the coefficient on the pseudo CAC indicator (solid blue line) together with their 99 percent confidence intervals (shaded grey area). As the figure reveals, the estimates can take either positive or negative values, but crucially we never reject the hypothesis that yields are identical between pseudo CAC bonds and their matched counterparts (which recall is the appropriate null hypothesis for our falsification test).

Finally, we make use of cross-country variation in creditworthiness and the quality of the legal system to estimate specifications (17) and (18) after replacing CAC_i with the pseudo CAC indicator. Random-effects estimation results are reported in Panel A of Table 6, while Panel B shows the marginal effects of pseudo CAC provisions. Contrary to our findings based on the sample of CAC and matched no-CAC bonds (see Table 4 Panel B, and its illustrative shading of the estimated coefficients according to their significance levels), we fail, overall, to detect significant differences in yields between the two groups of bonds both across the ratings spectrum and the deck of the quality of the legal system measures. We

[38] The matching quality (in terms of residual maturities) is fairly similar to the one of CAC and matched no-CAC bonds: about 60 percent of bond pairs (42 out of 73) have residual maturities within 6 months, and about 75 percent (56 out of 73) within one year. Residual maturities are not statistically different between the two groups of bonds.

conclude that systematic differences between recently issued bonds and older bonds are not confounding the reduction in bond yields associated with CAC provisions that we have documented in Sections III and IV.

VI. Conclusion

This paper exploits the Euro Collective Action Clause (CAC) initiative of 2013 to obtain results on a key question in law and finance: are the non-financial contract terms of a bond priced? We ask that question in the context of sovereign bonds issued by Euro area countries under domestic law. The investigation allows us to disentangle the effects of contract terms from those of the governing law and rather examine how the effect of contract terms varies depending on the legal framework of the issuer. We find that investors are willing to pay a premium for CAC bonds in the Euro area relative to non-CAC bonds, and the more so in countries with worse ratings and more credible legal systems.

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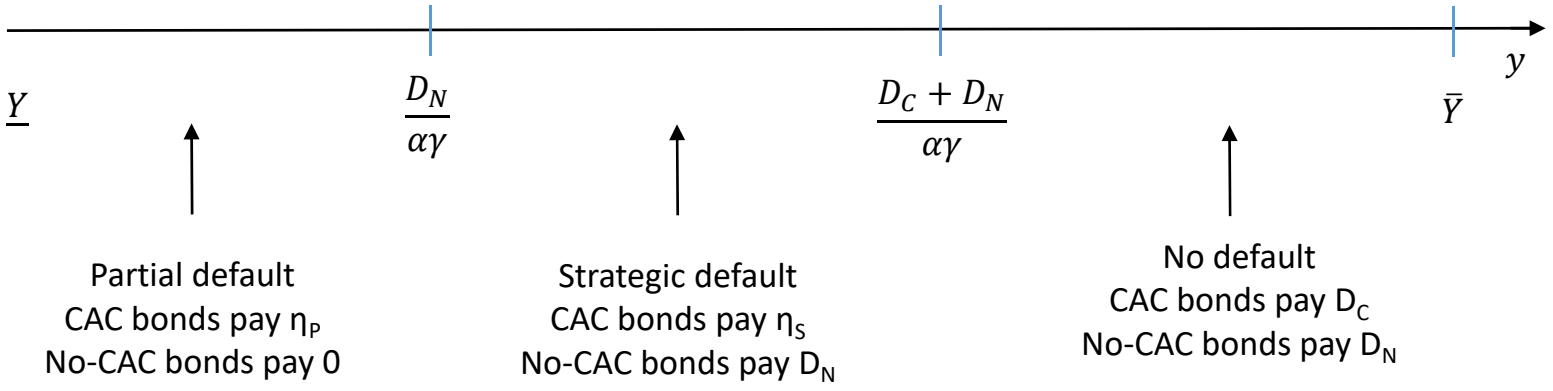

Figure 1
Different contractual clauses for creditors' repayment
Repayments to no-CAC and CAC bondholders as a function of the sovereign's output *y*.

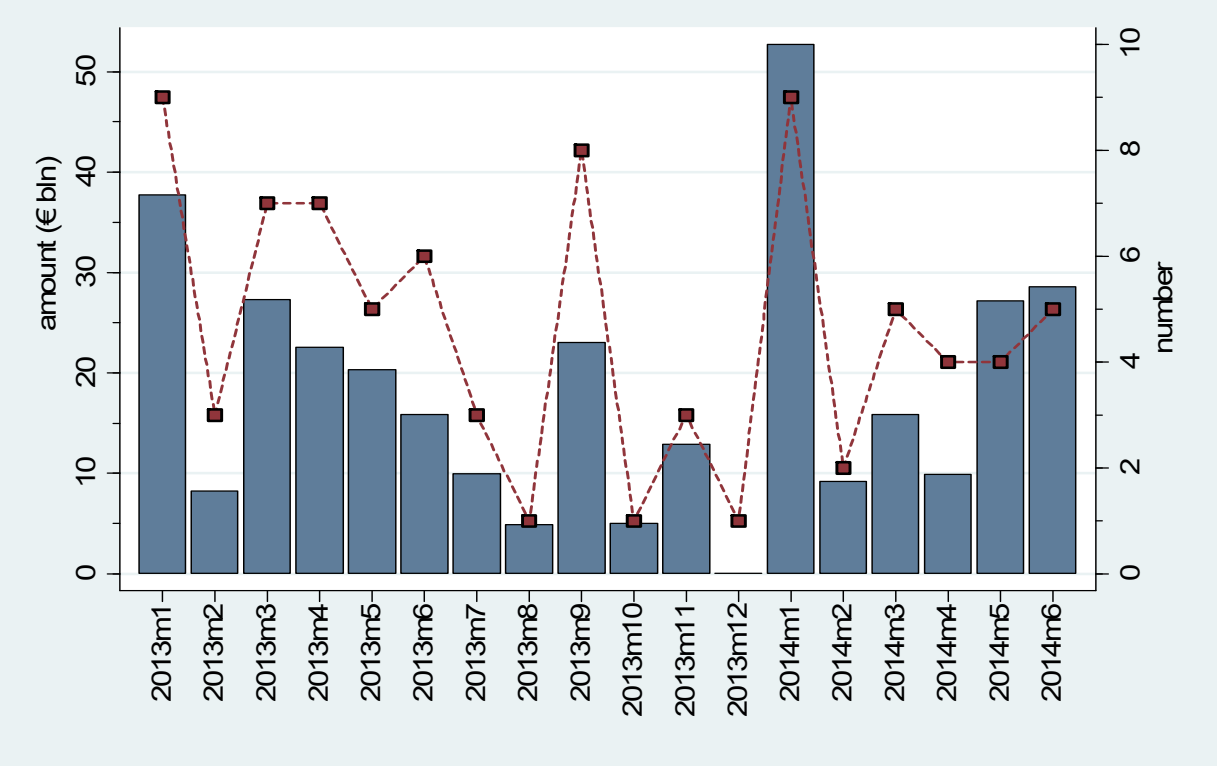

Figure 2

CAC bonds issuances

Monthly time series of CAC bonds new issuances by aggregate amount (blue bars, left vertical axis) and by number of issuances (red squares, right vertical axis). CAC bonds are identified as Euro-denominated zero-coupon or fixed coupon bonds issued under local law by 13 Eurozone countries between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years.

