Costs of Sovereign Defaults: Restructuring Strategies and the Credit-Investment Channel*

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Sovereign debt restructurings are associated with declines in GDP, investment, private sector credit and capital flows. The transmission channels and associated output and banking sector costs depend on whether the restructuring takes place preemptively, without missing payments to creditors, or after a default has occurred. Post-default restructurings are associated with larger declines in GDP, investment, private sector credit and capital inflows than preemptive restructurings. The adverse effects from a restructuring are stronger in countries with larger banking sectors, consistent with a "credit-investment channel".
(*JEL codes*: F34; F41; H63)

Countries where public debt is restructured experience declines in GDP, investment and credit to the private sector. Though previous studies have provided different measures of output and banking sector costs during restructurings, little is known about the transmission channels of debt restructuring to the financial system and the economy. This is a remarkable gap, with real world implications for sovereign debtors facing the problem of how to restructure their debt. As evidenced by the well-known sovereign debt workouts in Russia (1998–2000) and Uruguay (2003), understanding the spillovers and

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feedback effects that a debt restructuring has through the domestic financial system can help design a restructuring to minimize the risk that it triggers financial instability.

This paper contributes to that goal by showing how the transmission channels and associated output and banking sector costs of debt restructurings differ depending on the restructuring strategy followed. We classify restructuring strategies as in Asonuma and Trebesch (2016), based on whether payments were missed (post-default), were missed but only temporarily and with the consent of the foreign creditors (weakly pre-emptive) or whether payments continued to be made in full and on time during the negotiations (strictly pre-emptive debt restructuring). We use local projection models (Jordà 2005) to quantify the overall cumulative effect (both direct and indirect) of the restructuring strategy over a long horizon, while controlling for the dynamic feedback from other variables. Our analysis is based on a sample of 70 countries over 1978–2010, covering 179 debt restructuring episodes.

Post-default restructurings are, on average, associated with the most severe and protracted declines in levels of GDP, investment and private sector credit, with cumulative contractions of 6, 40, and 23 percentage points relative to the pre-restructuring linear trend over the first 3 years, respectively. These restructurings are also associated with a severe and prolonged decline in gross capital inflows, and a sharp and sustained increase in lending interest rates. Moreover, banking crises are more likely to occur following post-default restructurings. In contrast, the aftermath of strictly preemptive restructuring events features milder and shorter-lived impacts on GDP, investment, private sector credit and gross capital inflows. The intensity of the dynamics following weakly preemptive restructurings falls between those of post-default and strictly preemptive restructurings. The large adverse effects on private sector credit and lending terms likely contribute to the worse outcomes in GDP and investment following post-default restructurings.

We confirm the key role of bank credit to the private sector by estimating local projections on subsamples of the three restructuring strategies based on whether the pre-restructuring banking sector is relatively large or small compared to its sample median. This allows the responses to vary depending on the state of the economy as in Auerbach and Gorodnichenko (2016) and Jordà and Taylor (2016). Post-default restructurings in countries with the larger banking sector are associated with the worst outcomes for both investment and GDP. This prominent "credit-investment channel" influences GDP directly and indirectly through investment, helping explain the larger impact that post-default restructurings have on GDP.

A country's decision of how to go about restructuring its debt is influenced by the economic conditions it faces. Thus, Ordinary Least Square (OLS) estimation suffers from endogeneity problems. To address this issue, our baseline results follow the convention in the literature and apply the Augmented Inverse Probability Weighted (AIPW) estimator (Jordà and Taylor 2016) when using the local projections. This method assigns a greater weight to observations that are less likely to be associated with an event, aiming to replicate a distribution without selection bias.

This paper contributes to various literature strands. First, it adds to the large literature on the output costs of sovereign defaults, e.g., Sturzenegger (2004), Tomz and Wright (2007), Borensztein and Panizza (2009), De Paoli et al. (2009), Levy-Yeyati and Panizza (2011), Asonuma and Trebesch

(2016), Trebesch and Zabel (2017), and Kuvshinov and Zimmermann (2019).[1] These papers provide different measures of output costs by applying conventional panel regressions and local projection approaches. Our contribution to this literature is to show that the dynamics of output costs depend crucially on the restructuring strategy adopted. Moreover, we study the transmission channels through which a debt restructuring generates the output losses, while many of the papers above do not. The linkages between the real, financial, and public sectors we document shape the economy's response to a debt restructuring. Our results suggest that the extent of a country's reliance on bank credit intermediation is an important determinant of how output and investment respond to different restructuring strategies.

