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Sovereign risk after sovereign restructuring. Private and official default

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Abstract: This paper studies the relationship between sovereign debt default and sovereign credit risk by taking into account the depth of a debt restructuring and by distinguishing between commercial and official debt. We take different proxies for credit risk measures, such as rating agencies and institutional investors' ratings as well as bond yield spreads (EMBIG). By controlling for both the occurrence and the magnitude of debt defaults, we find that commercial and official defaults are associated to different outcomes. Private defaults seem to involve some reputational costs up to seven years since the last agreement, while official defaulters are not affected (or may even benefit) by the restructuring episodes. Using the Synthetic Control Method, we find further evidence for the heterogeneity of the economic impact of debt restructurings, confirming that official and private defaults may have different costs and then induce selective defaults.

Keywords: Sovereign defaults, Credit Rating Agencies, Institutional Investors, Synthetic control method

JEL Classification: F34, G15, G24, H63

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1 Introduction

The empirical literature on sovereign defaults has generally found that default costs are difficult to quantify and short lived.[1] Only more recently, thanks to a more precise measurement of a country's repayment record, more persistent effects of default have be detected, which are more in line with the effects of a default according to the theory. Little is still known, however, on the implications of debt restructurings involving official creditors, despite the role historically played in the resolution of debt crises (IMF 2013) and the fact that official debt accounts for a substantial share of total sovereign debt, especially in developing countries. Showing the heterogeneous determinants of default, as well as the heterogeneous treatment of creditors in the event of default, is important as it could help shedding light on what precisely are the costs of default to a sovereign country.[2]

In this paper, we document the relationship between sovereign debt default and credit risk by taking, as dependent variable, a set of indicators for a country creditworthiness, such as agencies' ratings, institutional investors' ratings and bond yield spreads (from J.P. Morgan's EMBI Global -EMBIG). What is more, we consider different measures for the severity of the debt crisis, that is the total amount of debt affected by the restructuring (as a share of total external debt), the corresponding present value reduction, or "haircut", and the face value reduction. We apply a similar methodology to Cruces and Trebesch (2013a) as well as the Synthetic Control Method, hereafter SCM, (Abadie and Gardeazabal 2003, Abadie *et al.* 2010), in order to provide some causal evidence for the heterogeneous effect of default on commercial and official debt.[3]

From now on in the paper, by "*private restructuring*", we will denote a restructuring deal with private creditors (foreign banks and bondholders), while "*official restructuring*" will stand for agreements reached with official creditors (in the Paris Club of official creditors, hereafter Paris Club). We add to previous works by comparing the rating outcome of official and private restructuring (as well as debt flow and stock effects), hence adding to the emerging empirical literature on official debts. To the best of our knowledge, it is the first time in this literature that both the distinction between private and official deals, as well as between occurrence and magnitude of a default, is taken into account in the context of credit risk.

[1] This literature has mainly looked at the effects of sovereign defaults on international trade (e.g., Rose 2005, Borensztein and Panizza 2010), international credit market (e.g., Borensztein and Panizza 2009, Gelos *et al.* 2011 and Panizza *et al.* 2009), and GDP growth (Sturzenegger 2004, Borensztein and Panizza 2009, De Paoli *et al.* 2006, 2009, Levy Yeyati and Panizza 2011), finding, overall, short lived effect of sovereign defaults.

[2] A recent paper (Arellano, Mateos-Planas and Ríos-Rull 2019) presents a theory of sovereign default able to rationalize the large heterogeneity in debt crisis, which are typically partial and vary in their duration.

[3] Due to data limitation, however, we could only apply this method to the rating provided by International Investors.

Sovereign credit ratings can be interpreted as a forward-looking summary indicator of macroeconomic and (often) political conditions, as these affect repayment prospects and borrowing capacity and they tend to be highly correlated with borrowing costs.[4] We should clarify, however, that most of these measures explicitly pertain to a sovereign's ability (and willingness) to service financial obligations to nonofficial (commercial) creditors. Hence, they are "biased" in favour of measuring the probability of default on debt owed to private creditors. In fact, understanding how rating agencies and institutional investors evaluate the repayment ability towards official creditors is not straightforward. This depends on how "visible" official debt risk is and on how rating agencies incorporate it into their rating models. From their official documentation, rating agencies seem to evaluate official risk only to the extent to which it can also affect the repayment prospects of government obligations to the private sector, due to the preferred creditor status associated with many of official claims (e.g., DBRS 2018).[5] In other words, official debt seems to be generally perceived as "problematic", and hence adversely affect sovereign rating, only to the extent to which arrears to official creditors may indicate growing financial distress and/or lack of willingness to pay, which eventually is going to affect private repayments as well. What is more, official creditors (notably the Paris Club) may directly seek comparable treatment for private-creditor claims as part of any restructuring of their own claims (e.g., Fitch 2019).[6]

Debt restructuring could affect a country's prospects in at least two alternative ways. Default involving higher haircuts/restructurings may involve more severe reputational costs. On the other hand, the channel of debt relief operates in the opposite direction. Since higher haircuts reduce the level of government's debt more substantially, such debt reduction might allow countries to exit a debt overhang improving in this way a country's economic prospects, as described by Krugman (1988). The overall impact of a debt restructuring on a country's economy is then theoretically ambiguous and remains an empirical question.

Analyzing 437 default episodes in 130 countries over the period 1990-2013, and using dyadic

[4] Cantor and Packer (1996) were among the first to focus on the relationship between default history and credit ratings, finding that countries that defaulted after 1970 are associated with a significant drop in a country's credit rating. Reinhart *et al.* (2003) find that a history of default is associated with lower ratings assigned by the Institutional Investor publication.

[5] Such preferred status, however, is not confirmed by a recent paper of Schlegl, Trebesch and Wright (2019), who, while confirming that multilateral institutions are senior creditors, show that official bilateral debt is junior, or at least not senior, to bank loans and bonds.

[6] The Paris Club's "comparability of treatment" principle dictates that private creditors (mainly banks, bondholders and suppliers) should receive "a treatment on comparable terms" to those granted by the Paris Club. Hence, creditor governments expect private creditors to share the debt burden by accepting haircuts that are at least as high as those negotiated by the Paris Club. Timing is also very important as rating agencies may consider an agreement with the Paris Club a positive (or negative) event depending on whether it is (or not) followed by a private deal. In a similar vein, they may positively evaluate a private agreement which is directly followed by an official one that may contribute to reducing the overall debt burden.

monthly data for agency rating and monthly data for institutional investors' ratings, we find that commercial and official defaults are associated to different outcomes.[7] Private defaults seem to involve some reputational costs up to seven years since the last agreement, while official defaulters are not affected by the restructuring episodes. Focusing on present value reduction (and debt write-off), we find that the reputational costs become stronger, while official defaulters may even benefit from the face value reduction. Using the EMBIG spread as dependent variable, we confirm the results of Cruces and Trebesch (2013) in the case of private haircuts, while we find that spreads go down up to seven years after final official deals. Finally, using the SCM we present further evidence for the heterogeneity of the economic impact of debt restructuring on investors' rating, which is consistent with the results obtained from the regression analysis.

Even if our results may depend on how rating agencies incorporate official risk into their rating models, they are important because they document that the costs of default vary with the amounts of debt and the type of creditors affected. Consistently with Schlegl *et al.* (2019), we find that defaulting on private debt is highly visible and hence it is likely to result in a rating downgrade, while an official default, which often occurs without much media coverage, is much less visible and hence less likely to determine some collateral damage. In particular, official restructuring that are arranged within the "Paris club umbrella" are supposed to guarantee a relatively smoother approach to the way in which deals are actually orchestrated than private ones, hence lowering even further the collateral damage of a default.[8] Sovereigns are aware that the consequences of a default depend in important ways on who the defaulted creditors are and what bargaining power each creditor group has, hence they may decide to prioritize their repayments accordingly (e.g., Erce and Mallucci 2018). Documenting this difference can then help shedding light on why countries default towards whom and why.

This paper contributes to the (empirical) literature of default costs. In particular, to the emerging literature focusing on the characteristics and the economic relevance of debt restructuring, both from both a private sector perspective (Asonuma and Trebesch 2016; Forni, Palomba, Pereira and Richmond 2016; Reinhart and Trebesch 2016; Schlegl *et al* 2019; Trebesch and Zabel 2017) and an official sector perspective (Cheng, Díaz-Cassou, Erce 2017, 2018; Corsetti and Erce 2018;

[7] Our data allows us to take into account of the dyadic relationship between agency-country pairs, at least as time-invariant factors are concerned. Recent studies document the existence of incentives of ratings agencies to distort ratings in favor of their respective home countries, as well as economically and culturally aligned countries (Fuchs and Gehring 2016) or of issuers, in the market for commercial mortgage-backed securities (Sean Chu and Rysman 2019).

[8] The importance of the way in which restructuring are actually arranged is also confirmed by the results of both Asonuma and Trebesch (2016) and Trebesch and Zabel (2017), who find that less confrontational (or preemptive) restructurings are associated with a lower output loss as compared to soft (non-preemptive) defaults.

Marchesi and Masi 2018; Reinhart and Trebesch 2016).[9]

After the Greek debt restructuring of 2012, private sovereign debt has been replaced by official debt. More generally, in response to the sovereign debt crises that shook the euro area since the end of 2009, the governments of Cyprus, Greece, Ireland and Portugal all received official funds from both the International Monetary Fund and newly created European Financial Stability Facility at first, then European Stability Mechanism (ESM). Our results may then provide some insight also for the debate on the consequences of debt heteorogeneity in Europe, which introduces the possibility for governments to operate selective defaults discriminating across investors.

The rest of this paper is organized as follows. Section 2 describes the data, while Section 3 presents the empirical model in the dyadic setting of rating agencies. In Section 4 we show the results obtained with investors' rating as dependent variables, both using panel data analysis and the SCM. The results obtained using the EMBIG bond spread as dependent variable are presented in Section 5. The final Section 6 concludes.

2 Data

We consider different measures of debt restructuring, that is the total amount of debt affected by the restructuring (as a share of total external debt), the corresponding present value reduction, or "haircut", and (as robustness) the face value reduction (FVR). We take these three specific measures to be able to compare the same type of intervention for restructuring involving private and official creditors.[10] In this paper, we focus on restructurings with foreign creditors, thus excluding debt restructurings that mainly affected domestic creditors. Figure 1 shows the evolution over time of the relative shares of official and private external debt for all countries in our sample. As we can see, official debt accounts for a substantial share of total sovereign (external) debt. Moreover, the shares of official and private debt have remained stable over the last forty years. In light of this observation, there is still too little research on the relative treatment of official versus private defaults.

INSERT FIGURE 1 HERE

[9] As in Marchesi and Masi (2018) we find differences between official and private default costs. More specifically, the different growth prospects observed for private and official defaulters in the aftermath of a debt crisis might depend on the different reputational costs in the credit markets.

[10] The two measures of private and official haircut come from two different sources and are computed in two different ways. For this reason, as a robustness check, we will also consider the private and official nominal haircut, which are computed, in both cases, as the ratio of face value debt reduction to the amount of debt treated in the restructuring deal (see Reinhert and Trebesch 2016; and Cheng *et al.* 2018).

We relied on the original dataset by Cruces and Trebesch (2013b) for the data on debt restructurings with commercial creditors.[11] This dataset provides a list of 187 distressed sovereign debt restructurings with external banks and bondholders occurred between 1970 and 2013. It includes information on the amount of debt restructured, the face value reduction, and a measure of debt relief (*Preferred Haircut HSZ*) computed by the authors considering the present value of both old and new debt instruments.

For official debt restructurings, we relied on the original dataset built by Cheng *et al.* (2017), which contains 429 sovereign debt restructurings with the Paris Club, between 1956 and 2015. Paris Club creditors may provide (official) debt treatments to debtor countries in the form of rescheduling (i.e., debt relief by postponement of debt service payments) or, in the case of concessional rescheduling, reduction in debt service obligations during a defined period (flow treatment) or as of a set date (stock treatment).[12] The new data made available by Cheng *et al.* (2018) allowed us to compare the impacts of (i) flow treatment and (ii) stock treatment. What is more, the authors report, for each agreement, the corresponding terms of treatment and the face value reduction provided (if any). Following Cheng *et al.* (2016a), by looking at the terms of treatment, we were able to compute the present value reduction for official deals (or haircut) and to compare this value with the corresponding haircut measure in the case of private agreements (or *Preferred Haircut HSZ)* used by Cruces and Trebesch (2013a).[13]

Our sample includes a maximum of 130 developing countries. Since the data on private debt restructurings are available only up to 2013, our year sample ends in that year too. It includes 64 defaulting countries, which experienced at least one debt crisis during the sample period as well as 66 non-defaulters. Among defaulters, 43 countries had both private haircuts and official debt restructurings, 14 countries had only an official restructurings (through the Paris Club) while only

[11] In August 2014, the authors provided an update of their data covering the year 2013 as well.

[12] The Paris Club is an informal forum of the most important official creditor countries and was designed to deal with the payment difficulties of debtors. The restructuring approach of the Paris Club has evolved over time. In the 1980s, negotiations took place on a case-by-case basis and focused on short-term liquidity problems, mostly implementing maturity extensions without nominal debt reduction. During the 1990s and 2000s, especially for low income countries, restructurings became increasingly concessional, including debt stock cancellations. Specifically, as low-income countries are concerned, the possibility of a partial debt stock cancellation of non-ODA debt was gradually extended from 33% of the eligible debt in 1988 (Toronto Terms) to 50% in 1991 (London Terms) and 66% in 1994 (Naples Terms). In 1996, the World Bank and the IMF have implemented the Heavily Indebted Poor Countries (or HIPC) Debt Initiative, which was first strengthened in 1999, and more recently in 2005, when, under the Multilateral Debt Relief Initiative (MDRI) multilateral institutions were encouraged to increase their specific contribution to debt reduction. Debt relief at completion point under the HIPC Initiative is provided within the HIPC Exit Terms.

[13] Cheng *et al.* (2016a) provide a detailed overview of the different terms and report the net present value relief associated to the different Paris Club Terms of Treatment over the years. We calculated the net present value relief associated to the "ad hoc" agreements by directly looking at the Paris Club documentation. (http://www.clubdeparis.org/en/traitements).

7 countries have experienced private defaults only. Table A1 in the Appendix shows all countries and years, including a list of debt crisis episodes studied here.

Table 1a shows summary statistics for different subperiods in the full sample of 437 restructurings.[14] While the average amount of debt affected by a private restructuring (haircut) is about 17 (34) percent over the full sample mean, when looking at the three different subperiods, we detect a sizeable increase in this amount over time. Average size of debt affected by private restructuring (and haircut) is almost double during the last subperiod (2002-2013), as compared to the initial period (1970-1988), and about 50 percent higher with respect to the intermediate one (1989-2001). When comparing the size of face value reduction, we can see that in only two cases there was some nominal debt reduction in the first subperiod.[15] One reason is that almost all the settlements up to the beginning of the Brady plan (1989-1994) mainly implied maturity extensions without an actual face value reduction. Nevertheless, these amount (about 58 percent) exceed, on average, the reductions granted in the other two subperiods.

As official restructuring are concerned, we find that the average amount of debt affected by an official restructuring (haircut), over the full period, is about 12 (64) percent, slightly lower than the average corresponding private amount.[16] Looking at the three different subperiods, we also find an increase of their size over time. Average size of official restructurings (haircut) during the last subperiod (2002-2013) is about three (two) times the average restructuring implemented during the initial period (1970-1988), and about two times (30 percent more) the average size of the intermediate period (1989-2001). As documented by the different debt relief initiatives described above, we detect a sizeable and stable amount of official face value reduction over time.

Table 1b presents summary statistics of the three types of restructuring according to a country's income. As the number of countries is concerned, we find that middle income countries tend to default more with both types of creditors, which is true independently of the measure we choose to denote the default severity. On average, middle and high income countries benefit from the most "generous" private deals, while we do not detect substantial differences among high, middle and low income countries with respect to the average size of an official restructuring. When considering the average size of both haircut and face value reduction, we can observe that low income countries tend to benefit from the highest amount.[17]

[14] Among those 158 episodes involved restructuring with private creditors, while 279 involved deals with official creditors.

[15] The two episodes of private debt reduction listed in Table 1a refer to the Bolivian buyback and to the Mexican "Morgan Bond plan", both taking place in 1988.

[16] In order to compare the two types of defaulters, we only consider official restructurings that were agreed until 2013, which is the last year for which we have information about the size of private restructurings.

[17] The only high income country which receives an official haircut of 100% is Seychelles in 2009.

TABLES 1a & 1b HERE

Finally, Figure 2 shows the evolution over time of the percentage of both private and official debt haircut and face value reduction. We can see that while private agreements were more common up to the mid nineties, Paris club deals prevail in more recent years. What is more, the average haircut (and face value reduction) is much higher under official agreements. Figure 3 illustrates the distribution of both private and official restructurings according to the relative amount of debt affected, the haircut size, and the amount of face value debt reduction. While in the case of private creditors agreements involving a relatively low amount of debt (or a small haircut and face value reduction) are more common, the opposite is true in the case of official agreements.

FIGURES 2 & 3 HERE

3 Credit Agency ratings

This Section assesses the link between debt crisis outcomes and subsequent agency rating, while in the next Section 4 and Section 5 we will use as dependent variable, the Institutional Investor's ratings and the monthly average secondary market bond stripped yield spread (EMBIG), respectively.[18]

3.1 Method

Since the data on credit agencies are available for the full sample of countries only since 1990, our monthly data are organized in an unbalanced panel, including a maximum of 130 developing countries, over the years 1990-2013 (instead of the full period 1970-2013). Our dependent variable is a sovereign's long-term foreign-currency rating provided by one of eight rating agencies: CI, Dagong, DBRS, Fitch, JCR, Moody's, R&I, and S&P. We retrieve monthly information on sovereign ratings via Bloomberg obtaining an unbalanced panel, as each agency assigns ratings to different sets of countries over varying periods of time. For our empirical analysis, all ratings have been translated to a 21-point scale. This means that we assign the highest value of 21 for an "AAA" rating. "C" and "D" in turn are translated into a value of one (see Fuchs and Gehring 2017 for a similar approach). The pair-wise correlation between sovereign ratings from the eight

[18] The latter indicator, however, is available only for a reduced sample of 47 countries and for the period 1993-2013. Table A7c in the Appendix, shows the correlation between agency (average) rating, investors' rating and bond spred in this reduced sample.

credit rating agencies under analysis ranges from 0.869 (between Standard and Poor's and Dagong Global) and 0.992 (between Fitch and Japan Credit Rating Agency) (see Table A7a in the Appendix). Tables A7b in the Appendix, shows the correlation between agency (pooled) rating and investors' ratings.

In order to account for the possible influence of agency-country time invariant specific characteristics (what is called the "home bias" in sovereign rating, see Fuchs and Gehring 2017) we estimated our model using fixed effects OLS at the agency-country-period-level.[19] We estimate the model with agency-country (pair) fixed effects (and cluster the standard errors at the pair-level), include period-fixed effects, and lag the explanatory variables by one period. We therefore control for unobserved effects that exclusively vary at the pair and period-level, substantially reducing concerns over endogeneity. Ordinary least squares treat the dependent variable as cardinal. This implies that the difference between an "AA" and an "AA+" rating, for example, is the same as between "BB" and "BB+."[20]

In order to identify post-crisis episodes, we focus on "final" restructurings only, which we define as those that were not followed by another restructuring vis-a-vis private or official creditors within the subsequent four years. Moreover, due to our focus on post-restructuring effects, we exclude observations during default. The information on the duration of private debt crisis comes from Asonuma and Trebesch (for private), while we rely on Beers and Mavalwalla (2018) and Cheng *et al* (2018) for information regarding the duration of official debt crises. Following Cruces and Trebesch (2013a), we take up to seven years after the last restructuring (haircut), in order to capture the existence of persistent effects.

The total amount of debt restructured at the end of a debt crisis corresponds to the total amount of relief achieved during the final agreement. It may consist in relief due to maturity extensions or changes in interest rates, in a nominal reduction of the debt stock, or both. In this Section we will consider both the total amount of debt affected by the restructuring and the case in which a restructuring comes with a haircut.[21] In Sections 4 and 5 we will focus only on the haircut.[22]

[19] Fuchs and Gehring (2016) investigates how the home country of rating agencies could affect rating decisions as a result of political economy influences and cultural distance. They find that agencies have biases in favor of the respective home countries, as well as in favor of culturally more similar countries, and countries in which home-country banks have a larger risk exposure. In particular, cultural proximity (as measured by linguistic similarity) is shown to be the main transmission channel that explains the advantage of the home country.

[20] The results are robust to using, as dependent variable, an average of all the agencies' ratings, as well as the two separate averages of only American agencies (i.e., Moody's, Fitch, Standard & Poor's, Dominion Bond Rating Services) as opposed to Asian agencies (Dagong Global, Rating and Investment Information, Japan Credit Rating Agency). They are reported in the Appendix, in Table A4, columns 2-3.

[21] The results obtained using the private/official face value reduction are reported in the Appendix, in Table A3 and in Figures A8a-A8b.

[22] Results obtained considering the alternative measures for the severity of the default are similar and available

The regression equation then is:

$$c_{i,j,t} = \alpha + \beta Z_{i,t-1} + \gamma_j C_{i,t-j} + \delta_j R_{i,t-j} + \eta_{i,j} + \tau_t + u_{i,j,t}, \qquad j = 1, ... - 3, -4\&5, -6\&7 \quad (1)$$

where $c_{i,j,t}$ represents the credit rating provided to country i, by agency j, at period t; C_{it-j} is a dummy equal to one when a country has finalized its last private/official restructuring and R_{it-j} denotes the amount of private/official debt affected in the last restructuring (or haircut) and Z is a vector containing the control variables lagged one period. $\eta_{i,j}$ and τ_t denote agency-country pair and year fixed effects, which allow us to control for both countries time invariant variation and common trends. In this way we can also account for global factors that might have influenced the simultaneous dating choice of debt restructuring events (e.g., Baker or Brady plan in the two periods, 1985-88, or 1989-94). Finally, $u_{i,j,t}$ is the error term.

The advantage of including both official and private restructurings in the same specification is that it allows us to detect their effects by avoiding an omitted variable bias. Moreover, we are also able to distinguish the rating variation associated with the default *per se* from that associated with the amount of the debt affected, i.e. "occurrence" versus "magnitude." The results of the model of equation (1) are presented in Tables 2 below. While Table 2 presents the results obtained including the amount of debt affected by a private or official restructuring, Tables 3 shows the results obtained in the case of private or official haircut.

As the control variables are concerned, we rely on the specification by Cruces and Trebesch (2013a). As they do, in order to capture the sovereign's domestic economic performance, we included public debt to GDP, the general government net lending/borrowing, GDP real growth, reserves to imports, inflation rate (based on consumer prices), current account, the ICRG and the political risk indicator.[23] Following Fuch and Gehring (2017), all time-varying control variables enter as lagged moving averages over one or three years. Table A2a and Table A2b in the Appendix provides a detailed description of all our variables employed, their sources and details on the computation of the lags, while Table A6a presents some summary statistics.

on request.

[23] We included further control variables, such as per capita GDP, total population (in log), and the number of years the chief executive has been in office. These results are reported in the Appendix, Table A4, column 1.

3.2 Results

In this Section, we discuss the results obtained considering both the amount of debt affected by private/official restructurings (in Table 2) and the size of private/official haircut (in Table 3). In columns 1-2 of Table 2, we include the amount of debt affected by the restructurings, expressed in percentage points, up to seven years after the final restructuring (with and without control variables, respectively). Column 2 shows that a one percentage point increase in the amount of debt affected by a private restructuring is associated with a decrease of about 0.1 notch in the credit rating, in year one after the restructuring. This means that a restructuring involving about 22 percent, which is roughly the mean for our sample, can be associated with a notch 2.2 lower in year one. Accordingly, a 1 standard deviation increase in amount of debt affected (about 18 percentage points in this sample) is associated with a rating which is 1.5 smaller one year after the private agreement, which is clearly an economically relevant magnitude.[24]

On the other hand, in the case of an official restructuring, a one percentage point increase in amount of debt affected by the restructuring is associated with an increase of about 0.02 notch in the credit rating, in year one after the restructuring. This means that an average restructuring of about 11 percent can be associated with a notch 0.22 higher in year one, and one standard deviation increase in the amount of debt affected by the restructuring (15 percentage points) is associated with a rating which is 0.21 notches larger in year one after the official agreement. While these results are economically relevant in the case of private deals, they become almost negligible when considering an official restructuring.

