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Sovereign Debt Restructuring and Growth

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Abstract

This paper studies the effect of sovereign debt restructurings with external private creditors on growth during the period 1970-2010. We find that there are bad and good (or not so bad) debt restructurings for growth. While growth generally declines in the aftermath of a sovereign debt restructuring, agreements that allow countries to exit a default spell (final restructurings) are associated with improving growth. The impact can be significant. In general, three years after restructuring, growth is about 5 percent lower compared to countries that did not face restructuring over the same period. The exception is for final restructurings, which result in positive growth in the years immediately after the restructuring. Final restructurings tend to be better for growth because they reduce countries' debt, with the strongest effect for countries that exit restructurings with relatively low debt levels.

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Contents Page

I. INTRODUCTION

Since the 2008 global financial crisis, there has been a wave of sovereign debt defaults and restructurings in both advanced and emerging market economies. In the seven years after the beginning of the crisis, eleven countries have defaulted and restructured their sovereign debt with private creditors, including Greece, which in 2012 had the largest sovereign debt restructuring in history.[1]

While most of these restructurings occurred after prolonged periods of recession or subdued growth, evidence on the net impact of sovereign debt restructurings on growth performance is ambiguous. The literature has focused on specific channels through which debt restructurings can be beneficial or costly to economic activity. Theory suggests that a default or restructuring can cause reputational damage and trigger sanctions and output losses (e.g., Eaton and Gersovitz 1981, Bulow and Rogoff 1989, Cole and Kehoe 1998, Aguiar and Gopinath 2006, Arellano 2008). Empirical evidence supports these conclusions and suggests that sovereign debt relief is associated with exclusion from capital markets and higher spreads the larger the debt relief received (Cruces and Trebesch 2013; Dias et al. 2012). However, for countries with large debt stocks, debt relief could be beneficial for growth as it reduces future debt payments and the implicit tax on domestic investment (Krugman 1988; Sachs 1989; Obstfeld and Rogoff 1996; Aguiar et al. 2009). Indeed, recent empirical evidence suggests that the economic landscape of debtor countries improves after debt relief operations if restructurings involve debt write-offs (Reinhart and Trebesch, 2014, 2016). In the end, the overall growth effect of restructurings remains an empirical question.

In this paper, we empirically assess how growth performs in the aftermath of sovereign debt restructurings with external private creditors arising after default and investigate causal linkages between the two.[2] A large literature focuses on growth performance around default episodes, showing that defaults tend to happen at the trough of a recession.[3] In this paper, we focus instead on growth after restructuring, an issue that has so far received much less attention in the literature.[4]

In examining these issues, we address two main methodological challenges. First, the timing of the debt restructuring can be endogenous, creating a typical reverse causality problem. Specifically, countries could renegotiate their debt only after their economy starts to recover

[1] In addition, Argentina defaulted in 2014 and reached a settlement with creditors in April 2016.

[2] Throughout the paper, we use the terms growth performance and per capita growth interchangeably to refer to per capita growth.

[3] However, Tomz and Wright (2007) find that although most defaults start during economic downturns, the relationship between economic cycles and default spells is weak.

[4] Our focus on restructurings with external private creditors is primarily driven by data constraints.

(e.g., Benjamin and Wright 2009). Similarly, the size of debt relief could be endogenous to expected growth, in that debt relief can depend on current and expected macroeconomic performance. Second, when examining the effect of restructuring on growth, we compare countries that did restructure with countries that did not. In doing so, however, we have to consider that countries that defaulted and restructured could be different from those that never did, giving rise to potential selection bias problems.

To address the potential endogeneity of the timing of the restructuring, we use an instrumental variable (IV) approach and further test our results using a difference-in-difference specification. We apply the difference-in-difference specification to two subsamples of restructuring episodes for which the timing of the restructuring is exogenous to a certain extent. The first subsample is constituted by Brady Bond restructurings, which were part of a centrally debt relief initiative orchestrated by the US Treasury. However, this subsample only covers 13 restructuring episodes, making it difficult to derive general conclusions. To expand the set of episodes under analysis, the second subsample includes sovereign debt restructurings following agreements with the Paris Club, which typically requires debtor countries to reach similar restructuring agreements with private sector creditors. To control for possible selection biases, we employ nonparametric propensity scoring matching methods and test our results using different control groups. These approaches alleviate potential endogeneity issues and together provide a more reliable framework for establishing causality. We use a similar approach to address possible endogeneity issues related to the size of debt relief.

Another challenge in analyzing growth performance around debt restructuring episodes is the role of omitted variables. To address this issue, we include country-fixed effects to capture countries' time-invariant features, and global trends to capture time-variant common trends that affect the whole sample. We also account for countries' time-variant variables, including banking and currency crises, debt stocks, and changes in the real effective exchange rate (REER).

Our econometric analysis points to a causal link from external debt restructuring to growth. We find that there are bad and good (or not so bad) debt restructurings for growth. Growth generally declines following a debt restructuring operation with one important caveat: restructurings that allow countries to exit a default spell (i.e., final restructurings) are associated with improvements in growth performance. The impact can be significant. In general, three years after restructuring, growth is about 5 percent lower than in countries that did not restructure over the same period. The exception is for final restructurings, for which growth is slightly positive, although the effect fades away over time.

One critical question is why final restructurings are "not so bad" for growth. We find that final restructurings are good for growth because they reduce countries' debt (in net present value (NPV) terms), with the effect depending on the post-restructuring level of debt. In

particular, final debt relief has a positive effect on growth when it allows the country to exit the restructuring with relatively low debt ratios.

These findings suggest that there is a fundamental difference between addressing debt sustainability issues and countries' debt overhang. A restructuring can be successful, allowing a country to exit default and address sustainability issues, but to be good for growth, it has to address the country's debt overhang problem. This may imply larger haircuts than those required to re-establish debt sustainability.

The remainder of the paper is organized as follows. In Section II, we present an overview of the recent literature on macroeconomic performance around sovereign debt restructurings. Section III presents our data and examines stylized facts about growth in the aftermath of debt relief. Section IV presents the methodology and results of our econometric analysis. Section V concludes and discusses avenues for future research.

II. SOVEREIGN DEBT RESTRUCTURINGS AND GROWTH

Economic theory is ambiguous as to whether sovereign debt restructurings are beneficial or costly for macroeconomic performance of debtor countries. Several recent empirical studies have looked at both the impact of restructurings on specific variables that can affect macroeconomic performance, as well as directly at the relationship between restructuring and growth.

The majority of the empirical literature on debt restructuring has focused on the impact of restructurings on variables such as market access and borrowing costs that may affect growth, largely finding negative effects. In their seminal paper on sovereign debt restructurings with external private creditors, Cruces and Trebesch (2013) find that restructurings involving higher haircuts, that is, higher reductions in the NPV of debt are associated with significantly higher subsequent bond yield spreads and longer periods of capital market exclusion. They show that a 40 percent present value haircut is associated with 270 basis points higher EMBI spreads in the first year after restructuring and 127 basis points higher in years 4-5.[5] Using the same dataset, Dias et al. (2012) find that countries with above-median haircuts (in NPV terms) experience a median exclusion from capital markets of eight years, whereas countries that inflict smaller haircuts on private investors experience a median exclusion from capital markets of only three years. Both studies focus on stylized facts and do not investigate whether the links between restructurings and market access are due to specific factors, such as punishment or reputational effects.

[5] Their conclusions are based on the Cruces and Trebesch's (2013) preferred measure of haircut. This measure compares the present value of the old debt to the present value of the new debt, both discounted at the same rate. In this paper, we use the same measure of haircut.

The evidence seems more positive when looking at possible wealth effects from debt restructuring. Arslanalp and Henry (2005) study stock market performance in the 12-month run up to the Brady Plan debt restructuring announcements and find that the real dollar value of the stock markets rose by 60 percent, on average, compared to a control group that saw their stock markets increase by only 4.8 percent.[6]

A few recent studies, focusing on macro-level data, find a positive relationship between debt restructuring and growth. Das et al. (2012) look at a sample of 44 final restructurings with bank and bondholders since 1980, finding that median real GDP growth increases to 4-5 percent in the 3-years following a final debt restructuring agreement compared to 1.5 percent in the 3-years prior to reaching an agreement. Similarly, Trebesch and Zabel (2014) focus on a smaller set of 30 default episodes and find that in the 5-years after concluding a final debt restructuring, countries, on average, experience per capita GDP growth of more than 10 percent. Examining the experience of the 16 Brady countries, Arslanalp and Henry (2005) find that their real per capita GDP grew faster in the 5-years after announcing a Brady Plan deal compared to a control group. While the size of the haircut does not appear to make a difference for postrestructuring growth performance (Trebesch and Zabel 2014), it does so if a restructuring is preemptive (i.e., takes place prior to a payment default). Asonuma and Trebesch (2016) look at restructuring episodes with external private creditors and find that for preemptive restructurings, growth rebounds quickly after the restructuring announcement. For other restructurings, their study suggests that growth remains below-trend for at least three years after default.[7] While their underlying model tries to explain why countries may or may not select a preemptive restructuring, it does not explain why growth performance differs with the type of restructuring.

Most empirical studies have focused on stylized facts and correlations and do not address the issue of causal links. One recent attempt to address this issue is Reinhart and Trebesch (2014, 2016) who explore linkages between restructuring and growth both for the 1920s and 1930s sovereign debt restructurings (with official creditors) and for those in the 1980s and 1990s (with external private creditors). For restructurings with private creditors, they find that the Brady debt relief operation translated into 3 percentage points higher real per capita GDP growth compared to a control group of noncrisis emerging markets (EM). However, they find no clear causality for the restructurings performed under the Baker initiative. Since a major

[6] Findings are not much different for restructurings negotiated with official creditors. For example, Rose (2005) finds international trade declining by about 8 percent per year for 15 years after Paris Club negotiations, and Fuentes and Saravia (2010) observe that countries that negotiate a debt restructuring with Paris Club see FDI flows reduced by up to 2 percent of GDP per year.

[7] Findings are less positive for restructuring largely involving official creditors. Depetris and Kraay (2005) study the impact of debt relief in 62 low-income countries (LICs) (all HIPC eligible countries plus 24 other LICs) between 1989 and 2003 and find little evidence of improved growth rates in countries receiving debt relief. Arslanalp and Henry (2004) argue that this may be because weak economic institutions and infrastructure pose greater barriers to growth than the debt overhang.

difference between the Baker and the Brady initiatives is that the latter involved large haircuts and face-value reductions, they take this evidence as suggestive that growth picks up only after restructurings carrying deep debt relief involving face-value debt reductions. However, they find no correlation between the magnitude of debt relief and economic performance post-crisis.

While the direction of causality between sovereign debt restructuring and growth remains ambiguous, understanding it is important for policymakers. From a policy perspective, it makes a difference whether debt restructuring leads to better growth performance, or whether a country can more easily restructure its public debt when growth prospects improve. This paper presents a systematic analysis to establish a causal relation from restructuring to growth. In our analysis, we use all restructuring episodes with external private creditors that occurred between 1970 and 2010 for which information is available. Our findings suggest that restructurings entailing significant debt reductions have a positive effect on growth.

III. Data, Definitions and Stylized Facts

In this section, we present our data and definitions and provide some stylized facts about sovereign debt restructurings and growth. We rely on Cruces and Trebesch's (2013) database of sovereign debt restructurings with external private creditors (both bank loans and bonds), to which we add information on default timing, annual growth performance, public debt developments, and a host of other macroeconomic variables around both debt defaults and restructuring episodes (see Appendix 1 for the complete list of variables and sources).