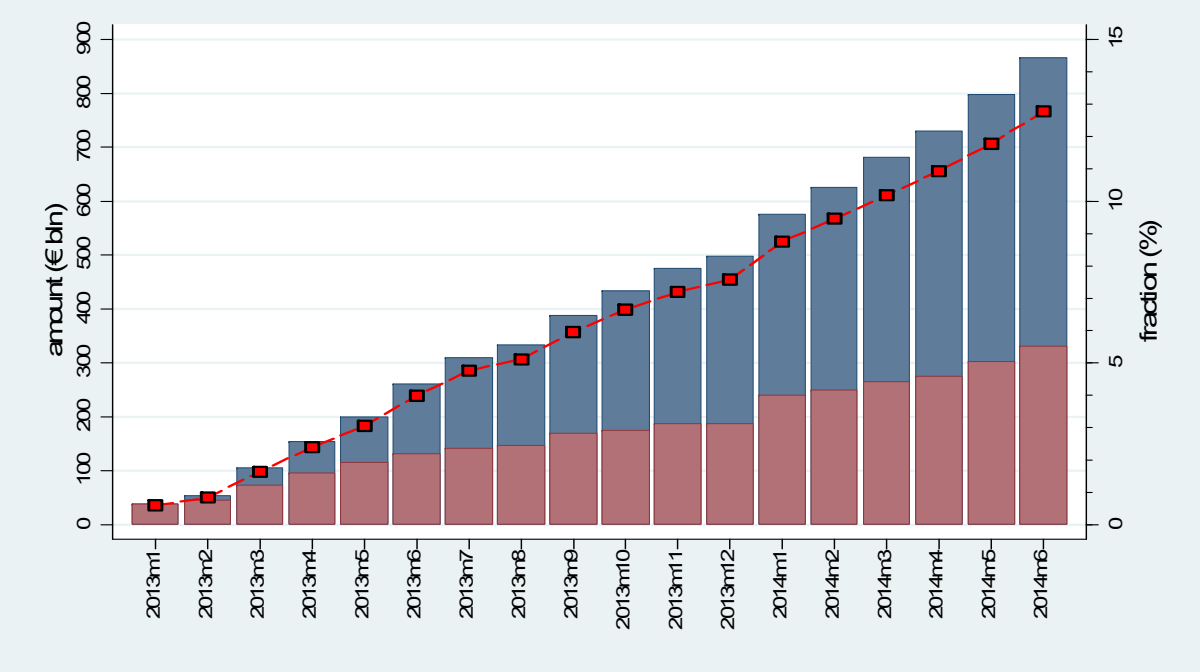

Figure 3

CAC bonds outstanding

Monthly time series of CAC bonds outstanding by aggregate amount (bars, left vertical axis) and by fraction of total long-term government debt outstanding (red squares, right vertical axis). Amount outstanding is split between amount issued (red bars) and amount reopened (blue bars). CAC bonds are identified as Euro-denominated zero-coupon or fixed coupon bonds issued under local law by 13 Eurozone countries between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years.

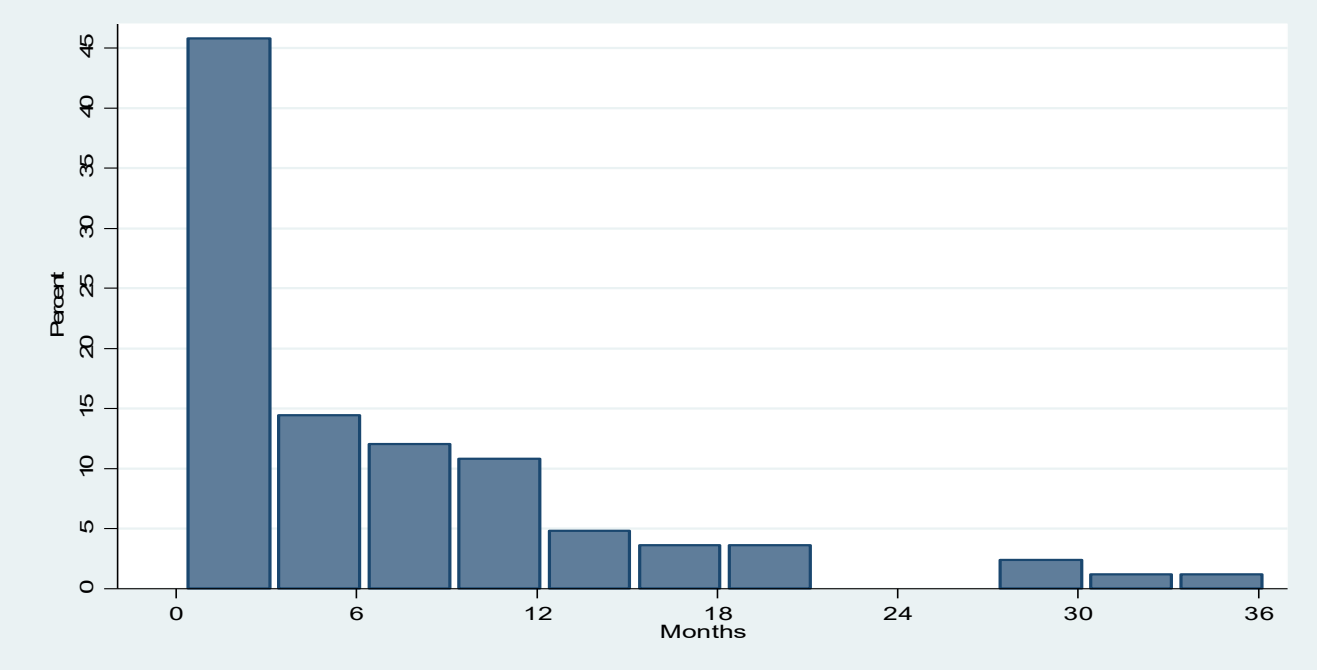

Figure 4

Maturity differential between CAC and matched non-CAC bonds

Histogram of the distance (in absolute value) between CAC and matched no-CAC bonds, expressed in months. CAC bonds are identified as Euro-denominated zero-coupon or fixed coupon bonds issued under local law by 13 Eurozone countries between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years. Matched no-CAC bonds are issued before January 1, 2013 and have maturities as close as possible to those of CAC bonds.