TABLE 2 HERE

In columns 3-4, we consider only the dummy indicating the occurrence of the private/official default, with and without control variables respectively. Finally, the last two columns contain the full specification, which includes both the lagged restructuring sizes and the lagged restructuring dummies, with and without control variables. While all these results are reported for comparison, we largely base the discussion on the fully specified model of column 6. To be able to comment these results, however, it should be kept in mind that the coefficients shown in the fully specified model (column 6 of Table 2) have to be interpreted conditionally, as in any interaction model.[25]

[24] We should emphasize that the economic consequences of this contraction may not be linear, as loosing the two notches from junk territory is clearly different than switching, for example, from AAA to AA (in S&P's rating).

[25] As pointed out by Cruces and Trebesch (2013a), multicollinearity does not bias least squares estimates, but the high correlation between C and R will tend to increase the estimated standard errors. The high correlation between C and R (about 0.7 in our sample) actually lowers the variance of the estimated effect of interest, $\gamma + \delta R$.

The best way to interpret the findings of Table 2 is to look at Figure 4a and 4b, which show the expected variation in agency rating of a restructuring conditional on its size, that is $\delta_j R_{it-j} + \gamma_j$, from equation 1 above.

FIGURES 4a & 4b HERE

Figures 4a and 4b show the expected effect for different levels of private and official restructuring, respectively. The different panels correspond to how many years after the restructuring agency rating is being measured, and the dotted lines show 90 percent confidence bands. The effects are calculated from the most complete specification (column 6). Besides easier interpretation, this joint estimate and the resulting graphs are important because the high correlation between C and R complicates making inference about their individual effects, but facilitates inference about their sum (see Cruces and Trebesch 2013a). The bottom line of Figure 4a is that private restructurings are negative and statistically significant for years 1–7, and basically for any positive amount of restructured debt (including the mean value in our sample, which is about 22 percent). This can be seen because, in each panel, the upper confidence band is below the 0 horizontal line for any positive amount (unless they involve an amount of debt which exceeds 50 percent of the total external debt).

In turn, Figure 4b reports the expected effect on growth of an official restructuring conditional on its size. It shows that official restructurings are generally positive and statistically significant up to three years since the end of the crisis, and for any amount of restructured debt smaller than 80 percent of total external debt. For years four to five after the restructuring they are significant only when the proportion of debt affected by the restructuring is smaller than 30 percent, which is still greater than the mean value in our sample (which is about 11 percent).

Hence, the restructuring size seems to involve some reputational costs and the correlation between private restructuring and agency credit rating is negative for years one to seven after the restructuring episode). On the other hand, official restructurings are associated to an increase in a country's rating.

TABLE 3 HERE

3.2.1 Haircut

Stronger results are obtained considering the case in which a private/official restructuring is associated to a present value reduction (haircut). In the case of private deals, the results of Table

3, column 2, show that a one percentage point increase in a private haircut is associated with a decrease of about 0.05 notch in the credit rating, in year one after the final haircut. This means that a haircut of about 48 percent, which corresponds to the mean for our sample, can be associated with a decrease of about 2.4 notches in year one. Accordingly, a one standard deviation increase in haircut (about 25 percentage points in this sample) is associated with a rating which is 1.25 notch smaller, one year after the private agreement.

Conversely, in the case of an official agreement, a one percentage point increase in an official haircut is associated with an increase of about 0.02 notch in the credit rating, in year one after the restructuring. This means that a haircut of about 45 percent (the mean for our sample) can be associated with an increase of about 1 notch, in year one. Accordingly, a one standard deviation increase in an official haircut (about 36 percentage points in this sample) is associated with a rating which is almost one notch bigger one year after the official deal. When considering the present value reduction, these results are economically relevant both in the case of private and official deals.

FIGURE 5a & 5b HERE

Next, we focus on the results for the fully specified model of equation 1, which includes both the lagged haircut and the lagged restructuring dummies as well as the control variables (column 6) and confirms the strong relationship between haircut size and subsequent ratings for years one to seven after the restructuring. Figures 5a and 5b then show the mean increase in credit ratings associated with a present value reduction, for different levels of private and official haircut and at different lag lengths, and 90 percent confidence bands. As before, the Figures are based on the most demanding specification (column 6 in Table 3).

In particular, Figure 5a shows that private haircuts are negative and statistically significant in the long term. This can be seen because the upper confidence band is always below the zero horizontal line at least for a haircut size.greater than 20 percent, which is less than half the average size in the sample (48 percent). The reduction in credit rating associated with haircut size is also economically substantial, especially for years four to seven after a restructuring.

In the case of official agreements, as shown in Figure 5b, the rating increase of a restructuring is statistically significant for levels of haircut at which the lower confidence band is above the zero horizontal line. From year one to two years after the agreements, we can see that haircuts greater than 40 percent (the mean of this sample being about 45 percent) can be associated with significantly higher ratings. From year three to seven after the restructuring, the rating increase can be significant only for much larger haircuts (i.e., greater than 60 percent).

In summary, in the case of private restructurings, the end of the crisis is associated to a contraction in credit rating, which is actually greater when the private deal comes with some haircut.[26] The opposite holds in the case of official agreements, when agency rating generally improve and the more so the larger the haircut. This evidence then suggests that while for private defaulters negative spillovers dominate, for official defaulters positive (debt relief) spillovers seem to prevail.

4 Institutional Investor ratings

In this Section we take as dependent variable the Institutional Investor's crediworthiness index (Institutional Investor Magazine), which has been computed and published twice a year since 1979 in the March and September issues of the Institutional Investor Magazine). We will use monthly observations of these bi-annual data.[27] This rating is based on information provided by economists and sovereign risk analysts at leading global banks and securities firms. The ratings grade each country on a scale from a minimum of 0 to a maximum of 100 and is available for 178 countries over the period 1979-2016.[28] Respondents' responses are weighted according to their institutions' global exposure, and names of respondents are kept strictly confidential.[29]

As pointed out by Reinhart and Rogoff (2009), the Institutional Investor's crediworthiness index can be then seen as a survey-based measure of the perceived crediworthiness of a large number of countries, with two main differences with respect to the credit ratings provided by agencies. First, this index can be regarded as a continuous variable, while the credit ratings assigned by the rating agencies have the features of a discrete variable. Second, this index changes annually over time, while the ratings may remain constant for long period of time.

[26] This result is in line with Gennaioli *et al.* (2014) who show that the spillovers of a default, on domestic and foreign banks, are larger the higher the haircut.

[27] Results are confirmed in the case of annual observations (i.e., yearly averages of these bi-annual data) and they available on request.

[28] The survey represents the responses of between 75 and 100 bankers, that are asked to rate each country on a scale of 0 to 100 with regards to what they perceive as the default risk of the country, where 100 represents no risk of default. Institutional Investor then compute the average of these individual ratings weighted by its perception of each bank's credit analysis sophistication and level of global prominence.

[29] As in previous work (Reinhart, Rogoff and Savastano 2003) we interpret the ratings reported in each semiannual survey as capturing the near-term risk of default within one to two years.

4.1 Panel Analysis

In order to have comparable results we restricted our sample to be the same (both in terms of number of countries and years) to the one estimated in the previous Section.[30] Results are robust to using the larger sample of countries and longer year span available in the survey covering the period 1970-2013.[31] We estimate the determinants of Institutional Investor ratings using a fixed-effects OLS estimator. The regression equation is:

$$I_{i,t} = \alpha + \beta Z_{i,t-1} + \gamma_j C_{i,t-j} + \delta_j R_{i,t-j} + \eta_i + \tau_t + \varepsilon_{i,t}, \qquad j = 1, ... - 3, -4\&5, -6\&7 \qquad (2)$$

where $I_{i,t}$ represents the Investor rating provided in country i, at period t; C_{it-j} is a dummy equal to one when a country has finalized its last private/official haircut, R_{it-j} denotes the amount of private/official haircut in the last restructuring and Z is a vector containing the control variables (lagged one period). Finally, η_i, and τ_t denote country and time dummies, respectively.

TABLE 4 HERE

We report the results in the case of private and official deals in Table 4. As previously described, in columns 1-2 of Table 4, we include the haircut size, expressed in percentage points, up to seven years after the final agreement (with and without control variables, respectively). Column 2 shows that a one percentage point increase in the private haircut size is associated with a decrease of about 0.2 points in the investor rating, in year one after the restructuring. This means that a restructuring involving about 50 percent, which is roughly the mean for our sample, can be associated with 11 points lower in year one. Accordingly, a 1 standard deviation increase in amount of debt affected (about 28 percentage points in this sample) is associated with a rating which is 6 points smaller one year after the private agreement. In the case of official agreements, instead, no coefficient is found to be significant. Thus, while these results are economically relevant in the case of private haircuts, when considering an official restructuring, no coefficient is found to be significant.

In turn, in columns 3-4, we include only the dummy indicating the occurrence of the private/official default, while the last two columns contain the full specification. As before, we focus on the results for the fully specified model of column 6, which confirms the strong relationship between private

[30] Due to the high number of missing data in the agency's sample, however, the two samples do not coincide.
[31] They are reported in the Appendix, in Table A5.

haircut size and subsequent ratings for years one to seven after the restructuring. As previously described, the best way to interpret the findings of Table 4 is to look at Figure 6a and 6b, which show the expected variation in agency rating of a restructuring conditional on its size.

FIGURES 6a & 6b HERE

The bottom line of Figure 6a is that private haircuts are negative and statistically significant for years one to seven after the final agreement. We can see that from one to three years since the final haircut, any positive amount can generally be associated with significantly lower ratings. On the other hand, from four to seven years after the final restructuring, the rating decrease can be significant only for haircuts greater than 20 and 40 percent, respectively (which are both smaller than the mean of this sample). On the other hand, in Figure 6b, the rating decrease after an official haircut could be statistically significant for levels of haircut at which the lower confidence band is below the zero horizontal line. Since this is never the case, at least when the haircut is greater than the sample mean (which is about 60 percent), we can conclude that an official haircut is not associated to any variation of the investor rating.

In summary, when comparing the results of the two models of equation (1) and (2), while in the case of private restructuring we find overall quite similar results, the results are different for official defaulters. More specifically, in the case of agency rating, the end of an official restructuring is associated to a (mild) improvement in the credit rating, while for institutional investors such effect is not significant. The results in this section should be taken cautiously, as identification is difficult and we cannot detect any causal effect but only strong conditional correlations. In the next Section we present some evidence of causality between restructuring and investor rating adopting an alternative specification method, the Synthetic Control Method. We can implement this method, however, only in the case of institutional investors for which data are available sine 1970, as a longer time dimension allows us to take over a 10-year pre-treatment (i.e., default) period.

4.2 Synthetic Control Method

In this Section we investigate the heterogeneity of the impact of debt restructurings by constructing a counterfactual of the path of the credit rating for each country that had only either private or official debt restructurings. The missing counterfactual outcome is estimated with the SCM developed by Abadie and Gardeazabal (2003) and later improved by Abadie *et al.* (2010).

The SCM provides for the identification of heterogeneous responses of macro-policies or events (treatments) that affect macro-units in small-sample comparative studies.[32] In our analysis, we evaluate the investor rating of defaulting countries with respect to the rating of a sample of non-defaulters (synthetic control). This method reduces discretion in the choice of the comparison units. In fact the SCM is a data-driven procedure that assigns a weight to each unit in the control group, in order to minimize the pre-treatment differences between the treated unit and its synthetic counterpart by taking into account a set of pre-intervention variables that are relevant to predict the outcome variable (predictors).

The ability to match the pre-event outcome of the treated country with that of the synthetic control is measured by the mean squared prediction error (hereafter MSPE), that is the expected squared distance between the outcome of the treated country and the outcome of the synthetic in the pre-event period: the lower the MSPE, the more the synthetic resembles the characteristics of the treated country.[33]

The SCM deals with endogeneity from omitted variable bias by accounting for the presence of unobservable time-varying confounders. Indeed, when there is a large number of pre-event periods, only those units that are similar in both observed and unobserved characteristics would produce similar paths for the outcome under analysis. Thus, if the path of the outcome variable of the treated and the synthetic unit are alike over a sufficiently long pre-treatment period, the difference (gap) between the investor rating of a defaulting country and the synthetic in the aftermath is an unbiased estimation of the effect of the default.

In order to disentangle the effect of private and official defaults, we consider countries that had only official debt restructurings (through the Paris Club), and countries that had only private restructurings, as described in Section 2. Among private defaulters, we have to exclude Belize, since it proves difficult to find a credible comparison unit that reproduces the path of investor rating, and Dominica, owing to data availability. On the contrary, we include Argentina, given the relevance of its default episode in 2001. Although Argentina has also experienced in the eighties (1982-93) a default involving both private and public creditors, the interval between the two episodes is long enough to prevent us from capturing the effect of the first episode.

As official restructurings are concerned, we had to exclude several countries for data availability

[32] This method has been firstly applied by Abadie and Gardeazabal (2003) to study the economic cost of terrorism in the Basque countries. Other studies that have used the SCM include those that analyze the effect of liberalizations (Campos and Kinoshita 2010; Billmeier and Nannicini 2011), natural resource discoveries (Smith 2015, Masi and Ricciuti 2019), and civil war (Costalli *et al.* 2017). Jorra (2011) used the SCM to analyze the heterogeneity of default costs in five countries, without distinguishing between private and official defaults.

[33] For a formal presentation of the model, see Abadie *et al.* (2010).

constraints.[34] Furthermore, since the credibility of the SCM hinges on its ability to match the pre-treatment outcome of the treated and the synthetic unit, we do not present results for Angola, Burundi, El Salvador, and Georgia, whose MSPEs were too high to guarantee a credible estimation of the treatment effect. Moreover, the SCM is not suited to deal with additional shocks that potentially affect the outcome in the period after the event under analysis. Thus, we cannot consider Central African Republic, Guinea-Bissau and Rwanda, whose economies were harmed by internal conflicts, and Haiti, which was stricken by a terrible earthquake just at the end of the debt crisis.

Therefore, we overall discuss six and seven cases of private and official debt crises, respectively. We consider the first year of the debt crisis as the starting point of the treatment period. This timing assumption enables us to observe what would have happened in the absence of the default both during the debt crisis and in its aftermath. For each treated country, the pool of potential control units encompasses no-defaulters for which data are available.

As stated before, due to data limitation, we use only the rating provided by international investors as our outcome variable. In order to have equivalent pre-event conditions in the treated country and in the synthetic control, we observe what would have been the investor rating from the start of the debt crisis up to 2013. The set of predictors encompasses those variables that should determine investor rating (see Fuchs and Gehring, 2017), which are averaged over a 10-year pre-event period.[35] Finally, we add the average investor rating calculated in the 10 years preceding the crisis.[36]

4.2.1 Private Restructurings

Figure 7 shows the ability of the SCM to produce a reliable control unit, by displaying the path of investor rating in each country that had private defaults (solid lines) and its synthetic counterpart (dashed lines). Each graph shows that the synthetic unit tracks well the trajectory of credit rating in the country under analysis when we look at the years before the start of the debt crisis (indicated by the first vertical line). Combined with the high degree of predictor balance reported in Table B1 in Appendix B, this suggests that the synthetic units would continue to track the outcome

[34] As already highlighted, the SCM requires a sufficiently long pre-treatment period with no missing values in the outcome variable for the entire period of analysis.

[35] The SCM requires at least one observation for each of the predictors in the pre-treatment period. To not further restrict our sample, if data are not available for a treated country, we exclude the variable from the set of predictors. Tables B1 and B2 in Appendix B show, for each country, which variables are actually used to conduct the optimization procedure.

[36] Our findings are robust to the exclusion of pre-treatment average of investor rating. However, the inclusion of these data ensures a better pre-treatment fit.

of the defaulting countries if the debt crises had not happened.[37] That is, the synthetic units provide rational estimates of the level of credit rating that these countries would have reached in the absence of the default.

FIGURE 7 HERE

Although Figure 7 shows that private defaults affect defaulting countries differently, each of the four cases displays a negative gap between the actual and the synthetic credit rating during the debt crisis, which persists (or even increases) until the final deal (indicated by the second vertical line).[38] Some striking differences, however, are detectable afterwards. In particular, while the negative gap in the credit rating increases in the case of Venezuela, Uruguay was able to catch up with its synthetic unit, and its credit rating is above the synthetic outcome at the end of the debt crisis.

Furthermore, we tested to what extend our results are driven by any particular control country by iteratively re-estimate the synthetic outcomes omitting in each iteration one of the country that received a positive weight, or leave-one-out synthetic control (Abadie *et al.* 2015). Thin lines in Figure B.1 in the Appendix depict the leave-one-out synthetic outcomes, while bold and dashed lines reproduce actual and synthetic outcomes, respectively, as in Figure 7. This sensitivity test confirms that the results presented above are fairly robust to changes in the composition of the control group. Uruguay represents a remarkable exception since its synthetic counterpart would have been significantly below the path of its credit rating excluding Colombia from the control group. However, the divergence from the results presented above may be explained by the lesser ability of the algorithm to match the pre-event outcome of our case study. Indeed, the leave-one-out procedure entails a lower fit between the treated and the synthetic unit in the pre-event period.

Table 5, then, quantifies the economic impact of a private default in the seven years following the last deal. The effect is calculated as the percentage difference between the observed investor rating and its synthetic counterfactual. As can be seen, the negative effect in Argentina reaches the values of -28 percent, which is an improvement with respect to the rating obtained during the debt crisis. During the same time span, the credit rating of Venezuela is lower with respect to the

[37] Table B1 in Appendix B reports the weights assigned to each country that constitutes the synthetic. A comparison of the predictors in the pre-treatment period provides an appraisal of the quality of the synthetic control. As can be seen, the synthetic control groups are able to reproduce the pre-treatment characteristics of the treated countries.

[38] Notice that the duration of the debt crisis differs quite substantially, ranging from one year in the case of Greece to eight years for South Africa and Uruguay.

synthetic (51 percent on average). Uruguay was able to overcome the gap completely seven years after the end of the debt crisis (i.e., fifteen years after the initial deal).

TABLE 5 HERE

The SCM does not allow for a validation of our results using the traditional modes of statistical inference because of the small-sample nature of the data. We overcome this problem by implementing in-space placebo tests, which compare the estimated treatment effect for each defaulter with all the (fake) treatment effects of control countries (Abadie *et al.* 2010). More precisely, we estimate the treatment effect assuming that each control country was affected by the default in the same year as the treated country. If the estimated effect on the defaulting country is larger than most of the effects obtained by the (fake) experiments, we can conclude that the SCM results are not driven randomly by chance.

Figure B3 in the Appendix shows the results of these experiments: Panels a) depict the distributions of the placebo tests, while panels b) present the P-values for the hypothesis that the effect occurred by chance. The placebo tests prove that private haircuts negatively affect the credit rating of the defaulters, although heterogeneously. Considering the seven years after the end of the debt crisis, the negative effect on the credit rating is always statistically significant, but in Paraguay, in which it is significant up to five years after the end of the debt crisis. Conversely, the positive gap in Uruguay is never significant.

4.2.2 Official Restructurings

Figure 9 provides a graphical confirmation of the ability of the synthetic units to match the pre-treatment outcome of the official defaulting countries. For most of the cases, the synthetic investor rating very closely tracks the trajectory of this variable in the treated country, and the actual and the synthetic outcome start to diverge only at the end of the pre-treatment period.[39]

FIGURE 8 HERE

[39] Table B2 in Appendix B reports the weights assigned to each country that constitutes the synthetic, and the predictor balance obtained through the optimization procedure for sovereign defaulters on official debt. As before, the comparison of the variables used to construct the control units proves that the SCM provides a good estimate of the counterfactual outcome, given that the MSPE is still not high. Thus, we are again confident that the SCM reduces the possible bias arising from control units that do not provide a satisfying fit in terms of pre-treatment variables.

Defaults on official debt show also heterogeneous effects across countries. However, none of the defaulters has a reduction in credit rating that increases after the end of the debt crisis, and, for some of them, the default seems to have a positive effect.[40] More precisely, Egypt was able to recover the outcome losses, achieving a credit rating higher than their counterparts at the end of the debt crisis (indicated by the second vertical line). Guatemala and Myanmar do not show a drop in credit rating and their ratings are even above the counterpart. Ghana, Indonesia and Sri Lanka show a negative gap after the default but they catch up with their synthetic units within ten years after the resolution of the crisis.

The leave-one-out procedure presented in Figure B2 in Appendix B confirms that these results are not driven by the composition of the control group. Exceptions are Egypt and Myanmar, for which the paths of the synthetic outcomes would be above the actual outcomes after the end of the debt crisis too, and Ghana and Guatemala, for which the positive effect would be even higher. It is worth saying that these results may be explained by the higher RMSPE obtained by the procedure.

TABLES 6 HERE

Table 6 sets out the economic impact of official defaults after the last restructuring.[41] During this time window, all countries show an positive gap between the actual and the synthetic investor rating, with the exception of Comoros, Indonesia, and Sri Lanka. On average, the annual outcome gap induced by the default seven years after the last restructuring ranges between -29 percent (Comoros) and +51 percent (Myanmar), with a higher degree of variation with respect to the cases of private haircuts. This is also confirmed by the placebo tests presented in Figure B4 in the Appendix, which also shows that the effect of official default is not significant at conventional levels, whereas the positive effect is significant in Myanmar.

4.2.3 Average effects

In this subsection, we aggregate the country-specific effects of private and official defaults into average effects in order to improve the comparability of the results obtained through the panel analysis. Following Cavallo *et al.* (2013), first, we normalize the estimates by setting equal to 1

[40] The length of the default period varies from one year (Guatemala, Myanmar and Sri Lanka) to eleven years (Indonesia).

[41] The effect is calculated as the percentage difference between the observed investor rating and its synthetic counterfactual.

the credit rating of each treated country in the starting year of the debt crisis. Then, we pool the country specific effects of private and official defaulters, separately.

Figure 10 presents the average impacts of debt crises on credit rating of private and official defaulters. As can be seen, the difference between the two types of defaulter is substantial. Considering eigth years after the event (which corresponds to the average private crisis duration in this sample), the gap in rating between private defaulters and their syntetic counterpart is, on average, about 40 percent, which is clearly an economically relevant magnitude.

Conversely, in the case of an official default, while we observe, on average, a contraction in investors' rating during the years of the crisis (the average duration is eleven years in this case), official defaulters do catch up with respect to their syntetic counterpart in its aftermath.

FIGURE 9 HERE

In summary, consistently with the results obtained from the regression analysis, we find that countries involved in only private restructurings are not able to recover losses in credit rating in the medium-long run**.** On the other hand, the SCM shows that restructurings with official creditors can improve credit ratings. In the next Section we will consider a more direct measure of borrowing costs, such as the bond spread, as in Cruces and Trebesch (2013a).

5 EMBIG spread

In this Section we use as dependent variable the monthly average secondary market bond stripped yield spread from J.P. Morgan's EMBI Global (EMBIG) for each country.[42] EMBIG spreads have been used to proxy foreign currency borrowing costs of both governments and the private sector in emerging market economies. Due to data availability the sample is now restricted only to 47 countries over the year 1993-2013. Among the 47 countries covered by the EMBIG, 23 are defaulters which restructured their debt, while the other 24 countries are "nondefaulters.[43] The

[42]The stripped yield spread is the difference between the weighted average yield to maturity of a given country's bonds included in the index and the yield of a US Treasury bond of similar maturity.