Our focus on restructurings with external private creditors is primarily driven by data constraints. These restructurings mainly involve foreign currency denominated debt held by external creditors.[8] Although Reinhart and Rogoff (2009) and Standard and Poor's (2006) list domestic debt defaults, to our knowledge, no comprehensive database of domestic debt restructuring terms exists. In addition, we do not assess the impact of restructurings with official creditors because they are not directly connected to the ability of a country to access credit markets. Moreover, they differ significantly from private sector restructurings, tending to address only debt falling due during a specific time period and typically occur under an IMF program. Our database provides detailed debt restructuring and macroeconomic information on each individual restructuring and default episode that occurred between 1970 and 2010 for which data are available.

[8] Following Cruces and Trebesch's dataset, our analysis includes two cases of restructuring debt issued in domestic currency, but mainly foreign held: Russia, 1998 and Ukraine, 1998.

We link information on defaults and restructurings and focus on restructuring episodes that occur during default.[9] To identify default episodes, we follow Standard and Poor's (2010) definition of default (see Appendix I).[10] One advantage of linking information on default and restructuring is the ability to determine if multiple restructurings are undertaken within a single default spell and to isolate the "final" restructuring, that is, the restructuring that permits a country to emerge from default (Reinhart and Trebesch 2016). However, one problem in linking default and restructuring episodes is that declaring the end of a default spell and completion of debt restructuring involves judgment. Unlike corporate debt restructurings undertaken in the US, where all obligations are typically addressed in bankruptcy reorganization, sovereign debt restructurings often involve holdouts or the inability to contact all debt holders (Standard and Poor's, 2010). Moreover, there may be multiple restructurings undertaken within a single default spell, making it difficult to assess in real time whether a restructuring will result in the end of the default spell. For our purposes, we use information from Standard and Poor's to identify the end of a default spell, identifying the final restructuring as the restructuring after which the default spell ends (see Appendix II).[11]

Over the period 1970-2010, there have been 86 default episodes in 67 countries, which involved 168 restructuring events.[12] This implies that the average default episode requires almost two restructuring events until resolution. On average, debt restructuring occurs several years after the start of the default period. The average spell between the start of a default episode and the first restructuring event is 4.9 years (with a median of 3 years). The

[9] We focus on restructurings after default as most debt restructurings with private creditors are either contemporaneous or follow default. In our dataset, only 9 out of 168 restructurings occur outside of a default episode.

[10] According to Standard and Poor's (2010), a default is the "the failure to meet a principal or interest payment on the due date (or within the specified grace period) contained in the original terms of a debt issue or [the government] tenders an exchange offer of new debt with less-favorable terms than the original issue". Standard and Poor's stopped reporting default information on unrated countries after 2006. To complete default spells post-2006 for unrated countries we use Global Development Finance (GDF) database for information on the status of interest and principle arrears on external long-term debt (maturity over 1 year) due to private creditors.

[11] According to Standard & Poor's a country has emerged from default when "…no further near-term resolution of creditors' claims is likely" (Beers and Cavanaugh 2006).

[12] Over the period 1970-2010, we identify 124 default episodes, but only 86 were associated with at least one restructuring. The fact that we do not record a restructuring within a default episode could be due to missing information or the presence of a restructuring with official creditors instead of private creditors. Cruces and Trebesch's (2013) dataset contains 180 restructuring events for the years we are focusing on. We exclude eight events because there are multiple restructurings that occur in the same year, and an additional four events because countries no longer exist and data is unavailable (Yugoslavia 1983, 1984, 1985, 1988). Due to the period we consider, (largely because of data limitations) we also exclude recent restructuring events such as Greece, Ukraine, and Argentina.

lag between the start of the default and the final debt restructuring event (the restructurings after which countries exit default) rises to 7.4 years (with a median of 5.5 years) (Table 1).

Restructurings usually carry significant haircuts, but provide somewhat limited debt reduction.[13] On average, a debt restructuring results in a 38.0 percent haircut (median 33.4 percent), covering about 11.2 percent of GDP (median 5.8 percent of GDP), and, on average, delivers an NPV debt reduction[14] of 4.6 percent of GDP and 5.3 percent of total (domestic and external) public debt outstanding before the restructuring. However, final restructurings appear to deliver more substantial debt relief. For final restructurings, the haircut size is substantially larger (47.3 percent, on average) than for non-final restructurings (28.3 percent, on average) and cover 13.5 percent of GDP of debt. They often involve face value reductions (49 of the 86 final restructurings), delivering an average NPV debt reduction of 6.7 percent of GDP and 7.7 percent of debt outstanding before the restructuring.

Table 1. Summary Statistics, 1970-2010

	Number of Observations	Median	Mean	Min	Max	Standard Deviation
Restructuring episodes	168					
Distance from default (first), years	86	3.0	4.9	1.0	25.0	5.2
Debt relief						
Haircut, percent	168	33.4	38.0	-9.8	97.0	27.1
NPV debt reduction (percent of GDP)	163	2.0	4.6	-0.3	55.6	7.1
NPV debt reduction (percent of pre-restructuring debt)	149	2.5	5.3	-0.5	34.0	6.8
Final restructuring episodes	86					
Distance from default (final), years	86	5.5	7.4	1.0	25.0	5.8
Debt relief						
Haircut, percent	86	43.1	47.3	-4.6	97.0	29.2
NPV debt reduction (percent of GDP)	84	3.3	6.7	-0.1	55.6	9.1
NPV debt reduction (percent of pre-restructuring debt)	76	3.8	7.7	-0.2	34.0	8.4

Source: Cruces and Trebesch (2013), and authors' calculations.

Preliminary analysis

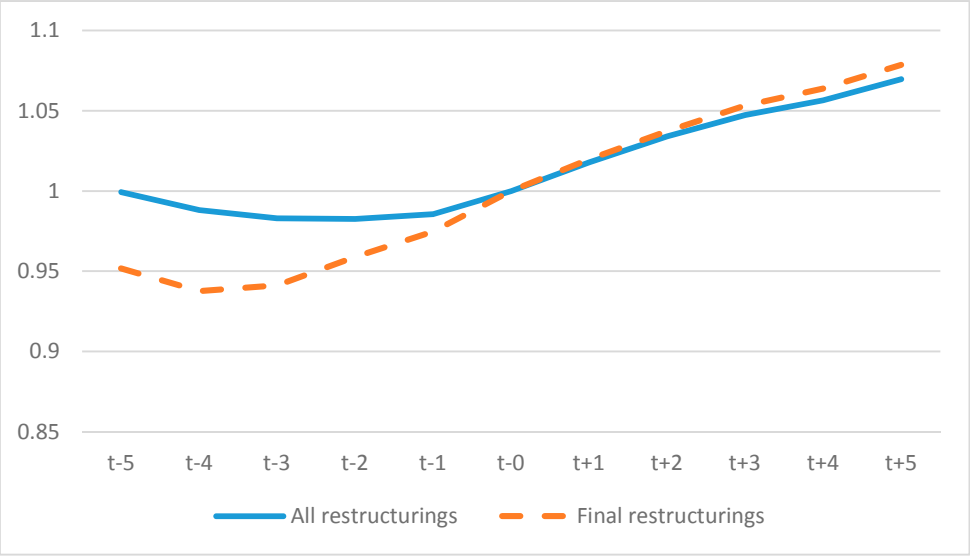
Is GDP growth performance different after sovereign debt restructuring episodes? To address this question, we start by examining the evolution of per capita GDP following debt-restructuring episodes. At this stage, our analysis is purely descriptive, focusing on simple correlations.

[13] Haircuts calculated as the ratio of the present value of the old defaulted debt to the present value of the new restructured debt using the same market rate that was prevailing immediately after the debt exchange to discount future cash flows (see Cruces and Trebesch (2013) and online appendix). To secure large country coverage, debt data refer to central government debt (see Appendix I).

[14] Calculated as the haircut multiplied by the amount of debt involved, divided by either GDP or public debt in the year prior to restructuring.

A simple starting point is to look at the average per capita GDP growth rate around the date of a restructuring. We look at both final restructurings that allow the borrower country to exit from a default spell, as well as the full set of restructurings (Figure 1). It is worth noting that while it is relatively straightforward to identify final restructurings ex-post, in real time, it is not possible to know whether a restructuring proposal will succeed. Following Reinhart and Trebesch (2016), we look at average growth in the five years before and after the restructuring date *t*. Average per capita GDP growth shows a relatively flat path before the restructuring (through *t*) and a substantial positive trend thereafter (cumulative growth is 7 percent from t to t+5). The paths of final and all restructurings after time *t* show no significant differences. These patterns seem to suggest that restructuring episodes are associated with positive growth performance in the aftermath of the restructuring.

Figure 1. Average Per Capita Real GDP around Sovereign Debt Restructuring Episodes



Note: Per capita real GDP is normalized to 1 at the time of restructuring t-0.

An alternative and more rigorous approach to describe GDP growth around restructurings is to estimate how the conditional expectation of GDP growth depends on the temporal distance from the restructuring episode relative to some baseline benchmark. This approach has the advantage of isolating the dynamics related to restructurings from normal GDP trends and handling multiple restructuring events occurring within the time window under consideration (in our case, 11 years). Following Gourinchas and Obstfeld (2012), we consider the following fixed effects panel specification:

$$y_{it} = \alpha_i + \beta_s \delta_{is} + \varepsilon_{it} \qquad (1)$$

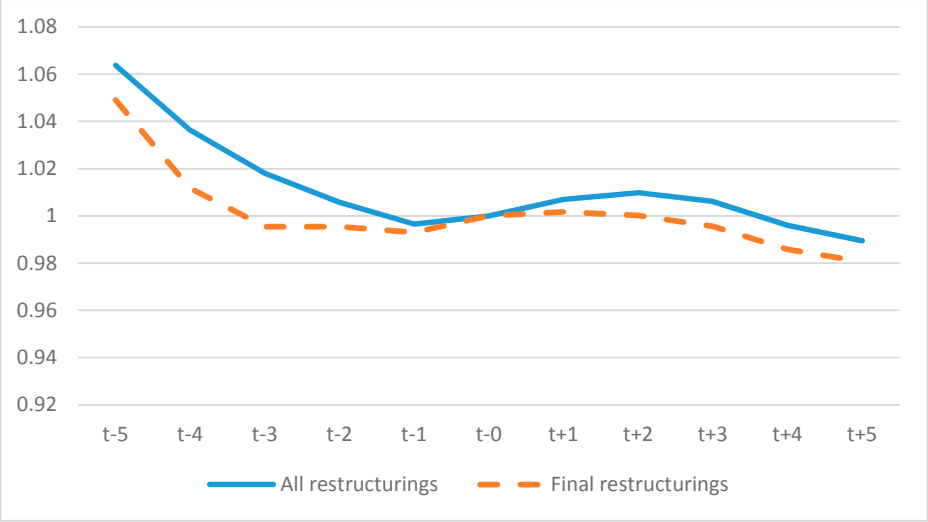
In equation (1), y_{it} denotes per capita real GDP growth rate in country *i* at time *t*, δ_{is} is a dummy variable equal to 1 when country *i* is *s* periods away from restructuring in year *t* and zero otherwise. We set the event window around a restructuring event to 11 years (5 years

before and 5 years after, $-5 \leq s \leq 5$) so as to capture relatively slow changes. The regression also allows for country fixed effect α_i. In this equation, the coefficient β_s, the parameter of interest, measures the conditional effect of restructuring on per capita growth throughout the event window $-5 \leq s \leq 5$ relative to "tranquil" times. Tranquil times are implicitly defined as the country-year observations that do not fall within any restructuring event window. This is our benchmark. In our case, the benchmark includes the broader sample of 187 countries for which data are available. The error term, ε_{it}, captures all remaining variation in the realization of per capita real GDP growth.