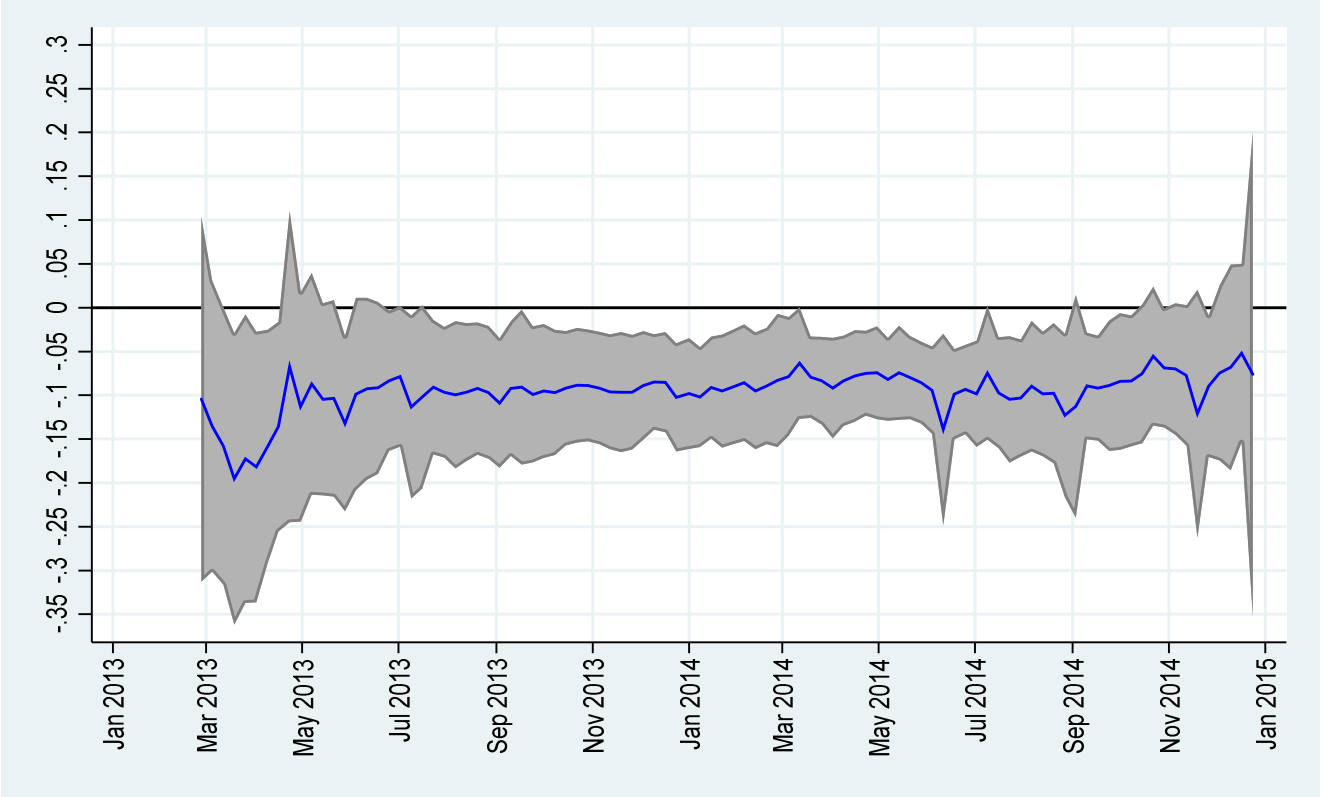

Figure 5

CAC provisions and yield differentials, over time

Point estimates (solid blue line) together with their 99 percent confidence intervals (shaded grey area) of the effect of CAC provisions on yields. The sample ranges from February 25, 2013 to December 30, 2014 and includes 83 bonds issued after January 1, 2013 (CAC bonds) and 83 bonds issued before January 1, 2013 (matched no-CAC bonds). Point estimates are for the CAC indicator from cross-sectional regressions of weekly log-yields on country rating and a series of bond-level controls (duration, size, bid-ask spread, and turnover). Definitions of the explanatory variables are provided in Appendix Table A1.

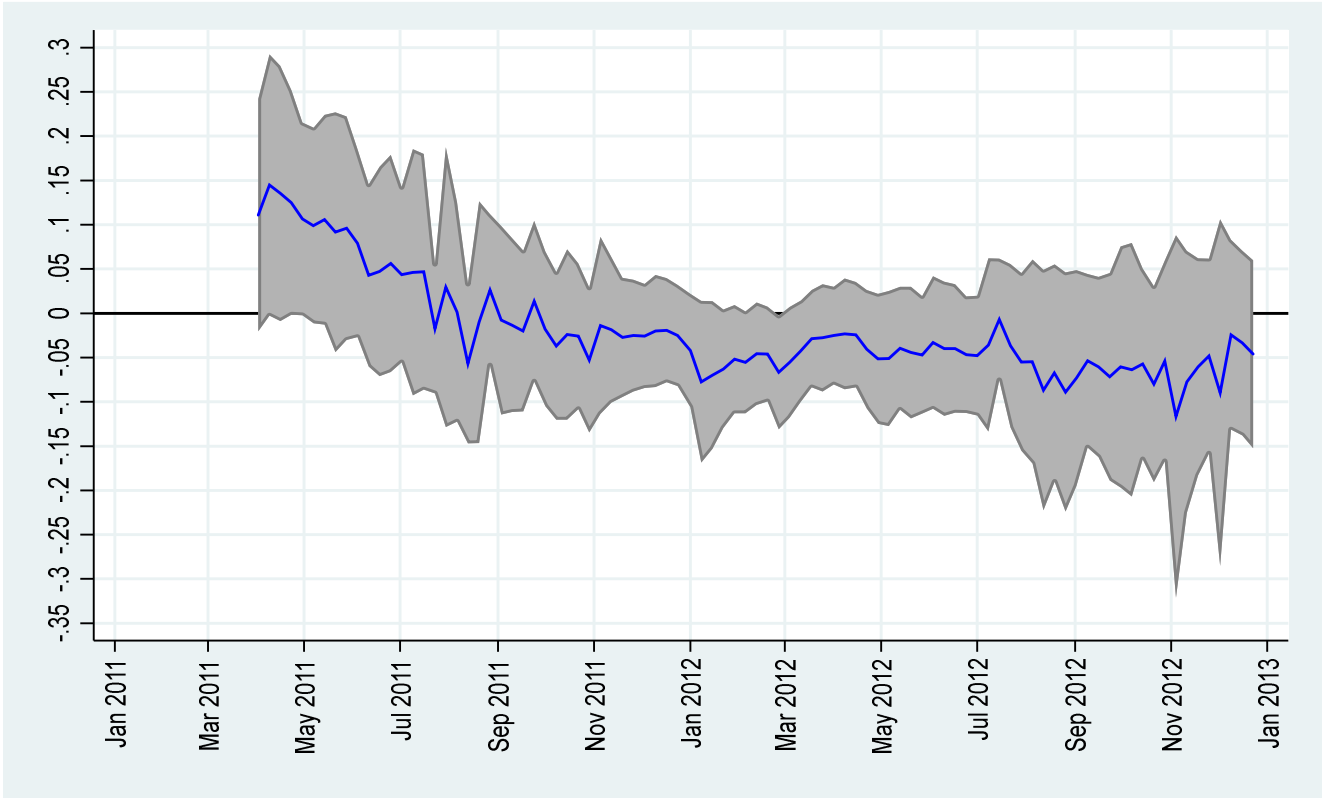

Figure 6

Pseudo CAC provisions and yield differentials, over time (placebo)

Point estimates (solid blue line) together with their 99 percent confidence intervals (shaded grey area) of the effect of Pseudo CAC provisions on yields. The sample ranges from April 4, 2011 to December 28, 2012 and includes 73 bonds issued after January 1, 2011 (Pseudo CAC bonds) and 73 bonds issued before January 1, 2011 (matched Pseudo no-CAC bonds). Point estimates are for the Pseudo CAC indicator from cross-sectional regressions of weekly log-yields on country rating and a series of bond-level controls (duration, size, bid-ask spread, and turnover). Definitions of the explanatory variables are provided in Appendix Table A1.

Table 1
Data filtering and country representativeness

Issuer	Initial	CAC provisions	Local law	CAC & Matched no-CAC	Amount (€ bln)
Austria	4	4	4	4	27.35
Belgium	16	13	13	13	47.65
Cyprus	7	7	5	-	-
Finland	3	3	3	3	15
France	10	10	10	10	220.57
Germany	5	5	5	5	90
Ireland	2	2	2	2	13.62
Italy	18	18	18	18	297.57
Luxembourg	2	2	2	1	2
Malta	10	9	-	-	-
the Netherlands	5	5	5	5	76.46
Portugal	6	6	5	5	12.43
Slovakia	4	4	4	4	7.94
Slovenia	4	4	3	3	3.14
Spain	10	10	10	10	179.76
Total	106	102	89	83	993.49

This table describes the country breakdown of bonds at each stage of our data construction process. "Initial" refers to Euro-denominated zero-coupon or fixed coupon bonds issued by national governments in the Eurozone between January 1, 2013 and June 30, 2014 and with maturity (at issuance) between 1 and 30 years. The remaining columns describe country representativeness after each filter: "CAC provisions" requires bonds to be flagged by Bloomberg as including CACs; "Local law" requires bonds to be local-law bonds; "CAC & Matched no-CAC" requires availability of a comparable no-CAC bond. Amount outstanding refers to CAC bonds and is measured at the end of 2014.

