COST AND EFFICACY OF COLLECTIVE ACTION CLAUSES

By Chenbo Fang[1, 2]

Recent developments in sovereign capital market, such as the debt crisis in Eurozone, Greece's massive restructuring, and the escalating tension between Argentina and its holdout creditors, have brought Collective Action Clauses (CACs) back to the limelight. These clauses in sovereign bond contracts are claimed to address the coordination problem among creditors and thus enable a more orderly restructuring process, and previous research has found little cost of carrying these "insurances" for debtor countries. In this research, I revisit the cost question through a replication method and new evidence made available by the Eurozone CACs mandate, and I examine the actual efficacy of CACs by surveying the 22 sovereign bond restructurings since 1970, on which there has been little empirical analysis. My analysis finds that Euro CACs with the aggregation feature are associated with a small but positive addition to the borrowing cost, and riskier investments with lower credit rating and longer maturity are subject to higher CACs premium. At the same time, CACs have not significantly affected the outcome of restructurings after controlling for other factors, such as creditor structure, haircut, and government coerciveness. This cost-benefit analysis led to the conclusion that although CACs do not lead to substantially higher borrowing cost—even the "Super CACs" with the Aggregation Feature, including them does not necessarily guarantee a more orderly restructuring, and thus more dramatic reforms may be necessary if further improvement in the restructuring process is desired.

Keywords: Sovereign Bond Restructuring, Collective Action Clauses (CACs), Aggregation Feature, Borrowing Cost, Participation Rate, Length of Negotiation, Litigation

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I. Introduction

A. The Coordination Problem

Sovereign restructuring is fundamentally different from its counterpart in the corporate world. A distressed company in the U.S., for example, can follow the Chapter 11 and submit a restructuring petition to the bankruptcy court, which would become legally binding for all the creditors involved if approved by the court, a majority of these creditors, and a subsequent confirmation hearing (see Administrative Office of the United States Courts, 2005). In contrast, there is no analogous supranational jurisdiction that can discharge a distressed country from excessive debt. In seeking debt relief, a country has to negotiate with its creditors privately rather than appealing to an objective arbitrator. Moreover, even if the restructuring is approved by most debt holders, it is not legally binding on the rest of them. A determined creditor that rejects the restructuring offer—known as holdout—can pursue the debtor country indefinitely.

This *non-dischargeability*[3] is exacerbated by a shift from loans to bonds in sovereign capital market following the "Brady Deals" in early 1990s.[4] On the heel of widespread sovereign defaults in Latin America, U.S. Secretary of the Treasury Nicholas Brady created a novel restructuring plan for these default countries where illiquid syndicate loans, which had been the dominant instrument in sovereign borrowings, were replaced by tradable bonds. This transition has not been reversed, and bond borrowing has since been the dominant way of raising debt for most sovereign issuers (see Das, Papaioannou, and Trebesch, 2013, P18). Compared to syndicate loans that used to be held by a handful of commercial banks, bonds are dispersed among creditors around the world and are easy to take position from the secondary market. A face-to-face negotiation with all of its creditors becomes virtually impossible for a debtor country not only because of the sheer number of bondholders but also their divergent interests (see Weidemaier and Gulati, 2013, P56).

The above conditions give rise to the coordination problem. In a restructuring, if the majority of bondholders have already agreed to the restructuring plan, it would be less costly for the debtor country to pay the remaining holdout in full than to deal with their continual harassments—litigations in particular. Indeed, according to Schumacher, Trebesch and Enderlein (2014), recent restructurings have seen a rise of the use of litigation, which in turn can lead to loss of market access and decline in international trade. These are a much higher price to be paid compared to the minority holdout's claims. Some hedge funds, including the famous Elliott Associates that is behind the recent litigation against Argentina, have developed the strategy where they take a minority position in some distressed sovereign bond series, hold out, and sue default countries until full payment.[5] In light of the debtor country's ex post incentive to give higher compensation to holdout, individual bondholders would be reluctant to agree to the restructuring plan ex ante in fear of leaving money on the table, even if there is widespread consent on the restructuring. Coordination problem among creditors would thus exacerbate the non-dischargeability of sovereign debt, resulting in lower participation rate, longer negotiation, and more litigation in a restructuring.

3 See Gelpern (2013) for more comments on the concept of non-dischargeability.

4 See Buckley (1997) for more discussion of the evolution of this market in the early 1990s.

5 See The Guardian (2011) for a selection of the so-called "vulture funds."

B. How Can CACs Solve the Problem

Collective Action Clauses, or simply CACs, are one of the key contractual reforms to address the coordination problem and improve the orderliness of restructurings.

CACs refer to not a single, but a range of contract provisions.[6] At the core of policy discussion is the collective modification clause (see Weidemaier and Gulati, 2013, P53), which permits the modification of payment terms for the entire bond issue if a pre-specified supermajority of creditors agrees to the restructuring plan. The clause greatly compromises the holdout strategy aforementioned, since minority dissent creditors would be forced to take the cut along with the supermajority bondholders and legally prohibited from filing any lawsuit. Without the threat of higher compensation to holdout, coordination among creditors should proceed much more smoothly. Specifically, according to Bi, Chamon, and Zettelmeyer (2011), modification clause should lead to higher participation rate—the wait-and-sue strategy becomes unpromising if the restructuring plan appeals to most creditors, shorter negotiation—the debtor country no longer has to meticulously care for unanimous consent, and elimination of litigations, at least those filed by minority holdout.

The prevailing modification clause, however, only allows bondholders to make majority decisions on a bond-by-bond basis. Thus, the holdout can still concentrate their capital, purchase enough bonds in individual series, and block at least a portion of the restructuring. An Aggregation Feature on top of the modification clause, which constitutes the "Super CACs," has been devised to address this problem.[7] The feature says that if there is supermajority consent across *all* bond series, the supermajority threshold for individual bond restructuring would be lowered, making it harder for the holdout to block position and thus hinder the majority decision.

Besides the collective modification clause and the Aggregation Feature, other CACs include the collective acceleration clause—which requires a minimum bondholder vote to approve a demand to accelerate payment after a default; the collective representation clause—which empowers a trustee or a bondholder committee to act on behalf of bondholders collectively; the disenfranchisement clause—which bars certain bondholders from voting on restructuring plans; and others.

C. CACs History and Usage

As Weidemaier and Gulati (2013) state: "CACs have been in use for nearly a century" rather than some recent innovations portrayed by many policymakers. They originated in English law bonds in 1879, and most of the international bonds governed by English law have historically included CACs (see Buchheit and Gulati, 2002). In contrast, most sovereign bonds issued in New York, the other major center for international securities, had not carried CACs until 2003, when Mexico as a market leader started to include CACs in its international series. Gelpern and Gulati (2006) show that the shift is due to substantial involvement by the public sector, including the "Rey Report" by G10, subsequent echoing comments from G7 and G22, and most importantly a "behind-the-scenes" campaign led by U.S. Treasury.

Most of the New-York-law bonds issued after 2003 have adopted the collective modification clause recommended by the Rey Report, which has 75% as the threshold for supermajority. This

6 See Bradley and Gulati (2013), P20, for a detailed description of the various forms of CACs.

7 See Bradley and Gulati (2013) for more on "Super CACs."

threshold is higher than those required in most old English bonds as many U.S. investors viewed English modification requirements as too easily satisfied. On the other hand, the collective modification clause mandated by the Eurozone, as detailed in the next section, require a minimum of 66.67% of the vote to change payment terms.[8]

In contrast, the Aggregation Feature, which is also part of the "Model CACs" recommended by the Rey Report, has been included only in a small subset of the post 2003 New-York-law bonds (see Bradley and Gulati, 2013). The Eurozone CACs mandate, on the other hand, ensures that all Eurozone sovereign bonds issued after 2012 contain an identical Aggregation Feature.

The history of CACs usage has a lot of implication for their efficacy. Eichengreen and Mody (2000) show that the different provisions of English law and New York law issues derive from a contract change in the distant past that was required by U.S. Trust Indenture Act of 1939 to inhibit corporate insider misbehavior. CACs provisions, therefore, are remnants of past practices rather than actively monitored parameters. Weidemaier and Gulati (2013) further demonstrate that New York law market participants have been well aware of the existence of CACs but did not believe them to be a necessary feature of sovereign bond documentation. This stands in stark contrast with the popular narrative by CAC's advocates that CACs have been neglected due to market failure and would have otherwise brought order to restructuring. This heightens the importance of an empirical analysis that examines the actual efficacy of CACs.

D. Euro CACs As the Latest Fashion

The Euro Debt Crisis triggered the latest round of CACs adoption. After Greece's bailout in mid-2010 and with solvency problem spread across the entire Eurozone, politicians in the richer Euro nations came under increasing pressure from an angry public to make policy changes that would mitigate the need for future bailouts. One of the goals was to streamline the debt restructuring process so that private creditors can take the cut together, or *bail-in*, in a debt distress (see Bradley and Gulati, 2013). Less than a year into the crisis, Eurogroup made a statement that, among other proposals, requires the inclusion of "standardized and identical collective action clauses…consistent with those common under UK and US law after the G10 report on CACs… in the terms and conditions of all new euro area government bonds starting in June 2013…" (see Eurogroup, 2010).

Greece, however, was unable to wait until the proposed start date and retroactively inserted CACs in its local-law bonds before what turned out to be the largest sovereign restructuring in history (see Zettelmeyer, Trebesch, and Gulati, 2013). Notably, the CACs contained the Aggregation Feature, which, according to Zettelmeyer, Trebesch, and Gulati (2013), turned out to be "pivotal" in enhancing participation rate for the debt exchange.

Confirmed by Greece's experience and with more restructurings on the horizon, Eurozone leaders advanced the mandatory inclusion of CACs by 6 months, and as part of the Treaty Establishing the European Stability Mechanism announced on February 2, 2012, CACs are said to be "included, as of 1 January 2013, in all new euro area government securities with maturity above one year…" (see Eurozone, 2012, Paragraph 3 of Article 12). The final draft reduces the threshold for collective modification to 66.67% from 75% recommended by the G10 report, and cross-series vote requirement to 75% from 85% that is the New York law Aggregation Feature (see EFC Sub-committee on EU Sovereign Debt Markets, 2012).

8 See Group of Ten (1996) and Weidemaier and Gulati (2013) for more specifics on voting threshold for different versions of modification clauses.

As Bradley and Gulati (2013) point out, the mandate affects mostly local law bonds, since, as mentioned in Section 1.3, most international bonds issued after 2003 (either under English law or New York law) have already carried CACs. After examining the local laws of all 18 Eurozone countries, we confirmed that except for Belgian ones that had long contained English style CACs, all other domestic sovereign bonds are subject to the change from the mandate.

II. Cost Of Cacs

A. Literature Review

Intuitively, CACs should come with a price, since they make it easier for a debtor country to restructure its debt and thus to cut creditors' returns. Theoretically speaking, there is a tradeoff between ex post enforceability and ex ante cost of borrowing—since the former would be significantly lowered by the inclusion of CACs, the latter should be raised in proportion.[9] Furthermore, Becker, Richards and Thaicharoen (2003) theorize that CACs may increase moral hazard and encourage over-borrowing. With these additional risks, creditors may feel justified to demand higher yields on their investments. Proponents of this view, such as Folkerts-Landau (1999), which I refer to as the "higher-risk school," argue that CACs would lead to "a prohibitive increase in borrowing costs at a time when trillions of dollars are needed for infrastructure finance…" However, under the premise that CACs are effective, a more orderly restructuring process facilitated by CACs can lead to faster economic recovery and thus higher expected return of the investments in the long run (see Eichengreen and Mody, 2000, P2). In this sense, CACs may reduce the overall risk of the bonds and boost investors' willingness to lend. I refer to this view—represented by Eichengreen and Mody (2000) and Bradley and Gulati (2013)—as the "lower-risk school." Therefore, cost of CACs can go either way, and remains as an empirical question to be addressed.