Based on the above specification, per capita GDP level (Figure 2) tends to fall significantly in the years preceding the restructuring episode, while remaining rather flat in the aftermath of restructurings relative to tranquil times. This pattern clearly differs from the pattern emerging from looking at average growth rates.

The different patterns between average growth and conditional growth expectations around sovereign debt restructurings episodes cast doubts on whether the pickup in average growth after restructuring shown in Figure 1 has any statistical significance. In addition, it points to possible endogeneity problems, as growth appears to pick up ahead of the restructuring event and not afterward. Finally, it may well be that the conditional expectation of GDP growth depends on the exact definition of tranquil times, i.e., on how the control group is defined. We investigate these issues in the following sections.

Figure 2. Conditional Expectation Relative to "Tranquil Times" of Per Capita Real GDP around Sovereign Debt Restructuring Episodes



Note: The level of GDP is normalized to one in the year of restructuring t-0 and the real GDP level is constructed by using the point estimates of coefficients β_{s-5} to β_{s+5} from Equation (1). These coefficients represent the average growth of countries that restructured in difference from countries that did not for various years preceding and following the restructuring episode.

IV. The Aftermath of Sovereign Debt Restructuring: Econometric Analysis

In this section, we examine causality links between sovereign debt restructurings and growth. In examining these links, two main challenges arise. The first is a potential endogeneity or reverse causality problem in that the timing of restructurings could be endogenous to the growth prospects of the country. Recent theoretical work by Benjamin and Wright (2009) and others (e.g., Bi, 2008) argues that sovereign and creditors may be more willing to negotiate a restructuring when growth recovers, as resources to share are larger. In this case, any growth pick-up around restructuring episodes may not be the outcome of the restructuring, but rather leads to the restructuring. Similarly, the size of debt relief could be endogenous to expected growth. For instance, in most IMF programs involving a debt restructuring, the size of debt relief depends on the expected growth performance (given a definition of debt sustainability). The second challenge is a potential selection bias problem. Countries that default and restructure their debt may be different from countries that do not restructure at all. This issue points to the problem of identifying the correct control group for comparisons with countries that have restructured. Should this group include only countries that have restructured or should it include countries that never restructured?

To address these challenges, we examine the relationship between various types of restructurings and growth by running OLS regressions with lagged variables, instrumental variable regressions, difference-in-difference specification, and scoring method regressions. Once the causality link is clarified, in the next section we assess whether the size of the haircut (or, more generally, debt relief) matters as well. That is, if larger haircuts – other things equal – lead to better growth performance (Section V).

A. Methodology

To examine the relationship between sovereign debt restructurings and GDP growth, we run yearly growth panel regressions. The dependent variable is per capita GDP growth $y_{i,t}$, where *i* refers to the country and *t* to the period. We consider several features of debt restructurings using dummy variables and various measures of debt relief. Since our focus is on short-term growth dynamics around restructuring episodes, we also account for the possible role of omitted variables by controlling for country specific time-invariant and time-variant factors that could affect growth, as well as for common shocks across countries. Our empirical model is as follows:

$$y_{i,t+1} = c + \beta_{restr} HC_{i,t} + \gamma_i + \beta_{dom}[X_{i,t\to t-3}] + \beta_{ext}[Z_{t+1}] \qquad (2)$$

Equation (2) shows our baseline regression. The coefficient γ_i represents country-specific fixed effects, which control for all time-invariant country specific factors affecting both GDP growth and restructurings. By including country fixed effects, our regression explains growth in terms of deviation from each country mean rather than focusing on long-run growth. $HC_{i,t}$ is a dummy for restructuring. The vector Z_{t+1} includes global real GDP growth and the US real interest rate, controlling for common time-variant shocks across countries. To account for the remaining country-specific time-variant shocks, the vector $X_{i,t\to t-3}$ contains lagged variables that capture the most common shocks to short-term cyclical growth. Using these

variables, we attempt to remove the effect of pre-existing economic conditions from our coefficient estimates. In particular, we control for the output gap, which captures the business cycle; the preexisting debt level; the exchange rate (lagged up to three periods) and the presence of banking and currency crises (in the form of dummy variables), which account for other channels at work during public debt crises.[15] We initially run our model using standard OLS estimators, covering 65 countries for which data are available over the period 1970-2010.[16]

An important issue to account for in equation (2) is whether growth after restructuring depend on the distance of the restructuring from default. To control for this possibility, equation (2) is modified by adding a variable *distance from default*, which reports how many years have lapsed since default, while omitting the HC variable. Since the new variable turns out to be not significant, we use the basic model in our regressions, without further considering the role of *distance from default*.

Using lagged variables may not be sufficient to rule out reverse causality. Therefore, we estimate an instrumented version of model (2). Specifically, we instrument the restructuring dummy $HC_{i,t}$ as a way to confirm that restructuring is indeed exogenous to growth (see Section IV.B). As instrument, we use the probability that a restructuring occurs in any given year post default. We proxy this probability using the distribution over time of restructurings after default in the whole sample of episodes that we have.

To further test the robustness of our results, we run difference-in-difference regressions (see Section IV.C). The main challenge in performing this analysis is to identify restructuring events whose timing is not endogenous to the economic situation of crisis countries. We use the Brady plan agreements of the 1990s. In addition, we look at restructurings with private creditors that followed official sector Paris Club restructurings.[17] In both cases, the timing of the private sector restructurings is not obviously dependent on the growth performance of the debtor country. The case of the Brady initiative can be seen as a centrally orchestrated debt restructuring applied across a number of debtor countries, irrespective of their individual economic circumstances. In the case of Paris Club restructurings, restructurings with private creditors were prompted by the equal treatment clause required under such deals. In this sense, Paris Club restructurings can be taken as external events that prompt a restructuring with private creditors. As the timing of Paris Club restructurings is likely to be independent of the specific growth performance of the debtor country (if anything, it may be related to negative shocks to the debtor country), the timing of the restructuring with private creditors in each country can also be seen as exogenous to the country growth performance.
Finally, to address selection bias and control group issues, we complement our standard OLS regressions with nonparametric propensity score matching methods (MM). The MM (see

[15] See Appendix I for sources and definitions of variables and data coverage.

[16] We have 168 restructuring episodes, of which 86 are final. Among the final restructurings, 17 occur in low-income countries (LICs). To keep the sample as large as possible, in the subsequent analysis we always include LICs. Removing LICs leaves the results unchanged, often leading to more significant and larger estimated coefficients (results excluding LICs are available upon request).

[17] Information on Paris Club restructuring dates is from Das et al. (2012).

Rosenbaum and Rubin, 1983) relies on a probit regression for the probability of restructuring to identify a group of countries (the control group) that have similar predicted probability of restructuring as the countries that restructured (treated group) but never did. A difference-in-difference estimator is then used to assess the differential effect of countries that restructured compared with those that did not.

Further robustness checks include running our basic model using different country samples, hence implicitly looking at different control groups. In particular, we estimate our basic model using the widest possible set of countries for which data are available, irrespective of whether they restructured or not (overall 65 countries). We also restrict our sample to countries that have defaulted at least once, even if they have not restructured their debt (48 countries). In addition, we only consider countries that have restructured by looking at observations within an 11-year window around restructurings (i.e., five years before and after a restructuring for 38 countries).[18]

B. Results

We start our analysis with the specification of equation (2) to examine whether restructurings are correlated with GDP growth. In particular, we use OLS to regress the growth rate of per capita real GDP in year t+1, the year after the restructuring, on a dummy variable equal to one when a country has completed a restructuring deal at time *t*, and the set of controls. We use our full set of 65 countries over the period 1970-2010 for which data are available, covering both countries that have restructured and those that have not.

Results reported in Table 2 (column 1) show that the restructuring dummy is not significant, suggesting that, in line with our stylized facts, restructurings are not correlated with growth. The coefficients of the controls for domestic and external factors in equation (2) have the expected signs. The lagged debt to GDP ratio and banking and currency crises dummies are negatively correlated to growth, confirming established conclusions from a large empirical literature that both high public debt levels and banking and currency crises are detrimental to growth. Depreciation of the real effective exchange rate and large initial output gaps are associated with higher growth in the following year (a return to the trend effect). As expected, a higher US policy interest rate (a proxy for world interest rates) reduces domestic growth, while higher world growth improves domestic growth.

When we look at the type of debt restructuring, however, we find that restructurings are, in general, bad for growth unless they allow a country to exit a default period (i.e., if they are final). Column (2) in Table 2 includes a dummy, equal to one if the restructuring is final. This dummy captures the marginal effect on growth of a final restructuring. Per capita GDP growth is 1.3 percent lower in the year following a restructuring compared with the benchmark sample including countries that have restructured and those that have not. However, final restructurings are associated with 0.8 percent positive GDP growth (the sum of the coefficients of the two dummies on all and final restructurings). To test that final restructurings are indeed different from non-final restructurings, we replace the final restructuring dummy with a nonfinal restructuring dummy and find that the coefficient is

[18] We have experimented with different window lengths with limited differences in the results.

negative, indicating that non-final restructurings are significant and negatively correlated with GDP performance (results available on request). We also run an F test for the sum of the two dummy coefficients and find that the sum is statistically significant.

To address reverse causality issues, we instrument the key restructuring variables of our baseline regression (Table 2, column 3). Our choice of instrument for the restructuring dummy is the sample frequency (or number) of restructurings, given the distance from the year of default (Figure 3). We do the same for the final restructuring dummy, in this case using the distributions of final restructurings. Both instruments satisfy first stage regression requirements that instruments be correlated to the explanatory variables. First stage regressions have a high R-squared of 76-78 percent and satisfy standard tests. Specifically, the Anderson test ("canonical correlations") rejects the null hypothesis of zero correlation between the instrument and the restructuring dummies. The Cragg-Donald test also supports strong correlation. The second stage regression delivers very similar results when using robust standard errors. Moreover, our instruments should not depend on any country-specific growth performance, as countries with the same duration from default to restructuring did not necessarily default at the same time. In other words, there is no concern that the instrument captures "contagion" effects (i.e., countries having defaulted at similar times).

A possible issue with our instruments is that countries with better institutions could reach a restructuring deal faster than countries with dysfunctional institutions (see Trebesch 2010). In this case, if the level of institutional development is correlated with growth, there could potentially be a correlation between the sample distribution of the timing of restructuring and growth, as countries with better institutions could reach a deal sooner while, at the same time, having higher growth. If this were the case, our instrument would not be fully exogenous. To dispel doubts, we look at two widely used indices of institutional quality (government effectiveness and institutional constraints).[19] Simple correlations between these indices and the duration of default spells to final restructurings is very low, suggesting that institutional development may not be relevant for the time of restructuring.[20] In further support of this point, Figure 4 compares the average values of the two institutional indices and the average duration of default. It shows that, while the duration of default spells widens from the 1980s to the 1990s, the two measures of institutional quality remained flat. Not surprisingly, simple OLS regressions indicate that a one standard deviation improvement in government effectiveness (institutionalized constraints index) reduces (increase) the time until the final

[19] Government effectiveness is provided by Worldwide Governance Indicators (www.govindicators.org) using a scale of -2.5 (bad) to +2.5 (good), measuring government effectiveness for the period 1996-2013 (not all years available). Data on institutionalized constraints are taken from Polity IV database and measure the extent of institutionalized constraints on the decision-making powers of chief executives, whether individuals or collectives on a scale of 1 (low) to 7 (high). Glaeser et al. (2004) argues that all institution measures reflect political outcomes and do not serve as durable constraints. In their view, this variable is the best attempt at measuring the political environment.