Table 2
Sample overview CAC and no-CAC bonds (bond-level variables)

Table 2 Panel A. Full sample

Variable (unit)	CAC bonds (N=5,476)				Matched no-CAC bonds (N=5,476)				Difference
	Mean	Median	5th Pct.	95th Pct.	Mean	Median	5th Pct.	95th Pct.	
Yield (%)	1.650	1.450	0.207	3.995	1.669	1.419	0.206	4.034	0.019
Duration	5.852	6.275	0.969	11.184	5.546	5.684	0.99	10.399	-0.305***
Amount (€mln)	9,801.3	9,126.3	5.7	21,185.8	13,092.1	13,598.3	22.3	28,068.4	3,290.8***
Bid-Ask spread (%)	0.138	0.045	0.013	0.649	0.160	0.049	0.014	0.837	0.022***
Turnover (%)	0.712	0.026	0.000	1.902	0.948	0.006	0.000	2.775	0.237**
Maturity (yrs)	7.644	7.545	1.496	15.789	7.661	7.323	2.003	15.493	0.017

Table 2 Panel B. By country

		CAC bonds						Matched no-CAC bonds					
Country	Number of observations	Yield	Duration	Amount	Bid-Ask spread	Turnover	Maturity	Yield	Duration	Amount	Bid-Ask spread	Turnover	Maturity
Austria	274	1.577	9.472	5,113.3	0.099	0.014	11.77	1.580	9.077	10,660.2***	0.09	0.003***	12.696
Belgium	928	1.257	6.153	3,078.6	0.082	2.266	8.192	1.201*	5.845***	8,657.1***	0.063***	3.938**	8.295
Finland	206	1.178	6.891	4,823.6	0.042	0.394	8.412	1.220	6.86	5.233.2***	0.043	0.246***	8.891
France	562	0.982	5.737	18,104.4	0.035	0.148	7.39	0.916	5.109***	26,227.5***	0.037	0.030***	7.256
Germany	334	1.251	8.23	16,452.1	0.015	0.841	10.004	1.049***	7.221***	18,814.4***	0.021***	0.092***	8.858
Ireland	144	2.666	7.617	5,522.3	0.197	0.002	10.093	2.402**	6.469***	10,005.9***	0.186	0.001***	9.377
Italy	1,158	1.947	4.597	14,049.2	0.038	0.693	6.309	1.997	4.393*	14,892.6***	0.127***	0.410***	6.231
Luxembourg	77	1.596	8.061	2,000	0.308	0.001	10.005	1.391**	7.022***	1000***	0.283***	0.001***	8.701
the Netherlands	340	0.871	5.279	11,542.2	0.032	0.239	6.537	0.821	4.818**	11,947.40	0.031	1.773***	6.238
Portugal	346	1.971	2.453	2,634.1	0.333	1.099	3.35	2.430***	2.463	6,490.1***	0.288**	0.754***	3.284
Slovakia	291	2.311	8.852	1,754.1	0.92	0.001	12.634	2.434	9.026	982.9***	1.314***	0.001***	13.171
Slovenia	103	2.020	3.347	1,035.0	0.743	0.001	4.002	2.911***	4.223***	64.5***	0.084***	0.546***	5.257
Spain	713	2.250	5.246	14,136.7	0.074	0.113	7.595	2.224	5.125	18,614.2***	0.081	0.063***	7.803
All	5,476	1.65	5.852	9,801.3	0.138	0.712	7.644	1.669	5.546***	13092.1***	0.160***	0.948**	7.661

In this table Panel A presents means, medians, 5th and 95th percentiles for our samples of CAC and matched no-CAC bonds, while Panel B presents means of bond-level variables for our samples of CAC and matched no-CAC bonds, by country. Matched no-CAC bonds have maturities as close as possible to those of CAC bonds. Maturity for CAC bonds is computed at issuance, i.e., the difference between maturity and issue date; for matched no-CAC bonds it is computed as the difference between maturity date and the issuance date of the CAC bond with which the bond is matched. The time period ranges between January 1, 2013 and December 30, 2014. Descriptive statistics for maturity are computed in the cross-section (83 bonds in each sample); for other variables these are computed in the panel: in Panel A there are 5,476 bond-week observations in each sample, while in Panel B the number of bond-week observations for each sample/country is reported in the second column. The last column in Panel A reports the difference in means between matched no-CAC and CAC bonds together with the t-test statistical significance. In Panel B the t-test statistical significance is indicated next to mean values of the matched no-CAC sample. Differences in mean maturities are not tested due to the small number of bonds in each country. For Luxembourg the bond amount takes the value of 2,000 for CAC and the value of 1,000 for no-CAC bonds and as such we assess it to be different at the 1 percent level. The last row reports descriptive statistics for the entire panel. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 3
CAC provisions and yield differentials

dependent variable: weekly log-yields	Random Effects		Pooled Ordinary Least Squares	
	(1)	(2)	(3)	(4)
CAC	-0.084***	-0.053*^	-0.112***	-0.098***
	(0.017)	(0.028)	(0.024)	(0.027)
Duration	0.261***	×	0.360***	×
	(0.021)		(0.049)	
Size	-0.026	×	-0.014	×
	(0.016)		(0.010)	
Bid-Ask spread	-0.002	×	0.048	×
	(0.110)		(0.079)	
Turnover	-0.007	×	-0.021	×
	(0.037)		(0.039)	
Rating	0.129***		-0.028	
	(0.014)		(0.074)	
Bond-level Random Effects	Yes	Yes	No	No
Matched bond-level Fixed Effects	No	No	Yes	Yes
Week Fixed Effects	Yes	-	Yes	-
Country Fixed Effects x (Bond characteristics)	No	Yes (×)	No	Yes (×)
Country x Week Fixed Effects	No	Yes	No	Yes
Observations	10,952	10,952	10,952	10,952
Bonds	166	166	166	166
Adjusted R-squared	0.756	0.882	0.883	0.923

This table presents bond-level random effects (columns 1-2) and pooled ordinary least squares (columns 3-4) regression results to examine the relation between CAC provisions and bond yields. The sample ranges from January 1, 2013 to December 30, 2014 and includes 83 bonds issued after January 1, 2013 (CAC bonds) and 83 bonds issued before January 1, 2013 (matched no-CAC bonds). CAC equals one if the bond has CAC provisions, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Size is the amount outstanding; Bid-Ask spread is the percentage bid-ask spread, i.e., $(P_{ASK} - P_{BID})/P_{MID}$, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; Rating is the S&P local currency long term debt issuer rating. Further details on the explanatory variables are provided in Appendix Table A1. Bond characteristics interacted with country fixed effects in columns 2 and 4 are indicated with ×. Rating is not included in columns 2 and 4 because it is subsumed by the interactions between county and week fixed effects. Effects are either included ("Yes"), not included ("No") or subsumed by other sets of effects ("-"). The table reports the estimated coefficients and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. *** Significant at the 1 percent level.** Significant at the 5 percent level. *^ Significant at the 6 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated CAC coefficients we also employ corresponding shades of grey.