Recent theoretical work has focused on how restructuring domestic debt can affect credit through the banks' direct exposure to the sovereign (e.g., Gennaioli et al. 2014; Sosa-Padilla 2018). In contrast, our empirical results highlight a channel of transmission of sovereign default into the real economy that is not prominent in the recent literature. Our analysis shows that even restructurings of private external debt—typically not held by domestic banks—can have deleterious effects on both private sector credit and investment.[2]

Our findings also contribute to the literature on the nexus between sovereign and banking crises in emerging economies. The existing evidence on the direction of causality between sovereign and banking crises remains mixed. Borensztein and Panizza (2009) show that default episodes seem to cause banking crises, while Reinhart and Rogoff (2011b) find that banking crises tend to precede sovereign debt crises. Balteanu and Erce (2018) reconcile these papers by exploring the two-way determinants of "twin" banking and sovereign crises. New to this literature, we show that the likelihood of a banking crisis depends on the restructuring approach. Furthermore, we also find evidence that countries that have already suffered a banking crisis are more likely to restructure debt preemptively.

Finally, we also contribute to a growing literature that studies how debt restructurings can be designed to mitigate output costs and financial instability. IMF (2014, 2015), Brookings-CIEPR (2013), Fernandez and Martin (2015) and Mariscal et al. (2015), among others, contrast outcomes of "reprofilings" (restructurings that mostly involve an extension of payment terms) to those of restructurings that involve deeper haircuts on different measures of borrower and creditor welfare.[3] Instead, we separate restructurings based on whether or not the sovereign missed payments to its

[1] The theoretical literature explores endogenous output costs through trade channel (Mendoza and Yue 2012) and through investment channel (Gordon and Guerron-Quintana 2018; Park 2017; Gornemann 2015; Asonuma and Joo 2019).

[2] On theoretical analysis, Sandleris (2014) shows that, through signaling effects, a sovereign default can create a contraction in both domestic and foreign lending to the private sector even if domestic agents do not hold government bonds. A few recent papers use micro-level (firm- and bank-level) data to study the European debt crises. Fakos et al. (2018) find that part of collapse in private investment during the Greek debt crisis is explained by the firms' tightened credit constraints. Arellano et al. (2019) show that highly leveraged firms in the regions where banks are more exposed to government debt experienced larger contractions in output in periods of high sovereign spreads in Italy.

[3] For restructuring strategies, see Sturzenegger and Zettelmeyer (2006), Diaz-Casssou et al. (2008), Das et al. (2012), Erce (2015), Asonuma and Trebesch (2016) and Asonuma et al. (2016). For specific sovereign debt restructuring episodes using micro-level data, see Hébert and Schreger (2017) and Sandleris and Wright (2014) on Argentina. For a "quasi-sovereign" debt restructuring case, see Chari et al. (2019) on Puerto Rico.

creditors. A related strand of this literature discusses the ex ante vs ex post incentives of restructuring debt (e.g., Hatchondo, et al. 2014). Our paper highlights that much of the ex post adverse costs hinge on whether restructurings take place pre-emptively, and also sheds light on the particular financial sector linkages that are associated with avoiding the worst outcomes.

The rest of this paper is structured as follows. In the next section, we define our debt restructuring strategies and various crisis-related events, and explain our dataset. Section II explains the local projection approach and presents our results, including estimations based on sub-sampling our restructuring events to show the role of the "credit-investment channel". Finally, Section III concludes. Details of various robustness analysis are provided in Online Appendix.

I. Evidence on Sovereign Debt Restructurings, Banking Crises and Sudden Stops

A. *Data Description and Definitions of Crisis Events*

Throughout the paper, we focus only on private external debt restructurings. Neither official nor domestic debt restructurings are considered. As a robustness check, in Online Appendix E.2, we consider private external debt restructurings with and without official external debt (Paris Club) restructurings or IMF-supported programs. Online Appendix E.3 considers only external debt restructurings which were not accompanied by domestic debt restructurings.[4]

Our sample covers the period 1978–2010. We follow Jordà and Taylor (2016) and restrict the sample of countries that experienced at least one restructuring event. Our baseline sample has 70 countries, which are listed in the Appendix. We also check the robustness of our results in a sample that includes non-restructuring countries (Figure C2 in Online Appendix C.2), which also helps compare our estimates with the existing literature (e.g., Borensztein and Panizza 2009; Kuvshinov and Zimmermann 2019). Following previous studies (Cruces and Trebesch 2013; Asonuma and Trebesch 2016), we consider each restructuring as an independent event when there is a second restructuring within the five-year window after the start of first restructuring event. When estimating the impact of the first restructuring, we include the observations from the second restructuring that occur within the five-year window from the start of the first restructuring. This is important to capture the medium-term costs of shall restructurings which could fail to restore debt sustainability. The data sources for the different macroeconomic series used in the paper are listed in the Appendix.