[43]The 23 defaulters are Algeria, Argentina, Belize, Brazil, Bulgaria, Cote d'Ivoire, Croatia, Dominican Republic, Ecuador, Iraq, Mexico, Nigeria, Pakistan, Panama, Peru, Philippines, Poland, Russia, Serbia and Montenegro, South Africa, Ukraine, Uruguay, and Venezuela. The 24 "nondefaulters" covered in the EMBIG Chile, China, Colombia, Egypt, El Salvador, Gabon, Georgia, Ghana, Greece, Hungary, Indonesia, Jamaica, Kazakhstan, Lebanon, Lithuania, Malaysia, Morocco, South Korea, Sri Lanka, Thailand, Trinidad and Tobago, Tunisia, Turkey and Vietnam. They include countries with no external sovereign debt restructuring in the chosen period, as well as countries that entered the EMBIG more than seven years after their restructuring. For more information see Cruces and Trebesch (2013a).

regression equation is:

$$E_{i,t} = \alpha + \beta Z_{i,t-1} + \gamma_j C_{i,t-j} + \delta_j R_{i,t-j} + \eta_i + \tau_t + \varepsilon_{i,t}, \qquad j = 1, ... - 3, -4\&5, -6\&7 \quad (3)$$

where $E_{i,t}$ represents monthly bond spread of a country i, at period t; C_{it-j} is a dummy equal to one when a country has finalized its last private/official haircut, R_{it-j} denotes the amount of private/official haircut in the last restructuring and Z is a vector containing the control variables (lagged one period).[44] Finally, η_i, and τ_t denote country and time dummies, respectively.

TABLE 7 HERE

We report the results in the case of private and official deals in Table 7. As previously described, in columns 1-2 of Table 7, we include the haircut size, expressed in percentage points, up to seven years after the final agreement (with and without control variables, respectively). Column 2 shows that a one percentage point increase in haircut is associated with EMBIG spreads that are about 3 bp higher in year 1 after the restructuring. This means that a restructuring involving about 40 percent, which is roughly the mean for our sample, can be associated with 120 bp higher in year one. Accordingly, a 1 standard deviation increase in amount of debt affected (about 22 percentage points in this sample) is associated with a rating which is 66 bp higher one year after the private agreement.

On the other hand, in the case of an official agreement, a one percentage point increase in an official haircut is associated with a decrease of about 1.8 bp in the credit rating, in year one after the restructuring. This means that a restructuring with a haircut of about 54 percent (i.e., the mean for our sample) can be associated with a reduction of almost 100 bp, in year one after the last official agreement. Accordingly, a one standard deviation increase in an official haircut (about 44 percentage points in this sample) is associated with a rating which is 80 bp lower one year after the official deal. When considering the present value reduction, these results are economically relevant both in the case of private and official deals.

In columns 3-4, we include only the dummy indicating the occurrence of the private/official default, while the last two columns contain the full specification. As before, we focus on the results for the fully specified model of column 6, which confirms the relationship between private haircut and subsequent spreads for years four to seven after the restructuring.

[44] As in the previous Section, we have also replicated the analysis using the total amount of debt affected by the restructuring as a measure of the default severity. They are similar and available on request.

Figures 10a and 10b show the mean increase in bond spreads associated with a debt restructuring, for different levels of H and at different lag lengths, and 90 percent confidence bands. The figures are based on the most demanding specification (column 6 in Table 7). The main message of this Figure is that restructurings with haircuts above 40 percent (the mean of this sample) can be associated with significantly higher spreads from four to the seven years after a restructuring.[45] As official restructuring are concerned, Figure 7b shows that haircuts above 40 percent (the mean of this sample) can be associated with significantly lower spreads from three to the seven years after the final official restructuring.

As in Cruces and Trebesch (2013a), we find that controlling for both the occurrence and the magnitude of default is crucial to detect a more lasting link between debt default and borrowing costs. Most importantly, private (official) restructurings are generally associated with lower (higher) ratings and higher (lower) spreads up to seven years since the last restructuring. As rating and spread represent indirect and direct measures for borrowing costs, respectively, our result suggest that the costs of default may vary with the restructuring terms and the relative treatment of official versus private creditors.[46]

6 Conclusions

This paper studies the relationship between sovereign debt default and credit risk by taking into account the depth of a debt restructuring and by distinguishing between commercial and official sovereign debt agreements. We analyze 417 default episodes in 130 countries over the period 1990-2013, and we consider ratings provided by both sovereign rating agencies and institutional investors and bond spreads. Controlling for both the occurrence and the magnitude of defaults, we find a more lasting relationship between debt default and credit risk.

In the case of sovereign ratings, private defaulters are associated to a negative stigma in the aftermath of the restructuring, while official defaulters are overall not affected (or they may even benefit) by the restructuring episodes. When debt relief operations involve some present value reduction (haircut), the reputational losses of private defaulters are to some extent bigger, while the end of the restructuring seem even more beneficial for official defaulters. These results are confirmed when taking the EMBIG bond spread as dependent variable over a subsample of countries.

[45] From one to two years after the restructuring the restructuring are only marginally significant.

[46] Hence, the positive growth prospect observed for official defaulters in previous contributions after the end of the default (see for example Marchesi and Masi 2018) might be due to the absence of a negative stigma in the credit market.

Hence, the trade-off concerning the effects of sovereign debt restructurings seems to be associated with opposite outcomes for private and official defaulters. For the former, negative (reputational) spillovers seem to prevail, while for official defaulters the positive spillovers of a debt reduction are more important.

The analysis is of course limited in several respects. We do not claim to draw causal inferences from the empirical analysis, given the nature of the data available. We do emphasize that the direction of causality in the relationship between sovereign defaults and credit risk raises some questions and thus a robust association between debt defaults and lower (higher) ratings (spreads) can only be indicative of a correlation between the two variables. Thus, we prefer to interpret the coefficients in the models below as conditional correlations rather than causal effects.

In order to provide some causal evidence on the relationship between default and credit ratings, we use the Synthetic Control Method. Due to data limitation, however, we could apply this method only to the rating provided by International Investors. Consistently with the results obtained from the regression analysis, we find that countries involved in only private restructurings are not able to recover the contraction in their credit rating up to the medium-long run. On the other hand, official creditors not only are able to catch up with their syntethic counterpart but they may even improve their rating in the aftermath of the default.

Our results, therefore, points to the importance of the way in which debt restructurings are orchestrated, in line with the distinction between "excusable and unexcusable" (Grossman and van Huyck 1988) and "hard" and "soft" defaults (Trebesch and Zabel 2017). Debtor countries, being aware that the consequences of default depend on who the defaulted creditors are, may then decide to prioritize their repayments accordingly.

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Tables and figures

Table 1a: Restructurings and Haircuts over time (in %)

	Observations	Mean	SD	Min	Max
Private restructuring					
1970-1988	81	12.75	15.03	0.39	59
1989-2001	57	18.81	21.90	0.25	100
2002-2013	20	25.14	17.32	2.02	51.34
Official restructuring					
1970-1988	76	7.09	8.74	0.40	60.89
1989-2001	143	10.46	12.71	0.02	82
2002-2013	46	24.25	31.12	0.03	100
Private haircut					
1970-1988	81	22.77	52.89	-9.80	93
1989-2001	57	43.32	26.42	-8.30	92
2002-2013	20	52.89	31.12	4.70	96
Official haircut					
1970-1988	1	33.00		33.00	33
1989-2001	71	58.43	20.06	12.03	100
2002-2013	34	76.95	27.82	3.64	100
Private face value reduction					
1970-1988	2	57.99	39.59	30.00	86
1989-2001	34	40.59	30.48	0.67	92
2002-2013	14	55.76	30.09	3.78	96
Official face value reduction					
1970-1988					
1989-2001	13	73.51	30.35	13.57	100
2002-2013	30	62.91	25.22	17.10	100

Table 1b: Restructurings and Haircuts by country's income

Private Restructurings (Average size %)		
High Income	Middle Income	Low Income
20	18	2
Official Restructurings (Average size %)		
High Income	Middle Income	Low Income
11	12	13
Private Restructurings (# of countries)		
High Income	Middle Income	Low Income
7	42	5
Official Restructurings (# of countries)		
High Income	Middle Income	Low Income
4	48	9
Private Haircut (Average size %)		
High Income	Middle Income	Low Income
27	33	53
Official Haircut (Average size %)		
High Income	Middle Income	Low Income
100	65	62
Private Haircut (# of countries)		
High Income	Middle Income	Low Income
7	42	5
Official Haircut (# of countries)		
High Income	Middle Income	Low Income
1	22	9
Private Face Value Reduction (Average size %)		
High Income	Middle Income	Low Income
38	41	91
Official Face Value Reduction (Average size %)		
High Income	Middle Income	Low Income
45	56	80
Private Face Value Reduction (# of countries)		
High Income	Middle Income	Low Income
4	30	4
Official Face Value Reduction (# of countries)		
High Income	Middle Income	Low Income
1	13	9

Table 2: Private and Official Restructuring and Agency credit rating, 1990-2013, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Final Private Restructuring (-1)	-0.093***	-0.081***			-0.040	-0.048
	(-4.209)	(-3.213)			(-1.485)	(-1.394)
Final Private Restructuring (-2)	-0.064***	-0.040*			-0.021	-0.004
	(-3.560)	(-1.683)			(-0.922)	(-0.134)
Final Private Restructuring (-3)	-0.034***	-0.010			-0.005	0.020
	(-3.169)	(-0.877)			(-0.339)	(1.505)
Final Private Restructuring (-4 & 5)	-0.027***	-0.009			-0.014	0.007
	(-3.369)	(-1.313)			(-1.318)	(0.832)
Final Private Restructuring (-6 & 7)	-0.019***	-0.007			-0.022**	0.002
	(-2.817)	(-1.209)			(-2.460)	(0.234)
Final Official Restructuring (-1)	-0.003	0.018**			0.009	0.011
	(-0.634)	(2.445)			(1.000)	(1.416)
Final Official Restructuring (-2)	-0.003	0.010*			0.007	0.004
	(-0.546)	(1.663)			(0.835)	(0.575)
Final Official Restructuring (-3)	-0.005	0.005			0.003	0.002
	(-0.915)	(0.815)			(0.431)	(0.223)
Final Official Restructuring (-4 & 5)	-0.007	-0.001			0.004	-0.004
	(-1.211)	(-0.107)			(0.549)	(-0.612)
Final Official Restructuring (-6 & 7)	-0.005	-0.005			-0.000	-0.006
	(-1.090)	(-0.916)			(-0.012)	(-1.064)
Final Priv. Restr. Dummy (-1)			-3.260***	-2.659***	-2.176***	-1.371**
			(-5.678)	(-5.176)	(-3.907)	(-2.489)
Final Priv. Restr. Dummy (-2)			-2.336***	-1.696***	-1.802***	-1.536***
			(-5.376)	(-4.137)	(-3.864)	(-3.175)
Final Priv. Restr. Dummy (-3)			-1.402***	-1.022***	-1.246***	-1.285***
			(-4.760)	(-4.043)	(-3.062)	(-3.868)
Final Priv. Restr. Dummy (-4 & 5)			-1.004***	-0.832***	-0.644**	-0.959***
			(-4.224)	(-3.899)	(-2.157)	(-3.430)
Final Priv. Restr. Dummy (-6 & 7)			-0.525***	-0.514***	0.034	-0.542***
			(-2.904)	(-3.292)	(0.153)	(-2.612)
Final Off. Restr. Dummy (-1)			0.214	1.191***	0.022	0.890**
			(0.617)	(3.475)	(0.054)	(2.429)
Final Off. Restr. Dummy (-2)			0.130	0.846***	0.001	0.759**
			(0.414)	(2.730)	(0.004)	(2.088)
Final Off. Restr. Dummy (-3)			0.071	0.534**	-0.010	0.533*
			(0.256)	(2.039)	(-0.032)	(1.665)
Final Off. Restr. Dummy (-4 & 5)			-0.056	0.420**	-0.140	0.474*
			(-0.252)	(2.097)	(-0.546)	(1.899)
Final Off. Restr. Dummy (-6 & 7)			0.041	0.205	0.077	0.282
			(0.265)	(1.494)	(0.423)	(1.625)
GDP real growth (-1)		0.041***		0.046***		0.046***
		(3.050)		(3.375)		(3.452)
Primary balance to GDP (-1)		0.002		0.003		0.004
		(0.144)		(0.156)		(0.214)
Current Account to GDP (-1)		-0.035***		-0.031***		-0.033***
		(-3.764)		(-3.341)		(-3.604)
Reserves to imports (-1)		0.004		0.004		0.004
		(1.202)		(1.267)		(1.227)
Public debt to GDP (-1)		-0.043***		-0.045***		-0.045***
		(-4.571)		(-4.892)		(-4.703)

Inflation (-1)		0.448		0.642		0.575
		(0.271)		(0.393)		(0.349)
(Absence of) Political risk (-1)		0.154***		0.155***		0.152***
		(8.543)		(8.395)		(8.416)
Constant	13.186***	5.586***	13.206***	5.592***	13.224***	5.797***
	(18.533)	(3.194)	(18.562)	(3.314)	(18.544)	(3.351)
Observations	57,984	43,616	57,984	43,616	57,984	43,616
R-squared	0.130	0.384	0.139	0.390	0.145	0.394
Number of pair_id	454	363	454	363	454	363
Pair FE	YES	YES	YES	YES	YES	YES
Period FE	YES	YES	YES	YES	YES	YES

Notes: This table shows coefficients of an unbalanced panel data regression with OLS fixed effects at the agency-country-period-level. Agency-country and period-fixed effects are included. Standard errors are clustered at the agency-country-level, t statistics are in parentheses. Significance levels: *0.10, ** 0.05, *** 0.01. The dependent variable is the, monthly country agency rating, while the key explanatory variables are the lagged values of C and R taken up to seven years after each final restructuring. Note that the coefficients of the lagged restructuring dummies in specifications 5 to 6 cannot be interpreted as unconditional marginal effects, but only conditional on C and R. The results of column 2 indicate that, for private deals, a 1 standard deviation increase in the amount of debt affected by the Restructuring (18 percentage points in this sample), is associated with a rating that is 1.5 notches smaller in year 1 and 0.7 smaller in year 2 after the last restructuring. In the case of official agreements, 1 standard deviation increase in R (15 percentage points in this sample) is associated with a rating which is 0.21 notches larger in year 1 and 0.15 larger in year 2 after the last restructuring.

Table 3: Private and Official Haircut and Agency credit rating, 1990-2013, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Final Private Haircut (-1)	-0.064***	-0.046***			-0.030*	-0.034**
	(-4.901)	(-4.505)			(-1.679)	(-2.491)
Final Private Haircut (-2)	-0.048***	-0.032***			-0.019	-0.028**
	(-4.658)	(-3.801)			(-1.255)	(-2.366)
Final Private Haircut (-3)	-0.028***	-0.018***			-0.003	-0.011
	(-5.107)	(-3.707)			(-0.344)	(-1.363)
Final Private Haircut (-4 & 5)	-0.023***	-0.017***			-0.007	-0.014**
	(-4.610)	(-3.677)			(-0.775)	(-2.001)
Final Private Haircut (-6 & 7)	-0.015***	-0.013***			-0.012	-0.012**
	(-3.404)	(-3.532)			(-1.468)	(-2.151)
Final Official Haircut (-1)	0.001	0.021***			0.032***	0.025***
	(0.165)	(5.851)			(3.260)	(3.880)
Final Official Haircut (-2)	-0.000	0.015***			0.030***	0.021***
	(-0.067)	(4.617)			(3.464)	(3.146)
Final Official Haircut (-3)	-0.003	0.009**			0.022***	0.017**
	(-0.700)	(2.585)			(2.694)	(2.525)
Final Official Haircut (-4 & 5)	-0.002	0.009***			0.018***	0.019***
	(-0.571)	(3.051)			(2.730)	(3.723)
Final Official Haircut (-6 & 7)	0.001	0.008***			0.010***	0.014***
	(0.394)	(2.777)			(2.693)	(3.948)
Final Priv. Haircut Dummy (-1)			-3.117***	-2.458***	-1.879***	-0.828*
			(-5.768)	(-4.777)	(-3.024)	(-1.809)
Final Priv. Haircut Dummy (-2)			-2.239***	-1.444***	-1.522***	-0.243
			(-5.593)	(-3.584)	(-2.901)	(-0.506)
Final Priv. Haircut Dummy (-3)			-1.317***	-0.756***	-1.242***	-0.389
			(-5.072)	(-2.849)	(-2.733)	(-0.908)
Final Priv. Haircut Dummy (-4 & 5)			-0.948***	-0.635***	-0.719*	-0.120
			(-4.376)	(-2.732)	(-1.847)	(-0.335)
Final Priv. Haircut Dummy (-6 & 7)			-0.504***	-0.421**	-0.124	-0.028
			(-2.756)	(-2.494)	(-0.390)	(-0.107)
Final Off. Haircut Dummy (-1)			-0.647	0.997***	-2.183***	-0.252
			(-1.414)	(2.709)	(-3.456)	(-0.501)
Final Off. Haircut Dummy (-2)			-0.792**	0.513	-2.097***	-0.465
			(-2.080)	(1.534)	(-3.995)	(-0.916)
Final Off. Haircut Dummy (-3)			-0.771**	0.186	-1.713***	-0.609
			(-2.440)	(0.651)	(-3.884)	(-1.348)
Final Off. Haircut Dummy (-4 & 5)			-0.687**	0.073	-1.475***	-0.795**
			(-2.515)	(0.276)	(-4.065)	(-2.479)
Final Off. Haircut Dummy (-6 & 7)			-0.266	0.113	-0.705***	-0.538***
			(-1.537)	(0.728)	(-3.361)	(-3.715)
GDP real growth (-1)		0.044***		0.047***		0.046***
		(3.263)		(3.333)		(3.370)
Primary balance to GDP (-1)		0.003		0.002		0.004
		(0.206)		(0.133)		(0.243)
Current Account to GDP (-1)		-0.030***		-0.030***		-0.029***
		(-3.157)		(-3.142)		(-3.025)
Reserves to imports (-1)		0.003		0.003		0.002
		(0.995)		(1.079)		(0.811)
Public debt to GDP (-1)		-0.045***		-0.045***		-0.044***
		(-5.218)		(-5.036)		(-5.082)

Inflation (-1)		0.581		0.586		0.567
		(0.357)		(0.356)		(0.347)
(Absence of) Political risk (-1)		0.159***		0.153***		0.157***
		(8.562)		(8.263)		(8.268)
Constant	13.135***	5.503***	13.225***	5.807***	13.213***	5.566***
	(18.575)	(3.264)	(18.614)	(3.456)	(18.596)	(3.292)
Observations	57,984	43,616	57,984	43,616	57,984	43,616
R-squared	0.134	0.394	0.142	0.387	0.151	0.396
Number of pair_id	454	363	454	363	454	363
Pair FE	YES	YES	YES	YES	YES	YES
Period FE	YES	YES	YES	YES	YES	YES

Notes: This table shows coefficients of an unbalanced panel data regression with OLS fixed effects at the agency-country-period-level. Agency-country and period-fixed effects are included. Standard errors are clustered at the agency-country-level, t statistics are in parentheses. Significance levels: *0.10, ** 0.05, *** 0.01. The dependent variable is the, monthly country agency rating, while the key explanatory variables are the lagged values of C and R taken up to seven years after each final restructuring. Note that the coefficients of the lagged restructuring dummies in specifications 5 to 6 cannot be interpreted as unconditional marginal effects, but only conditional on C and R. The results of column 2 indicate that, for private deals, a 1 standard deviation increase in Haircut (25 percentage points in this sample), is associated with a rating that is 1.3 notches smaller in year 1, 0.8 smaller in year 2, 0.5 smaller in year 3, 0.4 smaller in years 4 and 5, and 0.3 smaller in years 6 and 7 after the final restructuring. In the case of official agreements, 1 standard deviation increase in R (36 percentage points in this sample) is associated to a rating which is 0.8 notches larger in year 1, 0.5 larger in year 2, 0.3 larger in year 3, 0.3 larger in years 4 and 5, and 0.25 larger in years 6 and 7 after the final restructuring.

Table 4: Private and Official Haircut and Investor rating, 1990-2013, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Final Private Haircut (-1)	-0.189***	-0.188***			-0.025	-0.063
	(-3.672)	(-3.515)			(-0.329)	(-0.981)
Final Private Haircut (-2)	-0.152***	-0.169***			-0.056	-0.071
	(-3.365)	(-3.567)			(-0.840)	(-1.296)
Final Private Haircut (-3)	-0.092***	-0.109***			-0.029	-0.057
	(-3.201)	(-5.285)			(-0.629)	(-1.556)
Final Private Haircut (-4 & 5)	-0.067***	-0.091***			-0.038	-0.084**
	(-2.775)	(-5.091)			(-0.874)	(-2.521)
Final Private Haircut (-6 & 7)	-0.041**	-0.061***			-0.006	-0.075**
	(-2.037)	(-3.851)			(-0.141)	(-2.451)
Final Official Haircut (-1)	-0.032	-0.013			-0.014	0.020
	(-1.476)	(-0.689)			(-0.178)	(0.521)
Final Official Haircut (-2)	-0.032*	0.007			0.015	0.079**
	(-1.845)	(0.312)			(0.199)	(2.149)
Final Official Haircut (-3)	-0.036**	0.013			0.026	0.106***
	(-2.418)	(0.511)			(0.406)	(2.991)
Final Official Haircut (-4 & 5)	-0.034**	0.016			0.035	0.116***
	(-2.257)	(0.756)			(0.571)	(3.369)
Final Official Haircut (-6 & 7)	-0.023	0.013			0.049	0.112***
	(-1.579)	(0.724)			(1.085)	(2.988)
Final Priv. Haircut Dummy (-1)			-10.130***	-10.780***	-9.208***	-8.390**
			(-4.619)	(-3.826)	(-2.874)	(-2.567)
Final Priv. Haircut Dummy (-2)			-7.266***	-8.989***	-5.048*	-6.059***
			(-3.713)	(-4.318)	(-1.734)	(-2.658)
Final Priv. Haircut Dummy (-3)			-4.319***	-5.284***	-3.219	-2.953
			(-3.018)	(-4.643)	(-1.304)	(-1.339)
Final Priv. Haircut Dummy (-4 & 5)			-2.945**	-3.893***	-1.439	-0.296
			(-2.457)	(-3.839)	(-0.662)	(-0.156)
Final Priv. Haircut Dummy (-6 & 7)			-1.841*	-2.106**	-1.638	1.122
			(-1.892)	(-2.428)	(-0.799)	(0.687)
Final Off. Haircut Dummy (-1)			-2.839	-2.219	-1.623	-2.750
			(-1.554)	(-1.067)	(-0.267)	(-0.951)
Final Off. Haircut Dummy (-2)			-3.545*	-2.014	-4.268	-6.116**
			(-1.932)	(-0.954)	(-0.730)	(-2.373)
Final Off. Haircut Dummy (-3)			-3.979**	-2.031	-5.436	-7.879***
			(-2.273)	(-0.965)	(-1.072)	(-3.475)
Final Off. Haircut Dummy (-4 & 5)			-3.831**	-1.933	-5.798	-8.467***
			(-2.587)	(-0.904)	(-1.317)	(-3.763)
Final Off. Haircut Dummy (-6 & 7)			-3.071***	-1.840	-5.867*	-8.225***
			(-2.839)	(-0.998)	(-1.939)	(-3.052)
GDP real growth (-1)		0.059		0.066		0.069
		(1.020)		(1.098)		(1.176)
Primary balance to GDP (-1)		0.124*		0.128**		0.125**
		(1.953)		(2.050)		(2.036)
Current Account to GDP (-1)		-0.160***		-0.158***		-0.154***
		(-2.975)		(-2.929)		(-2.932)
Reserves to imports (-1)		0.009		0.009		0.006

		(0.747)		(0.807)		(0.502)
Public debt to GDP (-1)		-0.069***		-0.065***		-0.065***
		(-3.084)		(-2.930)		(-3.080)
Inflation (-1)		-1.974		-0.558		-0.727
		(-0.297)		(-0.088)		(-0.122)
(Absence of) Political risk (-1)		0.667***		0.650***		0.664***
		(8.567)		(7.761)		(8.213)
Constant	34.727***	7.830	35.211***	8.069	35.140***	7.232
	(30.469)	(1.277)	(30.600)	(1.334)	(30.365)	(1.276)
Observations	24,885	15,049	24,885	15,049	24,885	15,049
R-squared	0.573	0.693	0.580	0.695	0.581	0.706
Number of country_id	117	85	117	85	117	85
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: This table shows coefficients of an unbalanced panel data OLS regression with fixed effects at the country-year-level and country-year clustered standard errors. t statistics are in parentheses. Significance levels: *0.10, ** 0.05, *** 0.01. The dependent variable is the monthly country Investor's rating, while the key explanatory variables are the lagged values of C and R both taken up to seven years after each final restructuring. Note that the coefficients of the lagged restructuring dummies in specifications 5 to 6 cannot be interpreted as unconditional marginal effects, but only conditional on C and R. The results of column 2 indicate that, for private deals, a 1 standard deviation increase in Haircut (28 percentage points in this sample), is associated with a rating that is 6 points smaller in year 1, 5 smaller in year 2, 3 in year 3, 2.5 smaller in years 4 and 5, and 2 points smaller 6 and 7 years after the final restructuring. In the case of official agreements, instead, no coefficient is found to be significant.