Table 4
CAC provisions and yield differentials: Country creditworthiness and quality of law

Table 4 Panel A. Regression results

dependent variable: weekly log-yields	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Quality of law proxy =	--	--	*DLLS*	*LLSV (EJ)*	*LLSV (RL)*	*Heritage*	*PRS*	*World Bank*
CAC	×	-0.047	-0.259***	-0.048	0.221	-0.038	0.046	-0.047
		(0.037)	(0.088)	(0.120)	(0.185)	(0.077)	(0.108)	(0.037)
Duration	0.278***	0.261***	0.272***	0.287***	0.279***	0.260***	0.260***	0.260***
	(0.018)	(0.021)	(0.023)	(0.023)	(0.022)	(0.021)	(0.020)	(0.021)
Size	-0.008	-0.026	-0.044**	-0.033*	-0.036*	-0.022	-0.023	-0.025
	(0.020)	(0.017)	(0.019)	(0.019)	(0.020)	(0.016)	(0.016)	(0.016)
Bid-Ask spread	0.034	-0.002	0.150	0.110	0.117	-0.018	-0.010	-0.013
	(0.113)	(0.110)	(0.205)	(0.229)	(0.231)	(0.111)	(0.111)	(0.111)
Turnover	-0.002	-0.007	-0.010	0.005	0.004	-0.005	-0.008	-0.006
	(0.036)	(0.037)	(0.042)	(0.037)	(0.036)	(0.036)	(0.037)	(0.037)
Rating	-0.029	0.132***	0.107***	0.069	0.090***	0.099***	0.114***	0.101***
	(0.076)	(0.013)	(0.021)	(0.042)	(0.030)	(0.022)	(0.017)	(0.025)
Rating x CAC		-0.006						
		(0.006)						
Quality of law			0.169**	-0.197*	-0.241**	-0.106**	-0.092*	-0.263
			(0.079)	(0.101)	(0.122)	(0.053)	(0.054)	(0.164)
Quality of law x CAC			0.043*	-0.006	-0.036*	-0.006	-0.016	-0.032
			(0.022)	(0.015)	(0.021)	(0.010)	(0.013)	(0.029)
Week Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,952	10,952	10,370	10,010	10,010	10,952	10,952	10,952
Bonds	166	166	158	150	150	166	166	166
Adjusted R-squared	0.803	0.756	0.763	0.769	0.779	0.753	0.755	0.754

Table 4 Panel B. Net impact of CACs

(1) Country=	*AT*	*BE*	*DE*	*ES*	*FI*	*FR*	*IE*	*IT*	*LU*	*NL*	*PT*	*SI*	*SK*
	-0.164***	-0.054	-0.060	-0.010	-0.137**	-0.054	-0.146**	-0.086***	-0.131***	-0.081	-0.254**	-0.127	-0.017
	(0.042)	(0.071)	(0.042)	(0.018)	(0.067)	(0.067)	(0.066)	(0.032)	(0.025)	(0.084)	(0.114)	(0.184)	(0.090)
	[5.0%]	[17.0%]	[6.1%]	[13.0%]	[3.8%]	[10.3%]	[2.6%]	[21.2%]	[1.4%]	[6.2%]	[6.3%]	[1.9%]	[5.3%]
(2) Rating=	*AAA*	*AA+*	*AA*	*A*	*A-*	*BBB+*	*BBB*	*BBB-*	*BB*				
	-0.054*	-0.060**	-0.067***	-0.086***	-0.093***	-0.098***	-0.105***	-0.111***	-0.124***				
	(0.031)	(0.026)	(0.021)	(0.017)	(0.020)	(0.024)	(0.029)	(0.035)	(0.046)				
	[12.6%]	[12.1%]	[25.0%]	[5.5%]	[2.8%]	[3.3%]	[24.0%]	[8.5%]	[6.3%]				
(3) DLLS=	*2.63*	*2.73*	*3.07*	*3.14*	*3.23*	*3.51*	*3.52*	*3.56*	*3.93*	*4.04*	*4.26*	*5.25*	
	-0.145***	-0.141***	-0.126***	-0.123***	-0.119***	-0.107***	-0.107***	-0.105***	-0.089***	-0.084***	-0.075***	-0.032	
	(0.032)	(0.030)	(0.025)	(0.024)	(0.023)	(0.020)	(0.020)	(0.019)	(0.019)	(0.019)	(0.021)	(0.037)	
	[2.8%]	[17.9%]	[6.6%]	[4.0%]	[10.8%]	[6.4%]	[5.3%]	[1.5%]	[6.7%]	[22.3%]	[2.0%]	[13.8%]	
(4) LLSV(EJ)=	*5.5*	*6.25*	*6.75*	*8*	*8.75*	*9*	*9.5*	*10*					
	-0.083**	-0.088***	-0.092***	-0.100***	-0.104***	-0.106***	-0.109***	-0.112***					
	(0.041)	(0.031)	(0.025)	(0.018)	(0.021)	(0.023)	(0.029)	(0.035)					
	[6.9%]	[14.3%]	[23.1%]	[11.2%]	[2.9%]	[6.7%]	[24.0%]	[11.0%]					
(5) LLSV(RL)=	*7.8*	*8.33*	*8.68*	*8.98*	*9.23*	*10*							
	-0.056**	-0.075***	-0.088***	-0.098***	-0.107***	-0.135***							
	(0.027)	(0.020)	(0.017)	(0.017)	(0.019)	(0.029)							
	[17.1%]	[23.1%]	[6.9%]	[11.2%]	[6.7%]	[34.9%]							
(6) Heritage=	*5*	*6*	*7*	*8*	*9*								
	-0.069**	-0.075***	-0.081***	-0.087***	-0.094***								
	(0.028)	(0.020)	(0.016)	(0.018)	(0.025)								
	[26.5%]	[1.9%]	[19.3%]	[27.2%]	[25.1%]								
(7) PRS=	*6.67*	*7.5*	*8.33*	*10*									
	-0.059**	-0.072***	-0.085***	-0.111***									
	(0.025)	(0.018)	(0.016)	(0.028)									
	[26.5%]	[1.9%]	[52.7%]	[19.0%]									
(8) World Bank=	*0.357*	*0.446*	*0.969*	*0.996*	*1.033*	*1.398*	*1.403*	*1.615*	*1.721*	*1.788*	*1.809*	*1.829*	*1.926*
	-0.058**	-0.061**	-0.078***	-0.079***	-0.080***	-0.092***	-0.092***	-0.099***	-0.102***	-0.104***	-0.105***	-0.105***	-0.109***
	(0.028)	(0.025)	(0.017)	(0.016)	(0.016)	(0.018)	(0.018)	(0.022)	(0.024)	(0.025)	(0.026)	(0.026)	(0.028)
	[15.4%]	[3.1%]	[1.3%]	[9.0%]	[3.3%]	[7.4%]	[11.8%]	[4.3%]	[1.9%]	[0.9%]	[4.0%]	[3.4%]	[2.8%]

This table presents bond-level random effects regression results to examine the net impact of country heterogeneity, issuer's creditworthiness and quality of law on the relation between CAC provisions and bond yields. The sample ranges from January 1, 2013 to December 30, 2014 and includes 83 bonds issued after January 1, 2013 (CAC bonds) and 83 bonds issued before January 1, 2013 (matched no-CAC bonds). CAC equals one if the bond has CAC provisions, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Size is the amount outstanding; Bid-Ask spread is the percentage bid-ask spread, i.e., $(P_{ASK} - P_{BID})/P_{MID}$, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; Rating is the S&P local currency long term debt issuer rating; DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. Further details on the explanatory variables are provided in Appendix Table A1. The CAC indicator is interacted with country fixed effects in column 1 and indicated with ×. Panel A reports the estimated coefficients, and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. Panel B reports the net effect of CAC provisions for individual countries (indicated by ISO-Alpha 2 country code), for salient country ratings, and for selected values of the quality of law indicators, and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. Numbers in square brackets in Panel B refer to the percentage of the entire sample (bond-week observations) in a given country, with a given rating or with a given value of quality of law. For the World Bank rule of law index we report the 2013 values. The ISO-Alpha 2 country codes are: AT-Austria, BE-Belgium, DE-Germany, ES-Spain, FI-Finland, FR-France, IE-Ireland, IT-Italy, LU-Luxembourg, NL-the Netherlands, PT-Portugal, SI-Slovenia, and SK-Slovakia. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated CAC coefficients we also employ corresponding shades of grey.