We follow the Asonuma and Trebesch (2016) classification of private external debt restructurings:

DEFINITION 1: *'Strictly preemptive restructurings' are implemented without missing any payments at all.*

[4]See Das et al. (2012), Cheng et al. (2018) and Marchesi and Masi (2018) for work on official external debt restructurings, Reinhart and Rogoff (2011a) and Erce and Mallucci (2018) for work on restructurings involving domestic debt. On private external debt restructurings, see also Benjamin and Wright (2013), Sturzenegger and Zettelmeyer (2006, 2008), Cruces and Trebesch (2013), Bai and Zhang (2012) and Asonuma and Joo (forthcoming) for stylized facts around sovereign debt restructurings.

DEFINITION 2: *'Weakly preemptive restructurings' miss some payments, but only temporarily and after the start of formal or informal negotiations with creditor representatives.*

DEFINITION 3: *'Post-default restructurings' are cases where payments are missed without the agreement of creditor representatives (unilateral default prior to negotiations).*

Our sample includes 179 restructurings over 1978–2010, out of which 111, 45 and 23 were post-default, weakly and strictly preemptive restructurings, respectively (Panel A in Table 1). Average duration and haircuts vary substantially across strategies: 5.0, 1.1, and 0.9 years on average for the duration of post-default, weakly preemptive, and strictly preemptive restructurings, respectively. For haircuts, the corresponding averages are 48.0, 18.2, and 18.9 percent, respectively. We code the restructuring strategy dummies at an annual frequency, setting it to 1 if it either starts in the current year or continues from the previous year, and 0 otherwise. For comparison with previous studies, in Online Appendix E.1, we also use sovereign defaults from Standard and Poor's (S&P) database, though its coverage is largely a subset of the restructuring episodes of Asonuma and Trebesch (2016).

Restructurings are often accompanied by banking crises and sudden stops, which we define as follows:

DEFINITION 4: *'Banking crises' follow the Laeven and Valencia (2013) definition of an event that involves: (i) significant signs of distress (as indicated by bank runs, losses and/or bank liquidations) and (ii) significant banking policy intervention measures in response to losses in the banking system.*[5]

DEFINITION 5:*'Sudden stops' draw on Forbes and Warnock (2012). They are defined as an event where the annual change in gross capital inflows (to private sector) in the year of start of restructuring or the following year is less than two standard deviations below the historical average over the last five years.*[6,7]

A banking crisis occurs within the following two years in 11 out of 62 (16 percent) post-default restructurings (Panel B in Table 1). That frequency is lower for weakly preemptive (11 percent) and strictly preemptive restructurings (10 percent). It is interesting to note that banking crises are actually more frequent in the run-up to a preemptive debt restructuring than in its aftermath (Table A2 in Online Appendix A.2). Banking crises preceded 21 and 16 percent of weakly and strictly preemptive

[5]More specifically, Laeven and Valencia (2013) define significant intervention as the use of at least three out of the following six measures: (1) deposit freezes and/or bank holidays; (2) significant bank nationalizations; (3) bank restructuring gross costs (at least 3 percent of GDP); (4) extensive liquidity support (5 percent of deposits and liabilities to nonresidents); (5) significant guarantees put in place; (6) significant asset purchases (at least 5 percent of GDP).

[6]Forbes and Warnock (2012) define a sudden stop when the year-over-year change in quarterly gross capital inflows is less than two standard deviations below the historic average.

[7]Gross capital inflows indicate the change in the domestic resident liabilities to foreigners. Gross capital inflows to the private sector are defined as gross capital inflows minus (i) other inflows to the official sector and (ii) portfolio debt inflows (domestic bond markets consist mostly of government securities in our sample of emerging markets and low income countries).