Prior literatures, notably Eichengreen and Mody (2000) and Bradley and Gulati (2013), examined the cost of CACs by regressing bond yield at issuance on CACs along with other control variables.[10] However, there are several problems with this orthodox approach. Most importantly, it cannot separate time effects on bond yield from the inclusion of CACs. Take the recent Euro CACs as an example. As discussed in Section 1.4, the CACs mandate was part of the treaty that established the European Stability Mechanism (ESM), which itself is a comprehensive reform package that significantly affected the trajectory of Euro borrowing cost (see Eurozone, 2012). Immediately after the ESM Treaty, European Central Bank President Mario Draghi made the announcement that policymakers would do "whatever it takes" to preserve the euro, which singlehandedly lowered yield on Spanish 10-year bond by 39 basis points (see Black and Randow, 2012)—note that it was a change of yield on the old bonds without CACs. Therefore, new Eurozone sovereign issuances after 2012 may bear lower yields at issuance simply because of the higher investor confidence in Eurozone in general, rather than CACs.

9 See CIEPR (2013) for more discussion of the unenforceability of sovereign debt and its tradeoff with borrowing cost.

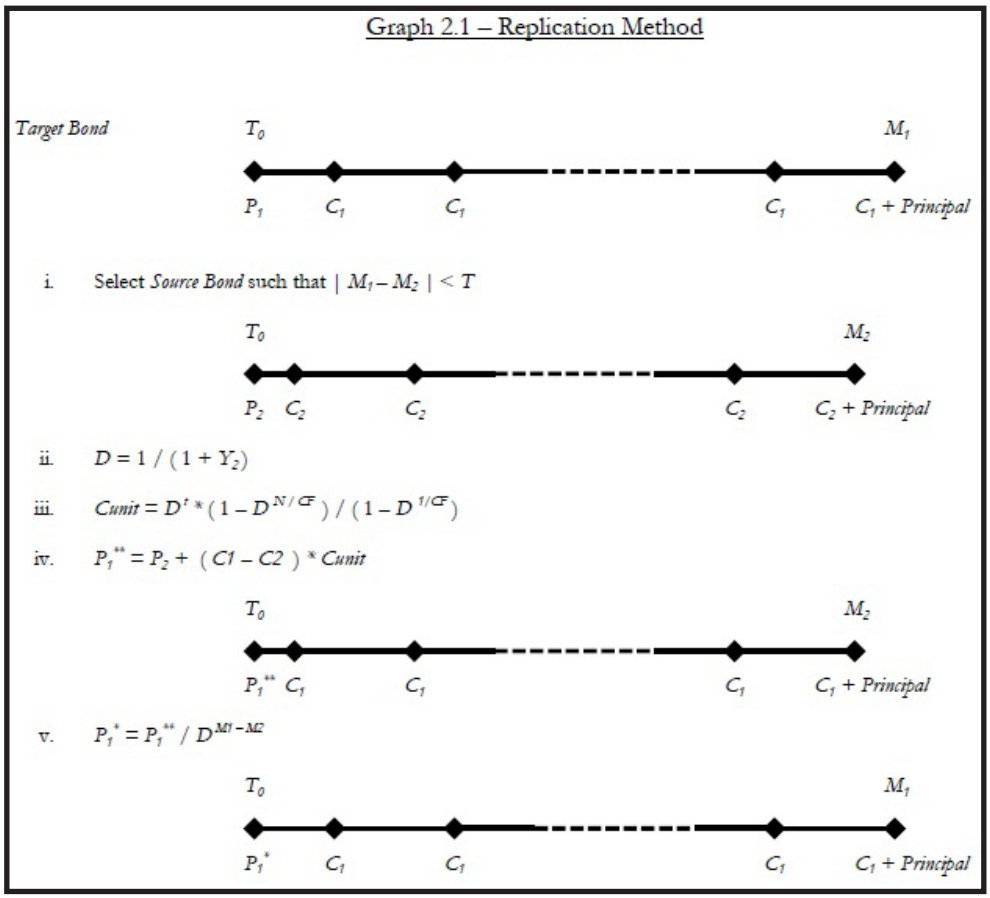
10 Including but not limited to Petas and Rahman (1999), Dixon and Wall (2000), Tsatsaronis (1999), Eichengreen and Mody (2000), Becker, Richards and Thaicharoen (2003), and Bradley and Gulati (2013).

B. A Replication Method

Replicating new bonds with CACs from old bonds without, in contrast, addresses the time effect issue above in particular. With the replication method detailed below, given a Target Bond with CACs embedded, I replicate its payment schedule from a Source Bond that contains the same contract features except for CACs. Thereby, time effects that simultaneously affect the costs of both bonds—such as fiscal and monetary policy, investor sentiment, and market environment—can be held constant. Consequently, yield difference of the two bonds can be attributed to the inclusion of CACs.

The replication method is summarized below and further illustrated in Graph 2.1:

i. Select Source Bond—given a Target Bond with CACs, I find a Source Bond that contains, except for CACs, the same set of contract features, which I define to be coupon frequency, maturity type, and indexation.[11] Furthermore, the maturity of the Source Bond (T_2) has to be within one coupon interval (T) from the maturity of the Target Bond (T_1). This way it is ensured that there exist time periods when the two bonds have the same number of remaining coupons (N).



2. Calculate discount factor (D)—use the yield of Source Bond (Y_2) as discount rate to calculate discount factor.

3. Calculate Value of Unit Coupon Maturing at T_2 (Cunit)—use the number of remaining coupons (N), coupon frequency (CF), and the time from first coupon payment

11 Indexation refers to whether the bond is indexed to inflation, GDP, and so on. I focus on these three contract features since they are highly relevant to the payoff of a bond and were the only ones readily available from Bloomberg.

(t) to calculate the value of unit coupon—an hypothetical instrument that pays out 1/CF unit return on every coupon payment date of the Source Bond.

4. Calculate Price of Counterfactual Target Bond Maturing at T_2 (P_1^{**})—equalize to coupon rate of the Target Bond.

5. Calculate Price of Counterfactual Target Bond Maturing at T_1 (P_1^{*})—discount P_1^{**} by the maturity difference between the Target Bond and Source Bond ($T_1 - T_2$).

With the counterfactual price, we can calculate the *counterfactual yield of the Target Bond* (Y_1^{*}), and subtract it from the actual yield (Y_1) to get the cost of CACs ($Y_1 - Y_1^{*}$).

Note that the replication method explicitly adjusts for coupon rate and maturity date and implicitly controls for issuer characteristics, benchmark rate, and the sets of aforementioned contract features and time effects. There are still two factors, however, that can affect bond yield yet un-controlled by replication: duration and amount of issuance. Therefore, I regress replication results on *coupon difference* ($C_2 - C_1$) and *relative amount of issuance* (AMT_1 / AMT_2) as a final check.

C. Data from the Eurozone CACs Mandate

The replication method above requires rather stringent conditions on the data: First, there need to exist two bonds that share the same set of contract features except for CACs; Secondly, the country has to issue frequently enough both before and after including CACs in its bonds so that for a *Target Bond* there exists at least one *Source Bond* that matures within in one coupon interval; Lastly, there need to be a period such that the prices of two issues are both available – this ensures that any time effect such as fiscal and monetary policy or market environment is reflected in the prices of both bonds and thus cancelled out.

Eurozone domestic sovereign bonds constitute a great sample that satisfies the stringent conditions above. First, most Eurozone countries issue a small variety of investment products and maintain the same contract features within each product. Secondly, as discussed in Section 1.4, domestic sovereign bonds in Eurozone had not carried CACs before 2013, whereas the CACs mandate guarantees that every sovereign bond issued after 2012 contains identical CACs. Therefore, there is a clear reference date to distinguish bonds with and without CACs. Data shows that 14 out of 18 Eurozone countries have been issuing debt frequently enough so that there are satisfactory pairs of *Target Bond* and *Source Bond* that mature within a single coupon interval. Lastly, most Eurozone sovereign securities have been actively traded in the secondary market and their daily prices are available from Bloomberg.[12]

Apart from satisfying the selection conditions, the sample yields a number of other benefits. Eurozone represents a diverse body of different creditworthiness, ranging from issuers with virtually no credit risk—such as Germany—to speculative-grade issuers—such as Portugal, and thus the result has predictive power for a generalized global pattern.[13] In addition, most cases in the sample have extended periods of secondary market pricing data, which allows us to track the cost of CACs over time. Lastly, Euro CACs contain the Aggregation Feature, which had

12 Pricing sources on Bloomberg are mostly BGN and BVAL, both of which calculate price as the average of last available bid and ask prices.

13 Ratings are based on Moody's Investors Service (2014).

not been common in sovereign issuances and thus could not be studied empirically.[14] Therefore, Eurozone sovereign bonds provide a great sample to study the so-called "Super CACs" that have the Aggregation Feature on top of standard CACs.

D. Result

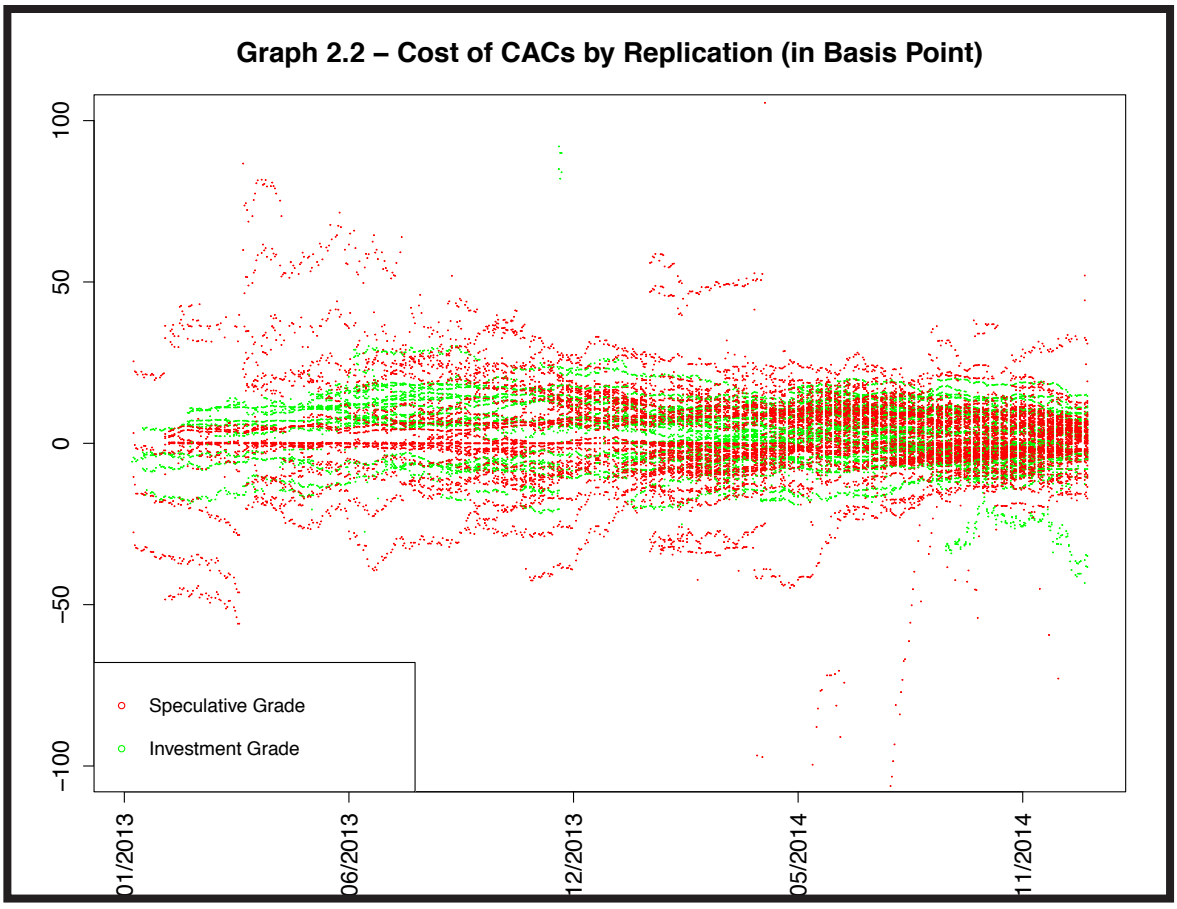
Table 2.1 summarizes results from the replication method. 184 pairs of bonds from 14 Eurozone issuers are eligible for replication.[15] Together they produce more than 28,000 observations of CAC's cost across the two years since January 1, 2013. Overall, Euro CACs have an addition of merely 2.249 basis points, or 0.0249%, to borrowing cost. According to normality assumption by the Central Limit Theorem, it is insignificantly different from zero with a standard deviation at 15.124. Graph 2.2 shows that the variation of CACs cost has decreased significantly over time, indicating that market opinion on the cost of Euro CACs was much more inconsistent at the beginning but has converged over time.