Table 5
Pseudo CAC provisions and yield differentials (placebo)

dependent variable: weekly log-yields	(1)	(2)
Pseudo CAC	-0.037	-0.024
	(0.030)	(0.026)
Duration	0.163***	×
	(0.026)	
Size	-0.044**	×
	(0.021)	
Bid-Ask spread	0.195**	×
	(0.079)	
Turnover	-0.084	×
	(0.057)	
Rating	0.201***	
	(0.029)	
Bond-level Random Effects	Yes	Yes
Week Fixed Effects	Yes	-
Country Fixed Effects x (Bond characteristics)	No	Yes (×)
Country x Week Fixed Effects	No	Yes
Observations	9,440	9,440
Bonds	146	146
Adjusted R-squared	0.723	0.836

This table presents bond-level random effects regression results to examine the relation between pseudo CAC provisions and bond yields. The sample ranges from January 1, 2011 to December 30, 2012 and includes 73 bonds issued after January 1, 2011 (pseudo CAC bonds) and 73 bonds issued before January 1, 2011 (matched pseudo no-CAC bonds). Pseudo CAC equals one if the bond was issued between Jan 2011 and June 2012, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Size is the amount outstanding; Bid-Ask spread is the percentage bid-ask spread, i.e., $(P_{ASK} - P_{BID})/P_{MID}$, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; and Rating is the S&P local currency long term debt issuer rating. Further details on the explanatory variables are provided in Appendix Table A1. Bond characteristics interacted with country fixed effects in column 2 are indicated with ×. Rating is not included in column 2 because it is subsumed by the interactions between county and week fixed effects. Effects are either included ("Yes"), not included ("No") or subsumed by other sets of effects ("-"). The table reports the estimated coefficients and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated CAC coefficients we also employ corresponding shades of grey.

Table 6
Pseudo CAC provisions and yield differentials: Country creditworthiness and quality of law (placebo)

Table 6 Panel A. Regression results

dependent variable: weekly log-yields	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Quality of law proxy =	--	*DLLS*	*LLSV (EJ)*	*LLSV (RL)*	*Heritage*	*PRS*	*World Bank*
Pseudo CAC	-0.097*	-0.069	0.018	0.067	0.115*	0.263***	0.029
	(0.051)	(0.136)	(0.122)	(0.262)	(0.062)	(0.098)	(0.027)
Duration	0.163***	0.172***	0.179***	0.180***	0.172***	0.168***	0.169***
	(0.026)	(0.026)	(0.024)	(0.025)	(0.025)	(0.025)	(0.024)
Size	-0.047**	-0.063***	-0.064***	-0.069***	-0.042*	-0.043**	-0.043**
	(0.022)	(0.022)	(0.022)	(0.023)	(0.022)	(0.021)	(0.022)
Bid-Ask spread	0.196**	0.205**	0.190**	0.199**	0.201***	0.203**	0.200**
	(0.079)	(0.084)	(0.082)	(0.079)	(0.077)	(0.080)	(0.078)
Turnover	-0.084	-0.078	-0.081	-0.075	-0.084	-0.088	-0.085
	(0.057)	(0.057)	(0.056)	(0.056)	(0.057)	(0.057)	(0.057)
Rating	0.195***	0.187***	0.177***	0.180***	0.183***	0.190***	0.187***
	(0.030)	(0.030)	(0.036)	(0.033)	(0.034)	(0.032)	(0.035)
Rating x Pseudo CAC	-0.006						
	(0.006)						
Quality of law		0.161***	-0.118**	-0.203***	-0.084*	-0.072	-0.187
		(0.057)	(0.053)	(0.075)	(0.044)	(0.045)	(0.136)
Quality of law x Pseudo CAC		0.002	-0.01	-0.015	-0.021*	-0.037***	-0.057*
		(0.029)	(0.018)	(0.032)	(0.011)	(0.014)	(0.032)
Week Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	9,440	9,198	9,116	9,116	9,440	9,440	9,440
Bonds	146	142	140	140	146	146	146
Adjusted R-squared	0.722	0.728	0.725	0.727	0.724	0.723	0.725

Table 6 Panel B. Net impact of Pseudo CACs

(1) Rating=	*AAA*	*AA+*	*AA*	*AA-*	*A+*	*A*	*BBB+*	*BBB*	*BBB-*	*BB*	
	-0.084*	-0.072*	-0.060*	-0.048	-0.036	-0.023	0.001	0.013	0.026	0.050	
	(0.046)	(0.041)	(0.036)	(0.033)	(0.030)	(0.028)	(0.029)	(0.032)	-0.035	-0.045	
	[23.7%]	[12.2%]	[17.8%]	[2.5%]	[3.6%]	[9.4%]	[24.9%]	[0.1%]	[4.0%]	[1.9%]	
(2) DLLS=	*2.63*	*2.73*	*3.07*	*3.14*	*3.23*	*3.51*	*3.52*	*3.56*	*3.93*	*4.04*	*5.25*
	-0.062	-0.062	-0.061	-0.061	-0.061	-0.060	-0.060	-0.060	-0.059*	-0.059**	-0.056*
	(0.062)	(0.059)	(0.050)	(0.049)	(0.046)	(0.039)	(0.039)	(0.038)	(0.030)	(0.028)	(0.029)
	[1.0%]	[17.6%]	[9.0%]	[4.6%]	[10.3%]	[5.5%]	[3.3%]	[0.9%]	[3.0%]	[23.9%]	[20.9%]
(3) LLSV(EJ)=	*5.5*	*6.25*	*6.75*	*8*	*8.75*	*9*	*9.5*	*10*			
	-0.037	-0.045*	-0.050**	-0.062*	-0.070	-0.072	-0.077	-0.082			
	(0.033)	(0.026)	(0.025)	(0.033)	(0.043)	(0.047)	(0.054)	-0.062			
	[3.0%]	[21.0%]	[24.2%]	[10.4%]	[1.1%]	[5.6%]	[21.0%]	[13.8%]			
(4) LLSV(RL)=	*7.8*	*8.33*	*8.68*	*8.98*	*9.23*	*10*					
	-0.049*	-0.057**	-0.062**	-0.067*	-0.071*	-0.082					
	(0.027)	(0.025)	(0.029)	(0.036)	(0.042)	-0.063					
	[22.1%]	[24.2%]	[3.0%]	[10.4%]	[5.6%]	[34.8%]					
(5) Heritage=	*5*	*7*	*8*	*9*							
	0.009	-0.034	-0.055	-0.076							
	(0.019)	(0.028)	(0.037)	(0.047)							
	[25.9%]	[23.2%]	[27.1%]	[23.8%]							
(6) PRS=	*6.67*	*8.33*	*10*								
	0.019	-0.042	-0.104**								
	(0.024)	(0.030)	(0.048)								
	[25.9%]	[55.7%]	[18.4%]								
(7) World Bank=	*0.421*	*0.572*	*1.026*	*1.176*	*1.404*	*1.44*	*1.607*	*1.765*	*1.802*	*1.811*	*1.814*	*1.956*
	0.005	-0.004	-0.029	-0.038	-0.051	-0.053	-0.062	-0.071	-0.073	-0.074	-0.074	-0.082
	(0.021)	(0.021)	(0.026)	(0.029)	(0.035)	(0.036)	(0.040)	(0.045)	(0.046)	(0.046)	(0.046)	(0.050)
	[17.1%]	[1.9%]	[1.9%]	[14.3%]	[13.1%]	[7.1%]	[4.1%]	[1.0%]	[0.9%]	[2.1%]	[6.2%]	[3.2%]