TABLE 1 – SUMMARY STATISTICS

Panel A: Debt Restructuring Sample

	Post-default	Weakly preemptive	Strictly preemptive
Number of episodes	111	45	23
Number of countries	60	26	13
Average duration (years)	5.0	1.1	0.9
(with sudden stops/without sudden stops)	(5.0/5.0)	(1.0/1.1)	(1.3/0.6)
Average haircut (percent)	48.0	18.2	18.9
(with sudden stops/without sudden stops)	(54.6/49.8)	(4.2/21.8)	(18.5/21.8)

Panel B: Samples of Banking Crises and Sudden Stops

	Number of episodes 1/	Banking crises 2/	Sudden stops, gross	Sudden stops, gross to private
All debt restructurings	115	17 (14%)	31 (25%)	31 (25%)
Post-default	62	11 (16%)	22 (32%)	19 (28%)
Weakly preemptive	34	4 (11%)	5 (14%)	9 (26%)
Strictly preemptive	19	2 (10%)	4 (20%)	3 (15%)
Non-restructuring time	1088	54 (5%)	233 (20%)	268 (23%)

Notes: 1/ Including episodes in countries without any experience of private external debt restructurings.
2/ Banking crises over two years since the start of debt restructurings, from year $t+1$ to $t+2$.

restructurings, respectively. In contrast, they only preceded 13 percent of post-default restructurings.

Panel B in Table 1 also reports that sudden stops are more likely during post-default restructurings. On average, sudden stops occur in 32 percent of post-default restructurings, while only in 14 and 20 percent of weakly preemptive and strictly preemptive restructurings, respectively.[8] If we focus on capital inflows to the private sector, the frequency of sudden stops is 28, 26 and 15 percent for post-default, weakly and strictly preemptive restructurings, respectively. Differences in duration or haircuts between restructuring strategies with and without a sudden stop are negligible (Panel A in Table 1). Figure A1 in Online Appendix A.2 summarizes these trends in banking crises and sudden stops.

For macroeconomic variables, we follow convention in the literature by using data at an annual frequency to secure the widest possible country coverage. The Appendix lists the variables and their data sources. Summary statistics for our key variables are reported in Table A1 in Online Appendix A.1.

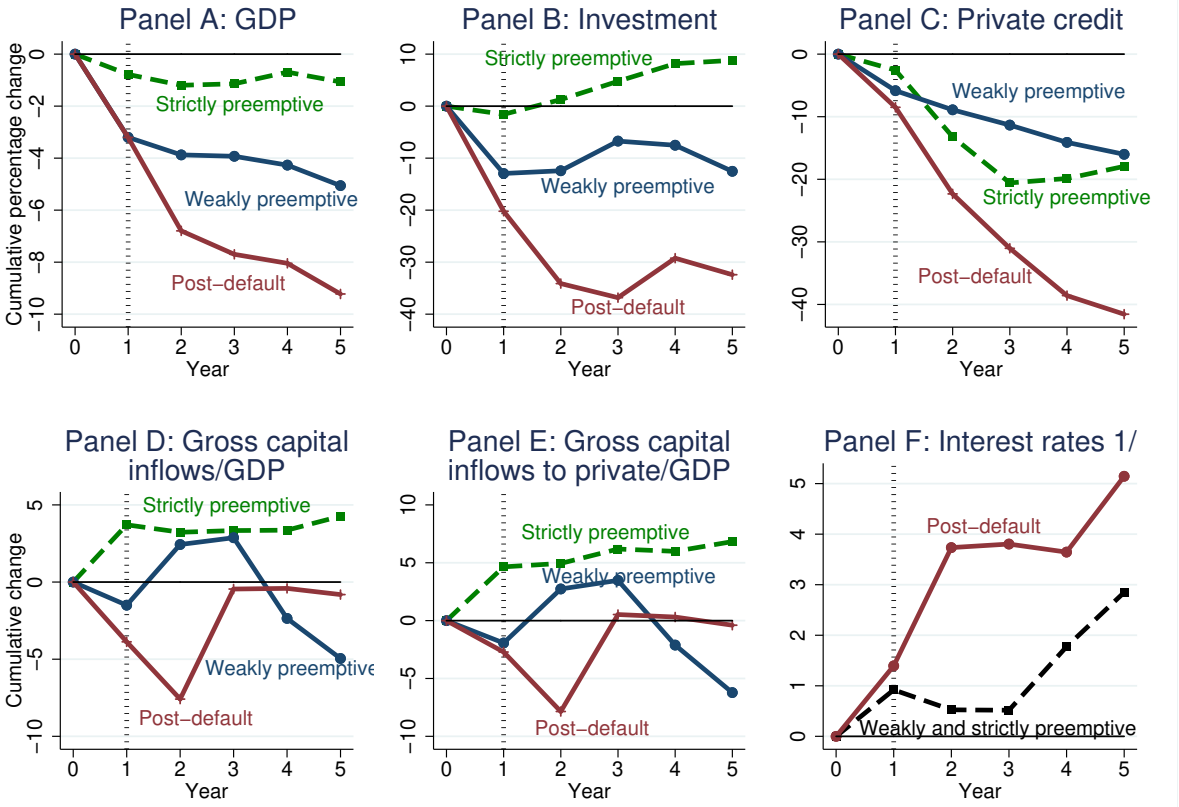
B. *Evidence on GDP, Investment, Private Credit and Capital Flows in Sovereign Debt Restructurings*