[20] The simple correlation is -0.0887 for the government effectiveness measure (implying that a higher level of government effectiveness reduces the time to a final restructuring) and -0.0019 for the institutionalized constraints index (suggesting that less constraints would increase the time to a final restructuring).

restructuring by only 0.7 months (0.1 months).[21] As our measures of institutional quality matter little for the timing of restructuring, our instrument should be reasonably independent from growth, therefore serving our purposes well.[22]

Our IV regressions confirm that sovereign debt restructurings have a negative effect on growth, while final restructurings that allow a country to exit default are not bad for growth. The estimated coefficient for the restructuring dummy is negative and significant (Table 2, column 3) and growth in per capita GDP is 1.9 percent lower in the year following restructuring compared with our benchmark. However, final restructurings appear to be broadly neutral for growth (0.1 percent increase in GDP).

A second concern is the possibility of a selection bias and the choice of the benchmark. To reduce this concern, we complement our OLS and instrumental regressions with nonparametric propensity score matching methods (Table 2, column 5). We also restrict the sample to the 11-year window around restructurings, therefore considering only countries that have restructured (Table 2, column (4)). Similarly, we restrict the sample only to countries that have defaulted once since 1970 and obtain broadly similar results. All these methods confirm the positive differential effect of final restructurings of broadly the same magnitude.[23]

So far, we have considered the effect of restructuring on growth one year after the restructuring, but a more interesting question is whether such effects are persistent over time. To answer this question, in the spirit of the local projection methods in Jorda (2005), we run both our OLS and IV regressions using, as a dependent variable, cumulative per capita GDP growth up to five years after the restructuring date for our full sample (Table 3) and for the restricted sample of countries that have restructured (Table 4). We focus on a five-year window after restructuring as countries in our sample are characterized by substantial growth volatility that makes it difficult to identify any growth effect of restructuring over longer horizons. Results confirm that sovereign debt restructurings are in general negative for growth (with an average annual loss of 1.5 percent of GDP over a five-year period), while final restructurings are not so bad for growth (with an average annual increase of ¼ percent of GDP over a five-year period following the restructuring). However, the positive effect of final restructurings on growth fades away after about four years in the full sample OLS

[21] As noted above, the government effectiveness measures is on a scale of -2.5 (bad) to +2.5 (good), and one standard deviation is about 1. One standard deviation improvement in the index from the average would imply moving from the 57th percentile of the distribution to the 82nd percentile.

[22] Our equation (2) does not include institutional quality indices because institutional quality tends to be persistent over short periods of time (such as around restructuring episodes). Therefore, it should not affect cyclical growth, and differences between countries in institutional quality are likely captured by country-fixed effects. Moreover, the limited coverage of institutional quality indices would reduce our observations by more than 60 percent in the full sample regression and about 80 percent in the restricted sample.

[23] For the matching method, Table 2 reports results based on the nearest neighbor matching method. For this method, we obtain very similar results with and without bootstrapping the standard errors (reported results are based on 1,000 bootstrapping). The evidence is weaker and the final restructuring dummy coefficient has the correct sign but is not significant when using other matching criteria (i.e., radius matching, kernel matching, or stratification matching).

regression and after five years in the restricted sample. The IV regressions confirm these results, although in this case, the positive effect of final restructuring is much more short-lived (lasting only one year) in the full sample, and lasts three years in the restricted sample. However, even in this case, at the margin, a final restructuring has a much less negative impact of growth. Since the links between growth and debt restructuring cannot be accounted for by preexisting economic conditions in the restructuring country, our results suggest that final restructurings lead to higher growth, although the effect disappears over time.

C. Robustness Checks

In this section, we further test our results on causality by performing an event study in the same spirit as Reinhart and Trebesch (2016). In particular, we restrict our attention to subsamples of restructuring episodes for which we can identify a centrally orchestrated debt relief event or an external trigger, independent of country-specific economic circumstances. In principle, this would make the timing of the restructuring exogenous to country growth performance. We focus on two events. First, we look at the Brady debt relief initiative introduced by the US Treasury in the early 1990s, involving sixteen countries. In an attempt to expand our robustness check to a larger subsample of restructurings, we look at cases of final restructurings with external private creditors that follow Paris Club debt reliefs. Paris Club debt relief includes an equal treatment clause that requires private sector creditors to follow suit and reach an arrangement in line with the official sector restructuring, triggering a restructuring with private creditors. In both instances, the timing of restructuring with private creditors (and in some instances, the amount of debt relief) can, to a large extent, be assumed as exogenous to the growth performance of the country involved.

Once the exogenous event is identified, we run a standard difference-in-difference regression of the following type:

$$y_{i,t+1} = c + \gamma_i + \beta_0 \text{dummy}_{time} + \beta_1 \text{dummy}_{time\ t} \text{ X dummy}_{treat\ i,t} + \beta_1 HC_{i,t} + \beta_{dom}[X_{i,t\rightarrow t-3}] + \beta_{ext}[Z_{t+1}] \qquad (3)$$

In equation (3), we replace the previously used dummy for final restructurings with two new dummies. The first dummy takes the value of one after the treatment occurs (time dummy) and controls for common (to all countries) time effects in the ten years (t) following the common restructuring event. The second dummy is a cross-product dummy that takes the value one over the ten years we are interested in only for countries (i) that participated in the debt operation (time multiplied by treatment dummies). The coefficient of this cross dummy is the parameter of interest as it captures whether or not treated countries (i.e., those that restructured) recorded higher growth rates in the aftermath of the restructuring. To run regression (3), we need to make a choice about three issues: the timing of the common event, the treatment, and the control groups.[24]

[24] It is worth noting that equation (3) includes country fixed effects that capture possible non-time dependent differences between the treatment and control groups.

In the case of the Brady Plan, we follow Reinhart and Trebesch (2016) and use the 1990 Mexico agreement as the treatment year (the first year with an actual Brady agreement) and limit our treatment group to the 13 Brady agreements that involved EM economies.[25] Our baseline counterfactual includes our entire dataset (i.e., countries that defaulted or did not default in the 10 years after the Mexico deal for which we have data, 65 countries).

Difference-in-difference regressions for the Brady Plan cases support our earlier findings. The treatment coefficient of the multiplicative dummy in Table 5 (column (1)) is positive and significant, indicating that the Brady debt relief operation, on average, translated into 1.3 percentage points higher yearly growth for the 13 EM Brady countries over the ten following years, compared with the counterfactual. Our results are not affected qualitatively by the chosen counterfactual. They hold if we restrict our control group to EM that did not restructure over our period of interest (1990-2000), or to middle-income countries over the period 1980-2000 (i.e., 10 years before and after the first Brady event) (Table 5, column 2).

Finally, we expand our event study and explore whether final restructurings with private creditors preceded by Paris Club agreements have had a positive effect on growth. In equation (3), the cross dummy takes the value of one in the five (ten) years after a Paris Club agreement and if a final restructuring with private creditors is reached within the following three years (treat), and zero otherwise.[26] In this case, the treatment year is the year of the Paris Club debt relief and varies across countries. The main advantage of looking at Paris Club debt reliefs is that our treated group expands significantly, covering 55 restructuring episodes over the period 1970-2010. In this case, we use as control groups both our full sample of countries and, as alternative, all countries that have had at least one Paris Club restructuring (417 cases) whether or not they are followed by a private sector deal (Table 6, Paris Club restricted sample). This latter control group allows us to compare growth after restructurings following Paris Club agreement with the performance of countries that share the same characteristic of having reached a Paris Club agreement over the sample period.

As in the Brady initiative, final restructurings preceded by Paris Club agreements have a positive and significant effect on growth (Table 6, columns 1-2), leading to about 1 percentage point, on average, higher annual growth in the five (and ten) years following the Paris Club agreement. Results remain substantially unchanged if we modify the control group, restricting it only to countries with Paris Club deals (Table 6, columns 3-4) and to

[25] The first deal under the Brady initiative was Mexico, which was announced in February 1990. The Mexico agreement became the blueprint for subsequent restructurings. 16 Brady bond arrangements were finalized during the 1990s, of which 13 involved middle-income EM economies: Argentina (1993), Brazil (1994), Bulgaria (1994), Costa Rica (1990), Dominican Republic (1994), Ecuador (1995), Jordan (1993), Mexico (1990), Panama (1996), Peru (1997), Poland (1994), Uruguay (1991), Venezuela (1990). Following Reinhart and Trebesch (2016), we use 1990 as the treatment year for all cases.

[26] The choice of the 3-year window intends to capture restructurings with private sector creditors that are not too far from the Paris Club deals to avoid capturing restructurings that may depend on the debtor country growth performance. Modifying the 3-year window changes the results only marginally, leaving our conclusions unchanged. Moreover, given that we use annual data, we do not consider private sector restructurings occurring in the same year of a Paris Club restructuring, as it is not possible to know which restructuring occurred first.

countries that did not restructure over the period 1970-2010 (results not reported). The fit improves if we restrict the control group to middle-income countries and to the period 1980-2000 (i.e., 10 years before and after the relevant Paris Club event) (results available on request).

Both of our event studies, although using different subsets of restructuring episodes (13 Brady cases and 55 Paris Club agreement cases), support our earlier results that final restructurings have a positive effect on growth.

V. Debt Reduction, Debt Level and Growth Performance

While final restructurings allow countries to exit default and supposedly resolve debt sustainability issues, it is not clear whether this is sufficient to revive growth prospects, or whether specific features of these restructurings matter for growth. In this section, we explore features that could make final restructurings better for growth. In particular, we look at whether the size of debt relief and the post-restructuring debt level matter. While this is only one of the possible channels, the extensive debt overhang literature suggests that countries with public debt ratios above certain thresholds experience lower long-term growth performance than other countries.[27]

Final restructurings differ from non-final restructurings in two main respects. First, on average, countries enter final and non-final restructurings with similar debt-to-GDP ratios, but the debt ratio after final restructurings is, on average, lower than before restructuring, while the ratio increases in case of non-final restructurings (Figure 5). Second, and not surprisingly, final restructurings carry NPV debt relief about three times larger, on average, than non-final restructurings, often involving face value reductions (reductions in the nominal value of debt) (Figure 6). These features suggest that both debt relief and post restructuring debt levels may matter for final restructurings to have a positive effect on growth.

To examine the role of debt relief on growth, we follow our approach above and estimate equation (2) where various measures of debt relief size replace the final restructuring dummy.[28] Regression results suggest that larger debt relief leads to better post restructuring growth performance. Simple OLS regressions (Table III.1, columns 1-2) show that both measures of debt relief have a positive and significant coefficient, with a 10 percent NPV debt reduction associated with 1.2 percent higher growth (0.5 percent for 10 percent haircuts) in the first year after the restructuring. Instrumental regressions broadly confirm the OLS findings (Table III.1, columns 3-4). Finally, our event study strategy with a difference-in-

[27] See, for example, Kumar and Woo (2010) and Reinhart and Rogoff (2010). This literature mainly focuses on long-term growth dynamics.

[28] For our analysis, we use two measures of debt relief. First, we consider the size of the haircut in NPV terms (i.e., size of the haircut). Second, we look at the NPV debt reduction expressed as a percentage of the pre-restructuring stock of debt. This latter measure is defined as the haircut at time *t* multiplied by the debt involved, and divided by total public debt in year *t-1* (the years before the restructuring). This measure of debt relief has the advantage of taking into account that haircuts only apply to a fraction of existing debt.

difference specification also supports the finding that larger debt relief leads to better post restructuring growth performance (see Appendix III for detailed results).