Table 7: Private and Official Haircut and bond spread, 1990-2013, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Final Private Haircut (-1)	4.724*	2.784			6.177	2.269
	(1.762)	(1.322)			(1.589)	(0.872)
Final Private Haircut (-2)	3.732*	3.000*			6.087	3.777
	(1.824)	(1.888)			(1.664)	(1.154)
Final Private Haircut (-3)	3.275	1.404			4.878	3.570
	(1.663)	(1.131)			(1.337)	(1.299)
Final Private Haircut (-4 & 5)	3.291***	2.826***			7.145***	6.626***
	(2.749)	(3.711)			(2.834)	(2.796)
Final Private Haircut (-6 & 7)	1.416	1.922**			8.160***	6.015**
	(1.146)	(2.252)			(3.721)	(2.630)
Final Official Haircut (-1)	-3.482***	-1.781*			-4.301***	-2.108
	(-3.146)	(-1.883)			(-2.833)	(-0.824)
Final Official Haircut (-2)	-4.423***	-2.441*			-6.393***	-3.995
	(-2.798)	(-1.717)			(-3.023)	(-1.234)
Final Official Haircut (-3)	-3.850**	-3.012***			-3.157*	-1.798
	(-2.376)	(-3.617)			(-1.727)	(-0.589)
Final Official Haircut (-4 & 5)	-4.216***	-3.793***			-3.859**	-3.727
	(-4.498)	(-5.792)			(-2.502)	(-1.341)
Final Official Haircut (-6 & 7)	-3.470***	-1.488***			-1.924	-0.697
	(-3.002)	(-4.016)			(-1.264)	(-0.402)
Final Priv. Haircut Dummy (-1)			153.344	109.244	-124.943	0.349
			(1.416)	(1.170)	(-0.979)	(0.004)
Final Priv. Haircut Dummy (-2)			108.032	103.066	-151.820	-64.137
			(1.388)	(1.502)	(-1.291)	(-0.491)
Final Priv. Haircut Dummy (-3)			89.847	14.486	-106.076	-132.969
			(1.056)	(0.251)	(-0.749)	(-1.126)
Final Priv. Haircut Dummy (-4 & 5)			68.665	51.534	-204.243	-192.159
			(1.017)	(0.861)	(-1.633)	(-1.462)
Final Priv. Haircut Dummy (-6 & 7)			-24.053	14.458	-304.426***	-181.834
			(-0.419)	(0.284)	(-3.202)	(-1.616)
Final Off. Haircut Dummy (-1)			-83.458	-25.141	159.246	111.896
			(-0.384)	(-0.187)	(1.628)	(0.629)
Final Off. Haircut Dummy (-2)			14.007	-9.020	309.909	191.847
			(0.060)	(-0.059)	(1.666)	(0.870)
Final Off. Haircut Dummy (-3)			-98.585	-122.897	74.600	22.056
			(-0.516)	(-1.098)	(0.742)	(0.121)
Final Off. Haircut Dummy (-4 & 5)			-101.383	-86.462	98.741	97.595
			(-0.666)	(-0.660)	(0.873)	(0.531)
Final Off. Haircut Dummy (-6 & 7)			-128.873	-69.479	-100.634	-68.184
			(-1.281)	(-0.763)	(-1.128)	(-0.490)
GDP real growth (-1)		-4.856		-4.474		-4.134
		(-1.540)		(-1.489)		(-1.481)
Primary balance to GDP (-1)		-16.698***		-17.488***		-16.806***
		(-3.266)		(-3.538)		(-3.224)
Current Account to GDP (-1)		-10.003***		-9.764***		-9.525***
		(-2.963)		(-2.737)		(-2.751)
Reserves to imports (-1)		-1.328		-1.561		-1.165
		(-0.999)		(-1.067)		(-0.690)
Public debt to GDP (-1)		9.834***		10.510***		9.349***
		(3.512)		(3.347)		(3.542)

Inflation (-1)		-0.093		-0.038		-0.141*
		(-0.936)		(-0.334)		(-1.832)
(Absence of) Political risk (-1)		-7.709***		-7.249**		-6.429**
		(-2.764)		(-2.257)		(-2.380)
Constant	363.940***	951.647***	364.566***	956.923***	434.986***	942.554***
	(5.245)	(3.947)	(4.121)	(3.465)	(4.604)	(3.593)
Observations	5,115	3,935	5,115	3,935	5,115	3,935
R-squared	0.344	0.455	0.330	0.444	0.364	0.465
Number of country_id	46	34	46	34	46	34
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: This table shows coefficients of an unbalanced panel data OLS regression with fixed effects at the country-year-level and country-year clustered standard errors. t statistics are in parentheses. Significance levels: *0.10, ** 0.05, *** 0.01. The dependent variable is the monthly average country yield spread over US Treasury bonds (EMBIG stripped spread) measured in basis points (bp), while the key explanatory variables are the lagged values of C and R both taken up to seven years after each final restructuring. Note that the coefficients of the lagged restructuring dummies in specifications 5 to 6 cannot be interpreted as unconditional marginal effects, but only conditional on C and R. The results of column 2 indicate that, for private deals, a 1 standard deviation increase in Haircut (23 percentage points in this sample), is associated with a spread that is 70 bp larger in year 2, 65 bp larger in years 4 and 5, and 44 bp larger after the restructuring. In the case of official agreements, 1 standard deviation increase in R (44 percentage points in this sample) is associated with a spread that is 80 basis points smaller in year 1, 107 bp smaller in year 2, 133 bp smaller in year 3, 167 bp smaller in years 4 and 5, and 66 bp smaller in years 6 and 7 after the restructuring.

Table 6: Private restructurings: predictor balance, RMSPE, and country weights

	Argentina		Greece		Paraguay	
	Treated	*Synthetic*	*Treated*	*Synthetic*	*Treated*	*Synthetic*
Average pre-default Investor Rating	35.95	36.46	69.56	70.54	40.51	40.50
GDP per capita	7878.72	10954.37	27566.21	19703.19	2330.03	3771.28
GDP growth	3.39	3.05	.28	-.12	2.17	1.31
(log) Population	17.38	17.43	16.22	16.16	15.03	16.50
Openness	19.48	42.02	52.75	69.02	-	-
Government Consumption	11.09	14.54	20.61	19.58	-	-
Account balance	-3.13	-1.25	-9.58	-9.56	-6.99	-3.96
Inflation	0.21	0.37	.51	.47	.024	.29
Political Risk	72.48	58.56	74.73	78.22	54.75	54.74
Polity2	7.2	5.11	10	8.70	-8	5.88
Reserves to import	66.26	38.60	6.62	18.45	-	-
RMSPE	**2.91**		**6.72**		**0.76**	
Control group	Bangladesh 0.5; China 0.07; Israel 0.43; Portugal 0.005		Papua New Guinea 0.03; Portugal 0.88; Zimbabwe 0.09		China 0.005; Colombia 0.44; Portugal 0.13; Zimbabwe 0.43	

	South Africa		Uruguay		Venezuela	
	Treated	*Synthetic*	*Treated*	*Synthetic*	*Treated*	*Synthetic*
Average pre-default Investor Rating	60.01	59.99	40.86	40.86	68.04	67.96
GDP per capita	6358.87	6398.18	7105.51	2258.18	14013.75	19677.26
GDP growth	0.53	2.52	0.281	2.82	-4.15	-1.27
(log) Population	17.25	17.25	14.89	16.02	16.56	17.12
Openness	53.42	72.74	34.88	56.84	49.23	57.66
Government Consumption	14.61	14.62	13.65	15.29	12.07	18.12
Account balance	-0.57	-2.89	-4.67	-4.59	1.86	0.05
Inflation	0.05	0.25	0.00024	0.34	0.001	0.211
Political Risk	64	64.00	-	-	-	-
Polity2	4	3.99	-7	.31	9	7.57
Reserves to import	23.80	38.79	105.36	41.40	81.66955	45.80
RMSPE	**0.60**		**0.22**		**1.65**	
Control group	Bahrain 0.06; Colombia 0.02; Finland 0.12; India 0.3; Malaysia 0.34; Zimbabwe 0.04; Thailand 0.001; Tunisia 0.11; United Kingdom 0.02		Colombia 0.19; Portugal 0.03 Zimbabwe 0.42; Tunisia 0.37		Iran 0.16; Netherlands 0.34; Spain 0.5	

Notes: For each defaulting country, we report i) the predictor balance (i.e., for each predictor used for the construction of the counterfactual, we report the pre-default average of the defaulter and the pre-default average of the synthetic control); ii) the root of the mean square prediction error; iii) the control countries with a weight higher than 0. For some countries, some variables are not used because of missing data.

Table 7a: Private restructurings: effects during the debt crisis

	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8
Argentina	-53.35	-61.02	-51.15	-49.91	-	-	-	-
Greece	-46.41	-	-	-	-	-	-	-
Paraguay	-11.63	-21.37	-28.54	-25.27	-27.40	-27.98	-27.57	-
South Africa	-25.34	-40.15	-38.85	-39.73	-36.08	-30.55	-23.15	-25.56
Uruguay	-17.23	-14.00	-15.67	-10.91	-7.97	-12.31	-10.731	-11.31
Venezuela	-41.25	-43.37	-42.56	-46.79	-48.26	-52.76	-55.64	-

Notes: For each country, the % effect is given by the percentage difference between the observed GDP per capita and its synthetic counterfactual during the debt crisis. Dashes indicate no estimation is available.

Table 7b: Private restructurings: effects *n* years after the end of the debt crisis

	t_1	t_2	t_3	t_4	t_5	t_6	t_7
Argentina	-26.70	-12.96	-12.23	-37.65	-35.72	-26.08	-28.40
Greece	-46.41	-36.74	-45.37	-46.08	-	-	-
Paraguay	-25.70	-27.92	-27.13	-26.22	-25.40	-23.32	-17.17
South Africa	-27.92	-22.85	-19.11	-19.86	-17.13	-13.19	-11.17
Uruguay	-5.99	-3.34	-2.97	-2.25	-3.08	1.57	7.51
Venezuela	-49.31	-46.12	-47.85	-48.63	-54.79	-56.29	-52.84

Notes: For each country, the % effect is given by the percentage difference between the observed GDP per capita and its synthetic counterfactual up to ten years after the end of the debt crisis. Dashes indicate no estimation is available.

Table 8: Official restructurings: predictor balance, RMSPE, and country weights

	Comoros		Egypt		Ghana		Guatemala	
	Treated	*Synthetic*	*Treated*	*Synthetic*	*Treated*	*Synthetic*	*Treated*	*Synthetic*
Average pre-default Investor Rating	14.83	15.34	34.12	34.10	25.48	25.49	14.25	16.54
GDP per capita	794.88	655.40	1306.89	2616.02	870.38	1740.32	2132.97	388.88
GDP growth	-0.62	6.042	3.85	2.10	1.26	2.16	-.35	1.345
(log) Population	13.34	15.56	17.674	16.00	16.59	18.05	15.98	18.41
Openness	53.84	99.66	64.49	64.24	55.53	33.30	35.80	18.28
Government Consumption	13.69	12.10	17.33	16.73	13.09	8.44	7.15	4.20
Account balance	-7.33	-3.53	-5.39	-4.25	-5.54	-1.18	-3.66	-1.40
Inflation	0.56	0.826	0.12	.47	.04	0.33	0.11	0.271
Political Risk	-	-	48.22	48.17	63.27	55.15	37.26	33.72
Polity2	7.17	-2.23	-6	1.27	-1	5.93	0.7	-3.4
Reserves to import	68.09	11.61	17.63	25.48	29.57	48.95	32.93	24.27
RMSPE	**2.10**		**1.78**		**1.12**		**2.97**	
Control group	Solomon Islands 0.07; Tajikistan 0.93		Cyprus 0.06; Singapore 0.04; Zimbabwe 0.6; Thailand 0.18; Tunisia 0.13		Bangladesh 0.79; Hungary 0.14; Tunisia 0.07		Bangladesh 1	

	Indonesia		Myanmar		Sri Lanka	
	Treated	*Synthetic*	*Treated*	*Synthetic*	*Treated*	*Synthetic*
Average pre-default Investor Rating	48.02	47.97482	12.91	12.97	33.52	33.59
GDP per capita	1619.28	2612.889	790.55	863.73	1739.41	4122.61
GDP growth	4.08	4.077659	10.07	.11	3.74	2.10
(log) Population	18.99	17.29672	17.71	16.97	16.75	17.37
Openness	49.48	81.17715	2.45	76.34	79.86	74.05
Government Consumption	9.88	11.86915	12.69	12.09	10.95	10.97
Account balance	-2.49	-2.490902	2.31	-10.78	-3.12	0.17
Inflation	0.10	.316715	0.41	0.40	0.25	0.45
Political Risk	48.23	56.55366	47.27	44.80	57.99	59.08
Polity2	-7	.7879	-6.3	-0.94	5.2	4.74
Reserves to import	33.33	33.30768	12016.78	13.40	26.63	
RMSPE	**1.08**		**1.12**		**0.81**	
Control group	Bangladesh 0.19; China 0.03; Korea Rep. 0.004; Malaysia 0.36; Thailand 0.25; Tunisia 0.16		Bangladesh 0.23; Belarus 0.02; Zimbabwe 0.75		Bangladesh 0.52; Belarus 0.06; Colombia 0.14; Estonia 0.06; Luxembourg 0.005; Papua New Guinea 0.17; Singapore 0.05	

Notes: For each defaulting country, we report i) the predictor balance (i.e., for each predictor used for the construction of the counterfactual, we report the pre-default average of the defaulter and the pre-default average of the synthetic control); ii) the root of the mean square prediction error; iii) the control countries with a weight higher than 0. For some countries, some predictors are not used due to missing data.

Table 9a: Official restructurings: effects *during* the debt crisis

	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8	t_9	t_{10}	t_{11}
Comoros	-17.84	-28.42	-33.04	-38.73	-	-	-	-	-	-	-
Egypt	-30.70	-34.08	-41.09	-40.72	-	-	-	-	-	-	-
Ghana	-3.49	-3.22	-5.63	-10.02	-21.24	-25.97	-27.58	-19.43	-	-	-
Guatemala	-3.70	-	-	-	-	-	-	-	-	-	-
Indonesia	-4.66	-5.18	-4.91	-16.67	-39.51	-43.16	-52.14	-53.20	-46.14	-38.37	-32.31
Myanmar	25.43	-	-	-	-	-	-	-	-	-	-
Sri Lanka	-9.29	-	-	-	-	-	-	-	-	-	-

Notes: For each country, the % effect is given by the percentage difference between the observed GDP per capita and its synthetic counterfactual during the debt crisis. Dashes indicate no estimation is available.

Table 9b: Official restructurings: effects *n* years after the end of the debt crisis

	t_1	t_2	t_3	t_4	t_5	t_6	t_7
Comoros	-33.44	-26.56	-26.61	-	-	-	-
Egypt	-31.74	-28.25	-23.48	-19.81	-19.39	-11.27	4.43
Ghana	-13.16	-7.07	2.05	5.58	5.85	1.23	0.64
Guatemala	-3.70	-12.70	-15.54	-8.94	0.56	6.76	26.35
Indonesia	-27.34	-18.15	-15.79	-14.37	-6.67	-7.86	-1.03
Myanmar	25.43	50.86	77.80	-	-	-	-
Sri Lanka	-9.29	-13.43	-12.09	-18.41	-27.18	-17.89	-17.89

Notes: For each country, the % effect is given by the percentage difference between the observed GDP per capita and its synthetic counterfactual up to ten years after the end of the debt crisis. Dashes indicate no estimation is available

Figure 1: Share of private and official debt over time

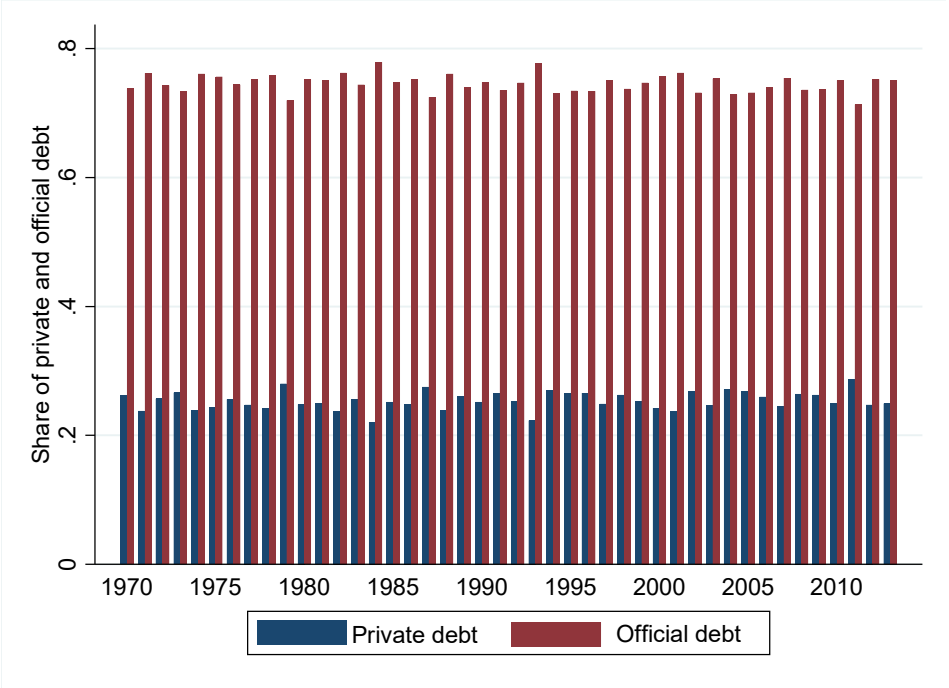


Figure 2: Share of private and official debt restructurings, haircuts and face value reduction over time

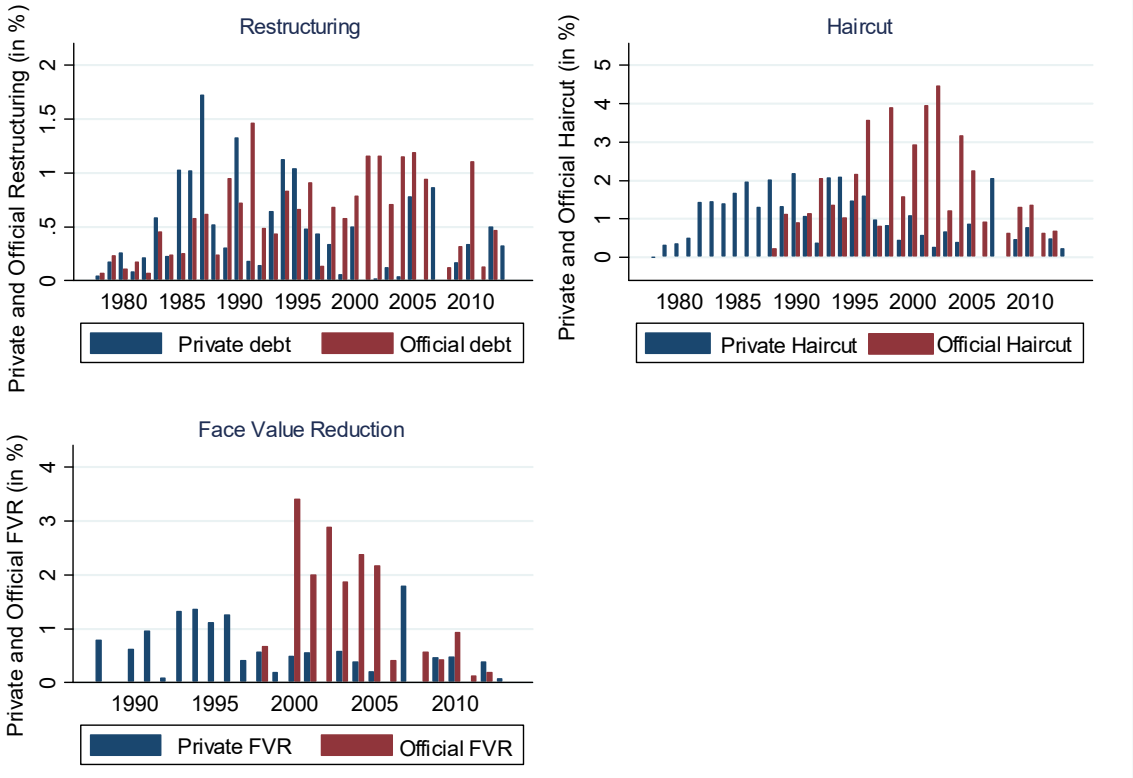


Figure 3: Frequency by size of private and official restructurings, haircuts and face value reduction