Table 2.1 – Cost of CACs by Replication (in basis point)

Mean	2.249
Median	2.700
Standard Deviation	15.124
Investment Grade (intercept)	1.192 *** (0.194)
Speculative Grade	1.242 *** (0.207)
Time to Maturity	0.245 *** (0.015)
Coupon Difference	0.441 *** (0.065)
Relative Amount Issued	-1.675 *** (0.056)
Replication Pairs	194
Issuer Countries	14
Total Observations	28,410
Investment Grade Observations	17,233
Speculative Grade Observations	11,177

14 See Section 1.2 for details of the Aggregation Feature.

15 Details included in Appendix B – Replication Cases.



As mentioned in Section 2.2, the replication method leaves out the effect of *duration* and *amount of issuance* on bond yield, which can potentially cause omitted variable bias. Therefore, I control for *coupon difference* ($C_2 - C_1$) and *relative amount of issuance* (AMT_1 / AMT_2) with an OLS regression. In addition, I regress the result on *credit rating* and *time to maturity* to analyze their interactions with CACs cost.

A division of the replication cases by credit rating shows that speculative-grade issuers experience a slightly higher add-on to borrowing cost than investment-grade bonds, by 1.242 basis points.[16] The result bolsters the rationale behind the "higher-risk school," since investments made by less creditworthy issuers, which are riskier, are subject to higher premium.

Along this line, it is interesting to see whether bonds with longer time to maturity—thus higher risk—would similarly carry higher CACs cost. Indeed, the regression result shows that time to maturity—defined as years from pricing date to maturity date—is associated with a statistically significant increase to CACs cost. However, the magnitude of the increase is quite small, at 0.245 basis points per additional year, which means that controlling for other factors, a 20-year bond would only have a CACs-specific risk premium of 2.45 basis points compared to a 10-year bond.

Overall, my result is consistent with prior literature in that CACs do not lead to substantial difference in borrowing cost—an increase of merely 2.249 basis points, which is insignificantly

16 The categorization of speculative grade versus investment grade is based on Moody's Investors Service (2014). Since there is only one issuer at or below "Ba" (Portugal), which is Moody's own threshold for "Speculative Grade" versus "Investment Grade," I redefine speculative grade as at or below "Baa," investments at which "may possess certain speculative characteristics."

different from zero according to normality assumption by the Central Limit Theorem. However, contrary to previous results, my analysis supports the "higher-risk school"—less creditworthy issuers experience a higher increase to borrowing cost, and bonds with longer maturity carry higher CACs cost. In another words, ex ante risk addition outweighs ex post risk reduction in the CAC's cost calculus. This departure from mainstream literature can be seen as a novel insight since I studied the form of "Super CACs" with the aggregate feature, which is absent in most of the bonds studied by prior literatures. As mentioned in Section 1.4, the Aggregation Feature further compromises the holdout strategy and was "pivotal" in enhancing participation rate for Greece's 2012 debt exchange. The difference with prior literatures may thus be attributed to investors' risk evaluation of the Aggregation Feature specifically, rather than any inconsistency.

III. Efficacy

A. Sample

As discussed in Section 1.1, bonds became popular among sovereign borrowers only after the wave of Brady Deals in early 1990s. Bond restructurings, in turn, are relatively new and scarce in history. The survey by Cruces and Trebesch (2013, P92) shows that while there have been 187 distressed sovereign restructurings since 1970, only 22 of them involve significant bond component.[17] Despite the scarcity, I focus only on these 22 distressed bond restructuring cases, where coordination problems among diverse creditors were present and thus CACs were relevant. The loss of sample size, is made up for by closer examination of each case.

i. Response Variables

Based on the mechanism modeled by Bi, Chamon, and Zettelmeyer (2011) of how CACs can solve the coordination problem, I focus on participation rate, length of negotiation, and number of litigations as measures of efficacy and hence the response variables.[18]

Participation rate data is primarily from Duggar (2013). I focus on initial participation rate—the participation rate as of an official exchange offer deadline—as opposed to final participation rate—the rate that is eventually achieved, which can be several years later (for example, Argentina's 2005 restructuring offer was re-opened to holdout creditors in 2010). My reason is that the former reflects the deal that a debtor country can strike without subsequent techniques, which are difficult to record and can alter the final participation result significantly.

Trebesch (2010) has a database of restructuring delays, which records both *time from announcement or default* and *time from start of negotiation*, to exchange date. I choose the latter variable, since the delay from default to start of negotiation is not relevant in our analysis of CACs. I should point out that many negotiation start dates are blurry (since they need not to be publicly available) and the data may not reflect reality exactly. To counter this, I include a robustness check with the announcement or default date (in Appendix A), which is publicly available for all cases and thus assumed to be accurate.

17 Cruces and Trebesch (2013, P92) has five key case selection criteria, which I follow in this analysis.

18 Refer to Section 1.2 for more description of the mechanism.

As for number of litigations, Schumacher, Trebesch and Enderlein (2014) have a comprehensive database of creditor lawsuits filed against defaulting sovereigns since 1976, from which I draw relevant data for bond restructurings covered in this analysis.

I also include robustness analysis with alternative response variables—that is, with final participation rate and length of negotiation from announcement or default—in Appendix A.

ii. Explanatory Variables

The main explanatory variable should capture relevant CACs information. Based on my description in Section 1.2 and the narratives of CACs in Section 3.2 below, I focus on the collective modification clause (CMC) among other CACs given its theoretical and historical relevancy to restructuring and its being at the center of policy discussion. After examining the data, I focus on whether CMC was actually triggered in a restructuring, rather than whether CMC was present in the bonds in exchange. My reason is that within my sample, there are no cases where CMC was present but could not be triggered because the supermajority threshold was not reached. Instead, these cases where CMC was present but not triggered bolster the claim in Weidemaier and Gulati (2013, P76) that "market participants have been well aware of the existence of CACs but did not believe them to be a necessary feature of sovereign bond documentation." Coding these cases as having CMC involved would thus be problematic since both the debtor country and the creditors were probably not aware of the effect of the clause. Therefore, I focus on the usage of CMC in lieu of the presence of it.

To identify whether CMC was used in a restructuring, I first look at whether it was present. The most reliable sources are original listing prospectuses of the bonds in exchange, which can be found from Thomson One. One complementary tool I employed is the governing law, which is usually easy to find on the prospectus and can be inferred from involved law firms.[19] As discussed in Section 1.3, Eichengreen and Mody (2001) and Becker, Richards and Thaicharoen (2003) show that English law bonds have always included CMC whereas New York law bonds have not include the clauses until 2003. I find that CMC can be present in all of the bonds (e.g. Belize 2013), only a small part of the bonds (e.g. Argentina 2005), or none of the bonds (e.g. Ecuador 2000). After narrowing down to the restructurings where CMC was present, I then look at whether the clause was actually triggered. For this part, I rely on data from Panizza, Sturzenegger, and Zettelmeyer (2009) and Duggar (2013). Given the data availability, I code CMC as a dummy variable indicating whether CMC was triggered in a restructuring (yes-CMC) or not (no-CMC), and use it as the main explanatory variable. Alternatively, I could have constructed a polytomous variable that capture the degree of presence of CMC as well as the threshold specification, but a dichotomous variable is what can be achieved with the data availability.

Given the scarcity of observations, I was very selective in choosing the controls. After taking out variables that are highly collinear with others, I narrow down the list to creditor structure—a dummy variable indicating whether the creditors were concentrated or dispersed, debt structure—how many different bond series were to be exchanged, haircut—how big was the cut for creditors, relative size of restructuring—debt in exchange as percentage of total debt, government coerciveness—how willing was the debtor country to engage in a negotiation. Sources of data on these variables are IMF Country Reports, exchange offers from Thomson One, Fernandez-Ansola and Laursen (1995), Panizza, Sturzenegger, and Zettelmeyer (2009), Trebesch

19 I used this technique only when relevant terms are not available—missing pages, for example.

Table 3.1 – Bond Restructuring Cases (foreign creditors only since 1970)

Bond Restructuring Case				Collective Modification							Participation Rate			Length of Negotiation (in month)	
Country	Exchange Offer Date	Bonds Exchanged	Governing Law	Included?	Used?	Government Coerciveness	Creditor Structure	Debt Structure	Haircut	Debt in Exchange (% of Total Debt)	Initial Participation	Final Participation	Number of Litigations	From Announcement or Default	From Start of Negotiation
Argentina	Jan-05	external bonds	eight governing laws	partly	no	9	Dispersed	multiple	76.8%	41.7%	76.2%	92.6%	47	40	18
Belize	Dec-06	private external debt	New York law	yes	yes	2	Concentrated	few	23.7%	51.6%	98.1%	98.1%	0	7	7
Belize	Feb-13	2029 Superbond	New York law	yes	yes	3	Concentrated	few	31.5%	47.3%	100.0%	100.0%	0	8	8
Cote d'Ivoire	Sep-09	FC external Brady bonds	New York law	no	no	7	Concentrated	few	55.2%	18.7%	100.0%	100.0%	0	25	25
Cote d'Ivoire	Nov-12	eurobond coupon	New York law	yes	yes	3	Dispersed	few	6.1%	0.6%	100.0%	100.0%	0	23	1
Dominica	Apr-04	LC bonds, domestic and external	English law	partly	no	2	Dispersed	multiple	54.0%	44.5%	72.0%	100.0%	1	7	7
Dominican Republic	Apr-05	external bonds	New York law	no	no	2	Dispersed	few	4.7%	16.7%	97.0%	97.0%	0	14	14
Ecuador	Jul-00	FC external Brady bonds and eurobonds	New York law	no	no	6	Concentrated	few	38.3%	44.8%	97.0%	97.0%	1	13	3
Ecuador	Apr-09	global bonds	New York law	no	no	7	Dispersed	few	67.7%	25.3%	91.0%	91.0%	0	7	7
Greece	Feb-12	domestic and external bonds	mostly local law, but also foreign laws	yes	yes	3	Dispersed	multiple	64.6%	55.2%	96.9%	96.9%	0	9	9
Grenada	Sep-05	external and domestic bonds	New York law and local law	no	no	2	Concentrated	multiple	33.9%	65.1%	94.0%	94.0%	1	14	12
Moldova	Aug-02	FC external bonds	English law	yes	yes	2	Concentrated	few	36.9%	3.2%	100.0%	100.0%	0	5	5
Pakistan	Nov-99	three FC external bonds	English law	yes	no	3	Concentrated	few	15.0%	1.2%	99.0%	99.0%	0	12	1
Panama	Jan-94	US dollar floating rate notes, Japanese yen, and ECU denominated bonds	foreign laws	no	no	4	Dispersed	few	15.1%	2.9%	97%	99%	0	84	16
Russia	Mar-99	LC domestic GKOs and OFZs with non-residents	local law	no	no	8	Dispersed	multiple	46.0%	2.3%	88.5%	88.5%	0	10	10
Russia	Feb-00	FC domestic MinFin III	local law	no	no	8	Dispersed	few	51.5%	0.7%	90.0%	90.0%	0	10	4
Russia	Aug-00	FC external PRINs and IANs by state-owned bank	English law	yes	no	6	Dispersed	few	50.8%	16.4%	99.0%	99.0%	0	21	16
Seychelles	Dec-09	external bonds	English law	yes	yes	3	Dispersed	few	56.2%	29.6%	100.0%	100.0%	0	16	11
St. Kitts and Nevis	Feb-12	domestic and external bonds	local law	yes	yes	3	Concentrated	few	62.9%	12.8%	100.0%	100.0%	0	10	9
Ukraine	Sep-98	LC domestic treasury bills (OVDPs) with non-residents	local law	no	no	2	Dispersed	multiple	11.8%	2.8%	100.0%	100.0%	0	2	1
Ukraine	Feb-00	five FC external bonds	Luxembourg law and German law	partly	yes	2	Concentrated	few	18.0%	8.3%	99.0%	99.0%	0	3	3
Uruguay	Apr-03	46 domestic bonds and treasury bills, 18 external bonds, and one Samurai bond	mostly local law, but also NY law, English law, and Japanese law	partly	yes	1	Dispersed	multiple	9.8%	56.8%	93.0%	93.0%	0	3	3

See Appendix C for detailed sources and notes for each variable and each restructuring case.