As the size of debt relief matters for growth, it is interesting to examine whether the post restructuring debt level that the debt relief delivers also matters. Given that post restructuring debt ratios are endogenous to economic conditions, our approach is to look at the impact on growth of a given amount of debt relief for countries that entered a final restructuring event with different debt ratios. The idea is that, all else equal (in particular, the size of debt relief), countries entering a final restructuring with low (high) debt ratios would register relatively low (high) post restructuring debt ratios. Following the debt overhang literature, we would expect the effect of debt restructuring on growth to be larger when countries start (and therefore end) the restructuring with relatively lower debt ratios.

Using a simple, although somewhat crude, approach to study whether the debt ratio plays any role in determining the effect of debt relief on growth, we split our sample of final restructurings into cases with "high" and "low" pre restructuring debt levels (around the median). Specifically, we restrict our focus to final debt restructuring episodes involving face value reductions, as these directly reduce the nominal value of debt, and we split these episodes into high and low initial debt around the median debt level (86 percent of GDP for final restructurings with face value reductions). For these two groups, the average debt reduction is similar (about 10 percent for final restructurings with an initial debt ratio below the median initial debt and 12 percent for those above the median). However, the average starting debt level is very different for the two groups: 61 and 177 percent of GDP below and above the median, respectively. Therefore, on average, these two groups of countries enter final restructurings with very different debt levels while receiving similar amounts of debt relief, which will result in different debt levels after restructuring.

The initial debt ratio plays an important role in explaining how significant debt relief is for post-restructuring growth (Table 7). We find that the amount of debt relief has a significant and persistent positive effect on growth when the initial debt ratio is relatively low (below the median). Moreover, there is no significant effect on growth when the initial debt level is high (above median). We also test for the hypothesis that the estimated coefficients for the low and high debt cases do not differ and reject this possibility at the 10 percent significant level, corroborating our results that debt relief has a bigger impact on growth when the starting level of debt is low. We obtain similar results when we restrict the sample to observations within the 11-year window around a restructuring, and if we focus on large final restructuring episodes (i.e., excluding the bottom quartile of NPV debt reduction) with and without face value reductions.

Our results on the debt level should be interpreted cautiously, as our sample is limited to about 50 restructurings cases (60 cases if we focus on the top 75 percentile final NPV debt reductions). The limited number of observations also prevents us from running meaningful IV regressions for these specifications.

Overall, our findings lend support to the hypothesis that addressing debt sustainability is different from reducing the negative impact that high debt levels may have on a country's

growth. Final restructurings allow countries to exit default, helping to reestablish debt sustainability, but they only have an effect on growth if they leave countries with relatively low debt.

VI. CONCLUSION

Governments often enter debt restructuring operations in difficult economic situations and expect that solving their debt crisis can help improve the country's macroeconomic performance. However, economic theory is ambiguous as to whether sovereign debt restructurings are beneficial (or costly) for growth of debtor countries and empirical studies are inconclusive.

The central finding of this paper is that sovereign debt restructurings with external private creditors can affect per capita GDP growth performance in the years after debt restructuring. We establish this causal link using different techniques, including instrumenting our regressions and conducting difference-in-difference regressions with various identification strategies to account for reverse causality problems and employing nonparametric propensity scoring matching methods to account for possible selection biases. These approaches together provide a reliable framework for establishing a causal effect from debt restructuring to growth performance, in that growth is not explained by preexisting economic conditions.

We find that there are bad and good (or "not so bad") debt restructurings for growth. Growth generally declines following a debt restructuring operation; however, restructurings that allow countries to exit a default spell (i.e., final restructurings) lead to significant improvements in growth performance in the aftermath of the debt operation, with the effect being persistent over time. Final restructurings are good for growth because they reduce countries' debt (in NPV terms), and the lower the post restructuring debt is, the better the post restructuring growth performance for any given level of debt relief.

These results suggest that there is a difference between addressing debt sustainability and debt overhang issues. While final restructurings supposedly address immediate debt sustainability issues and allow a country to exit default, they are important for growth if they address countries' debt overhang issues and leave the country with a relative low debt ratio. These results can help to inform the policy debate concerning what to expect from different forms of restructuring.

While our results help to shed light on the economic impact of sovereign debt restructurings, a number of theoretical and policy questions remain for future research. For instance, future research could delve deeper into the channels that drive growth performance in the aftermath of debt restructurings and assess the issue of creditor residence for which new databases should be constructed. Moreover, there is ample scope to examine the connection between public- and private creditor- driven debt relief.

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APPENDIX I. DEFINITIONS AND DATA SOURCES

This appendix defines the main variables used in the paper and identifies data sources.

Sovereign debt default: Standard &Poor's (SP) default database, 1950-2012, and Global Development Finance (GDF) database, 2006-2012.

SP defines default as "the failure to meet a principal or interest payment on the due date (or within the specified grace period) contained in the original terms of a debt issue or the event that the government tenders an exchange offer of new debt with less-favorable terms than the original issue".[29] The SP database provides default information until 2006, and from 2007, it provides information only for rated countries. For events post-2006 in non-rated countries, we use GDF information on the status of interest and principle arrears on external long-term debt (maturity over 1 year) due to private creditors.[30]

Sovereign debt restructuring: Cruces and Trebesch (2013) (CT) database. Sovereign debt restructurings can include three possible elements:

- *Debt rescheduling*, which can be defined as a lengthening of maturities of the old debt, possibly involving lower interest rates. Debt rescheduling implies debt relief, as it shifts contractual payments into the future.
- *Debt reduction*, which can be defined as a reduction in the face (nominal) value of the old instruments. Deals with outright face-value reductions are not very common.
- *Debt buybacks*, in which outstanding debt instruments are exchanged against cash, often at a discount.

CT focus on sovereign debt restructurings, defined as restructurings of public or publicly guaranteed debt with foreign private creditors. A number of features characterize this dataset:

- Debt restructurings that predominantly affected domestic creditors and those affecting official creditors, including when negotiated under the chairmanship of the Paris Club, are excluded. Foreign creditors include foreign commercial banks (i.e. "London Club" creditors) as well as foreign bondholders. For recent deals, CT follow the

[29] SP also provides information on both external and domestic defaults. Compared with foreign currency debt, the frequency of default on local currency sovereign debt is low. Based on SP data, of the 28 sovereigns defaulting on their local currency debt, 12 previously defaulted on their foreign currency debt. On the other hand, a majority of sovereigns (61) continued servicing local currency debt without interruption after defaulting on foreign currency debt.

[30] Debt to private creditors include bonds that are either publicly issued or privately placed; commercial bank loans from private banks and other private financial institutions; and other private credits from manufacturers, exporters, and other suppliers of goods, and bank credits covered by a guarantee of an export credit agency.

categorization of domestic and external debt exchanges of Sturzenegger and Zettelmeyer (2007, p. 263). Therefore, two domestic debt restructurings are explicitly included, as they mainly involved external creditors: Russia's July 1998 GKO exchange and Ukraine's August 1998 exchange of OVDP bonds.

- The dataset focuses on distressed debt exchanges (i.e., including debt rescheduling, reduction and buybacks), defined as restructurings of bonds (and/or bank loans) at less favorable terms than the original bond (loan), following Standard & Poor's (2006, 2010).[31] Restructurings that are part of routine sovereign liability management such as debt swaps and buybacks in normal times are disregarded.

- The sample is confined to medium and long-term debt restructurings only, although it includes cases in which short-term debt is exchanged into debt with a maturity of more than one year.

- Only restructurings that are actually implemented are regarded, thus ignoring cases in which negotiations where never concluded or in which an agreement in principle or an exchange offer were never finalized.

Between 1970 and 2010, there are 180 restructurings with private creditors that can be divided into the following: 123 pure rescheduling deals and thus limited to an extension of maturities, 57 restructuring implying a face-value reduction, and 26 buybacks. In our annual data, we consider 168 cases after dropping restructurings occurring in the same year.

Currency and Banking Crises: Laeven and Valencia (2012) (LV) database. LV database collects information on systemic banking crisis, defined by the coincidence of two conditions: (i) significant signs of financial distress in the banking system (significant bank runs, losses in the banking system, and/or bank liquidations), and (ii) significant banking policy intervention measures in response to significant losses in the banking system. Policy interventions are considered significant if at least three out of the following six measures have been used: extensive liquidity support (5 percent of deposits and liabilities to nonresidents), bank restructuring gross costs (at least 3 percent of GDP), significant bank nationalizations, significant guarantees put in place, significant asset purchases (at least 5 percent of GDP), or deposit freezes and/or bank holidays.

LV define currency crisis as a nominal depreciation of the currency vis-à-vis the U.S. dollar of at least 30 percent that is also at least 10 percentage points higher than the rate of depreciation in the year before.

[31] Standard and Poor's. (2006, 2010).

Table I.1 Macroeconomic Variables

Variable description	Source	Definition
Public Debt	Reinhart and Rogoff (2010), Abbas et al. (2010)	Central government debt data as from Reinhart and Rogoff (2010). Data integrated with information from Abbas et al (2010)'s historical database for countries not covered in Reinhart and Rogoff (2010). Note that Abbas et al (2010) report central government debt data, but, for the most recent years, include WEO data on general government.
Nominal GDP	World Economic Outlook	
Real GDP	Penn World Tables	
Exchange Rates	World Economic Outlook	
World Real GDP Growth	World Economic Outlook	
US Short-Term Deposit Rate	World Economic Outlook	Deposit rate refers to rates offered to resident customers for demand, time, or savings deposits.
10 year yields	Dias, D. A., C. Richmond, and M. L. J. Wright, (2013)	Country-specific 10-year interest rates are proxied by high-yield US corporate yields based using credit ratings.