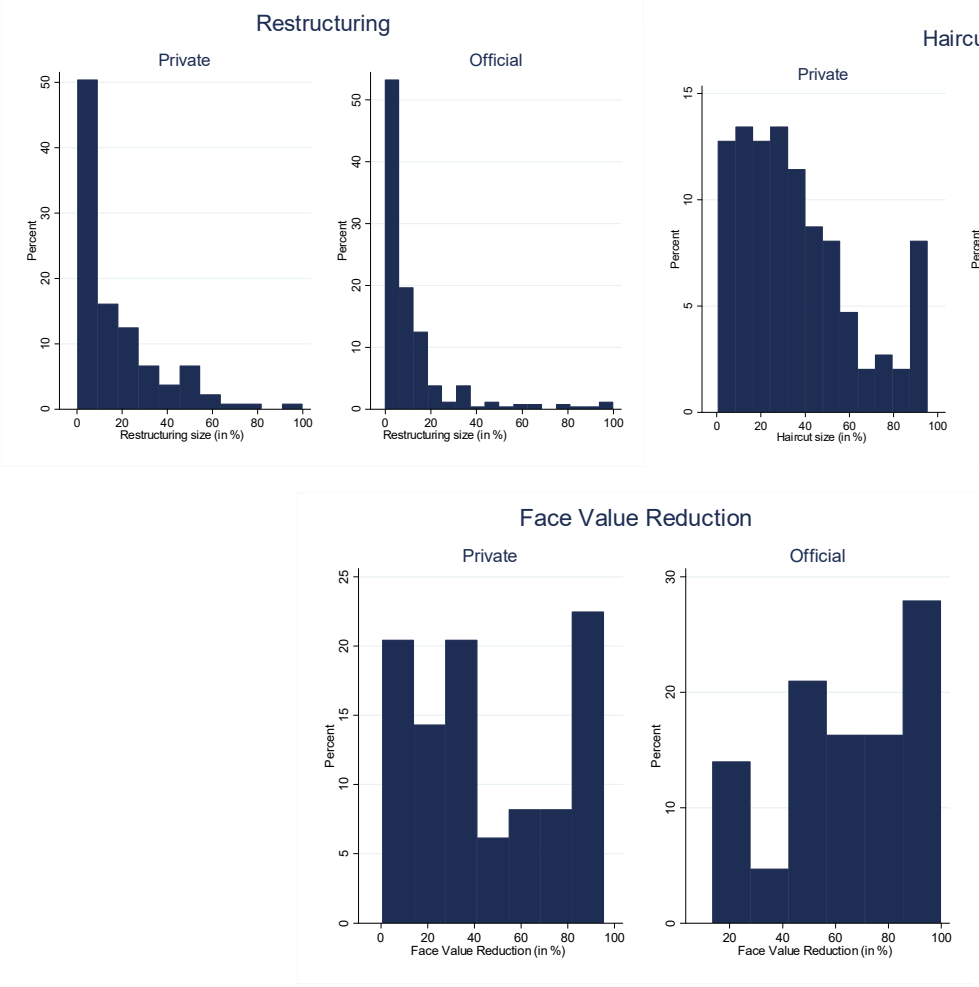
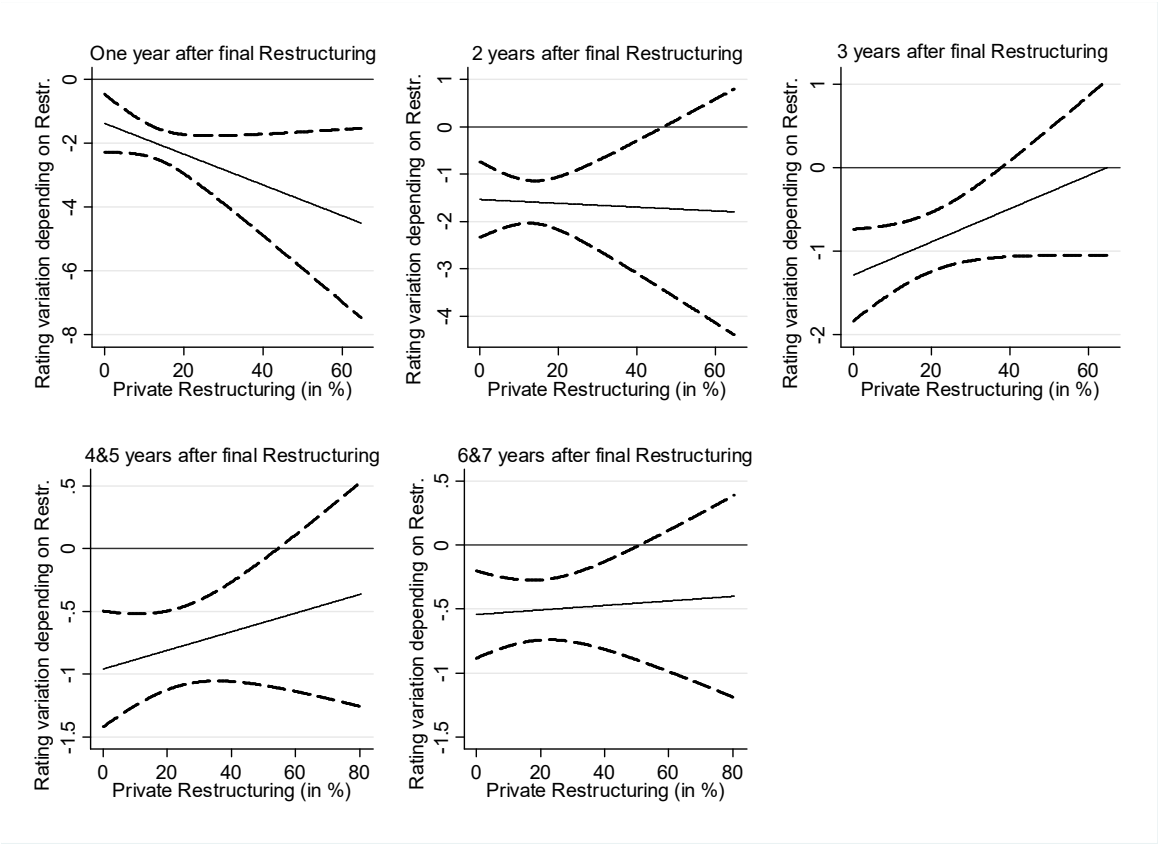
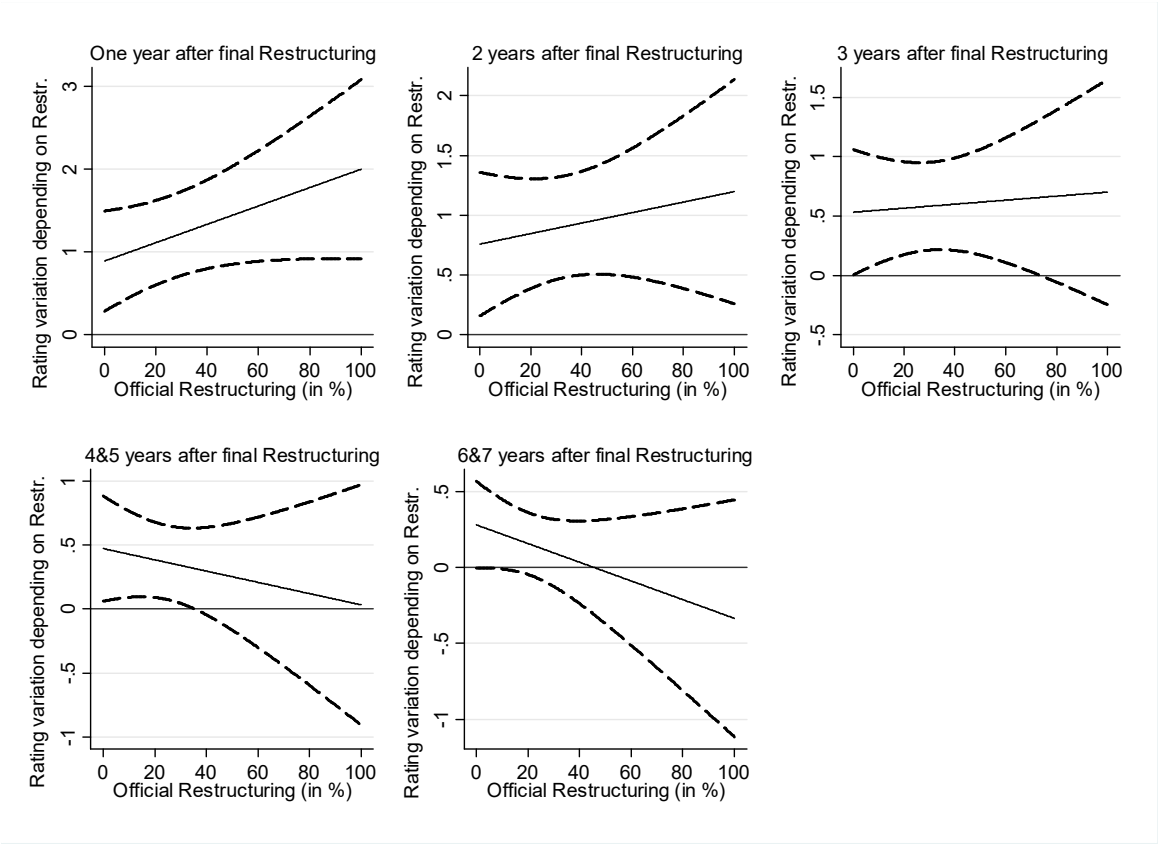


Figure 4a: Expected effect on agency rating for different levels of private restructuring



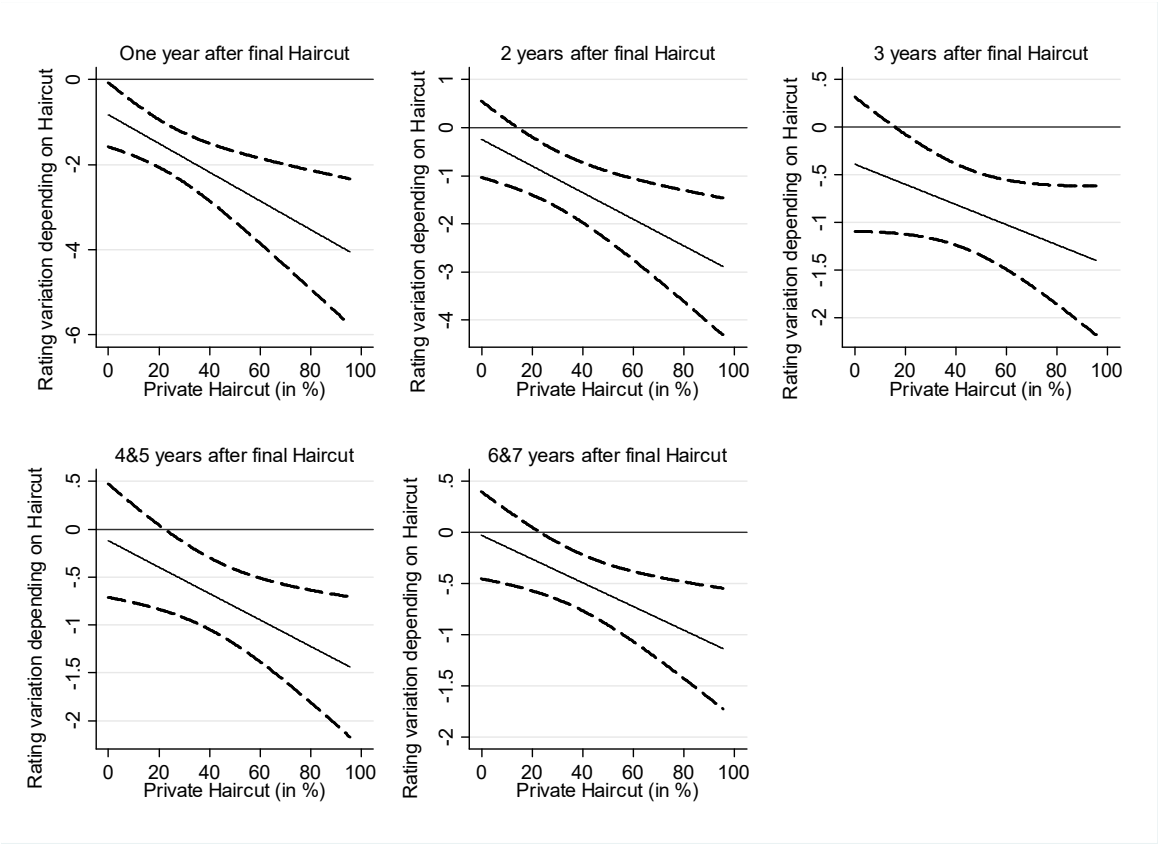
Notes: Each graph shows the marginal effect of private restructuring on agency rating, for different restructuring sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 2, column 6. The rating contraction after an agreement is statistically significant for levels of restructurings at which the upper confidence band is below the zero horizontal line. We can see that restructurings can generally be associated with significantly lower ratings during the 7 years after a restructuring (unless they involve an amount of debt which exceeds 50 percent of the total external debt.

Figure 4b: Expected effect on agency rating for different levels of official restructuring



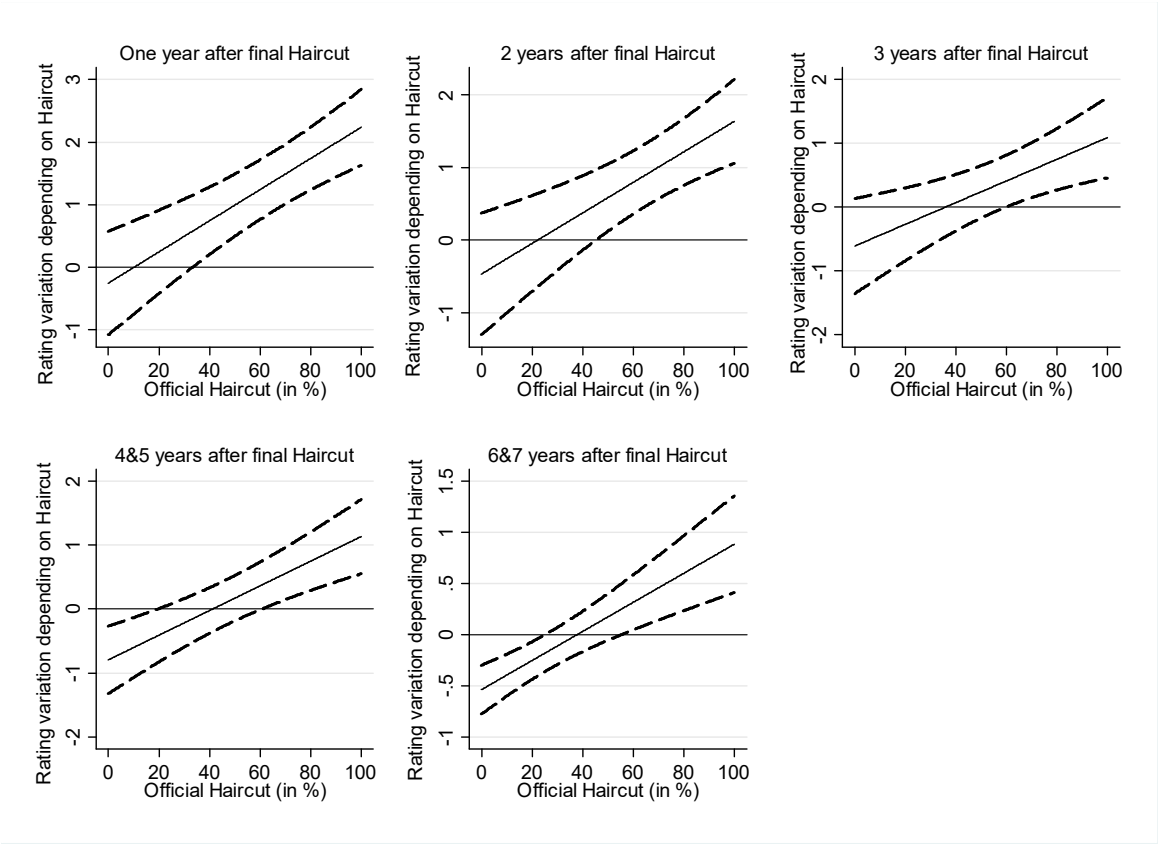
Notes: Each graph shows the marginal effect of official restructuring on agency rating, for different restructuring sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 2, column 6. The rating increase after an agreement is statistically significant for levels of restructurings at which the lower confidence band is above the zero horizontal line. We can see that restructurings can generally be associated with significantly higher ratings, at least, during the 3 years after a restructuring. Up to 5 years since the restructuring, the rating increase is significant only for restructurings up to 20 percent of the total external debt, which is smaller than the mean of this sample (equal to 11 percent).

Figure 5a: Expected effect on agency rating for different levels of private haircut



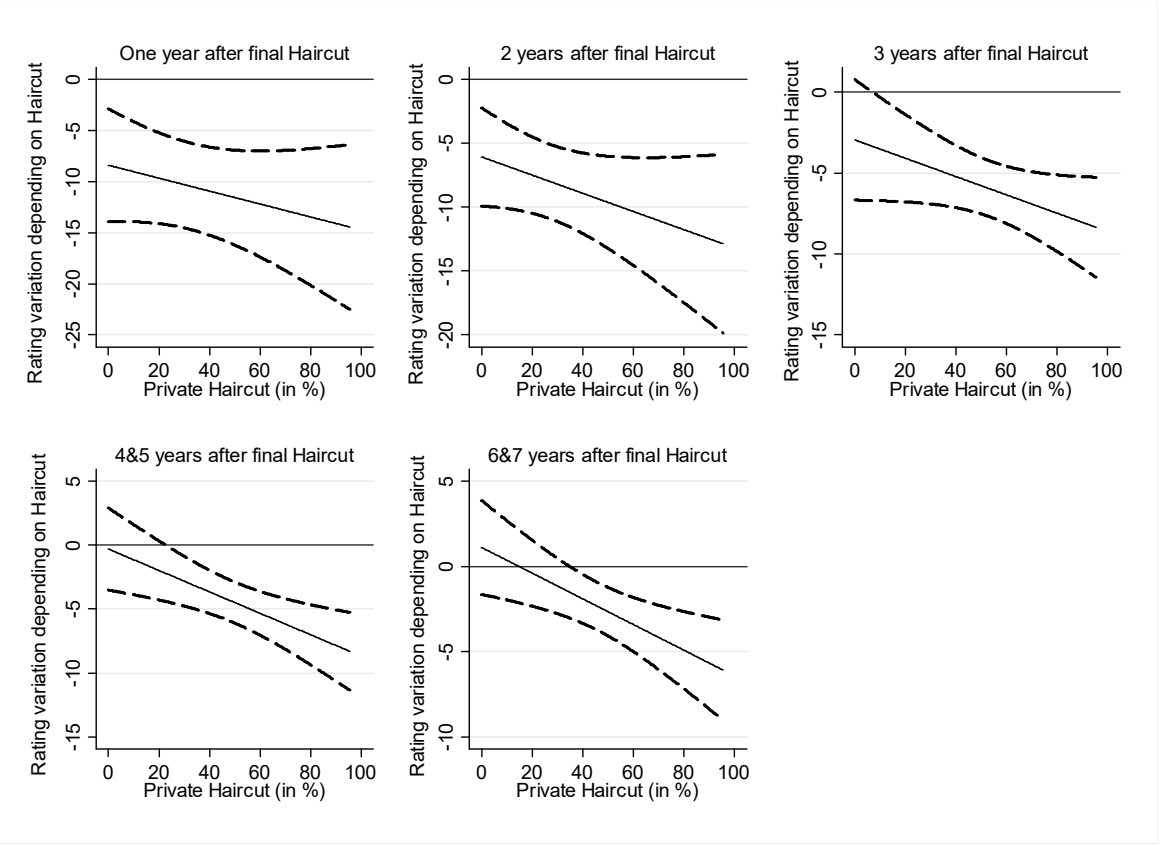
Notes: Each graph shows the marginal effect of private haircut on agency rating, for different haircut sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 3, column 6. The rating contraction of a restructuring is statistically significant for levels of haircut at which the upper confidence band is below the zero horizontal line. We can see that haircut greater than 20 percent (the mean of this sample being about 48 percent) can be associated with significantly lower ratings during the seven years after a restructuring.

Figure 5b: Expected effect on agency rating for different levels of official haircut



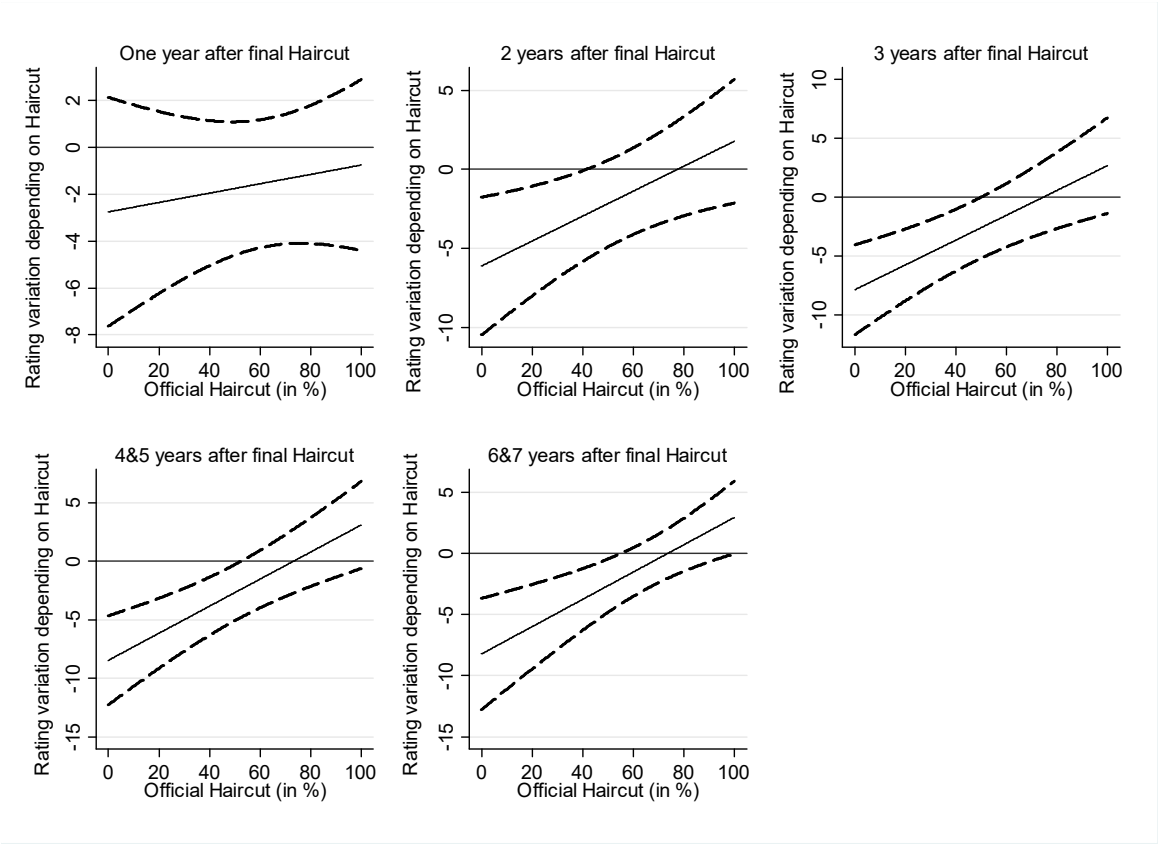
Notes: Each graph shows the marginal effect of official haircut on agency rating, for different haircut sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 3, column 6. The rating increase of a restructuring is statistically significant for levels of haircut at which the lower confidence band is above the zero horizontal line. From year one to two years after the agreements, we can see that haircut greater than 40 percent (the mean of this sample being about 45 percent) can be associated with significantly higher ratings. From year three to seven years after the restructuring, the rating increase can be significant only for much larger haircuts, i.e., greater than 60 percent.

Figure 6a: Expected effect on investor rating for different levels of private haircut



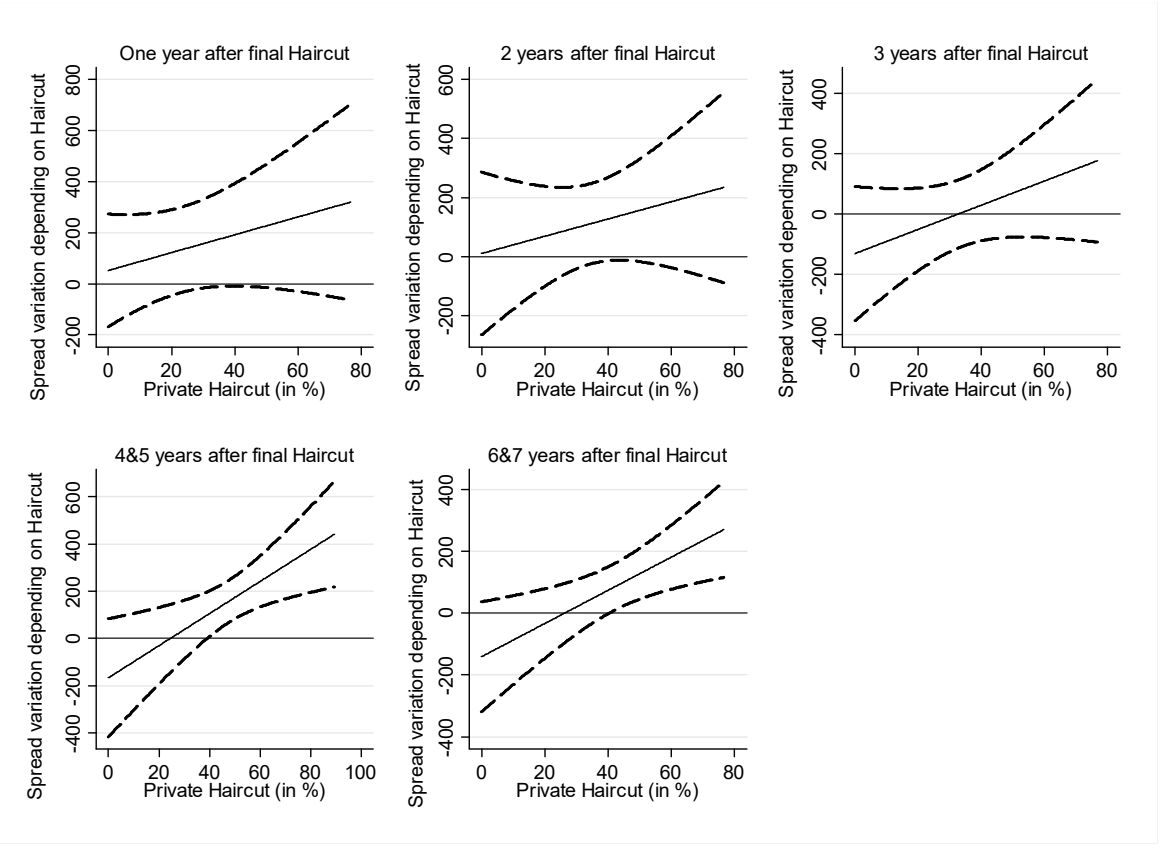
Notes: Each graph shows the marginal effect of private haircut on agency rating, for different haircut sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 5, column 6. The rating contraction of a restructuring is statistically significant for levels of haircut at which the upper confidence band is below the zero horizontal line. We can see that from one to three years since the restructuring, any positive haircut can generally be associated with significantly lower ratings. While from four to seven years after the restructuring, the rating decrease can be significant only for haircuts greater than 20 and 40 percent, respectively (the mean of this sample being around 50 percent).