(2010), Enderlein, Trebesch, and von Daniels (2012), Cruces and Trebesch (2013), Duggar (2013), and Zettelmeyer, Trebesch, and Gulati (2013).[20] [21] [22]

Appendix C has a detailed list of sources for all response and explanatory variables above for each restructuring.

B. Narratives of CACs in Restructurings[23]

Table 3 lists relevant information for every bond restructuring case. We can see that there have been 13 bond restructurings where CMC was present but only 9 where CMC was actually triggered.

CMC was used for the first time during Ukraine's exchange of five Eurobonds in 2000. Then in Moldova 2002, CMC was used to amend the payment terms after an agreement was reached with its major bondholder, who held 78% of the outstanding bonds against a required 75% majority vote threshold in the CMC. In its 2003 restructuring, Uruguay used the CMC contained in its Samurai bonds—the first use of CMC in Japan. In 2006, Belize used the CMC embedded in one of its bonds to bind 1.3% of non-complying or non-responding creditors to accept the terms of the exchange, increasing the acceptance rate to 98%—this was the first usage of CMC under New York law in more than 70 years. After that, CMC has been triggered in all restructurings that involved bonds with embedded CMC, including Seychelles 2009, Cote d'Ivoire 2012, and St. Kitts and Nevis 2012. Greece's 2012 debt exchange incorporated a novel feature as an Act of Parliament retroactively inserted CMC into domestic law bonds prior to the announcement of the debt exchange offer. The CMC was subsequently triggered to achieve a 100% participation rate for domestic law bonds. Most recently, in Belize 2013, CMC was triggered after a 86.2% supermajority participation was reached.

However, four of the restructurings with CMC embedded in underlying bonds did not make use of the clause. Russia's 2000 restructuring of its PRINs, Pakistan's 1999 restructuring of its Eurobonds, and Dominica's 2003 restructuring of its external bonds all involved bonds that were governed by English Law and thus should contain the standard CACs.[24] However, none of the three restructurings made use of CACs, which supports the claim by Weidemaier and Gulati (2013) that "market participants have been well aware of the existence of CACs but did not believe them to be a necessary feature of sovereign bond documentation."

C. Quantitative Analysis

The histograms in Graph 3 give a preliminary idea of the efficacy of CMC. It shows that the yes-CMC group has on average higher participation rate (by 6.2%) and shorter negotiation (by 4 months), and is free of litigation compared to the no-CMC group. This points to considerable

20 A better alternative is the number of creditors if data were more available.

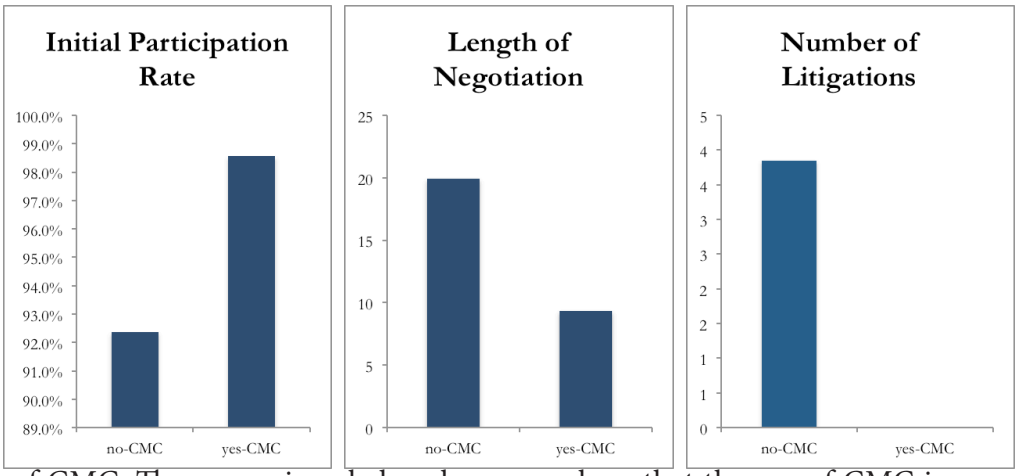
21 Given the data availability, this is a dummy variable indicating whether there were seven or more bond series to be exchanged.

22 Alternatives are absolute value of debt in exchange and debt in exchange as percentage of GDP, both of which are highly collinear with the measure selected. Given the small sample size, I include only the measure selected in subsequent analysis, which has the highest correlation with participation rate of the three.

23 Narratives in this section are drawn from Panizza, Sturzenegger, and Zettelmeyer (2009), Zettelmeyer, Trebesch, and Gulati (2013), Duggar (2013) and a variety of news reports.

24 See Section 1.3 of this paper.

Graph 3.1 – Restructuring Results on Average



efficacy of CMC. The regressions below, however, show that the use of CMC is correlated with other more determinant factors of restructuring outcome, controlling for which renders the clause's effect insignificant. Regression results are exhibited in Table 3.2, 3.3, and 3.4.

For participation rate, I used a simple OLS regression given its relatively normal distribution. I focused on a basic model where CMC is the only regressor, a slightly bigger model with one more explanatory variable that produces the lowest Beysian Information Criteria (BIC), and one with the lowest BIC out of all the possible models.[25] It can be seen that creditor structure and haircut, among all explanatory variables, are the most important determinants of participation rate. Controlling for creditor structure alone and fixing on the concentrated-creditor group, as shown in the second model, diminishes both the multitude (from 6.2% to 3.3%) and the significance (from 10% significant to insignificant) of CMC. To interpret this, take Moldova 2002 as an example. The narrative from the previous section shows that a single creditor who held 78% of the outstanding bonds was responsible for achieving the 75% CMC threshold, but this level of creditor concentration has historically been associated with little participation problem, and the absence of CMC would not have worsened the situation counterfactually. On the other hand, the insignificance of the interaction term (indicating yes-CAC and dispersed creditor structure) in the second model suggests that CMC's performance is equally lackluster in the dispersed-creditor subgroup, where it is supposed to be effective by design. Within the subgroup, although CMC is associated with a 5.5% increase to participation on average, the big standard error renders the effect insignificant. Given the meager number of observations, it can be interpreted as that CMC has not been tested sufficiently in dispersed-creditor situations—situations for which it is designed.

In analyzing length of negotiation, which is in discrete format and has a long tail, I use a Poisson regression.[26] Similar to the participate rate analysis, I focus on three models with different sizes, which yield similar result that *CMC* becomes much less significant with even just one or two controls. The relative size of debt in exchange and the debtor country's willingness to negotiate appear to be the determinant factors of negotiation length. Controlling these two variables alone leaves little variation for *CMC* to explain and halves its contribution to insignificant level.

25 The models considered here have at most two-way interaction terms, and the only interaction terms are CMC*creditor structure and CMC*debt structure. The other interaction terms cannot be reasonably interpreted. For example, an interaction term between CMC and haircut does not have an easy interpretation.

26 More sophisticated model, such as a semi-parametric survival model adopted by Trebesch (2010), would be ideal if a larger sample were available.

Litigation has been rare even for such a small sample size. Argentina 2005, which is a clear outlier compared to other bond restructurings, had 47 litigations filed by different plaintiffs after the 2002 default. The rest of litigation incidents, according to Duggar (2013), are one lawsuit filed against Ecuador in 2001 by a commercial bank, one lawsuit filed against Dominica in 2005 and one against Grenada in 2006, both by the Export-Import Bank of Taiwan. The rarity of litigation occurrence produces enormous standard error for *CMC* despites its big magnitude, and thus *CMC* is not significant even in the basic model. The model with the lowest BIC indicates that the likelihood of litigation can be best predicted by the haircut level.

Table 3.2 – OLS Result for Initial Participation Rate (in percentage)

	CACs Only	With Creditor Structure	Model with Lowest BIC
yes–CACs (dummy)	6.196 *** (3.088)	3.338 (3.149)	2.936 (2.943)
Dispersed Creditor Structure (dummy)		-10.108 *** (3.469)	-9.318 ** (3.259)
Multiple Debt Structure (dummy)			
Haircut			-10.952 * (5.677)
Debt in Exchange (% of GDP) (log)			
Government Coerciveness			
yes-CACs * Dispersed Creditor Structure		5.472 (5.987)	5.075 (5.583)
yes-CACs * Multiple Debt Structure			
Observations	22	22	22
R^2	0.168	0.453	0.551
Adjusted R^2	0.126	0.362	0.446
BIC	155.987	152.932	151.667

Siginificance Codes: '***' 0.01 '**' 0.5 '*' 0.1

Table 3.3 – Poisson Result for Length of Negotiation from Start of Negotiation (in month)

	CACs Only	With Government Coerciveness	Model with Lowest BIC
yes–CACs (dummy)	-0.505 *** (0.159)	-0.255 (0.192)	-0.318 * (0.192)
Dispersed Creditor Structure (dummy)			
Multiple Debt Structure (dummy)			
Haircut			
Debt in Exchange (% of GDP) (log)			0.214 *** (0.055)
Government Coerciveness		0.086 ** (0.034)	0.095 *** (0.034)
yes-CACs * Dispersed Creditor Structure			
yes-CACs * Multiple Debt Structure			
Observations	22	22	22
Residual Deviance	85.874	79.287	62.812
BIC	173.522	170.027	156.642

Siginificance Codes: '***' 0.01 '**' 0.5 '*' 0.1

Table 3.4 – Poisson Regression Result for Number of Litigation

	CACs Only	Model with Lowest BIC
yes–CACs (dummy)	-18.650 (1155.953)	-19.193 (3331.392)
Dispersed Creditor Structure (dummy)		
Multiple Debt Structure (dummy)		
Haircut		19.668 *** (2.705)
Debt in Exchange (% of GDP) (log)		
Government Coerciveness		
yes-CACs * Dispersed Creditor Structure		
yes-CACs * Multiple Debt Structure		
Observations	22	22
Residual Deviance	227.21	30.643
BIC	245.082	51.608

Siginificance Codes: '***' 0.01 '**' 0.5 '*' 0.1

The analyses above lead us to an important observation besides the fact that CMC has not been highly influential in affecting restructuring outcome. Bond restructurings—both those with CMC involved and without—have had high participation rate, at 94.9% on average, and rare occurrence of litigation, at 0.14 cases excluding Argentina 2005. These two measures show that restructurings have actually been very orderly, far from the situation that enthusiast reformers have portrayed. Although there is a visible rise of the use of litigation since the 1980s (see Schumacher, Trebesch and Enderlein, 2014), running to the courthouse is still exception rather than the rule. The worst restructurings that received widespread attention and legitimized the advocacy of CACs are outliers rather than the norm.[27]

Robustness checks with alternative response variables, as shown in Appendix A, confirm the fact that CMC alone has limited efficacy in shortening negotiation length and no significant impact on raising participation rate or preventing litigation. In addition, regardless of what efficacy measures we use, restructurings have been very orderly in general.

27 The result is consistent with Duggar (2013).

IV. Conclusion

Using a replication method that eliminates time effects, Euro CACs has led to an increase of borrowing cost of merely 2.249 basis points, which is insignificantly different from zero according to normality assumption. The result is consistent with prior literatures in that CACs do not lead to substantial difference in borrowing cost. However, contrary to previous results, my analysis supports the "higher-risk school"—less creditworthy issuers experience a higher increase to borrowing cost, and bonds with longer maturity carry higher CACs cost. In another words, ex ante risk addition outweighs ex post risk reduction in the CACs cost calculus.