APPENDIX II. CHARACTERISTICS OF RESTRUCTURING EVENTS, 1970-2010

Table II.1 Selected Characteristics of Restructuring Events, 1970-2010

					Cumulative debt relief 1/ % of GDP			
Country	Default period	Number of restructuring deals within default episode	Years since default until first restructuring deal	Years since default until final restructuring deal	By restructuring	Total	% of total debt	Cumulative face value reduction in % of GDP
Albania	1991-1995	1	5	5	14.8 (1996*)	14.8	21.3	10.1
Algeria	1991-1996	2	2	6	0.3 (1992), 1.6 (1996)	1.9	1.2	
Argentina	1982-1993	3	4	12	3.4 (1986), 5.9 (1988), 3.9 (1993*)	13.2	28.9	1.1
Argentina	2001-2005	1	5	5	25.7 (2005*)	25.7	24.3	9.8
Belize	2006-2007	1	2	2	9.5 (2007)	9.5	10.7	
Bolivia	1986-1997	2	3	8	9.5 (1988*), 2.3 (1993*)	11.8	8.0	10.9
Bosnia and Herzegovina	1992-1997	1	6	6				
Brazil	1983-1994	6	1	12	-0.3 (1983), 0.1 (1984), 0.5 (1986), 3.5 (1988), 0.6 (1992), 2.3 (1994*)	6.7	9.0	0.7
Bulgaria	1990-1994	1	5	5	55.6 (1994*)	55.6	32.7	30.7
Cameroon	1985-2003	2	18	19	4.7 (2002*), 5.0 (2003*)	9.7	13.0	9.7
Chile	1983-1990	5	1	8	0.1 (1983), 0.5 (1984), 10.1 (1986), 3.8 (1987), 3.3 (1990)	17.8	27.1	
Congo, Demogratic Republic of	1976-2010^	7	5	14	0.8 (1980), 0.2 (1983), 0.2 (1984), 0.3 (1985), 0.3 (1986), 0.2 (1987), 0.3 (1989)	2.3	4.5	
Congo, Republic of	1983-2010^	1	25	25	22.7 (2007*)	22.7	24.9	19.0
Costa Rica	1981-1990	3	3	10	7.6 (1983), 4.0 (1985), 17.4 (1990*)	29.0	28.1	11.4
Cote d'Ivoire	1983-1998	1	16	16	31.5 (1998*)	31.5	34.0	30.2
Cote d'Ivoire	2000-2010^	1	11	11	7.1 (2010*)	7.1	10.9	2.6
Croatia	1992-1996	1	5	5	0.4 (1996)	0.4	1.5	
Dominca	2003-2005	1	2	2	21.6 (2004*)	21.6	23.3	6.0
Dominican Republic	1982-1994	2	5	13	5.2 (1986), 3.9 (1994*)	9.1	21.3	3.1
Dominican Republic	2005	1	1	1	0.2 (2005)	0.2	1.5	
Ecuador	1982-1995	4	2	14	0.4 (1983), 0.1 (1984), 3.4 (1985), 12.9 (1995*)	16.8	23.6	5.0
Ecuador	1999-2000	1	2	2	13.7 (2000*)	13.7	12.7	12.2
Ecuador	2008-2009	1	2	2	3.7 (2009*)	3.7	14.1	3.8
Ethiopia	1991-1999	1	6	6	2.4 (1996*)	2.4	1.7	2.4
FYR Macedonia	1992-1997	1	6	6	2.1 (1997)	2.1	7.3	
Gabon	1986-1994	2	2	9	0.1 (1987), 0.7 (1994)	0.8	1.0	
Gambia, The	1986-1990	1	3	3	2.7 (1988)	2.7	2.3	
Grenada	2004-2005	1	2	2	10.2 (2005)	10.2	12.6	
Guinea	1986-1988	1	3	3	0.5 (1988)	0.5		
Guinea	1991-1998	1	8	8	0.3 (1998*)	0.3	0.4	0.3
Guyana	1982-2010^	2	11	18	13.8 (1992*), 4.6 (1999*)	18.4	3.7	18.4
Honduras	1981-2005	2	9	21	1.6 (1989), 0.1 (2001*)	1.7	1.4	0.1
Iraq	1987-2006	1	20	20	24.3 (2006*)	24.3		22.2
Jamaica	1978-1979	2	1	2	0.1 (1978), 0.2 (1979)	0.3	0.4	
Jamaica	1981-1985	3	1	5	0.5 (1981), 1.4 (1984), 5.9 (1985)	7.8	4.9	
Jamaica	1987-1993	2	1	4	3.5 (1987), 3.1 (1990)	6.6	5.8	
Jordan	1989-1993	1	5	5	12.7 (1993*)	12.7	8.8	6.7
Kenya	1994-1998	1	5	5	0.3 (1998*)	0.3	0.5	0.2

Country	Default period	Number of restructuring deals within default episode	Years since default until first restructuring deal	Years since default until final restructuring deal	Cumulative debt relief 1/ % of GDP By restructuring	Total	% of total debt	Cumulative face value reduction in % of GDP
Liberia	1981-2009	1	2	2				
Madagascar	1981-2002	4	1	10	0.8 (1981), 2.7 (1984), 0.3 (1987), 0.8 (1990)	4.6	5.2	
Malawi	1988	1	1	1	1.0 (1988)	1.0	1.0	
Mauritania	1992-1996	1	5	5	3.3 (1996*)	3.3	2.1	3.3
Mexico	1982-1990	5	2	9	0.4 (1983), 0.8 (1985), 5.8 (1987), 1.0 (1988*), 5.8 (1990*)	13.8	19.0	3.0
Moldova	2002	1	1	1	0.9 (2002)	0.9	1.2	
Morocco	1986-1990	3	1	5	0.7 (1986), 2.8 (1987), 5.0 (1990)	8.5	9.1	
Mozambique	1983-1992	2	5	9	5.1 (1987), 4.1 (1991*)	9.2		4.1
Nicaragua	1979-2007	5	2	17	8.3 (1980), 4.3 (1981), 2.3 (1982), 1.5 (1984), 24.4 (1995*)	40.8	24.5	24.4
Niger	1983-1991	3	2	9	0.7 (1984), 1.3 (1986), 3.9 (1991*)	5.9	10.2	3.9
Nigeria	1982-1992	6	2	10	0.1 (1983), -0.1 (1984), 3.7 (1987), 2.1 (1988), 7.5 (1989), 8.3 (1991*)	21.6	16.6	
Pakistan	1998-1999	1	2	2	0.3 (1999)	0.3	0.3	
Panama	1983-1996	3	3	14	1.3 (1985), 0.9 (1994), 14.7 (1996*)	16.9	22.6	0.3
Peru	1980	1	1	1	-0.1 (1980)	-0.1	-0.2	
Peru	1983-1997	2	1	15	0.1 (1983), 11.4 (1997*)	11.5	32.7	6.1
Philippines	1983-1992	4	4	10	4.2 (1986), 4.1 (1987), 1.9 (1990*), 1.9 (1992*)	12.1	22.6	2.0
Poland	1981-1994	7	2	14	3.4 (1982), 0.8 (1983), 0.5 (1984), 1.0 (1986), 3.0 (1988), 0.0 (1989), 6.4 (1994*)	15.1		4.2
Romania	1981-1983	2	2	3	1.0 (1982), 0.4 (1983)	1.4		
Romania	1986	1	1	1	0.2 (1986)	0.2		
Russian Federation	1991-2000	3	7	10	2.0 (1997), 1.2 (1999*), 6.5 (2000*)	9.7	20.7	5.0
Sao Tome and Principe	1987-1994	1	8	8	6.9 (1994*)	6.9		6.9
Senegal	1981-1985	2	4	5	0.8 (1984), 0.2 (1985)	1.0	1.4	
Senegal	1990	1	1	1	0.2 (1990)	0.2	0.4	
Senegal	1992-1996	1	5	5	1.5 (1996*)	1.5	1.9	1.5
Serbia	1992-2004	1	13	13	8.1 (2004*)	8.1	12.6	6.8
Seychelles	2008-2010	1	3	3	18.5 (2010*)	18.5	17.1	16.4
Sierra Leone	1986-1995	1	10	10	23.8 (1995*)	23.8	9.4	23.8
Slovenia	1992-1996	1	4	4	0.1 (1995)	0.1	0.9	
South Africa	1985-1987	1	3	3	1.1 (1987)	1.1	4.4	
South Africa	1989	1	1	1	1.0 (1989)	1.0	3.1	
South Africa	1993	1	1	1	0.8 (1993)	0.8	2.3	
Sudan	1979-2010^	1	7	7	8.3 (1985)	8.3		
Tanzania	1984-2004	1	21	21	1.1 (2004*)	1.1		1.1
Togo	1988	1	1	1	1.5 (1988)	1.5	1.9	
Togo	1991-1997	1	7	7	4.3 (1997*)	4.3	4.7	4.3
Trinidad and Tobago	1988-1989	1	2	2	1.6 (1989)	1.6	3.1	
Turkey	1978-1979	1	1	1	.5 (1979)	0.5	3.3	
Turkey	1982	1	1	1	.4 (1982)	0.4	2.0	
Uganda	1980-1993	1	14	14	4.1 (1993*)	4.1	3.9	4.1
Ukraine	1998-2000	3	1	3	0.2 (1998), -0.0 (1999*), 0.9 (2000*)	1.0	1.9	0.7
Uruguay	1983-1985	1	1	1	0.1 (1983)	0.1	0.1	
Uruguay	1990-1991	1	2	2	3.4 (1991*)	3.4	6.9	2.1
Uruguay	2003	1	1	1	2.5 (2003)	2.5	2.4	

Country	Default period	Number of restructuring deals within default episode	Years since default until first restructuring deal	Years since default until final restructuring deal	Cumulative debt relief 1/ % of GDP			Cumulative face value reduction in % of GDP
					By restructuring	Total	% of total debt	
Venezuela	1983-1988	2	4	6	3.3 (1986), 1.4 (1988)	4.7	13.1	
Venezuela	1990	1	1	1	14.9 (1990*)	14.9	22.9	2.8
Vietnam	1985-1998	1	13	13	1.5 (1997*)	1.5	1.7	0.8
Yemen	1985-2001	1	17	17	6.0 (2001*)	6.0	9.9	6.0
Zambia	1983-1994	1	12	12	15.1 (1994*)	15.1	8.6	15.1
Average, all episodes		1.8	4.9	7.3		8.7	10.1	7.8
Median, all episodes		1.0	3.0	5.5		5.3	6.9	4.3

Sources: Standard and Poor's (2006), Moody's (2015), Cruces and Trebesch (2013), and authors' estimates.
Notes: ^ indicates default episode not ended as of 2010; * denotes year in which restructuring included face value debt reduction (possibly along with reprofiling as well); 1/ calculated as the sum of US$ equivalent NPV reductions (NPV haircut times US$ amount of debt involved) across all restructuring episodes within each default episode. For each restructing event, the US$ reduction is scaled by either GDP of the same year or stock of public debt (domestic and external) as of the end of the previous year.

APPENDIX III. DEBT REDUCTION AND GROWTH PERFORMANCE

This appendix presents results reported in section V on the impact of debt relief on growth for final debt restructuring episodes.

We examine causality linkages using equation (2), where two different measures of debt relief replace the final restructuring dummy. Following the approach of Section IV, we then run OLS, instrumental variable and restricted sample regressions to deal with endogeneity and selection bias issues. As measure of debt relief, first, we consider the size of the haircut in NPV terms (i.e., size of the haircut). Second, we look at the NPV debt reduction expressed as a percentage of the pre-restructuring stock of debt. This latter measure is defined as the haircut at time *t* multiplied by the debt involved, and divided by total public debt in year *t-1* (the year before the restructuring). This measure takes into account that haircuts only apply to a fraction of existing debt and provides the NPV debt reduction that directly affects a country's debt burden.

Regression results suggest that larger debt relief leads to better post-restructuring growth performance. The simple OLS regressions (Table III.1, columns 1-2) show that both our measures of debt relief have a positive and significant coefficient, with a 10 percent debt reduction associated with 1.2 percent higher growth (0.5 percent for 10 percent haircuts) in the first year after the restructuring.

Instrumental regressions (Table III.1, columns 3-4) confirm our OLS findings. We use two new instruments for our measures of debt relief: the average haircut by distance from default (Figure III.1) and the average debt relief by distance from default (Figure III.1) for the size of haircut and the debt relief variables, respectively. These instruments should help to address possible endogeneity issues related to the timing and the size of the restructuring.[32] First stage regressions for both instruments are supportive of a strong correlation between the instruments and the instrumented variables. The IV regressions show that 10 percent debt relief improves growth in the year after restructuring by an even larger amount (3.2 percent for NPV debt relief and 0.6 percent for haircuts).

Results are similar, although less significant, when we restrict our sample to the eleven years around the restructuring (Table III.1, columns 5-6). The initial positive effects of debt relief on growth are persistent over time (Table III.2). Based on our preferred IV specification, on average, 10 percent NPV debt reduction improves cumulative growth in the five years after restructuring by more than 6 percentage points. In the sample restricted to countries that have restructured, within the 11-year window around a restructuring the coefficient on debt relief is not significant in the year following a restructuring, but it becomes significant at the 10 percent level in the second and third years after the restructuring.

Following the approach of section IV, we also test our results for reverse causality by performing an event study and running difference-in difference regressions as in equation

[32] First stage regressions are available from the authors upon request.

(3). Again, we focus on the Brady debt relief initiative of the 1990s. In this case, we replace the cross-product dummy in equation (3) with a variable that takes debt relief or haircut values over the ten years following the event. The coefficient of this variable is the parameter of interest as it captures how much higher growth rates are, on average, in countries undertaking a final restructuring in the years after the restructuring, compared with other countries in the sample as a function of debt relief or haircut values.