This table presents bond-level mixed random effects regression results to examine the net impact of issuer's creditworthiness and quality of law on the relation between pseudo CAC provisions and bond yields. The sample ranges from January 1, 2011 to December 30, 2012 and includes 73 bonds issued after January 1, 2011 (pseudo CAC bonds) and 73 bonds issued before January 1, 2011 (matched pseudo no-CAC bonds). Pseudo CAC equals one if the bond was issued between Jan 2011 and June 2012, and equals zero otherwise; Duration is the Macaulay Duration-0.5×(Convexity/100); Size is the amount outstanding; Bid-Ask spread is the percentage bid-ask spread, i.e., $(P_{ASK} - P_{BID})/P_{MID}$, indicating ask, bid and mid prices, respectively; Turnover is the traded volume across exchanges divided by the amount outstanding; Rating is the S&P local currency long term debt issuer rating; DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. Further details on the explanatory variables are provided in Appendix Table A1. Panel A reports the estimated coefficients, and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. Panel B reports the net effect of pseudo CAC provisions for salient country ratings and for selected values of the quality of law indicators, and below in parentheses the standard errors that are adjusted for clustering at the matched bonds level. Numbers in square brackets in Panel B refer to the percentage of the entire sample (bond-week observations) with a given rating or with a given value of quality of law. For the World Bank rule of law index we report the 2011 values. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. To facilitate the reading of the significance levels for the estimated CAC coefficients we also employ corresponding shades of grey.

APPENDIX

Proof of Proposition 3: Part i) of the proposition follows directly from Proposition 2. In fact, if $D_N - D_C > 0$, such difference is larger, for given γ, the more likely the partial default region is relatively to the strategic default region. For given γ, this occurs as the mass of the distribution probability *f(y)* in the interval $[\underline{y}, \frac{D_N}{\alpha\gamma}]$ increases relative to the mass in the interval $[\frac{D_N}{\alpha\gamma}, \frac{D_N+D_C}{\alpha\gamma}]$.

For part (ii) of the proposition, we first derive how D_N and D_C vary with γ. Solving the participation constraint of the no-CAC bondholders in (11) with equality in equilibrium, we can define the implicit function F_N as follows:

$$F_N(D_N, \gamma) = \int_{\frac{D_N}{\alpha\gamma}}^{\overline{y}} D_N f(y)dy - 1 = 0. \tag{P.1}$$

From the Implicit Equation Theorem it follows that:

$$\frac{dD_N}{d\gamma} = -\frac{\partial F_N / \partial \gamma}{\partial F_N / \partial D_N}, \tag{P.2}$$

where:

$$\frac{\partial F_N}{\partial \gamma} = \frac{D_N^2}{\alpha\gamma^2} f\left(\frac{D_N}{\alpha\gamma}\right), \tag{P.3}$$

and:

$$\frac{\partial F_N}{\partial D_N} = \int_{\frac{D_N}{\alpha\gamma}}^{\overline{y}} f(y)dy - \frac{D_N}{\alpha\gamma} f\left(\frac{D_N}{\alpha\gamma}\right). \tag{P.4}$$

Hence, substituting (P.3) and (P.4) into (P.2) yields:

$$\frac{dD_N}{d\gamma} = -\frac{\frac{D_N^2}{\alpha\gamma^2} f\left(\frac{D_N}{\alpha\gamma}\right)}{\int_{\frac{D_N}{\alpha\gamma}}^{\overline{y}} f(y)dy - \frac{D_N}{\alpha\gamma} f\left(\frac{D_N}{\alpha\gamma}\right)}. \tag{P.5}$$

Similarly, solving (12) with equality in equilibrium, we can define:

$$F_C(D_C,\gamma)=\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}}(\alpha-1)\gamma y f(y)dy+\int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}}(\alpha\gamma y-D_N)f(y)dy\ +\int_{\frac{D_N+D_C}{\alpha\gamma}}^{\overline{y}}D_C f(y)dy-1=0 \quad \text{(P.6)}$$

Again from the Implicit Function Theorem it follows that:

$$\frac{dD_C}{d\gamma}=-\frac{\partial F_C/\partial\gamma}{\partial F_C/\partial D_C}, \quad \text{(P.7)}$$

where:

$$\frac{\partial F_C}{\partial\gamma}=\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}}(\alpha-1)yf(y)dy-(\alpha-1)\frac{{D_N}^2}{\alpha^2\gamma^2}f\left(\frac{D_N}{\alpha\gamma}\right)+\int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}}\alpha yf(y)dy \quad \text{(P.8)}$$
$$-\frac{D_N+D_C}{\alpha\gamma^2}D_C f\left(\frac{D_N+D_C}{\alpha\gamma}\right)+\frac{D_N+D_C}{\alpha\gamma^2}D_C f\left(\frac{D_N+D_C}{\alpha\gamma}\right),$$

which simplifies to:

$$\frac{\partial F_C}{\partial\gamma}=\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}}(\alpha-1)yf(y)dy+\int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}}\alpha yf(y)dy\ -(\alpha-1)\frac{D_N^2}{\alpha^2\gamma^2}\ f\left(\frac{D_N}{\alpha\gamma}\right), \quad \text{(P.9)}$$

and where:

$$\frac{\partial F_C}{\partial D_C}=\frac{D_C}{\alpha\gamma}f\left(\frac{D_N+D_C}{\alpha\gamma}\right)+\int_{\frac{D_N+D_C}{\alpha\gamma}}^{\bar{y}}f(y)dy-\ \frac{D_C}{\alpha\gamma}f\left(\frac{D_N+D_C}{\alpha\gamma}\right)=\int_{\frac{D_N+D_C}{\alpha\gamma}}^{\bar{y}}f(y)dy\,. \quad \text{(P.10)}$$

Hence, substituting (P.9) and (P.10) into (P.7) yields:

$$\frac{dD_C}{d\gamma}=-\frac{\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}}(\alpha-1)yf(y)dy+\int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}}\alpha yf(y)dy\ -(\alpha-1)\frac{D_N^2}{\alpha^2\gamma^2}\ f\left(\frac{D_N}{\alpha\gamma}\right)}{\int_{\frac{D_N+D_C}{\alpha\gamma}}^{\bar{y}}f(y)dy}. \quad \text{(P.11)}$$

Assume $D_N-D_C>0$. Then, the difference D_N-D_C increases with γ if the (negative) variation of D_C is larger in absolute value than the (negative) variation of D_N. In order to see when this happens, we compare equations (P.5) and (P.11). First notice that:

$$\int_{\frac{D_N+D_C}{\alpha\gamma}}^{\overline{y}} f(y)dy \; < \int_{\frac{D_N}{\alpha\gamma}}^{\overline{y}} f(y)dy - \frac{D_N}{\alpha\gamma} f\left(\frac{D_N}{\alpha\gamma}\right). \tag{P.12}$$