This departure from mainstream literature can be seen as a novel insight since I studied the form of "Super CACs" with the aggregate feature, which is absent in most of the bonds studied by prior literatures. As mentioned in Section 1.4, the Aggregation Feature further compromises the holdout strategy and was "pivotal" in enhancing participation rate for Greece's 2012 debt exchange. The difference may thus be attributed to investors' perception of the risks and functions of the Aggregation Feature specifically, rather than any inconsistency.

Albeit with little cost, CACs have also had little efficacy in improving sovereign restructurings. After controlling for other explanatory factors such as creditor structure, haircut, and government coerciveness, collective modification clause (CMC) has limited efficacy in shortening negotiation length and no significant impact on raising participation rate or preventing litigation.

A closer look at the response variables reveals that bond restructurings have actually been very orderly, with high participation rate, at 94.9% on average, and rare occurrence of litigation, at 0.14 cases excluding Argentina 2005. The worst restructurings that received widespread attention and legitimized the advocacy of CACs are outliers rather than the norm.

To conclude, this cost-benefit analysis reveals that CACs, even the "Super CACs" with the Aggregation Feature, would not lead to significantly higher borrowing cost as dreaded by some policy makers and theorists such as Folkerts-Landau (1999). There should thus be no hurdle in including these "freebies" in future contracts. However, the actual efficacy of CACs in improving restructuring experience would presumably be limited as well, with participation rate and prospect for litigation similar to those in the past controlling for factors such as creditor structure, haircut, and government coerciveness. More dramatic reforms, are needed if further improvement in sovereign bond restructuring is desired. Apart from more contractual ones, statutory reforms such as the establishment of an international sovereign bankruptcy court may finally become the center of debate (see International Monetary Fund, 2003).

Further improvements can be made to solidify the arguments of this research. On the cost side, the set of contractual features other than CACs can be broadened with better data availability. This would ensure the two bonds of a replication pair differ from each other no more than maturity, coupon rates, and CACs. On the efficacy side, more complicated regression techniques, such as the semi-parametric Cox proportional hazard model employed by Trebesch (2010), can be adopted once the sample of sovereign bond restructurings is expanded. With almost all sovereign issuances already containing CACs since 2003, however, the number of cases where CACs are not present will continue to be limited.

Bibliography

Administrative Office of the United States Courts (2011), Bankruptcy Basics, November 2011, Revised 3rd Edition.

Asonuma, Tamon, Gerardo Peraza, Kristine Vitola, and Takahiro Tsuda (2014), Sovereign Debt Restructurings in Belize: Achievements and Challenges Ahead, IMF Working Paper 14/132.

Becker, Torbjorn, Anthony Richards, and Yunyong Thaicharoen (2003), Bond Restructuring and Moral Hazard: Are Collective Action Clauses Costly? Journal of International Economics, October 2003, 61(1), 127-161.

Bi, Ran (2008), "Beneficial" Delays in Debt Restructuring Negotiations, IMF Working Paper 08/38.

Bi, Ran, Marcos Chamon, and Jeromin Zettelmeyer (2011), The Problem that Wasn't: Coordination Failures in Sovereign Debt Restructurings, IMF Working Paper 11/265.

Black and Randow (2012), Draghi Says ECB Will Do What's Needed to Preserve Euro, Bloomberg, July 26, 2012.

Bradley, Michael and Mitu Gulati (2013), Collective Action Clauses for the Eurozone, Review of Finance, 2013, 1-58.

Buchheit, Lee C. and Mitu Gulati (2002), Sovereign Bonds and the Collective Will, Emory Law Journal, 2002, 51(4), 1317-1363.

Buckley, Ross P. (1997), the Facilitation of the Brady Plan: Emerging Markets Debt Trading from 1989 to 1993, Fordham International Law Journal, 1997, 21(5), 1802-1889.

Committee on International Economic Policy and Reform (CIEPR) (2013), Revisiting Sovereign Bankruptcy, October 2013.

Cruces, Juan J. and Trebesch Christoph (2013), Sovereign Defaults: The Price of Haircuts, American Economic Journal: Macroeconomics, 2013, 5(3), 85-117.

Das, Udaibir, Michael Papaioannou and Christoph Trebesch (2013), Sovereign Debt Restructurings 1950–2010: Literature Survey, Data, and Stylized Facts, IMF Working Paper 12/203.

Duggar, Elena (2013), Investor Losses in Modern-Era Sovereign Bond Restructurings, Moody's Sovereign Defaults Series, October 7, 2013.

Duggar, Elena (2013), The Role of Holdout Creditors and CACs in Sovereign Debt Restructurings, Moody's Sovereign Defaults Series, October 7, 2013.

EFC Sub-Committee on EU Sovereign Debt Markets (2012), Model Collective Action Clause Supplemental Explanatory Note.

Eichengreen, Barry and Ashoka Mody (2000), Would Collective Action Clauses Raise Borrowing Costs?, NBER Working Paper 7458.

Eichengreen, Barry, and Ashoka Mody (2003), Is Aggregation a Problem for Sovereign Debt Restructuring?, American Economic Review, 93(2), 80-84.

Enderlein, Henrik, Christoph Trebesch, and Laura von Daniels (2012), Sovereign Debt Disputes: A Database on Government Coerciveness During Debt Crises, Journal of International

Money and Finance, March 2012, 31(2), 250-266.

Eurozone (2012), Treaty Establishing the European Stability Mechanism.

Eurogroup (2010), Statement by the Eurogroup, November 28, 2010.

Fernandez-Ansola, Juan Jose, and Thomas Laursen (1995), Historical Experience with Bond Financing, IMF Working Paper 95/27.

Gadanecz, Blaise (2004), The Syndicated Loan Market: Structure, Development and Implications.

Gelpern, Anna (2013), A Skeptic's Case for Sovereign Bankruptcy, Houston Law Review, 2013, Vol. 50, 1095-1127.

Gelpern, Anna and Mitu Gulati (2013), The Wonder-Clause, Journal of Comparative Economics, 41(2), 311-652.

Government of Belize (2007), Belize 2015 Notes Amended, Press Release, February 5, 2007.

Group of Ten (1996), Resolving Sovereign Liquidity Crises, Washington, D.C.: Group of Ten.

International Monetary Fund (2003), Proposals for a Sovereign Debt Restructuring Mechanism (SDRM).

International Monetary Fund (2012), St. Kitts and Nevis, IMF Country Report 12/284.

Muse-Fisher, John (2014), Starving the Vultures: NML Capital v. Republic of Argentina and Solutions to the Problem of Distressed-Debt Funds, California Law Review, 2014, 120(6), Article 8, 1671-1726.

Olivares-Caminal, Rodrigo (2013), The Pari Passu Clause in Sovereign Debt Instruments: Developments in Recent Litigation, BIS Papers No. 72, 121-128.

Panizza, Ugo, Federico Sturzenegger and Jeromin Zettelmeyer (2009), The Economics and Law of Sovereign Debt and Default, Journal of Economic Literature, 47(3), 651-698.

Reinhart, Carmen M., and Christoph Trebesch (2014), A Distant Mirror of Debt, Default, and Relief, NBER Working Paper 20577.

Reuters (1994), Panama Offer on Defaulted Bonds 99 Percent Accepted, Reuters, August 5, 1994.

Rogoff, Kenneth, and Jeromin Zettelmeyer (2002), Bankruptcy Procedures for Sovereigns: A History of Ideas, 1976-2001, IMF Staff Papers, 49(3), 470-507.

Schumacher, Julian, Christoph Trebesch and Henrik Enderlein (2014), Sovereign Defaults in Court.

Sturzenegger, Federico and Jeromin Zettelmeyer (2005), Haircuts: Estimating Investor Losses in Sovereign Debt Restructurings, 1998-2005, IMF Working Paper 05/137.

The Guardian (2011), Vulture Funds – the Key Players, The Guardian, November 15, 2011.

Trebesch, Christoph (2010), Delays in Sovereign Debt Restructurings.

Weidemaier, Mark C. and Mitu Gulati (2012), A People's History of Collective Action Clauses, Virginia Journal of International Law, 2013, 54(1), 52-95.

Zettelmeyer, Jeromin, Christoph Trebesch and Mitu Gulati (2013), The Greek Debt Exchange: An Autopsy, Economic Policy, 2013, 28(75), 513-569.

Appendix A – Robustness Analysis with Alternative Response Variables

OLS Result for Final Participation Rate

	CACs Only	With Government Coerciveness	Model with Lowest BIC
yes–CACs (dummy)	0.026 (0.015)	0.005 (0.017)	0.005 (0.017)
Dispersed Creditor Structure (dummy)			
Multiple Debt Structure (dummy)			
Haircut			
Debt in Exchange (% of GDP) (log)			
Government Coerciveness		-0.008 ** (0.003)	-0.008 ** (0.003)
yes-CACs * Dispersed Creditor Structure			
yes-CACs * Multiple Debt Structure			
Observations	22	22	22
R^2	0.126	0.328	0.328
Adjusted R^2	0.082	0.258	0.258
BIC	-77.100	-79.800	-79.800

Siginificance Codes: '***' 0.01 '**' 0.5 '*' 0.1

Poisson Result for Length of Negotiation from Announcement or Default

	CACs Only	With Debt Structure	Model with Lowest BIC
yes–CACs (dummy)	-0.758 *** (0.126)	-0.816 *** (0.139)	-0.467 *** (0.166)
Dispersed Creditor Structure (dummy)			
Multiple Debt Structure (dummy)		-0.465 *** (0.138)	-0.311 ** (0.142)
Haircut			-1.286 *** (0.394)
Debt in Exchange (% of GDP) (log)			
Government Coerciveness			0.148 *** (0.039)
yes-CACs * Dispersed Creditor Structure			
yes-CACs * Multiple Debt Structure		-0.074 (0.341)	-0.091 (0.342)
Observations	22	22	22
Residual Deviance	235.09	219.64	204.49
BIC	334.321	325.054	316.087