Figure 6b: Expected effect on investor rating for different levels of official haircut



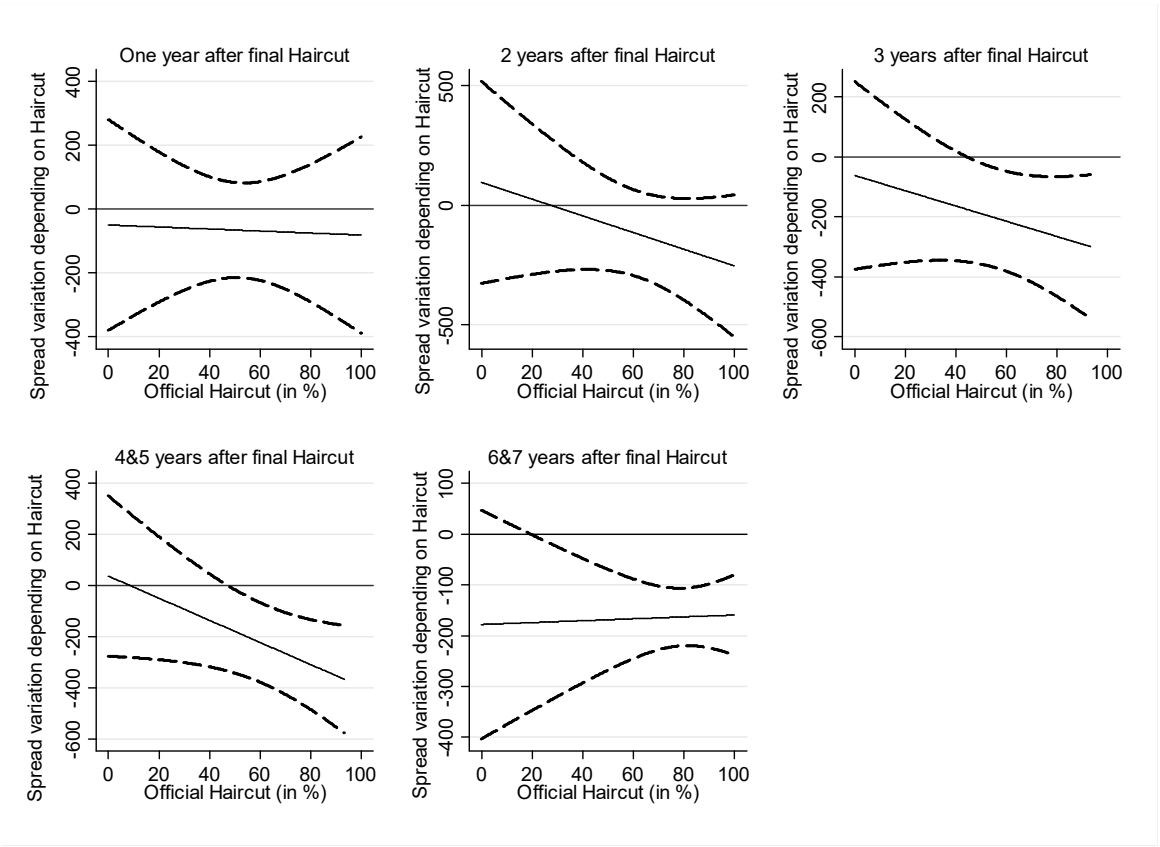
Notes: Each graph shows the marginal effect of official haircut on agency rating, for different haircut sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 5, column 6. The rating decrease of a restructuring is statistically significant for levels of haircut at which the lower confidence band is below the zero horizontal line. Since this is never the case from one to the seven years after a restructuring, we can conclude that such effect is never statistically significant.

Figure 7a: Expected effect on bond spread for different levels of private haircut



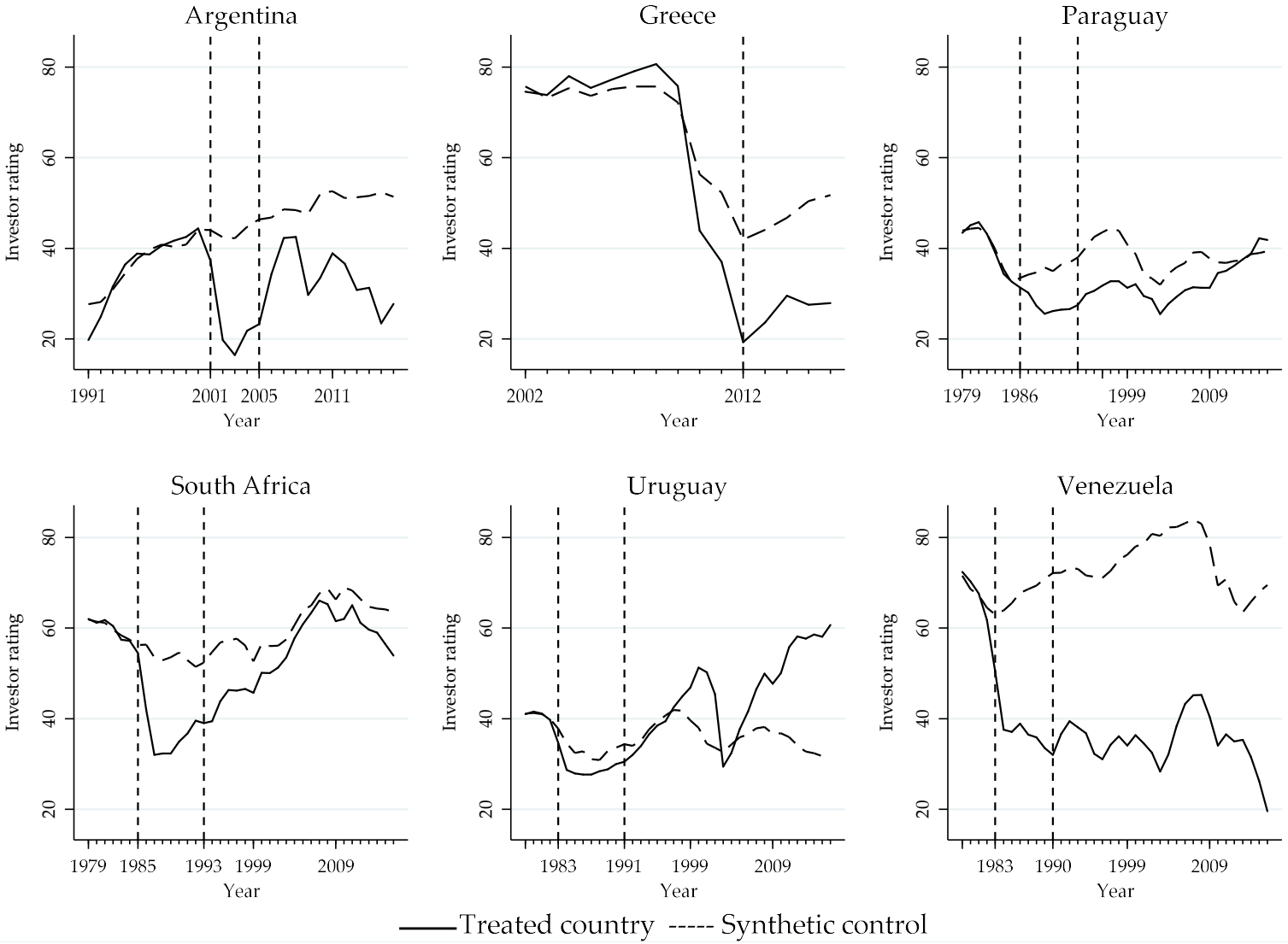
Notes: Each graph shows the marginal effect of private haircut on agency rating, for different haircut sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 7, column 6. The spread increase of a restructuring is statistically significant for levels of haircut at which the lower confidence band is above the zero horizontal line. We can see that haircuts above 40 percent (the mean of this sample) can be associated with significantly higher spreads from four to the seven years after a restructuring.

Figure 7b: Expected effect on bond spread for different levels of official haircut



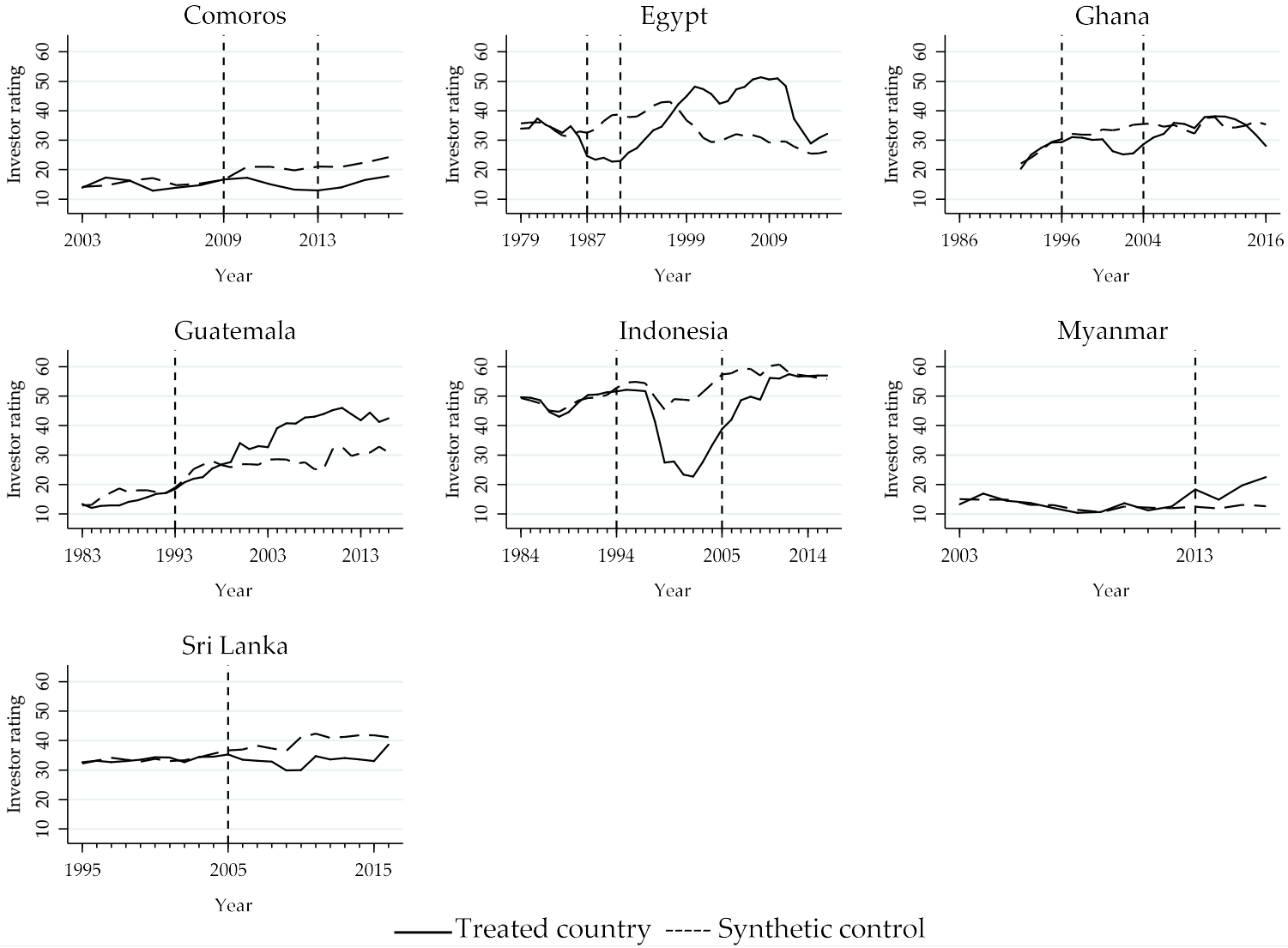
Notes: Each graph shows the marginal effect of official haircut on agency rating, for different haircut sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table 7, column 6. The spread decrease of a restructuring is statistically significant for levels of haircut at which the upper confidence band is below the zero horizontal line. We can see that haircuts above 40 percent (the mean of this sample) can be associated with significantly lower spreads from three to the seven years after a restructuring.

Figure 8: Private defaulters: evolution of investor rating, treated vs synthetic



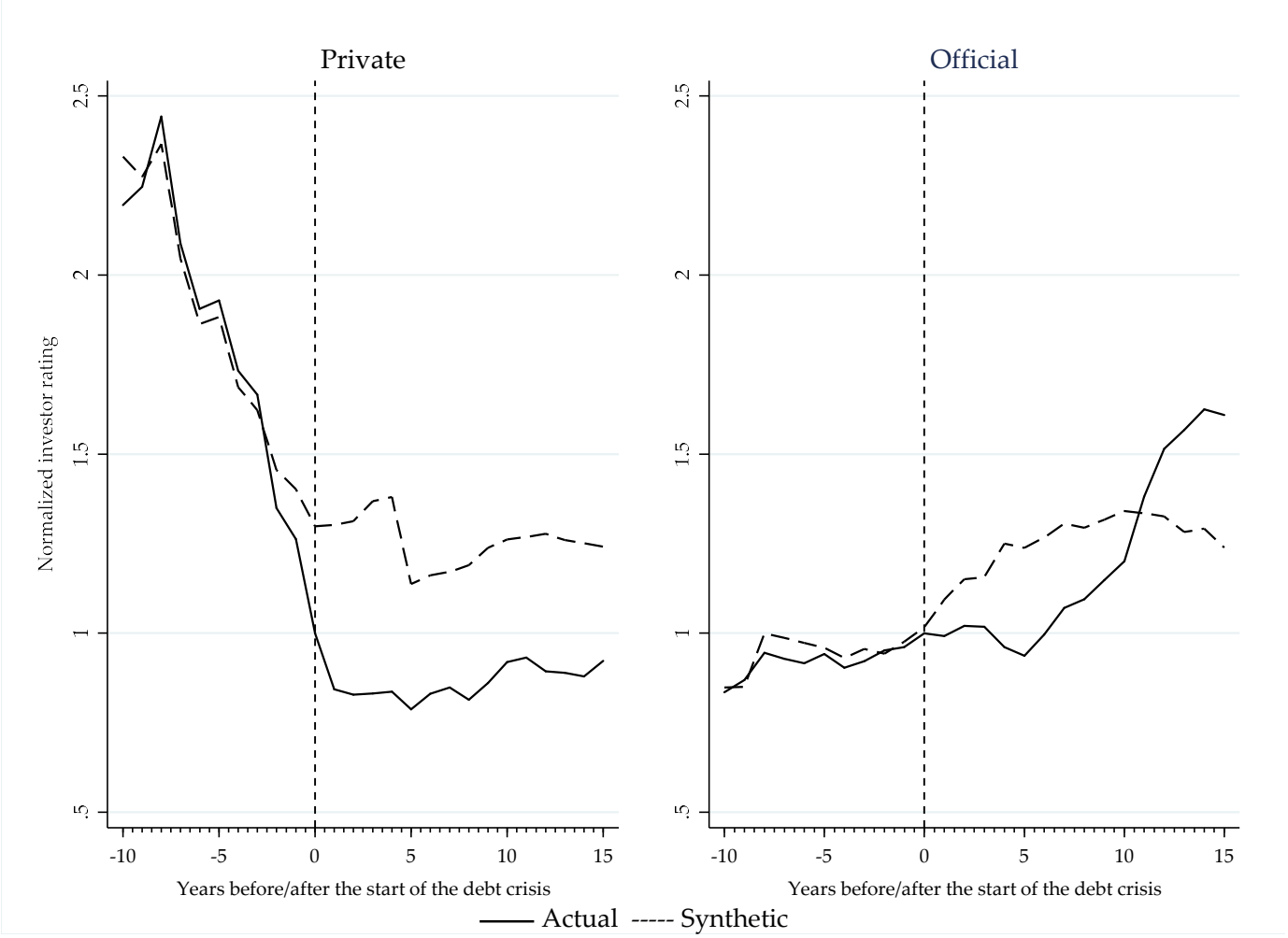
Notes: In each graph, the continuous line represents the trend of investor rating for the defaulting country, while the dashed line shows the trend for the synthetic country. The composition of each synthetic country is reported in Table 8.

Figure 9: Official defaulters: evolution of investor rating, treated vs synthetic



Notes: In each graph, the continuous line represents the trend of investor rating for the defaulting country, while the dashed line shows the trend for the synthetic country. The composition of each synthetic country is reported in Table 10.

Figure 10: Average effects on private and official defaulters



Notes: In each graph, the continuous line represents the average investor rating for the defaulting countries, while the dashed line shows the average outcome for the synthetic countries. Investor rating is normalized to 1 in period 0.

Appendix A

Table A1a: Country sample, defaulters

	Private restructurings			Official restructurings	
Albania	1991-1995			1993-2000	
Angola				1989	
Argentina	1982-1993	2001-2005		1985-1992	2014
Belize	2006-2013				
Benin				1989-2003	
Bolivia	1980-1993			1986-2001	
Bosnia Herzegovina	1992-1997			1998-2000	
Brazil	1983-1994			1983-1992	
Bulgaria	1990-1994			1991-1994	
Burkina Faso				1991-2002	
Cambodia				1995	
Cameroon	1985-2003			1989-2006	
Chile	1983-1990			1975-1987	
Comoros				2009-2013	
Congo, Dem. Rep.	1975-1989			1976-1989	2002-2010
Congo, Rep.	1983-1988	2007		1986-2004	2010
Costa Rica	1981-1990			1983-1993	
Cote d'Ivoire	1983-1998	2000-2012		1984-1994	1998-2012
Croatia	1992-1996			1995	
Cuba	1983-1985			1985-1986	
Dominican Republic	1982-1994	2004-2005		1985-1991	2004-2005
Ecuador	1982-1995	1999-2000	2008-2009	1983-2003	
Egypt, Arab Rep.				1987-1991	
El Salvador				1990	
Ethiopia	1990-1996			1992-2004	
Gabon	1986-1994			1987-1995	2000-2004
Georgia				2001-2004	
Ghana				1996-2004	
Greece	2012				
Grenada	2004-2005			2006	
Guatemala				1993	
Honduras	1981-2001			1990-2005	
Indonesia				1994-2005	
Iraq	1986-2006				
Jamaica	1977-1990			1984-1993	
Jordan	1989-1993			1989-2002	
Kenya	1992-1998			1994-2004	
Kyrgyz Republic				2002-2005	
Macedonia	1983-1988	1992-1997		1984-1988	1995-2000
Mali				1988-2003	
Mexico	1982-1990			1983-1989	
Moldova	2001-2004			2006	
Morocco	1983-1990			1983-1992	
Mozambique	1983-1991	2007		1984-2001	
Myanmar				2013	
Nicaragua	1978-1995	2007		1991-2004	
Nigeria	1982-1991			1986-1991	2000-2005
Pakistan	1998-1999			1981	1999-2001
Panama	1984-1996			1985-1990	
Paraguay	1986-1993				
Peru	1978-1997			1978-1996	
Philippines	1983-1992			1984-1994	
Poland	1981-1994			1981-1991	

Romania	1981-1983	1986	1982-1983
Russia	1991-2000		1993-1999
Rwanda			1998-2005
Senegal	1980-1985	1990-1996	1981-2004
Serbia			
Seychelles	2008-2010		
Slovenia			
South Africa	1985-1993		
Sri Lanka			2005
Trinidad and Tobago	1988-1989		1989-1990
Turkey	1976-1982		1978-1980
Uganda	1979-1993		1981-2000
Ukraine	1998-2000		2001
Uruguay	1983-1991	2003	
Venezuela, RB	1983-1990		
Viet Nam	1982-1997		1993
Zambia	1983-1994		1983-2005

Notes: Countries in bold correspond to are those with only private restructurings, while countries in italics are those with only official restructurings.

Table A1b: Country sample, non-defaulters

Andorra	Czech Rep.	Lesotho	Slovak Rep.
Armenia	Estonia	Libya	St. Vincent and the Gren.
Aruba	Faroe Islands	Liechtenstein	Suriname
Azerbaijan	Fiji	Lithuania	Taiwan
The Bahamas	French Polynesia	Macao	Tajikistan
Bahrain	Gibraltar	Malaysia	Thailand
Bangladesh	Hong Kong	Maldives	Tunisia
Barbados	Hungary	Malta	Turkmenistan
Belarus	India	Mauritius	Turks and Caicos Islands
Bermuda	Iran	Mongolia	United Arab Emirates
Botswana	Isle of Man	Montenegro	Uzbekistan
Cabo Verde	Israel	Namibia	
Cayman Islands	Kazakhstan	Oman	
China	South Korea	Papua New Guinea	
Colombia	Kuwait	Qatar	
Curacao	Latvia	Saudi Arabia	
Cyprus	Lebanon	Singapore	

Table A2a: Variable definitions and sources

Variable	Definition	Source
DEPENDENT VARIABLE		
Sovereign Rating	Sovereign rating on a 21-point scale, monthly (8 agencies, see Table A2b)	Bloomberg
Institutional Investor's Index	Perceived creditworthiness of a large number of countries, monthly	Institutional Investor Magazine
EMBIG spreads	Monthly average secondary market bond stripped yield spread, (EMBIG)	J.P. Morgan
VARIABLES OF INTEREST		
Private Restructuring	Private debt restructurings, percent of total external debt	Cruces and Trebesch (2013b)
Private Restr. Dummy	Dummy =1 in case of a private restructuring	Built by the author
Private Haircut	Private debt haircut, in percent	Cruces and Trebesch (2013b)
Private Haircut Dummy	Dummy =1 in case of a private haircut	Built by the author
Private Face Value Reduction	Private debt face value reduction, percent of treated debt	Cruces and Trebesch (2013b)
Private Face Value Reduction Dummy	Dummy =1 in case of a private face value reduction	Built by the author
Official Restructuring	Official debt restructurings, percent of total external debt	Cheng, Diaz-Cassou and Erce (2017)
Official Restr. Dummy	Dummy =1 in case of an official restructuring	Built by the author
Official Haircut	Official debt haircut, in percent	Cheng, Diaz-Cassou and Erce (2017)
Official Haircut Dummy	Dummy =1 in case of an official haircut	Built by the author
Official Face Value Reduction	Official debt face value reduction, percent of treated debt	Cheng, Diaz-Cassou and Erce (2017)
Official Face Value Reduction Dummy	Dummy =1 in case of an official face value reduction	Built by the author
CONTROL VARIABLES		
External debt to GDP	Ratio of external debt to GDP	WDI (2018)
GDP growth	Per capita GDP (constant 2015 US$), Annual rate of change	WDI (2018)
Reserves to Imports	Ratio of external debt to GDP	IFS (2018)
Inflation	Consumer price index (2010 = 100), Annual rate of change	WDI (2018)
Net lending/borrowing	General government net lending/borrowing	IMF, WEO Database (2018)
Current Account	Current account to GDP	WDI (2018)
Political Risk	ICRG Political Risk Index	ICRG (2018)
Per capita GDP	Per capita GDP (constant 2005 US$)	WDI (2018)
Government change	Dummy variable with a value of one	Database of Political Institutions (2017)
(log) Popolation	Log of total population	WDI (2018)

Table A2b: List of Agencies

Variable	Observations	Countries	Years	Headquarter	Source
Standard & Poor's (S&P)	24621	114	1977-2018	United States	Bloomberg
Moody's Investors Service	22950	117	1986-2018	United States	Bloomberg
Fitch Ratings	18596	99	1994-2018	United States/France	Bloomberg
Dominion Bond Rating Services (DBRS)	1609	20	2006-2018	Canada	Bloomberg
Dagong Global	6079	67	2010-2018	China	Bloomberg
Rating and Investment Information (R&I)	6189	28	1998-2018	Japan	Bloomberg
Japan Credit Rating Agency (JCR)	4041	21	1998-2018	Japan	Bloomberg
Capital Intelligence (CI)	4884	36	2002-2018	Cyprus/Kuwait	Bloomberg