Difference-in-difference regressions support our findings that larger debt relief leads to better post-restructuring growth performance although with lower significance. The estimated coefficient of the cross variable for haircuts (Table 5, column (3)) is positive and significant, suggesting that a haircut of 10 percent translated on average into 2.1 percentage points higher annual growth over the following ten years. The coefficient for NPV debt reduction (Column (4)) is instead positive but not significant unless we limit the analysis to the restricted set.

Figure III.1 Average Haircut by Distance from Default (Final Restructurings)

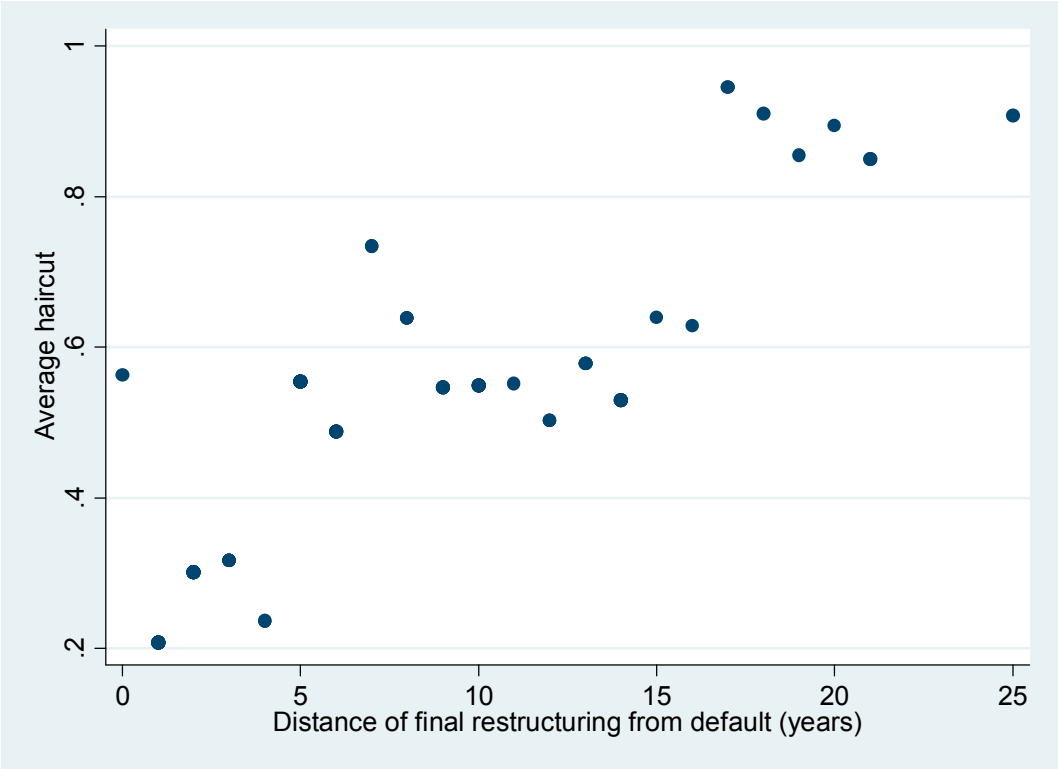


Figure III.2 Average NPV Debt Reduction by Distance from Default (Final Restructurings)

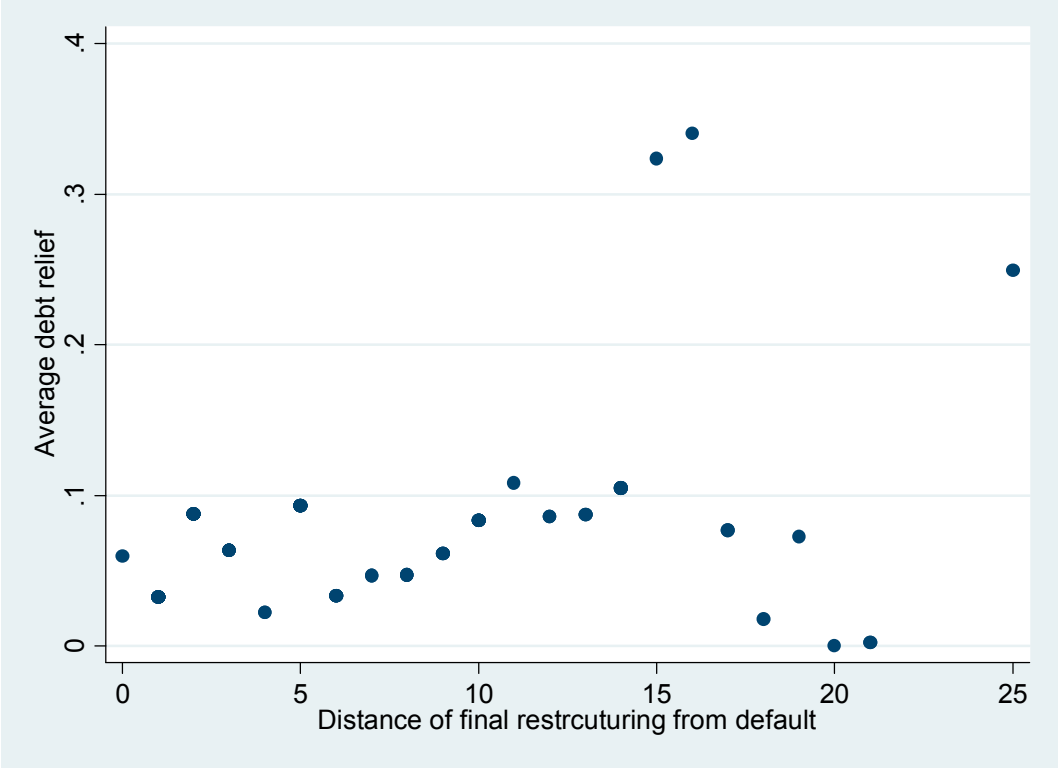


Table III.1 Debt Relief and Growth for Final Restructurings 1/

VARIABLES	OLS		IV		Restricted sample	
	(1)	(2)	(3)	(4)	(5)	(6)
Restructuring dummy in year *t*	-0.013**	-0.007	-0.018***	-0.020***	-0.009	-0.004
Size of haircut for final restructurings	0.047***	--	0.059***	--	0.046**	--
NPV debt reduction for final restructurings	--	0.119*	--	0.323***	--	0.122
Real GDP gap in year *t*	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
Debt to GDP ratio in year *t*	-0.079***	-0.081***	-0.078***	-0.079***	-0.062**	-0.065**
Banking Crisis in year *t+1*	-0.005	-0.004	-0.005	-0.004	0.000	0.004
Banking Crisis in year *t*	-0.024***	-0.024***	-0.024***	-0.024***	-0.012	-0.011
Currency Crisis in year *t+1*	-0.037***	-0.037***	-0.037***	-0.037***	-0.035***	-0.035***
Currency Crisis in year *t*	-0.019***	-0.020***	-0.019***	-0.019***	-0.018**	-0.018**
REER change in year *t*	-0.011***	-0.011***	-0.011***	-0.012***	-0.013**	-0.013**
REER change in year *t-1*	-0.016***	-0.016***	-0.017***	-0.017***	-0.014***	-0.014**
REER change in year *t-2*	-0.000	-0.000	-0.000	-0.001	-0.005	-0.005
US interest rate	-0.002***	-0.002***	-0.002***	-0.002***	-0.004***	-0.004***
World growth	0.007***	0.007***	0.007***	0.007***	0.004**	0.005**
Constant	0.005	0.005	0.005	0.005	0.009	0.009
Observations	1,711	1,711	1,711	1,711	516	516
R-squared	0.262	0.259	0.262	0.255	0.272	0.266
Number of ifs	65	65	65	65	38	38

1/ Restricted sample includes only countries that have restructured and covers observations within an 11-year window around a restructuring (i.e. five years before and after a restructuring).

Table III.2 Debt Relief and Growth for Final Restructurings: Effect over Time

VARIABLES	t+1 cumulative growth	t+2 cumulative growth	t+3 cumulative growth	t+4 cumulative growth	t+5 cumulative growth
			OLS		
Size of haircut for final restructurings	0.047***	0.068***	0.099***	0.103***	0.096***
NPV debt reduction for final restructurings	0.119*	0.223**	0.292**	0.305**	0.297*
			IV		
Size of haircut for final restructurings	0.059***	0.102***	0.145***	0.180***	0.168***
NPV debt reduction for final restructurings	0.323***	0.419***	0.581***	0.691***	0.654***
			Restricted sample		
Size of haircut for final restructurings	0.046**	0.053**	0.077***	0.072**	0.058*
NPV debt reduction for final restructurings	0.122	0.192*	0.245*	0.214	0.187

1/ The restricted sample includes only countries that have restructured and observations within an 11-year window around a restructuring (i.e. five years before and after a restructuring).

Table 2. Baseline Regressions

VARIABLES	(1) OLS	(2) OLS	(3) IV	(4) Restricted sample	(5) MM
Restructuring dummy in year *t*	-0.002	-0.013**	-0.019***	-0.011	--
Final restructuring dummy in year *t*	--	0.021**	0.020**	0.022**	0.024*
Real GDP gap in year *t*	-0.004***	-0.004***	-0.004***	-0.004***	--
Debt to GDP ratio in year *t*	-0.081***	-0.080***	-0.079***	-0.064**	--
Banking Crisis in year *t+1*	-0.004	-0.004	-0.004	0.003	--
Banking Crisis in year *t*	-0.024***	-0.024***	-0.024***	-0.012	--
Currency Crisis in year *t+1*	-0.037***	-0.037***	-0.037***	-0.035***	--
Currency Crisis in year *t*	-0.020***	-0.020***	-0.020***	-0.019**	--
REER change in year *t*	-0.011***	-0.011***	-0.011***	-0.013**	--
REER change in year *t-1*	-0.016***	-0.016***	-0.017***	-0.014***	--
REER change in year *t-2*	0.000	-0.000	-0.001	-0.005	--
US interest rate	-0.002***	-0.002***	-0.002***	-0.004***	--
World growth	0.007***	0.007***	0.007***	0.005**	--
Constant	0.005*	0.005	0.005	0.009	--
Observations	1,711	1,711	1,711	516	596
R-squared	0.258	0.261	0.260	0.269	--
Number of countries	65	65	65	38	51

Note: In order to improve the probit regression for the MM, we widen the set of regressors included in the baseline regression by adding the following variables: deposit money banks assets-to-GDP (a measure of the size of the banking sector; the Levine Financial Development and Structure Database); change in sovereign yields; change in US interest rate; change in the gross financial system claims on central government (percent of GDP); and the ICRG measure of default expectations. Because not all these variables are available for all countries/times, the number of observations decline when introducing these additional variables.