Siginificance Codes: '***' 0.01 '**' 0.5 '*' 0.1

Appendix B – Replication Cases

Replication Pair (issuer + maturity + coupon)	S&P Rating	Moody's Rating	Average Time to Maturity (in year)	Coupon Difference (in percentage)	Relative Amount of Issuance	Average Cost of CACs by Price (in dollar)	Average Cost of CACs by Yield (in basis point)
Austria Government Bond 10/18/2019 0.25 and 3/15/2019 4.35	AA+	Aaa	4.900	4.1	0.412	0.499	10.189
Austria Government Bond 10/18/2019 0.25 and 6/18/2019 1.95	AA+	Aaa	4.900	1.7	0.640	0.293	5.996
Austria Government Bond 10/18/2019 0.25 and 7/15/2020 3.9	AA+	Aaa	5.027	3.65	0.357	-0.493	-9.915
Austria Government Bond 10/19/2018 1.15 and 1/15/2018 4.65	AA+	Aaa	4.517	3.5	0.578	0.772	16.331
Austria Government Bond 10/19/2018 1.15 and 3/15/2019 4.35	AA+	Aaa	4.376	3.2	0.626	-0.326	-7.577
Austria Government Bond 10/19/2018 1.15 and 6/18/2019 1.95	AA+	Aaa	4.316	0.8	0.973	-0.566	-13.199
Austria Government Bond 10/20/2023 1.75 and 11/22/2022 3.4	AA+	Aaa	9.455	1.65	0.806	1.411	15.702
Belgium Government Bond 6/22/2018 1.25 and 3/28/2018 4	#N/A N/A	NR	4.346	2.75	1.040	0.421	9.329
Belgium Government Bond 6/22/2018 1.25 and 3/28/2019 4	#N/A N/A	NR	4.613	2.75	0.972	-0.614	-13.795
Belgium Government Bond 6/22/2018 1.25 and 9/28/2017 5.5	#N/A N/A	NR	4.379	4.25	1.409	0.887	19.598
Belgium Government Bond 6/22/2023 2.25 and 9/28/2022 4.25	#N/A N/A	NR	9.365	2	0.886	1.545	17.816
Bundesrepublik Deutschland 2/15/2023 1.5 and 1/4/2024 6.25	#N/A N/A	Aaau	9.498	4.75	1.756	-0.510	-5.983
Bundesrepublik Deutschland 2/15/2023 1.5 and 7/4/2022 1.75	#N/A N/A	Aaau	9.313	0.25	0.750	1.066	12.146
Bundesrepublik Deutschland 2/15/2023 1.5 and 9/4/2022 1.5	#N/A N/A	Aaau	9.225	0	1.000	0.688	7.901
Bundesrepublik Deutschland 2/15/2024 1.75 and 1/4/2024 6.25	#N/A N/A	Aaau	9.565	4.5	1.756	0.975	10.376
Bundesrepublik Deutschland 5/15/2023 1.5 and 1/4/2024 6.25	#N/A N/A	Aaau	9.179	4.75	1.756	-0.198	-2.324
Bundesrepublik Deutschland 5/15/2023 1.5 and 7/4/2022 1.75	#N/A N/A	Aaau	9.422	0.25	0.750	1.487	16.741
Bundesrepublik Deutschland 5/15/2023 1.5 and 9/4/2022 1.5	#N/A N/A	Aaau	9.340	0	1.000	1.104	12.507
Bundesrepublik Deutschland 5/15/2024 1.5 and 1/4/2024 6.25	#N/A N/A	Aaau	9.687	4.75	1.756	1.369	14.346
Bundesrepublik Deutschland 8/15/2023 2 and 1/4/2024 6.25	#N/A N/A	Aaau	9.306	4.25	1.756	0.124	1.309
Bundesrepublik Deutschland 8/15/2023 2 and 9/4/2022 1.5	#N/A N/A	Aaau	8.973	-0.5	1.000	1.388	14.993
Bundesrepublik Deutschland 8/15/2024 1 and 1/4/2024 6.25	#N/A N/A	Aaau	9.785	5.25	1.756	1.735	18.174

Finland Government Bond 4/15/2023 1.5 and 9/15/2022 1.625	AA+	Aaa	9.288	0.125	1.000	0.889	10.378
Finland Government Bond 9/15/2018 1.125 and 7/4/2019 4.375	AA+	Aaa	4.284	3.25	1.000	-0.626	-14.702
Finland Government Bond 9/15/2020 0.375 and 4/15/2020 3.375	AA+	Aaa	5.854	3	0.615	0.334	5.749
Finland Government Bond 9/15/2020 0.375 and 4/15/2021 3.5	AA+	Aaa	6.027	3.125	0.667	-0.516	-8.760
France Government Bond OAT 11/25/2015 0.25 and 10/25/2015 3	#N/A N/A	Aa1u	1.961	2.75	0.623	0.075	3.484
France Government Bond OAT 11/25/2015 0.25 and 10/25/2016 5	#N/A N/A	Aa1u	1.879	4.75	0.719	-0.250	-12.432
France Government Bond OAT 11/25/2015 0.25 and 4/25/2015 3.5	#N/A N/A	Aa1u	1.930	3.25	0.779	0.130	6.171
France Government Bond OAT 11/25/2015 0.25 and 4/25/2016 3.25	#N/A N/A	Aa1u	1.943	3	0.591	-0.116	-5.312
France Government Bond OAT 11/25/2016 0.25 and 10/25/2016 5	#N/A N/A	Aa1u	2.418	4.75	0.561	0.062	2.527
France Government Bond OAT 11/25/2016 0.25 and 10/25/2017 4.25	#N/A N/A	Aa1u	2.042	4	0.493	-0.051	-2.600
France Government Bond OAT 11/25/2016 0.25 and 4/25/2016 3.25	#N/A N/A	Aa1u	2.540	3	0.462	0.192	7.450
France Government Bond OAT 11/25/2016 0.25 and 4/25/2017 3.75	#N/A N/A	Aa1u	2.303	3.5	0.440	-0.061	-2.610
France Government Bond OAT 11/25/2018 1 and 10/25/2018 4.25	#N/A N/A	Aa1u	4.689	3.25	0.794	0.262	5.532
France Government Bond OAT 11/25/2018 1 and 10/25/2019 3.75	#N/A N/A	Aa1u	4.531	2.75	0.699	-0.701	-15.358
France Government Bond OAT 11/25/2018 1 and 10/25/2019 8.5	#N/A N/A	Aa1u	4.531	7.5	2.517	-0.516	-11.369
France Government Bond OAT 11/25/2018 1 and 4/25/2018 4	#N/A N/A	Aa1u	4.651	3	0.790	0.845	18.158
France Government Bond OAT 11/25/2018 1 and 4/25/2019 4.25	#N/A N/A	Aa1u	4.690	3.25	0.707	-0.256	-5.548
France Government Bond OAT 11/25/2019 0.5 and 10/25/2019 3.75	#N/A N/A	Aa1u	5.200	3.25	0.614	0.254	4.889
France Government Bond OAT 11/25/2019 0.5 and 10/25/2019 8.5	#N/A N/A	Aa1u	5.200	8	2.211	0.401	7.732
France Government Bond OAT 11/25/2019 0.5 and 10/25/2020 2.5	#N/A N/A	Aa1u	5.040	2	0.562	-0.654	-13.091
France Government Bond OAT 11/25/2019 0.5 and 4/25/2020 3.5	#N/A N/A	Aa1u	5.222	3	0.519	-0.268	-5.213
France Government Bond OAT 11/25/2024 1.75 and 10/25/2025 6	#N/A N/A	Aa1u	10.040	4.25	1.280	-0.727	-7.543
France Government Bond OAT 5/25/2018 1 and 10/25/2017 4.25	#N/A N/A	Aa1u	4.296	3.25	0.713	0.609	13.847
France Government Bond OAT 5/25/2018 1 and 10/25/2018 4.25	#N/A N/A	Aa1u	4.445	3.25	0.835	-0.273	-6.214
France Government Bond OAT 5/25/2018 1 and 4/25/2018 4	#N/A N/A	Aa1u	4.373	3	0.831	0.223	4.988
France Government Bond OAT 5/25/2018 1 and 4/25/2019 4.25	#N/A N/A	Aa1u	4.528	3.25	0.744	-0.704	-15.917
France Government Bond OAT 5/25/2019 1 and 10/25/2018 4.25	#N/A N/A	Aa1u	4.791	3.25	0.823	0.653	13.313
France Government Bond OAT 5/25/2019 1 and 10/25/2019 3.75	#N/A N/A	Aa1u	4.935	2.75	0.725	-0.219	-4.538
France Government Bond OAT 5/25/2019 1 and 10/25/2019 8.5	#N/A N/A	Aa1u	4.935	7.5	2.611	-0.016	-0.443
France Government Bond OAT 5/25/2019 1 and 4/25/2019 4.25	#N/A N/A	Aa1u	4.856	3.25	0.734	0.265	5.281
France Government Bond OAT 5/25/2019 1 and 4/25/2020 3.5	#N/A N/A	Aa1u	5.040	2.5	0.613	-0.873	-17.771
France Government Bond OAT 5/25/2023 1.75 and 10/25/2022 2.25	#N/A N/A	Aa1u	9.291	0.5	1.176	0.903	10.619
France Government Bond OAT 5/25/2023 1.75 and 4/25/2023 8.5	#N/A N/A	Aa1u	9.209	6.75	2.189	0.825	9.774
France Government Bond OAT 5/25/2024 2.25 and 10/25/2023 4.25	#N/A N/A	Aa1u	9.791	2	0.846	1.394	14.470
Ireland Government Bond 1/20/2037 5.92 and 1/20/2037 5.92	A	Baa1	23.027	0	0.232	-0.108	-0.576
Ireland Government Bond 3/20/2032 5.82 and 3/20/2032 5.82	A	Baa1	18.186	0	1.811	0.008	0.021
Ireland Government Bond 5/20/2042 5.92 and 5/20/2042 5.92	A	Baa1	28.358	0	0.216	1.019	5.426
Ireland Government Bond 7/20/2027 5.72 and 7/20/2027 5.72	A	Baa1	13.514	0	2.233	-0.014	-0.181
Ireland Government Bond 9/20/2047 5.92 and 9/20/2047 5.92	A	Baa1	33.698	0	0.299	1.111	5.212
Italy Buoni Poliennali Del Tesoro 1/15/2018 0.75 and 11/1/2017 3.5	#N/A N/A	Baa2u	3.240	2.75	0.398	0.139	4.600
Italy Buoni Poliennali Del Tesoro 1/15/2018 0.75 and 2/1/2018 4.5	#N/A N/A	Baa2u	3.157	3.75	0.279	-0.115	-3.533
Italy Buoni Poliennali Del Tesoro 11/15/2016 2.75 and 2/1/2017 4	#N/A N/A	Baa2u	2.560	1.25	0.484	-0.171	-6.468
Italy Buoni Poliennali Del Tesoro 11/15/2016 2.75 and 8/1/2016 3.75	#N/A N/A	Baa2u	2.481	1	0.464	0.299	11.095
Italy Buoni Poliennali Del Tesoro 11/15/2016 2.75 and 9/15/2016 4.75	#N/A N/A	Baa2u	2.489	2	0.776	0.167	6.057
Italy Buoni Poliennali Del Tesoro 12/1/2018 3.5 and 2/1/2019 4.25	#N/A N/A	Baa2u	4.617	0.75	0.806	-0.180	-3.361
Italy Buoni Poliennali Del Tesoro 12/1/2018 3.5 and 3/1/2019 4.5	#N/A N/A	Baa2u	4.625	1	0.822	-0.274	-5.287
Italy Buoni Poliennali Del Tesoro 12/1/2018 3.5 and 8/1/2018 4.5	#N/A N/A	Baa2u	4.530	1	0.779	0.476	10.654
Italy Buoni Poliennali Del Tesoro 12/1/2019 1.05 and 2/1/2020 4.5	#N/A N/A	Baa2u	5.011	3.45	0.157	-0.111	-2.117
Italy Buoni Poliennali Del Tesoro 12/1/2019 1.05 and 3/1/2020 4.25	#N/A N/A	Baa2u	5.011	3.2	0.146	-0.175	-3.433
Italy Buoni Poliennali Del Tesoro 12/1/2024 2.5 and 3/1/2025 5	#N/A N/A	Baa2u	10.125	2.5	0.584	-0.953	-9.316
Italy Buoni Poliennali Del Tesoro 12/15/2016 1.5 and 2/1/2017 4	#N/A N/A	Baa2u	2.434	2.5	0.625	-0.064	-2.557
Italy Buoni Poliennali Del Tesoro 12/15/2016 1.5 and 8/1/2016 3.75	#N/A N/A	Baa2u	2.468	2.25	0.599	0.319	12.538
Italy Buoni Poliennali Del Tesoro 12/15/2016 1.5 and 9/15/2016 4.75	#N/A N/A	Baa2u	2.513	3.25	1.001	0.204	7.996
Italy Buoni Poliennali Del Tesoro 12/15/2021 2.15 and 3/1/2022 5	#N/A N/A	Baa2u	7.159	2.85	0.716	-0.543	-7.289
Italy Buoni Poliennali Del Tesoro 3/1/2024 4.5 and 11/1/2023 9	#N/A N/A	Baa2u	9.917	4.5	1.903	0.829	11.718
Italy Buoni Poliennali Del Tesoro 3/1/2024 4.5 and 12/22/2023 8.5	#N/A N/A	Baa2u	9.846	4	7.508	0.579	9.033
Italy Buoni Poliennali Del Tesoro 3/1/2030 3.5 and 11/1/2029 5.25	#N/A N/A	Baa2u	15.413	1.75	0.444	-0.297	-0.093
Italy Buoni Poliennali Del Tesoro 5/1/2019 2.5 and 2/1/2019 4.25	#N/A N/A	Baa2u	4.705	1.75	0.744	0.383	8.292
Italy Buoni Poliennali Del Tesoro 5/1/2019 2.5 and 3/1/2019 4.5	#N/A N/A	Baa2u	4.772	2	0.758	0.371	8.126
Italy Buoni Poliennali Del Tesoro 5/1/2019 2.5 and 9/1/2019 4.25	#N/A N/A	Baa2u	4.833	1.75	0.732	-0.349	-6.944
Italy Buoni Poliennali Del Tesoro 5/1/2021 3.75 and 3/1/2021 3.75	#N/A N/A	Baa2u	6.950	0	0.747	0.413	7.431
Italy Buoni Poliennali Del Tesoro 5/1/2021 3.75 and 8/1/2021 3.75	#N/A N/A	Baa2u	6.950	0	0.644	-0.302	-3.413
Italy Buoni Poliennali Del Tesoro 5/1/2021 3.75 and 9/1/2021 4.75	#N/A N/A	Baa2u	6.950	1	0.726	-0.681	-9.115
Italy Buoni Poliennali Del Tesoro 5/1/2023 4.5 and 8/1/2023 4.75	#N/A N/A	Baa2u	9.317	0.25	0.735	-0.058	2.333
Italy Buoni Poliennali Del Tesoro 5/15/2016 2.25 and 12/1/2015 2.75	#N/A N/A	Baa2u	2.232	0.5	0.935	0.350	14.349
Italy Buoni Poliennali Del Tesoro 5/15/2016 2.25 and 4/15/2016 3.75	#N/A N/A	Baa2u	2.223	1.5	0.913	0.121	5.087
Italy Buoni Poliennali Del Tesoro 5/15/2016 2.25 and 8/1/2016 3.75	#N/A N/A	Baa2u	2.236	1.5	0.555	-0.182	-7.695
Italy Buoni Poliennali Del Tesoro 5/15/2016 2.25 and 9/15/2016 4.75	#N/A N/A	Baa2u	2.247	2.5	0.927	-0.331	-13.813
Italy Buoni Poliennali Del Tesoro 5/15/2017 1.15 and 2/1/2017 4	#N/A N/A	Baa2u	2.719	2.85	0.591	0.216	7.944
Italy Buoni Poliennali Del Tesoro 5/15/2017 1.15 and 5/1/2017 4.75	#N/A N/A	Baa2u	2.694	3.6	1.109	0.001	0.041
Italy Buoni Poliennali Del Tesoro 5/15/2017 1.15 and 6/1/2017 4.75	#N/A N/A	Baa2u	2.686	3.6	0.957	-0.059	-2.197
Italy Buoni Poliennali Del Tesoro 5/15/2017 1.15 and 8/1/2017 5.25	#N/A N/A	Baa2u	2.659	4.1	0.623	-0.099	-3.756
Italy Buoni Poliennali Del Tesoro 6/1/2018 3.5 and 2/1/2018 4.5	#N/A N/A	Baa2u	4.284	1	0.804	0.390	10.216
Italy Buoni Poliennali Del Tesoro 6/1/2018 3.5 and 8/1/2018 4.5	#N/A N/A	Baa2u	4.313	1	0.782	-0.128	-2.042
Italy Buoni Poliennali Del Tesoro 8/1/2019 1.5 and 3/1/2019 4.5	#N/A N/A	Baa2u	4.960	3	0.663	0.720	15.175
Italy Buoni Poliennali Del Tesoro 8/1/2019 1.5 and 9/1/2019 4.25	#N/A N/A	Baa2u	4.821	2.75	0.640	0.006	0.427
Lithuania Government Bond 1/31/2016 1.9 and 10/20/2016 4.8	#N/A N/A	#N/A N/A	1.752	2.9	0.798	-0.262	-15.609
Lithuania Government Bond 1/31/2016 1.9 and 2/10/2016 3.75	#N/A N/A	#N/A N/A	2.022	1.85	0.953	-0.041	-2.081
Lithuania Government Bond 1/31/2016 1.9 and 2/27/2015 4.3	#N/A N/A	#N/A N/A	2.446	2.4	0.854	1.098	47.238
Lithuania Government Bond 1/31/2016 1.9 and 4/29/2015 4.9	#N/A N/A	#N/A N/A	2.352	3	0.703	0.917	41.113
Lithuania Government Bond 10/3/2020 3.4 and 10/25/2019 3.7	#N/A N/A	#N/A N/A	6.471	0.3	1.017	2.241	36.587
Lithuania Government Bond 10/31/2018 2.6 and 3/28/2018 5.2	#N/A N/A	#N/A N/A	4.542	2.6	0.709	0.696	15.546
Lithuania Government Bond 2/27/2017 1.5 and 10/20/2016 4.8	#N/A N/A	#N/A N/A	2.670	3.3	1.000	0.507	19.120
Lithuania Government Bond 2/27/2017 1.5 and 6/7/2017 4.7	#N/A N/A	#N/A N/A	2.447	3.2	1.299	-0.192	-7.938
Lithuania Government Bond 2/27/2017 1.5 and 9/22/2017 4.95	#N/A N/A	#N/A N/A	2.301	3.45	1.718	-0.253	-11.019
Lithuania Government Bond 2/28/2023 4.1 and 5/17/2022 5.5	#N/A N/A	#N/A N/A	8.894	1.4	0.923	0.877	10.782
Lithuania Government Bond 5/2/2016 1.2 and 10/20/2016 4.8	#N/A N/A	#N/A N/A	1.438	3.6	0.528	-0.120	-8.667
Lithuania Government Bond 5/2/2016 1.2 and 2/10/2016 3.75	#N/A N/A	#N/A N/A	1.665	2.55	0.631	0.154	9.053
Lithuania Government Bond 8/30/2019 3.1 and 10/25/2019 3.7	#N/A N/A	#N/A N/A	5.406	0.6	0.633	0.869	17.083
Lithuania Government Bond 8/31/2015 1.7 and 2/10/2016 3.75	#N/A N/A	#N/A N/A	1.277	2.05	1.221	-0.395	-30.349
Lithuania Government Bond 8/31/2015 1.7 and 2/27/2015 4.3	#N/A N/A	#N/A N/A	1.350	2.6	1.094	0.194	12.262
Lithuania Government Bond 8/31/2015 1.7 and 4/29/2015 4.9	#N/A N/A	#N/A N/A	1.363	3.2	0.901	0.154	9.922
Lithuania Government Bond 8/31/2017 2.6 and 10/20/2016 4.8	#N/A N/A	#N/A N/A	2.931	2.2	0.864	0.806	26.794
Lithuania Government Bond 8/31/2017 2.6 and 3/28/2018 5.2	#N/A N/A	#N/A N/A	3.170	2.6	0.894	-0.469	-15.020
Lithuania Government Bond 8/31/2017 2.6 and 6/7/2017 4.7	#N/A N/A	#N/A N/A	2.940	2.1	1.121	0.077	2.424
Lithuania Government Bond 8/31/2017 2.6 and 9/22/2017 4.95	#N/A N/A	#N/A N/A	3.007	2.35	1.484	0.051	1.490