Table A3: Private and Official Face Value Reduction and Agency credit rating, 1990-2013, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Final Private FVR (-1)	-0.076***	-0.059***			-0.048*	-0.056**
	(-3.897)	(-4.663)			(-1.814)	(-2.140)
Final Private FVR (-2)	-0.061***	-0.048***			-0.052**	-0.066***
	(-3.771)	(-4.415)			(-2.419)	(-3.742)
Final Private FVR (-3)	-0.037***	-0.031***			-0.037**	-0.053***
	(-3.833)	(-4.573)			(-2.413)	(-4.445)
Final Private FVR (-4 & 5)	-0.030***	-0.030***			-0.037***	-0.052***
	(-3.398)	(-4.446)			(-2.674)	(-4.773)
Final Private FVR (-6 & 7)	-0.022***	-0.025***			-0.040***	-0.044***
	(-2.971)	(-4.457)			(-3.143)	(-4.714)
Final Official FVR (-1)	0.008	0.022***			0.001	-0.028*
	(1.049)	(3.851)			(0.095)	(-1.914)
Final Official FVR (-2)	0.004	0.015***			-0.008	-0.017
	(0.882)	(2.877)			(-0.707)	(-1.094)
Final Official FVR (-3)	-0.001	0.006			-0.014	-0.014
	(-0.372)	(1.227)			(-1.126)	(-0.870)
Final Official FVR (-4 & 5)	-0.001	0.010***			-0.010	0.027**
	(-0.382)	(3.163)			(-0.824)	(2.469)
Final Official FVR (-6 & 7)	-0.002	0.005*			-0.007	0.012
	(-0.677)	(1.748)			(-0.855)	(1.287)
Final Priv. FVR Dummy (-1)			-3.335***	-2.800***	-1.677*	-0.324
			(-4.428)	(-4.185)	(-1.871)	(-0.236)
Final Priv. FVR Dummy (-2)			-2.153***	-1.527***	-0.507	0.999
			(-3.873)	(-2.836)	(-0.876)	(1.485)
Final Priv. FVR Dummy (-3)			-1.001***	-0.584*	-0.018	1.152***
			(-3.294)	(-1.726)	(-0.038)	(2.724)
Final Priv. FVR Dummy (-4 & 5)			-0.590**	-0.557*	0.370	1.024***
			(-2.302)	(-1.906)	(0.976)	(3.089)
Final Priv. FVR Dummy (-6 & 7)			-0.195	-0.320	0.766**	0.839***
			(-0.790)	(-1.547)	(2.042)	(3.259)
Final Off. FVR Dummy (-1)			0.417	1.706***	0.529	3.800***
			(1.378)	(5.029)	(0.580)	(3.104)
Final Off. FVR Dummy (-2)			0.258	1.134***	0.985	2.413**
			(1.093)	(5.070)	(0.978)	(2.187)
Final Off. FVR Dummy (-3)			-0.155	0.532**	1.028	1.514
			(-0.630)	(2.370)	(0.939)	(1.404)
Final Off. FVR Dummy (-4 & 5)			-0.216	0.593**	0.737	-1.401*
			(-0.830)	(2.439)	(0.620)	(-1.824)
Final Off. FVR Dummy (-6 & 7)			-0.231	0.312	0.377	-0.681
			(-1.208)	(1.563)	(0.524)	(-0.998)
GDP real growth (-1)		0.041***		0.045***		0.040***
		(3.165)		(3.247)		(3.136)
Primary balance to GDP (-1)		0.004		-0.000		-0.000
		(0.265)		(-0.013)		(-0.026)
Current Account to GDP (-1)		-0.029***		-0.029***		-0.033***
		(-3.044)		(-3.034)		(-3.499)
Reserves to imports (-1)		0.003		0.003		0.003
		(0.953)		(1.022)		(0.936)
Public debt to GDP (-1)		-0.048***		-0.046***		-0.049***

		(-5.668)		(-5.094)		(-5.545)
Inflation (-1)		0.238		0.487		-0.007
		(0.146)		(0.294)		(-0.004)
(Absence of) Political risk (-1)		0.159***		0.155***		0.161***
		(8.669)		(8.314)		(8.588)
Constant	13.046***	5.821***	13.107***	5.738***	13.062***	5.788***
	(18.512)	(3.517)	(18.459)	(3.314)	(18.366)	(3.413)
Observations	57,984	43,616	57,984	43,616	57,984	43,616
R-squared	0.124	0.401	0.116	0.385	0.130	0.408
Number of pair_id	454	363	454	363	454	363
Pair FE	YES	YES	YES	YES	YES	YES
Period FE	YES	YES	YES	YES	YES	YES

Notes: This table shows coefficients of an unbalanced panel data regression with OLS fixed effects at the agency-country-period-level. Agency-country and period-fixed effects are included. Standard errors are clustered at the agency-country-level, t statistics are in parentheses. Significance levels: *0.10, ** 0.05, *** 0.01. The dependent variable is the, monthly country agency rating, while the key explanatory variables are the lagged values of C and R taken up to seven years after each final restructuring. Note that the coefficients of the lagged face value reduction dummies in specifications 5 to 6 cannot be interpreted as unconditional marginal effects, but only conditional on C and R. The results of column 2 indicate that, for private deals, a 1 standard deviation increase in the size of the face value reduction (26 percentage points in this sample), is associated with a rating that is 1.6 notches smaller in year 1, 1.2 smaller in year 2, 0.8 smaller in year 3 and in years 4 and 5, and 0.7 smaller in years 6 and 7 after the final restructuring. In the case of official agreements, 1 standard deviation increase in R (25 percentage points in this sample) is associated with a rating which is 0.6 notches larger in year 1, 0.40 larger in year 2, 0.25 larger in years 4 and 5 and 0.15 larger in years 6 and 7 after the last restructuring.

Table A4: Private and Official Haircut and Agency rating, 1990-2013, OLS

	(1)	(2)	(3)	(4)
	More Controls	Mean Total	Mean North America	Mean Asia
Final Private Haircut (-1)	-0.032**	-0.019	-0.020	-0.171***
	(-2.431)	(-1.339)	(-1.409)	(-10.979)
Final Private Haircut (-2)	-0.027**	-0.018	-0.018	-0.162***
	(-2.371)	(-1.224)	(-1.232)	(-6.179)
Final Private Haircut (-3)	-0.012	-0.007	-0.007	-0.131***
	(-1.537)	(-0.672)	(-0.596)	(-3.481)
Final Private Haircut (-4 & 5)	-0.014*	-0.012	-0.011	-0.135***
	(-1.880)	(-1.179)	(-1.069)	(-3.680)
Final Private Haircut (-6 & 7)	-0.012**	-0.013	-0.013	0.034***
	(-2.129)	(-1.527)	(-1.404)	(3.025)
Final Official Haircut (-1)	0.022***	0.018	0.020*	
	(3.409)	(1.578)	(1.750)	
Final Official Haircut (-2)	0.020***	0.015	0.016	
	(2.811)	(1.324)	(1.327)	
Final Official Haircut (-3)	0.016**	0.012	0.014	0.006
	(2.314)	(1.121)	(1.102)	(0.912)
Final Official Haircut (-4 & 5)	0.019***	0.015	0.016*	0.005
	(3.626)	(1.644)	(1.742)	(1.173)
Final Official Haircut (-6 & 7)	0.013***	0.017***	0.014***	0.001
	(3.765)	(3.218)	(2.673)	(0.354)
Final Priv. Haircut Dummy (-1)	-0.926**	-1.369**	-1.250*	0.427
	(-2.008)	(-2.138)	(-1.923)	(0.363)
Final Priv. Haircut Dummy (-2)	-0.271	-0.580	-0.439	1.350
	(-0.563)	(-0.775)	(-0.557)	(1.185)
Final Priv. Haircut Dummy (-3)	-0.297	-0.598	-0.568	1.377
	(-0.691)	(-0.977)	(-0.861)	(1.042)
Final Priv. Haircut Dummy (-4 & 5)	-0.138	-0.215	-0.207	1.523
	(-0.373)	(-0.375)	(-0.347)	(1.332)
Final Priv. Haircut Dummy (-6 & 7)	-0.031	0.022	0.028	-0.958*
	(-0.116)	(0.049)	(0.060)	(-1.969)
Final Off. Haircut Dummy (-1)	-0.060	0.026	-0.061	-0.947
	(-0.122)	(0.029)	(-0.070)	(-0.972)
Final Off. Haircut Dummy (-2)	-0.343	-0.331	-0.325	-1.390**
	(-0.650)	(-0.379)	(-0.356)	(-2.353)
Final Off. Haircut Dummy (-3)	-0.517	-0.551	-0.594	-1.306***
	(-1.112)	(-0.763)	(-0.685)	(-2.744)
Final Off. Haircut Dummy (-4 & 5)	-0.805**	-0.677	-0.733	-1.185***
	(-2.453)	(-1.239)	(-1.241)	(-3.646)
Final Off. Haircut Dummy (-6 & 7)	-0.475***	-0.755***	-0.627***	-0.332**
	(-3.237)	(-2.904)	(-2.681)	(-2.069)
GDP real growth (-1)	0.171***	0.039*	0.043*	0.047
	(3.191)	(1.781)	(1.885)	(1.360)
Primary balance to GDP (-1)	0.001	0.012	0.019	-0.058
	(0.066)	(0.517)	(0.810)	(-1.110)
Current Account to GDP (-1)	-0.030***	-0.030**	-0.029**	-0.011
	(-3.130)	(-2.262)	(-2.226)	(-0.258)

Reserves to imports (-1)	0.003	0.002	0.003	-0.003
	(0.925)	(0.446)	(0.548)	(-0.300)
Public debt to GDP (-1)	-0.043***	-0.039***	-0.038***	-0.054*
	(-5.014)	(-2.983)	(-2.890)	(-1.811)
Inflation (-1)	0.527	1.174	1.049	-5.871
	(0.323)	(0.436)	(0.406)	(-1.272)
(Absence of) Political risk (-1)	0.159***	0.142***	0.150***	0.157**
	(8.298)	(4.913)	(5.085)	(2.325)
Change in government	-0.317***			
	(-3.907)			
Population	-0.000			
	(-0.550)			
Growth	-0.127**			
	(-2.484)			
Constant	5.221***	5.240**	4.992*	5.909
	(3.065)	(2.038)	(1.923)	(1.240)
Observations	43,424	12,937	12,903	5,297
R-squared	0.403	0.411	0.406	0.538
Number of id	359	84	83	58
Pair FE	YES	YES	YES	YES
Period FE	YES	YES	YES	YES

Notes: In column 1 the regressions are estimated using fixed effects OLS at the agency-country-year-level; t statistics are in parentheses (clustered at the agency-country-level. In columns 2-4, the regressions are estimated using fixed effects OLS at the country-year-level; t statistics are in parentheses (clustered at the country-level). The dependent variables are: the dyadic monthly rating (column 1); the monthly mean of all agencies' rating (column 2); the monthly mean of the four North American Agencies, i.e., Standard & Poor's, Moody's, Fitch , Dominion Bond Rating Services (DBRS), (column 3); the monthly mean of the three Asian Agencies, i.e., Dagong Global, Rating and Investment Information (R&I), Japan Credit Rating Agency FN (JCR), (column 4). Significance levels: *0.10, ** 0.05, *** 0.01).

Table A5: Private and Official Haircut and Investor rating, 1970-2013, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Final Private Haircut (-1)	-0.174***	-0.180***			0.044	-0.007
	(-3.725)	(-2.977)			(0.630)	(-0.092)
Final Private Haircut (-2)	-0.138***	-0.149***			0.016	-0.011
	(-3.435)	(-2.959)			(0.268)	(-0.197)
Final Private Haircut (-3)	-0.088***	-0.096***			0.021	-0.018
	(-3.099)	(-4.165)			(0.527)	(-0.509)
Final Private Haircut (-4 & 5)	-0.069***	-0.066***			0.008	-0.028
	(-2.768)	(-3.204)			(0.222)	(-0.821)
Final Private Haircut (-6 & 7)	-0.055***	-0.036**			0.007	-0.030
	(-2.671)	(-2.202)			(0.170)	(-1.031)
Final Official Haircut (-1)	-0.041**	-0.000			-0.035	0.055
	(-2.400)	(-0.007)			(-0.539)	(1.499)
Final Official Haircut (-2)	-0.040**	0.007			0.008	0.091***
	(-2.489)	(0.374)			(0.127)	(2.981)
Final Official Haircut (-3)	-0.030*	0.024			0.019	0.121***
	(-1.934)	(1.137)			(0.318)	(3.760)
Final Official Haircut (-4 & 5)	-0.026	0.019			0.020	0.111***
	(-1.626)	(0.992)			(0.381)	(3.822)
Final Official Haircut (-6 & 7)	-0.025*	0.017			0.025	0.110***
	(-1.656)	(1.060)			(0.685)	(3.908)
Final Priv. Haircut Dummy (-1)			-10.645***	-11.659***	-12.507***	-11.892***
			(-5.698)	(-3.602)	(-4.612)	(-3.078)
Final Priv. Haircut Dummy (-2)			-8.142***	-9.392***	-8.750***	-9.041***
			(-4.827)	(-3.830)	(-3.680)	(-3.285)
Final Priv. Haircut Dummy (-3)			-5.434***	-5.458***	-6.265***	-4.755**
			(-4.218)	(-4.538)	(-3.322)	(-2.185)
Final Priv. Haircut Dummy (-4 & 5)			-4.231***	-3.439***	-4.576**	-2.263
			(-3.613)	(-3.227)	(-2.539)	(-1.224)
Final Priv. Haircut Dummy (-6 & 7)			-3.276***	-1.511*	-3.497*	-0.110
			(-3.287)	(-1.732)	(-1.836)	(-0.070)
Final Off. Haircut Dummy (-1)			-3.323**	-1.723	-0.777	-4.764*
			(-2.391)	(-1.157)	(-0.145)	(-1.826)
Final Off. Haircut Dummy (-2)			-3.809**	-1.783	-4.507	-7.085***
			(-2.568)	(-1.133)	(-0.825)	(-3.107)
Final Off. Haircut Dummy (-3)			-3.199**	-0.708	-4.699	-8.097***
			(-2.220)	(-0.406)	(-0.955)	(-3.681)
Final Off. Haircut Dummy (-4 & 5)			-2.933**	-1.045	-4.450	-7.691***
			(-2.143)	(-0.636)	(-1.091)	(-3.964)
Final Off. Haircut Dummy (-6 & 7)			-2.827**	-1.025	-4.600*	-7.645***
			(-2.531)	(-0.741)	(-1.750)	(-3.950)
GDP real growth (-1)		0.094		0.102		0.107
		(1.362)		(1.432)		(1.508)
Primary balance to GDP (-1)		0.168***		0.175***		0.178***
		(2.823)		(2.956)		(2.976)
Current Account to GDP (-1)		-0.146***		-0.146***		-0.145***
		(-2.813)		(-2.794)		(-2.802)
Reserves to imports (-1)		-0.000***		-0.001***		-0.000***

		(-2.887)		(-3.427)		(-3.006)
Public debt to GDP (-1)		-0.007		-0.006		-0.002
		(-0.438)		(-0.385)		(-0.130)
Inflation (-1)		-13.564*		-12.181		-11.361
		(-1.775)		(-1.611)		(-1.588)
(Absence of) Political risk (-1)		0.576***		0.563***		0.571***
		(6.863)		(6.409)		(6.466)
Constant	45.151***	5.161	45.070***	6.150	45.067***	5.527
	(34.397)	(0.978)	(34.184)	(1.141)	(34.056)	(1.023)
Observations	37,836	16,848	37,836	16,848	37,836	16,848
R-squared	0.414	0.637	0.427	0.647	0.428	0.655
Number of country_id	157	100	157	100	157	100
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES

Notes: This table shows coefficients of an unbalanced panel data OLS regression with fixed effects at the country-year-level and country-year clustered standard errors. t statistics are in parentheses. Significance levels: *0.10, ** 0.05, *** 0.01. The dependent variable is the monthly country Investor's rating, while the key explanatory variables are the lagged values of C and R both taken up to seven years after each final restructuring.

Table A6a: Descriptive Statistics (agency rating)

Variable	N	Mean	SD	Min	Max
Agency rating	43616	12.2	3.77	1	21
Final Priv. Haircut Dummy (-1)	43616	0.01	0.09	0	1
Final Priv. Haircut Dummy (-2)	43616	0.01	0.1	0	1
Final Priv. Haircut Dummy (-3)	43616	0.01	0.12	0	1
Final Priv. Haircut Dummy (-4 & 5)	43616	0.03	0.18	0	1
Final Priv. Haircut Dummy (-6 & 7)	43616	0.04	0.2	0	1
Final Private Haircut (-1)	43616	0.39	5.09	0	95.5
Final Private Haircut (-2)	43616	0.45	5.29	0	95.5
Final Private Haircut (-3)	43616	0.52	5.48	0	95.5
Final Private Haircut (-4 & 5)	43616	1.41	8.95	0	95.5
Final Private Haircut (-6 & 7)	43616	1.58	9.13	0	95.5
Final Off. Restr. Dummy (-1)	43616	0	0.07	0	1
Final Off. Restr. Dummy (-2)	43616	0.01	0.08	0	1
Final Off. Restr. Dummy (-3)	43616	0.01	0.08	0	1
Final Off. Restr. Dummy (-4 & 5)	43616	0.01	0.12	0	1
Final Off. Restr. Dummy (-6 & 7)	43616	0.02	0.13	0	1
Final Official Haircut (-1)	43616	0.23	4.23	0	100
Final Official Haircut (-2)	43616	0.25	4.39	0	100
Final Official Haircut (-3)	43616	0.28	4.67	0	100
Final Official Haircut (-4 & 5)	43616	0.61	6.74	0	100
Final Official Haircut (-6 & 7)	43616	0.72	7.38	0	100
GDP real growth (-1)	43616	4.19	3.55	-15.14	33.72
Primary balance to GDP (-1)	43616	-1.81	5.67	-20.35	43.3
Current Account to GDP (-1)	43616	-0.62	8.77	-46.72	45.45
Reserves to imports (-1)	43616	51.53	39.15	1.11	320.27
Public debt to GDP (-1)	43616	45.77	29.28	2.22	183.07
Inflation (-1)	43616	0.5	0.15	0.12	1
(Absence of) Political risk (-1)	43616	68.78	8.66	37.87	89.13

Notes: Descriptive statistics refer to the specification of Table 3, column 6.

Table A6b: Descriptive Statistics (Institutional Investor)

Variable	N	Mean	SD	Min	Max
Investor rating	15049	48	17.27	7.1	93.14
Final Priv. Haircut Dummy (-1)	15049	0.01	0.1	0	1
Final Priv. Haircut Dummy (-2)	15049	0.01	0.11	0	1
Final Priv. Haircut Dummy (-3)	15049	0.02	0.13	0	1
Final Priv. Haircut Dummy (-4 & 5)	15049	0.05	0.21	0	1
Final Priv. Haircut Dummy (-6 & 7)	15049	0.05	0.22	0	1
Final Private Haircut (-1)	15049	0.57	6.24	0	95.5
Final Private Haircut (-2)	15049	0.59	6.19	0	95.5
Final Private Haircut (-3)	15049	0.81	7.13	0	95.5
Final Private Haircut (-4 & 5)	15049	2.19	11.71	0	95.5
Final Private Haircut (-6 & 7)	15049	2.28	11.64	0	95.5
Final Off. Restr. Dummy (-1)	15049	0.01	0.1	0	1
Final Off. Restr. Dummy (-2)	15049	0.01	0.11	0	1
Final Off. Restr. Dummy (-3)	15049	0.01	0.11	0	1
Final Off. Restr. Dummy (-4 & 5)	15049	0.02	0.15	0	1
Final Off. Restr. Dummy (-6 & 7)	15049	0.02	0.15	0	1
Final Official Haircut (-1)	15049	0.65	7.28	0	100
Final Official Haircut (-2)	15049	0.79	8.07	0	100
Final Official Haircut (-3)	15049	0.82	8.21	0	100
Final Official Haircut (-4 & 5)	15049	1.37	10.43	0	100
Final Official Haircut (-6 & 7)	15049	1.4	10.5	0	100
GDP real growth (-1)	15049	4.57	4.39	-41.01	82.81
Primary balance to GDP (-1)	15049	-1.72	7.03	-151.31	43.3
Current Account to GDP (-1)	15049	-1.04	10.44	-240.52	45.45
Reserves to imports (-1)	15049	47.38	37.93	0.29	320.27
Public debt to GDP (-1)	15049	45.72	30.37	0	220.7
Inflation (-1)	15049	0.48	0.15	0.01	1
(Absence of) Political risk (-1)	15049	66.88	9.83	29.24	89.13

Notes: Descriptive statistics refer to the specification of Table 3, column 6.

Table A6c: Descriptive Statistics (Bond Spread)

Variable	N	Mean	SD	Min	Max
Bond spread	4271	358.32	308.91	13.87	3158.22
Final Priv. Haircut Dummy (-1)	4271	0.02	0.13	0	1
Final Priv. Haircut Dummy (-2)	4271	0.02	0.15	0	1
Final Priv. Haircut Dummy (-3)	4271	0.03	0.17	0	1
Final Priv. Haircut Dummy (-4 & 5)	4271	0.07	0.26	0	1
Final Priv. Haircut Dummy (-6 & 7)	4271	0.08	0.27	0	1
Final Private Haircut (-1)	4271	0.79	6.68	0	76.8
Final Private Haircut (-2)	4271	0.82	6.47	0	76.8
Final Private Haircut (-3)	4271	0.88	6.31	0	76.8
Final Private Haircut (-4 & 5)	4271	2.8	11.74	0	89.4
Final Private Haircut (-6 & 7)	4271	2.81	10.89	0	76.8
Final Off. Restr. Dummy (-1)	4271	0.01	0.09	0	1
Final Off. Restr. Dummy (-2)	4271	0.01	0.08	0	1
Final Off. Restr. Dummy (-3)	4271	0.01	0.1	0	1
Final Off. Restr. Dummy (-4 & 5)	4271	0.03	0.16	0	1
Final Off. Restr. Dummy (-6 & 7)	4271	0.02	0.14	0	1
Final Official Haircut (-1)	4271	0.56	7.23	0	100
Final Official Haircut (-2)	4271	0.22	4.1	0	100
Final Official Haircut (-3)	4271	0.26	4.37	0	93.33
Final Official Haircut (-4 & 5)	4271	1.08	9.09	0	93.33
Final Official Haircut (-6 & 7)	4271	1.23	10.13	0	100
GDP real growth (-1)	4271	4.31	3.64	-15.14	18.29
Primary balance to GDP (-1)	4271	-2.23	3.29	-12.75	8.69
Current Account to GDP (-1)	4271	-0.74	5.44	-20.52	21.18
Reserves to imports (-1)	4271	53.87	33.72	5.12	238.24
Public debt to GDP (-1)	4271	46.19	25.63	3.88	183.07
Inflation (-1)	4271	0.48	0.17	0.12	1
(Absence of) Political risk (-1)	4271	67.3	8.45	40.71	87

Notes: Descriptive statistics refer to the specification of Table 7, column 6.