It follows that a sufficient condition for $D_N - D_C$ to be increasing in γ is:

$$\int_{\underline{y}}^{\frac{D_N}{\alpha\gamma}} (\alpha-1) y f(y)dy + \int_{\frac{D_N}{\alpha\gamma}}^{\frac{D_N+D_C}{\alpha\gamma}} \alpha y f(y)dy \; - (\alpha-1)\frac{D_N^2}{\alpha^2\gamma^2} f\left(\frac{D_N}{\alpha\gamma}\right) > \frac{D_N^2}{\alpha\gamma^2} f\left(\frac{D_N}{\alpha\gamma}\right). \tag{P.13}$$

Part (ii) of the proposition follows. ■

Appendix Table A1
Definition of variables

Panel A: Main variables

Variable	Description	Unit/Scale
CAC	=1 if bond has CAC provisions, =0 otherwise	0/1
Pseudo CAC	=1 if bond issued between Jan 2011 and June 2012, =0 otherwise	0/1
Duration	Macaulay Duration-0.5×(Convexity/100)	-
Size	Amount outstanding	Mln € (log)
Bid-Ask spread	Percentage bid-ask spread $(P_{ASK}-P_{BID})/P_{MID}$	%
Turnover	Traded volume across exchanges /Amount outstanding	Decimals
Rating	S&P local currency LT debt issuer rating	1(AAA) to 12(BB)

Panel B. Quality of law proxies

Variable name	*Acronym*	Description	Source	Min-max sample values [country code]
Formalism Index	*DLLS*	«Substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts.» (7 point scale, good to bad). Not available for Slovakia.	Djankov, La Porta, Lopez-de-Silanes, Shleifer, Courts, 2003, *Quarterly Journal of Economics* 118, 2(1), 453-517	2.63 [IE] 5.25 [ES]
Judicial Efficiency Index	*LLSV (EJ)*	«Efficiency and integrity of the legal environment as it affects business, particularly foreign firms.» (10 point scale, bad to good). Not available for Luxembourg, Slovakia and Slovenia.	La Porta, Lopez-de-Silanes, Shleifer, Vishny, Law and Finance, *Journal of Political Economy* , 1998, 106(6), 1113-1155	5.5 [PT] 10 [FI, NL]
Rule of Law Index	*LLSV (RL)*	«Law and order tradition.» (10 point scale, bad to good). Not available for Luxembourg, Slovakia and Slovenia.	La Porta, Lopez-de-Silanes, Shleifer, Vishny, Law and Finance, *Journal of Political Economy* , 1998, 106(6), 1113-1155	7.8 [ES, IE] 10 [AT, BE, FI, NL]
Property Rights Index	*Heritage*	«The extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively.» (100 point original scale; rescaled on a 10 point scale, bad to good). Contemporaneous values.	Heritage Foundation, Index of Economic Freedom https://www.heritage.org/index/	5 [IT] 9 [AT, DE, FI, IE, LU, NL]
Law and Order Index	*PRS*	«Law and Order" form a single component, but its two elements are assessed separately, with each element being scored from zero to three points. To assess the "Law" element, the strength and impartiality of the legal system are considered, while the "Order" element is an assessment of popular observance of the law.» (6 point original scale; rescaled on a 10 point scale, bad to good). Lagged values.	PRS Group/ICRG Political Risk Rating https://www.prsgroup.com/	6.67 [IT, SK] 10 [AT, FI, IE, LU, NL]
Rule of Law Index	*World Bank*	«Rule of law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.». (5 point scale from -2.5 to 2.5, bad to good). Lagged values.	World Bank, Worldwide Governance Indicators http://databank.worldbank.org/ (2014 update)	0.357 [IT] 1.943 [FI]

This table provides a detailed description of our variables. Panel A: ratings are measured every Friday; all other variables are weekly averages of daily values. Data source is Bloomberg. Panel B: data source as indicated. December values for PRS sourced from https://info.worldbank.org/governance/wgi/pdf/prs.xlsx. The ISO-Alpha 2 country codes are: AT-Austria, BE-Belgium, DE-Germany, ES-Spain, FI-Finland, FR-France, IE-Ireland, IT-Italy, LU-Luxembourg, NL-the Netherlands, PT-Portugal, SI-Slovenia, and SK-Slovakia.

Appendix Table A2
Country variables
Appendix Table A2 Panel A. Variables, country breakdown

	Rating		*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*World Bank*			
	2013-14	2011-12						2013	2014	2011	2012
Austria	AA+	AAA,AA+	3.52	9.5	10	9	10	1.842	1.829	1.806	1.811
Belgium	AA	AA+,AA	2.73	9.5	10	8	8.33	1.395	1.403	1.37	1.404
Finland	AAA,AA+	AAA	3.14	10	10	9	10	1.943	1.926	1.977	1.956
France	AA+,AA	AAA,AA+	3.23	8	8.98	8	8.33	1.431	1.398	1.511	1.44
Germany	AAA	AAA	3.51	9	9.23	9	8.33	1.638	1.615	1.616	1.607
Ireland	A,A-,BBB+	BBB+	2.63	8.75	7.8	9	10	1.73	1.721		1.765
Italy	BBB+,BBB,BBB-	A+,A,BBB+	4.04	6.75	8.33	5	6.67	0.361	0.357	0.378	0.421
Luxembourg	AAA	AAA	3.56			9	10	1.774	1.788		1.802
the Netherlands	AAA,AA+	AAA	3.07	10	10	9	10	1.841	1.809	1.81	1.814
Portugal	BB	BBB,BBB-,BB	3.93	5.5	8.68	7	8.33	1.038	1.033	1.043	1.026
Slovakia	A	A+,A				5	6.67	0.456	0.446	0.525	0.527
Slovenia	A-		4.26			6	7.5	0.981	0.969		
Spain	BBB,BBB-	AA,AA-,A,BBB+,BBB-	5.25	6.25	7.8	7	8.33	1.043	0.996	1.158	1.176

Appendix Table A2 Panel B. Correlation matrix

	2013-14						2011-12					
	Rating	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*Rating*	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*
DLLS	0.692						0.598					
LLSV(EJ)	-0.926	-0.830					-0.805	-0.849				
LLSV(RL)	-0.823	-0.780	0.875				-0.719	-0.887	0.943			
Heritage	-0.728	-0.585	0.746	0.641			-0.744	-0.488	0.759	0.672		
PRS	-0.551	-0.515	0.620	0.518	0.919		-0.606	-0.310	0.643	0.553	0.919	
World Bank	-0.751	-0.622	0.772	0.677	0.991	0.938	-0.729	-0.430	0.730	0.635	0.990	0.950

Appendix Table A2 Panel C. VIF between Rating and quality of law indicator

	2013-14						2011-12					
Rating with	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*World Bank*	*DLLS*	*LLSV(EJ)*	*LLSV(RL)*	*Heritage*	*PRS*	*World Bank*
VIF	2.03	7.02	3.11	2.13	1.44	2.29	1.56	2.84	2.07	2.24	1.58	2.14
Tolerance	0.492	0.142	0.322	0.470	0.696	0.436	0.642	0.352	0.483	0.447	0.633	0.468

This table presents values for the country-level variables (Panel A), their correlation matrix (Panel B) and the Variance Inflation Factor between country ratings and the quality of law proxies (Panel C). In Panel A, values for the World Bank Rule of Law indicator are not reported during 2011-12 for country-years that are not included in the placebo sample. Rating is the S&P local currency long term debt issuer rating; DLLS captures the substantive and procedural statutory intervention in judicial cases at lower-level civil trial courts; LLSV (EJ) is the efficiency and integrity of the legal environment as it affects business, particularly foreign firms; LLSV (RL) captures the law and order tradition; Heritage is the extent to which a country's legal framework allows individuals to accumulate private property freely, secured by clear laws that the government enforces effectively; PRS measures law and order; World Bank captures the rule of law. Further details on the explanatory variables are provided in Table A1.