Malta Government Bond 7/31/2019 3.2 and 9/1/2019 6.6	#N/A N/A	#N/A N/A	5.082	3.4	1.185	-0.325	-6.747
Malta Government Bond 7/31/2020 3.35 and 4/25/2020 4.6	#N/A N/A	#N/A N/A	6.130	1.25	0.404	0.207	3.093
Malta Government Bond 7/31/2020 3.35 and 6/10/2020 5.2	#N/A N/A	#N/A N/A	6.074	1.85	1.222	0.017	-0.085
Malta Government Bond 9/22/2019 3 and 9/1/2019 6.6	#N/A N/A	NR	5.372	3.6	1.195	0.034	0.185
Malta Government Bond 9/26/2020 2 and 4/25/2020 4.6	#N/A N/A	#N/A N/A	5.963	2.6	0.038	-0.841	-13.950
Malta Government Bond 9/26/2020 2 and 6/10/2020 5.2	#N/A N/A	#N/A N/A	5.898	3.2	0.115	-0.600	-10.222
Netherlands Government Bond 1/15/2019 1.25 and 7/15/2018 4	#N/A N/A	NR	4.836	2.75	1.016	0.668	13.754
Netherlands Government Bond 1/15/2019 1.25 and 7/15/2019 4	#N/A N/A	NR	4.784	2.75	1.090	-0.340	-7.164
Netherlands Government Bond 1/15/2020 0.25 and 7/15/2020 3.5	#N/A N/A	#N/A N/A	5.178	3.25	0.338	-0.334	-6.497
Netherlands Government Bond 4/15/2016 0 and 1/15/2017 2.5	#N/A N/A	NR	2.621	2.5	0.974	-0.371	-13.730
Netherlands Government Bond 4/15/2016 0 and 7/15/2015 3.25	#N/A N/A	NR	2.386	3.25	1.008	0.270	10.371
Netherlands Government Bond 4/15/2016 0 and 7/15/2016 4	#N/A N/A	NR	2.459	4	1.035	-0.086	-3.196
Netherlands Government Bond 4/15/2016 0 and 9/12/2015 0.25	#N/A N/A	NR	1.581	0.25	4.354	-0.340	-22.920
Netherlands Government Bond 4/15/2017 0.5 and 1/15/2017 2.5	#N/A N/A	NR	2.728	2	0.961	0.093	3.106
Netherlands Government Bond 4/15/2017 0.5 and 1/15/2018 1.25	#N/A N/A	NR	3.121	0.75	0.972	-0.548	-17.756
Netherlands Government Bond 4/15/2017 0.5 and 7/15/2016 4	#N/A N/A	NR	2.873	3.5	1.021	0.276	9.458
Netherlands Government Bond 4/15/2017 0.5 and 7/15/2017 4.5	#N/A N/A	NR	2.784	4	1.026	-0.075	-2.628
Netherlands Government Bond 7/15/2023 1.75 and 1/15/2023 3.75	#N/A N/A	#N/A N/A	9.282	2	1.390	1.088	12.544
Netherlands Government Bond 7/15/2023 1.75 and 1/15/2023 7.5	#N/A N/A	#N/A N/A	9.282	5.75	1.920	1.370	15.771
Portugal Obrigacoes do Tesouro OT 2/15/2024 5.65 and 10/25/2023 4.95	#N/A N/A	Ba1	10.017	-0.7	1.111	1.134	14.728
Slovakia Government Bond 1/16/2029 3.625 and 7/11/2029 4.4	A	A2	14.581	0.775	14.050	-0.571	-4.215
Slovakia Government Bond 2/8/2033 3.875 and 8/9/2032 4.3	A	A2	19.204	0.425	3.000	0.278	1.952
Slovenia Government Bond 10/9/2017 1.75 and 3/23/2017 3.5	A-	Ba1	2.922	1.75	1.161	0.037	1.005
Slovenia Government Bond 10/9/2017 1.75 and 4/19/2017 5.625	A-	Ba1	2.863	3.875	4.151	-1.424	-50.100
Slovenia Government Bond 10/9/2017 1.75 and 4/8/2018 4.875	A-	Ba1	3.276	3.125	10.337	-3.500	-110.921
Slovenia Government Bond 3/25/2022 2.25 and 1/10/2022 4.75	A-	Ba1	7.349	2.5	33.569	0.823	12.152
Slovenia Government Bond 4/8/2021 3 and 1/10/2022 4.75	A-	Ba1	7.011	1.75	33.569	-0.850	-13.529
Slovenia Government Bond 4/8/2021 3 and 1/18/2021 4.375	A-	Ba1	6.706	1.375	0.623	-1.044	-16.252
Spain Government Bond 1/31/2020 1.4 and 10/31/2019 4.3	BBB	Baa2	5.419	2.9	0.428	0.560	10.681
Spain Government Bond 1/31/2020 1.4 and 10/31/2020 4.85	BBB	Baa2	5.168	3.45	0.492	-0.613	-12.153
Spain Government Bond 1/31/2020 1.4 and 4/30/2020 4	BBB	Baa2	5.337	2.6	0.411	-0.239	-4.594
Spain Government Bond 1/31/2020 1.4 and 7/30/2019 4.6	BBB	Baa2	5.546	3.2	0.440	0.988	18.705
Spain Government Bond 10/31/2017 0.5 and 1/31/2017 3.8	BBB	Baa2	2.916	3.3	0.366	0.471	16.363
Spain Government Bond 10/31/2017 0.5 and 1/31/2018 4.5	BBB	Baa2	3.062	4	0.403	-0.131	-4.315
Spain Government Bond 10/31/2017 0.5 and 7/30/2017 5.5	BBB	Baa2	2.916	5	0.391	0.154	5.407
Spain Government Bond 10/31/2017 0.5 and 7/30/2018 4.1	BBB	Baa2	3.062	3.6	0.415	-0.267	-8.861
Spain Government Bond 10/31/2017 0.5 and 9/30/2017 4.75	BBB	Baa2	2.958	4.25	2.014	0.275	9.546
Spain Government Bond 10/31/2018 3.75 and 1/31/2018 4.5	BBB	Baa2	4.491	0.75	0.999	0.918	19.573
Spain Government Bond 10/31/2018 3.75 and 7/30/2018 4.1	BBB	Baa2	4.563	0.35	1.028	0.571	12.038
Spain Government Bond 10/31/2018 3.75 and 7/30/2019 4.6	BBB	Baa2	4.629	0.85	0.947	-0.735	-16.468
Spain Government Bond 10/31/2023 4.4 and 1/31/2024 4.8	BBB	Baa2	9.708	0.4	1.266	-0.352	-4.107
Spain Government Bond 10/31/2024 2.75 and 1/31/2024 4.8	BBB	Baa2	9.920	2.05	1.438	1.474	15.595
Spain Government Bond 10/31/2024 2.75 and 7/30/2025 4.65	BBB	Baa2	10.127	1.9	1.520	-1.022	-11.177
Spain Government Bond 10/31/2028 5.15 and 1/31/2029 6	BBB	Baa2	14.610	0.85	0.632	-0.012	-0.063
Spain Government Bond 3/31/2015 2.75 and 1/31/2015 4.4	BBB	Baa2	1.171	1.65	0.502	0.218	13.752
Spain Government Bond 3/31/2015 2.75 and 1/31/2016 3.15	BBB	Baa2	1.579	0.4	0.511	-0.597	-35.701
Spain Government Bond 3/31/2015 2.75 and 10/31/2014 3.3	BBB	Baa2	1.250	0.55	0.483	0.342	21.240
Spain Government Bond 3/31/2015 2.75 and 10/31/2015 3.75	BBB	Baa2	1.281	1	0.681	-0.359	-25.349
Spain Government Bond 3/31/2015 2.75 and 4/30/2014 3.4	BBB	Baa2	1.484	0.65	0.683	0.829	42.635
Spain Government Bond 3/31/2015 2.75 and 4/30/2015 3	BBB	Baa2	1.216	0.25	0.503	-0.052	-4.721
Spain Government Bond 3/31/2015 2.75 and 7/30/2014 4.75	BBB	Baa2	1.345	2	0.643	0.589	33.442
Spain Government Bond 3/31/2015 2.75 and 7/30/2015 4	BBB	Baa2	1.187	1.25	0.522	-0.203	-15.866
Spain Government Bond 4/30/2017 2.1 and 1/31/2017 3.8	BBB	Baa2	2.820	1.7	0.994	0.315	10.384
Spain Government Bond 4/30/2017 2.1 and 1/31/2018 4.5	BBB	Baa2	3.120	2.4	1.094	-0.876	-29.031
Spain Government Bond 4/30/2017 2.1 and 10/31/2016 4.25	BBB	Baa2	2.746	2.15	1.006	0.421	14.282
Spain Government Bond 4/30/2017 2.1 and 7/30/2017 5.5	BBB	Baa2	2.890	3.4	1.061	-0.164	-6.099
Spain Government Bond 4/30/2017 2.1 and 9/30/2017 4.75	BBB	Baa2	2.943	2.65	5.462	-0.141	-4.824
Spain Government Bond 4/30/2019 2.75 and 10/31/2019 4.3	BBB	Baa2	4.899	1.55	0.967	-0.553	-11.610
Spain Government Bond 4/30/2019 2.75 and 7/30/2018 4.1	BBB	Baa2	4.872	1.35	1.081	1.186	23.928
Spain Government Bond 4/30/2019 2.75 and 7/30/2019 4.6	BBB	Baa2	4.803	1.85	0.996	-0.186	-4.152
Spain Government Bond 4/30/2024 3.8 and 1/31/2024 4.8	BBB	Baa2	9.690	1	1.408	0.574	6.067
Spain Government Bond 7/30/2016 3.3 and 1/31/2016 3.15	BBB	Baa2	2.312	-0.15	0.829	0.464	16.873
Spain Government Bond 7/30/2016 3.3 and 1/31/2017 3.8	BBB	Baa2	2.612	0.5	0.797	-0.480	-18.854
Spain Government Bond 7/30/2016 3.3 and 10/31/2015 3.75	BBB	Baa2	2.371	0.45	1.105	0.563	20.287
Spain Government Bond 7/30/2016 3.3 and 10/31/2016 4.25	BBB	Baa2	2.486	0.95	0.808	-0.211	-9.038
Spain Government Bond 7/30/2016 3.3 and 4/30/2016 3.25	BBB	Baa2	2.386	-0.05	0.806	0.306	10.539