Table 3. Persistence of Growth Effects: Full Sample

VARIABLES	t+1 cumulative growth	t+2 cumulative growth	t+3 cumulative growth	t+4 cumulative growth	t+5 cumulative growth
			OLS		
Restructuring dummy in year *t*	-0.013**	-0.028***	-0.045***	-0.065***	-0.076***
Final restructuring dummy in year *t*	0.021**	0.035***	0.055***	0.064***	0.064***
			IV		
Restructuring dummy in year *t*	-0.019***	-0.034***	-0.055***	-0.076***	-0.086***
Final restructuring dummy in year *t*	0.020**	0.028**	0.047***	0.053***	0.057**
Observations	1,711	1,646	1,581	1,516	1,451
R-squared OLS	0.261	0.380	0.452	0.474	0.465
R-squared IV	0.260	0.379	0.451	0.473	0.464
Number of countries	65	65	65	65	65

Table 4.Persistence of Growth Effects: Restricted Sample 1/

VARIABLES	t+1 cumulative growth	t+2 cumulative growth	t+3 cumulative growth	t+4 cumulative growth	t+5 cumulative growth
			OLS		
Restructuring dummy in year *t*	-0.011	-0.016	-0.029**	-0.041***	-0.048***
Final restructuring dummy in year *t*	0.022**	0.031**	0.048***	0.053***	0.049***
			IV		
Restructuring dummy in year *t*	-0.016*	-0.018	-0.035**	-0.046***	-0.051***
Final restructuring dummy in year *t*	0.022**	0.025	0.044**	0.046**	0.048**
Observations	516	509	500	491	482
R-squared OLS	0.269	0.378	0.481	0.529	0.555
R-squared IV	0.268	0.376	0.480	0.528	0.555
Number of countries	38	38	38	38	38

1/ The restricted sample includes only countries that have restructured and covers observations within the 11-year window around restructurings (i.e. five years before and after a restructuring).

Table 5. Brady Bonds Restructurings: Difference in Difference Regressions 1/

VARIABLES	(1) Brady timing	(2) Brady timing restricted sample	(3) Brady haircut	(4) Brady debt relief	(5) Brady haircut restricted sample	(6) Brady debt relief restricted sample
1991-2000 dummy	0.004*	0.013***	0.005**	0.005**	0.014***	0.014***
Brady countries x 1991-2000 dummy	0.013**	0.018*				
Brady countries haircut x 1991-2000 dummy			0.021*		0.034	
Brady countries debt relief x 1991-2000 dummy				0.036		0.112*
Real GDP gap in year *t*	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***	-0.004***
Debt to GDP ratio in year *t*	-0.086***	-0.067**	-0.087***	-0.088***	-0.068**	-0.070**
Banking Crisis in year *t+1*	-0.005	0.009	-0.005	-0.005	0.009	0.009
Banking Crisis in year *t*	-0.025***	-0.011	-0.025***	-0.025***	-0.011	-0.011
Currency Crisis in year *t+1*	-0.037***	-0.024***	-0.038***	-0.038***	-0.025***	-0.024***
Currency Crisis in year *t*	-0.020***	-0.010	-0.020***	-0.020***	-0.010	-0.009
REER change in year *t*	-0.011***	-0.015***	-0.011***	-0.011***	-0.015***	-0.015***
REER change in year *t-1*	-0.016***	-0.021***	-0.016***	-0.016***	-0.020***	-0.020***
REER change in year *t-2*	0.001	-0.005	0.001	0.001	-0.005	-0.005
US interest rate	-0.002***	-0.001	-0.002***	-0.002***	-0.001	-0.001
World growth	0.007***	0.003	0.007***	0.007***	0.003	0.003
Constant	0.003	-0.001	0.003	0.003	-0.000	-0.001
Observations	1,711	549	1,711	1,711	549	549
Number of countries	65	36	65	65	36	36
R-squared	0.264	0.253	0.263	0.262	0.252	0.252

1/ The sample is restricted to middle-income countries over the period 1980-2000, i.e., 10 years before and after the first Brady event.

Table 6. Paris Club and Private Sector Restructurings 1/

	(1)	(2)	(3)	(4)
	Full sample		Restricted control group	
VARIABLES	5 years	10 years	5 years	10 years
All PC restrcuturing (five years)	0.001		0.001	
PC restrcuturing followed by a final restructuring (five years)	0.011***		0.011**	
All PC restrcuturing (ten years)		0.006		0.006
PC restrcuturing followed by a final restructuring (ten years)		0.010***		0.010**
Real GDP gap in year *t*	-0.004***	-0.004***	-0.004***	-0.004***
Debt to GDP ratio in year *t*	-0.084***	-0.081***	-0.083***	-0.080***
Banking Crisis in year *t+1*	-0.005	-0.004	0.002	0.003
Banking Crisis in year *t*	-0.024***	-0.024***	-0.016*	-0.015*
Currency Crisis in year *t+1*	-0.037***	-0.037***	-0.033***	-0.031***
Currency Crisis in year *t*	-0.020***	-0.020***	-0.013*	-0.013*
REER change in year *t*	-0.011***	-0.011**	-0.010*	-0.009*
REER change in year *t-1*	-0.016***	-0.016***	-0.012**	-0.012**
REER change in year *t-2*	0.001	0.001	-0.000	-0.000
US interest rate	-0.002***	-0.002***	-0.004***	-0.004***
World growth	0.007***	0.007***	0.007***	0.007***
Constant	0.004	0.001	0.003	-0.004
Observations	1,711	1,711	851	851
Number of countries	65	65	35	35
R-squared	0.262	0.265	0.255	0.260

1/ Restricted sample includes countries with Paris Club deals over the period 1970-2010.

Table 7. Debt Relief, Debt Level and Growth Performance for Final Restructurings 1/

VARIABLES	t+1 cumulative growth	t+2 cumulative growth	t+3 cumulative growth	t+4 cumulative growth	t+5 cumulative growth
			Full sample		
Debt relief starting from low debt	0.228**	0.391**	0.445**	0.401*	0.448*
Debt relief starting from high debt	0.084	0.137	0.242*	0.303*	0.283
			Restricted sample		
Debt relief starting from low debt	0.201*	0.334*	0.361*	0.279	0.282
Debt relief starting from high debt	0.081	0.086	0.161	0.167	0.127

1/ The restricted sample includes countries that have restructured and covers only observations within an 11-year window around a restructuring (i.e. five years before and after a restructuring). Debt relief is measured as the NPV debt reduction brought by the restructuring agreement. The null hypothesis that the difference in estimated coefficients for the low and high debt cases is rejected at the 10 percent significant level in the first two years.

Figure 3. Distribution of Frequency of Restructurings by Distance of Restructurings from Default

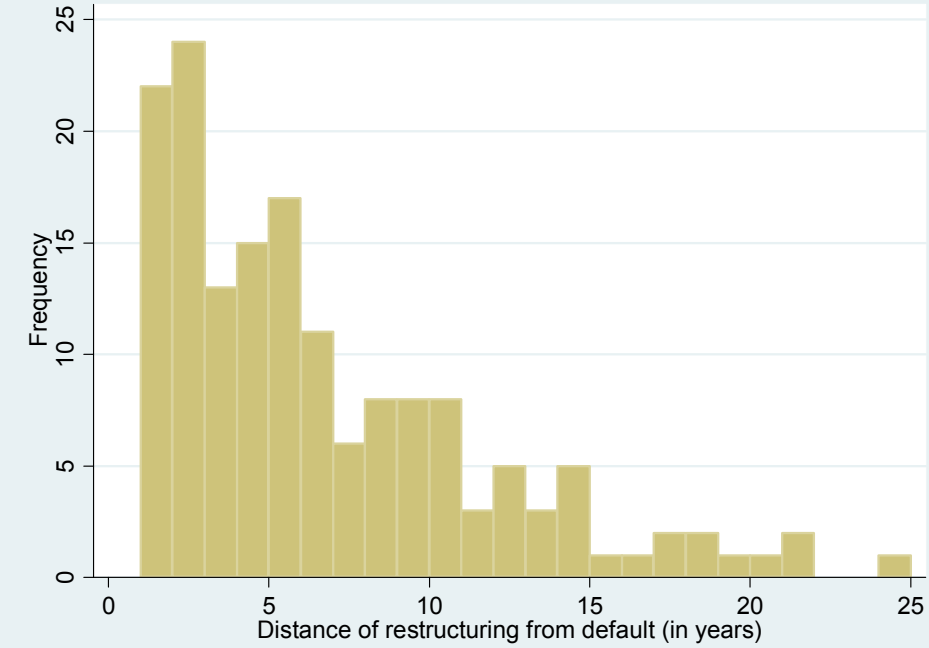
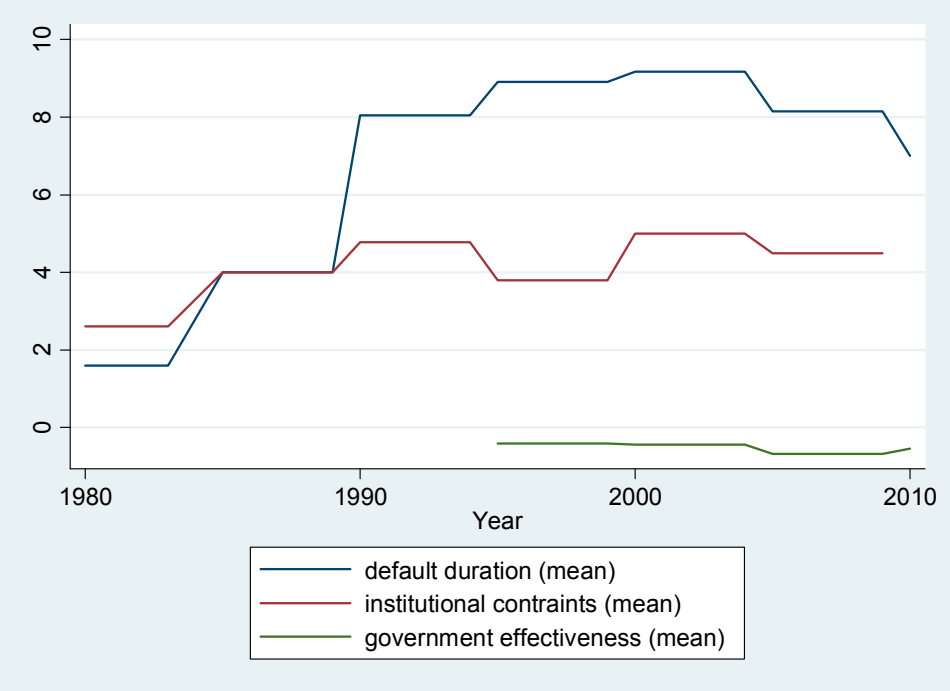


Figure 4. Institutional Quality and Default Duration 1/



1/ The variable "default duration" is defined as the number of years from the start of the default to the final restructuring. The figure reports the average default duration in the year of the final restructuring. A different and declining path would emerge if we classify the events on the basis of the default and not the final restructuring year. All averages are over a five years.

Figure 5. Pre- and Post-Restructuring Public Debt-to-GDP ratios

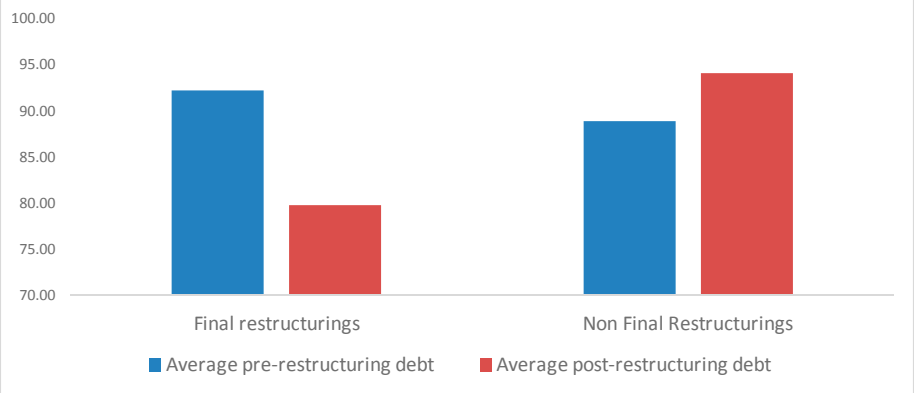


Figure 6. Debt Relief