Table A7a: Correlations between Agency credit rating, 1990-2018

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Standard & Poor's (S&P)	1							
Moody's Investors Service	0.979	1						
Fitch Ratings	0.991	0.987	1					
Dominion Bond Rating Services (DBRS)	0.977	0.992	0.988	1				
Dagong Global	0.869	0.913	0.907	0.919	1			
Rating and Investment Information (R&I)	0.934	0.955	0.957	0.954	0.973	1		
Japan Credit Rating Agency FN (JCR)	0.942	0.966	0.968	0.972	0.980	0.992	1	
Capital Intelligence (Cyprus)	0.974	0.991	0.988	0.989	0.942	0.979	0.986	1

(obs. 245)

Table A7b: Correlation between Agency and Investor rating

	(1)	(2)
Agency rating (pooled)	1	
Investor's Rating	0.921	1

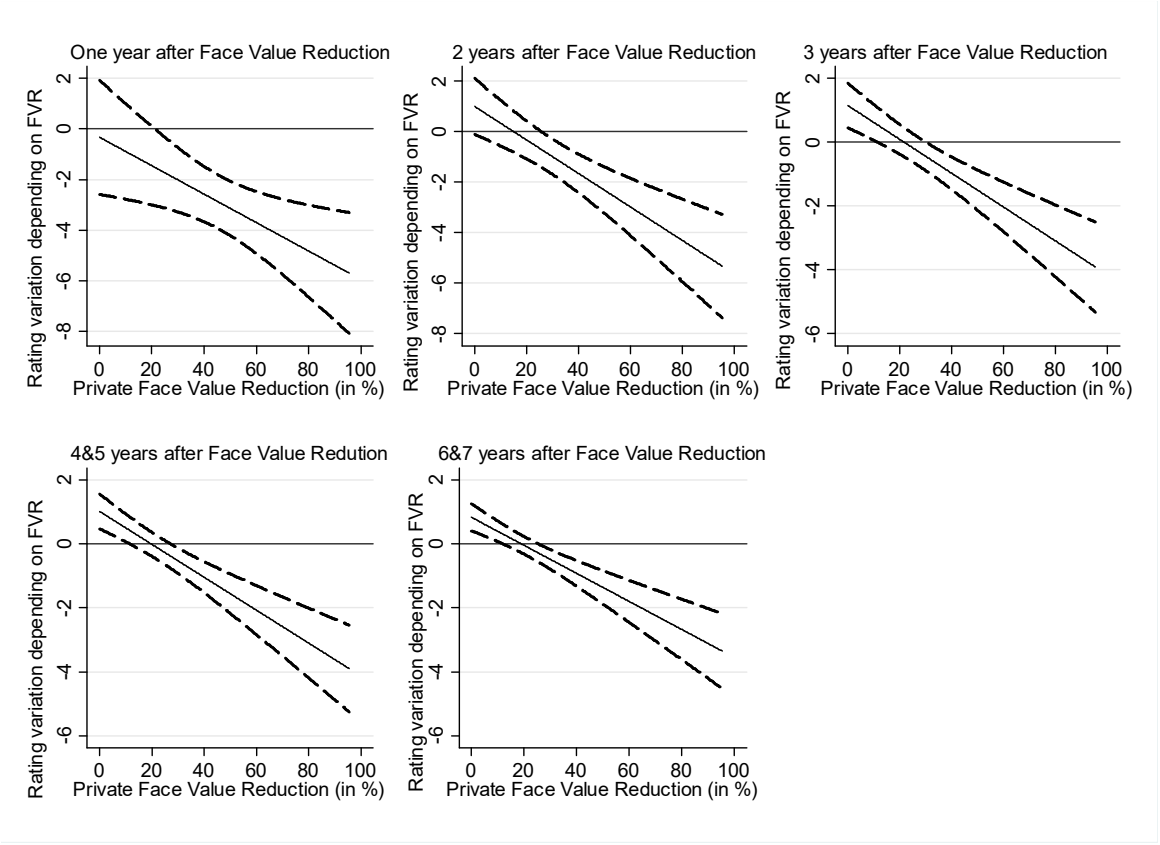
(obs. 71,484)

Table A7b: Correlation between Agency, Investor rating and EMBIG spread

	(1)	(2)	(3)
Agency rating (mean)	1		
Investor's Rating	0.9194	1	
EMBIG spread	-0.563	-0.4956	1

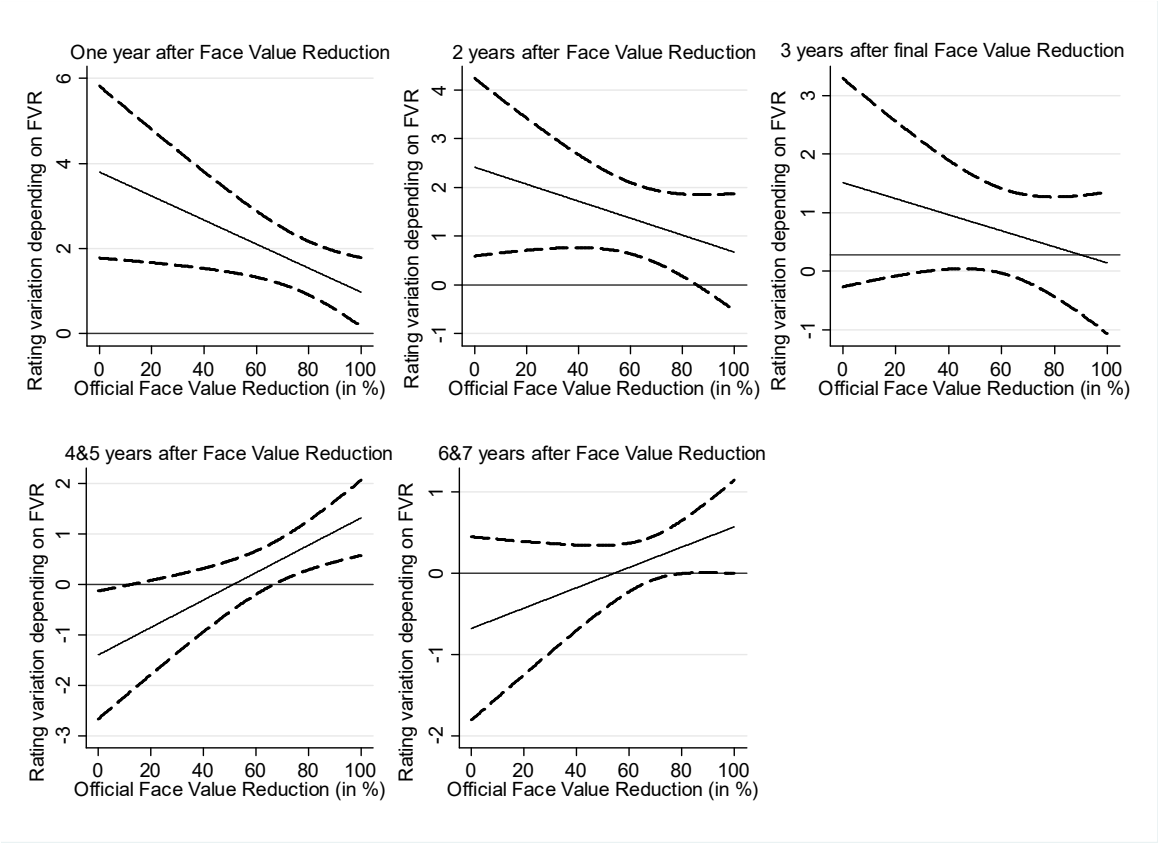
(obs=7,220)

Figure A8a: Expected effect on agency rating for different levels of private face value reduction



Notes: Each graph shows the marginal effect of private face value reduction on agency rating, for different face value reduction sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table A3, column 6. The rating contraction of a restructuring is statistically significant for levels of nominal haircut at which the upper confidence band is below the zero horizontal line. We can see that haircut greater than 20 percent (the mean of this sample being about 50 percent) can be associated with significantly lower ratings during the seven years after a restructuring.

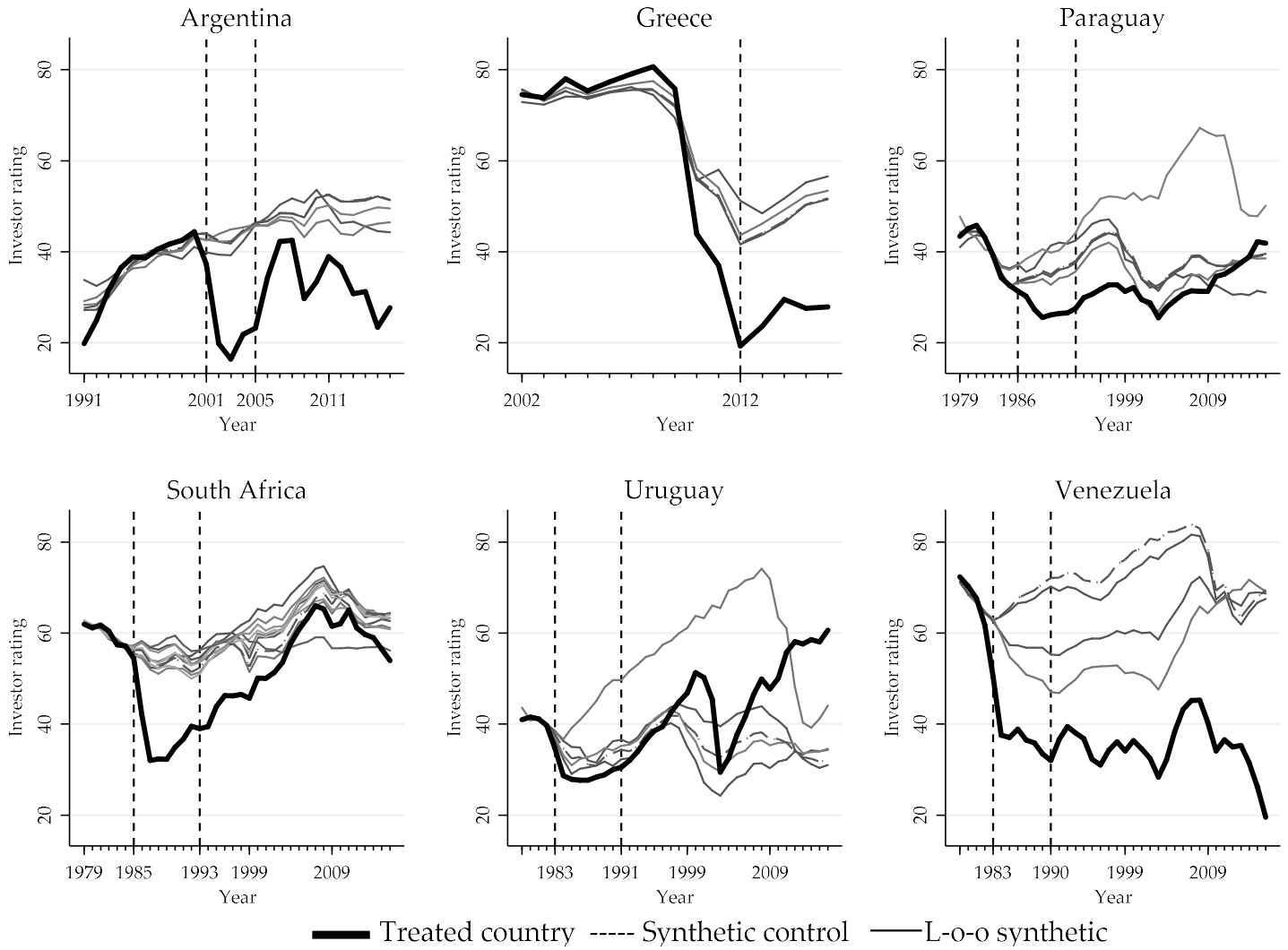
Figure A8b: Expected effect on agency rating for different levels of official face value reduction



Notes: Each graph shows the marginal effect of official face value reduction on agency rating, for different face value reduction sizes and at different lag lengths. The dashed lines show 90 percent confidence bands. The effects are calculated using the coefficients from Table A3, column 6. The rating increase of a restructuring is statistically significant for levels of nominal haircut at which the lower confidence band is above the zero horizontal line. From year one to two years after the agreements, we can see that any haircut can be associated with significantly higher ratings. From year five to seven years after the agreements nominal haircut greater than 60 percent (which corresponds to mean of this sample) can be associated with significantly higher ratings.

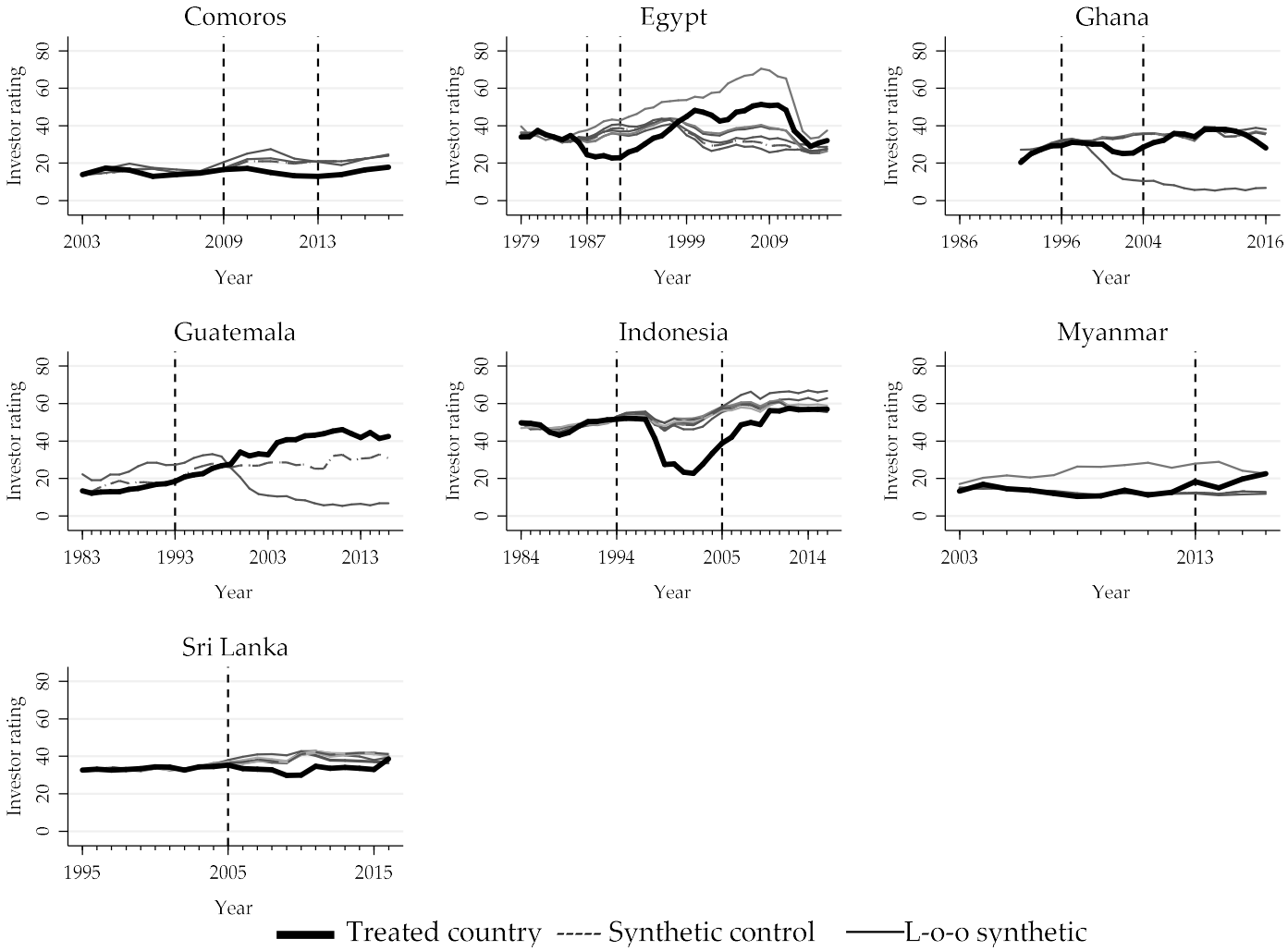
Appendix B

Figure B1: Private defaulters: leave-one-out distribution of the synthetic control



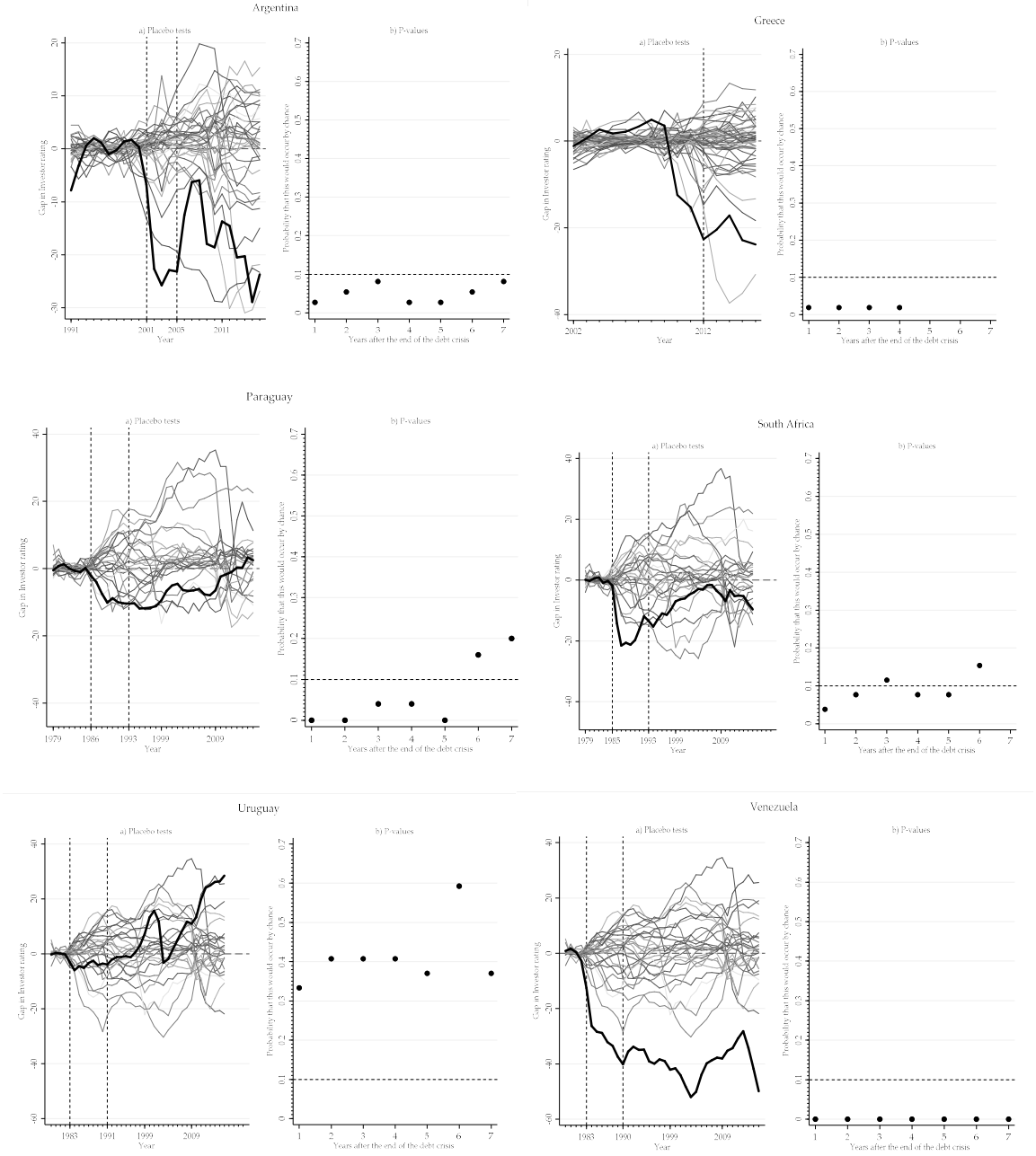
Notes: In each graph, the bold line represents the trend of investor rating for the defaulting country, the dashed line shows the trend for the synthetic country, and the continuous lines represents the synthetic countries obtained through the leave-one-out procedure.

Figure B2: Official defaulters: leave-one-out distribution of the synthetic control



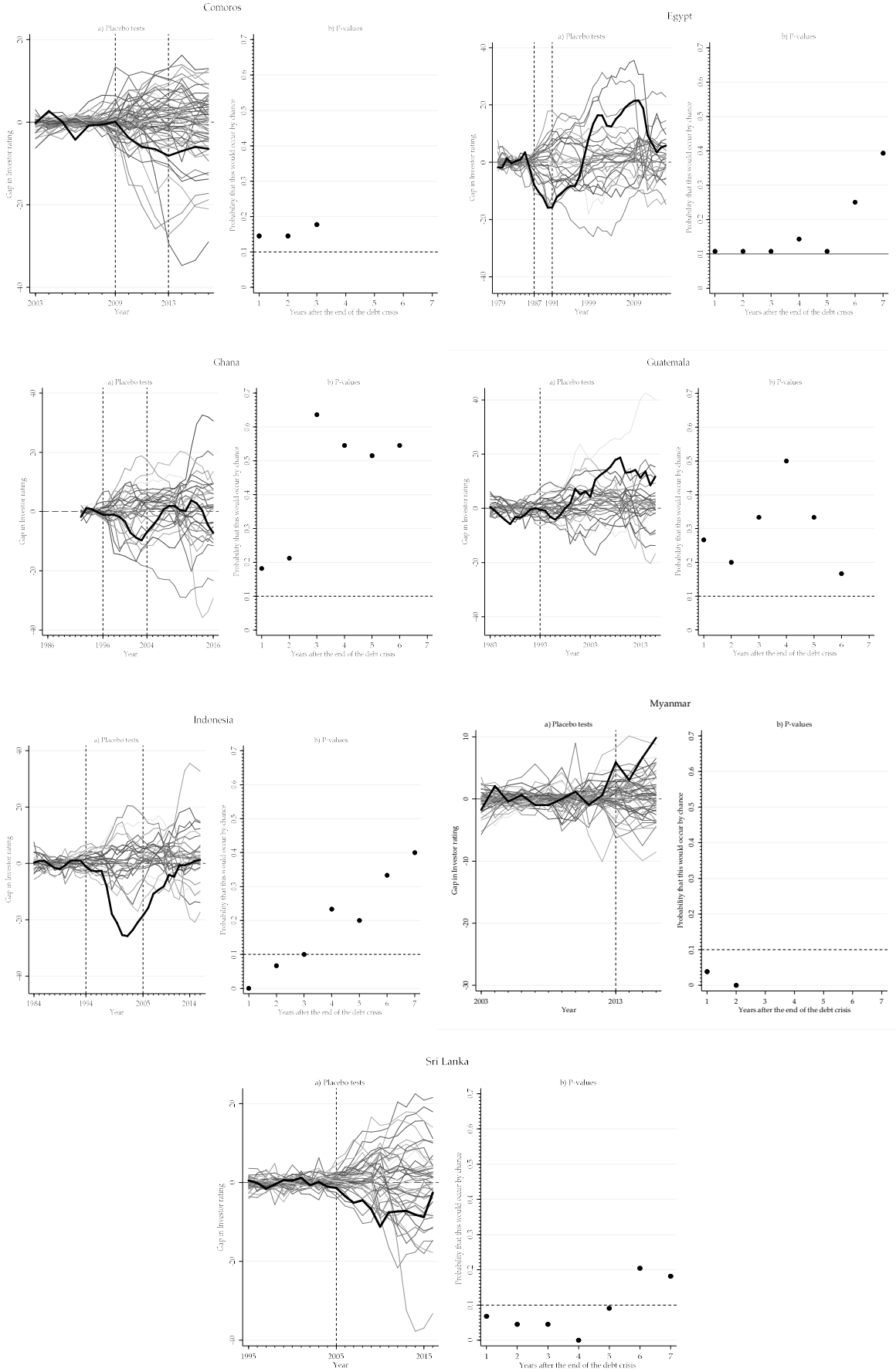
Notes: In each graph, the bold line represents the trend of investor rating for the defaulting country, the dashed line shows the trend for the synthetic country, and the continuous lines represents the synthetic countries obtained through the leave-one-out procedure.

Figure B3: Private defaulters: a) placebo tests b) p-value



Notes: In each graph, panel a) shows the placebo tests in which the bold line represents the gap between the investor rating of the defaulting country and its synthetic counterpart, and the continuous lines represents the same gap obtained through the in space-placebo procedure. Panel b) shows the corresponding p-values up to seven years after the end of the debt crisis.

Figure B4: Official defaulters: a) placebo tests b) p-value



Notes: In each graph, panel a) shows the placebo tests in which the bold line represents the gap between the investor rating of the defaulting country and its synthetic counterpart, and the continuous lines represents the same gap obtained through the in space-placebo procedure. Panel b) shows the corresponding p-values up to seven years after the end of the debt crisis.