Notes: [1] 184 Replication Pairs in total.
[2] Ratings are specific to domestic sovereign bonds.

Appendix C – Data Sources for Response Variables

Bond Restructuring Case					
Country	Exchange Offer Date	Bonds Exchanged	Participation Rate	Length of Negotiation	Number of Litigations
Argentina	Jan-05	external bonds	Duggar (2013)	Trebesch (2010)	Schumacher, Trebesch and Enderlein (2014)
Belize	Dec-06	private external debt			
Belize	Feb-13	2029 Superbond			
Cote d'Ivoire	Sep-09	FC external Brady bonds			
Cote d'Ivoire	Nov-12	eurobond coupon			
Dominica	Apr-04	LC bonds, domestic and external			
Dominican Republic	Apr-05	external bonds			
Ecuador	Jul-00	FC external Brady bonds and eurobonds			
Ecuador	Apr-09	global bonds			
Greece	Feb-12	domestic and external bonds			
Grenada	Sep-05	external and domestic bonds			
Moldova	Aug-02	FC external bonds			
Pakistan	Nov-99	three FC external bonds			
Panama	Jan-94	US dollar floating rate notes, Japanese yen, and ECU denominated bonds	Fernandez-Ansola and Laursen (1995) and Reuters (1994)		
Russia	Mar-99	LC domestic GKOs and OFZs with non-residents	Duggar (2013)		
Russia	Feb-00	FC domestic MinFin III			
Russia	Aug-00	FC external PRINs and IANs by state-owned bank			
Seychelles	Dec-09	external bonds			
St. Kitts and Nevis	Feb-12	domestic and external bonds			
Ukraine	Sep-98	LC domestic treasury bills (OVDPs) with non-residents			
Ukraine	Feb-00	five FC external bonds			
Uruguay	Apr-03	46 domestic bonds and treasury bills, 18 external bonds, and one Samurai bond			

Appendix C – Data Sources for Governing Law and CMC

Bond Restructuring Case				Collective Modification	
Country	Exchange Offer Date	Bonds Exchanged	Governing Law	Included? [1]	Used?
Argentina	Jan-05	external bonds	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)
Belize	Dec-06	private external debt	Thomson One	Thomson One	Panizza, Sturzenegger, and Zettelmeyer (2009)
Belize	Feb-13	2029 Superbond	Thomson One	Thomson One	Duggar (2013)
Cote d'Ivoire	Sep-09	FC external Brady bonds	Thomson One	Thomson One	n.a.
Cote d'Ivoire	Nov-12	eurobond coupon	Thomson One	Thomson One	Duggar (2013)
Dominica	Apr-04	LC bonds, domestic and external	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)
Dominican Republic	Apr-05	external bonds	Thomson One	Thomson One	n.a.
Ecuador	Jul-00	FC external Brady bonds and eurobonds	Thomson One	Thomson One	n.a.
Ecuador	Apr-09	global bonds	Thomson One	Thomson One	n.a.
Greece	Feb-12	domestic and external bonds	Zettelmeyer, Trebesch, and Gulati (2013)	Zettelmeyer, Trebesch, and Gulati (2013)	Duggar (2013)
Grenada	Sep-05	external and domestic bonds	Thomson One	Thomson One	n.a.
Moldova	Aug-02	FC external bonds	Thomson One	Thomson One	Panizza, Sturzenegger, and Zettelmeyer (2009)
Pakistan	Nov-99	three FC external bonds	Thomson One	Thomson One	Panizza, Sturzenegger, and Zettelmeyer (2009)
Panama	Jan-94	US dollar floating rate notes, Japanese yen, and ECU denominated bonds	Fernandez-Ansola and Laursen (1995)	Fernandez-Ansola and Laursen (1995)	n.a.
Russia	Mar-99	LC domestic GKOs and OFZs with non-residents	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	n.a.
Russia	Feb-00	FC domestic MinFin III	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	n.a.
Russia	Aug-00	FC external PRINs and IANs by state-owned bank	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)
Seychelles	Dec-09	external bonds	Thomson One	Thomson One	Duggar (2013)
St. Kitts and Nevis	Feb-12	domestic and external bonds	Thomson One	Thomson One	Duggar (2013)
Ukraine	Sep-98	LC domestic treasury bills (OVDPs) with non-residents	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	n.a.
Ukraine	Feb-00	five FC external bonds	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)
Uruguay	Apr-03	46 domestic bonds and treasury bills, 18 external bonds, and one Samurai bond	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)	Panizza, Sturzenegger, and Zettelmeyer (2009)

[1] For some cases inclusion of CMC is inferred from governing law or involved law firms.

Appendix C – Data Sources for Control Variables

Bond Restructuring Case			Government Coerciveness [1]	Creditor Structure	Debt Structure [2]	Haircut	Debt in Exchange (% of Total Debt)
Country	Exchange Offer Date	Bonds Exchanged					
Argentina	Jan-05	external bonds	Enderlein, Trebesch, and von Daniels (2012), Trebesch (2010), and Duggar (2013)	Duggar (2013)	Fernandez-Ansola and Laursen (1995)	Cruces and Trebesch (2013)	World Development Indicators
Belize	Dec-06	private external debt					
Belize	Feb-13	2029 Superbond					
Cote d'Ivoire	Sep-09	FC external Brady bonds					
Cote d'Ivoire	Nov-12	eurobond coupon					
Dominica	Apr-04	LC bonds, domestic and external					
Dominican Republic	Apr-05	external bonds			Duggar (2013)		Duggar (2013)
Ecuador	Jul-00	FC external Brady bonds and eurobonds					
Ecuador	Apr-09	global bonds					
Greece	Feb-12	domestic and external bonds					
Grenada	Sep-05	external and domestic bonds					
Moldova	Aug-02	FC external bonds					
Pakistan	Nov-99	three FC external bonds					
Panama	Jan-94	US dollar floating rate notes, Japanese yen, and ECU denominated bonds					
Russia	Mar-99	LC domestic GKOs and OFZs with non-residents					
Russia	Feb-00	FC domestic MinFin III					
Russia	Aug-00	FC external PRINs and IANs by state-owned bank					
Seychelles	Dec-09	external bonds					
St. Kitts and Nevis	Feb-12	domestic and external bonds			Duggar (2013)		Duggar (2013)
Ukraine	Sep-98	LC domestic treasury bills (OVDPs) with non-residents					
Ukraine	Feb-00	five FC external bonds					
Uruguay	Apr-03	46 domestic bonds and treasury bills, 18 external bonds, and one Samurai bond					

[1] I follow Enderlein, Trebesch, and von Daniels (2012) whenever data is available. Otherwise, I focus on whether there was a change of political leadership (a change of de facto debtor) as an indicator of coerciveness. Drawing data from Trebesch (2010, p11) and Duggar (2013) I assign 7 for cases where a change of political leadership was present, and 3 where there was no leadership change.

[2] Following the definition of Duggar (2013, p31), six or fewer debt instruments count as "few," otherwise count as "multiple".

[3] World Bank