Figure 1 reports the average cumulative percentage changes from the pre-crisis level (t=0), adjusted for differences in country means—equivalent to a country-specific linear trend—for GDP, investment, and private credit for the three restructurings strategies (Panels A–C).[9] It also reports the average

[8] See Broner et al. (2013), Kaminsky and Vega-García (2016) and Arteta and Hale (2008) for capital flows and sovereign debt crises.

[9] We drop the private credit series for Algeria covering two restructuring episodes in 1990-92 (strictly preemptive) and 1993-96 (post-default). As part of a package of financial restructuring, public enterprises commercial bank debt was shifted from the outstanding stock of bank credit to the economy to credit to the Government in 1993. That reclassification led to a very large contraction in the

cumulative change in the ratio of two measures of gross capital inflows to GDP, and in lending rates (Panels D–F). Figure B1 in Online Appendix B is analogous to Figure 1, but reports the median instead of the average values, and yields similar results.



Notes: GDP (real), investment (real), private credit (real) are measured as a demeaned cumulative percentage change from the pre-crisis ($t = 0$) level. Capital inflows-to-GDP and lending interest rates are measured as a demeaned cumulative change from the pre-crisis level ($t = 0$) level. Vertical dotted lines correspond to the start of restructurings (at $t = 1$).
1/ Weakly and strictly preemptive restructurings are combined due to the limited number of observations with lending rate data for the latter.

FIGURE 1 – GDP, INVESTMENT, PRIVATE CREDIT, CAPITAL FLOWS AND LENDING INTEREST RATES AROUND DEBT RESTRUCTURINGS, MEAN, BALANCED RESTRUCTURING SAMPLE

Both GDP, investment and private credit experience severe losses following a post-default restructuring (red lines in Panels A, B and C). Negative values indicate the percent difference of GDP, investment or private credit relative to its (country-specific) pre-event dynamics. That difference remains large for several years. A much smaller drop in GDP, investment and private credit occurs in the aftermath of a weakly preemptive restructuring (blue lines in Panels A, B and C). GDP and investment growth show more resilience following a strictly preemptive restructuring (green lines in Panels A and B), while the effect on private credit is similar to that of weakly preemptive restructurings.

series for credit to the private sector (where those loans were previously included). For additional details, please refer to IMF (1994).

While we observe qualitatively similar dynamics for GDP and investment, the magnitude of the decline in investment is larger than that of GDP in both post-default and weakly preemptive events (Panel B). This is consistent with consumption smoothing during crisis periods, where investment bears a disproportionate share of the adjustment. The decline in investment has an immediate impact on GDP—because investment is one of the components of GDP from the demand side—and also contributes to lower GDP growth in the following years.

Both gross capital inflows to the economy and to private sector experience a large decline in post-default restructurings, but recover over the medium term (red lines in Panels D and E). Weakly preemptive restructurings are associated with a milder and temporary decline and a quick rebound in the immediate aftermath, but eventually experience a large decline, comparable to the one for post-default restructurings (blue lines in Panels D and E). In contrast, there is a steady increase in flows after strictly preemptive restructurings (green lines in Panels D and E). Lending interest rates experience a sharp increase following post-default restructurings (red line in Panel F), which is more muted during preemptive episodes (black line in Panel F, where weakly and strictly preemptive restructurings are combined due to data availability).

Table 2 reports probit regression results, where the dependent variable is a dummy variable indicating a banking crisis in the current year and the explanatory variables are restructuring strategies in previous years. Banking crises are more likely to occur in countries which have experienced post-default restructurings in previous years—by quantitatively 3 percentage points—based on the results in column 3.

TABLE 2 – BANKING CRISES AFTER DEBT RESTRUCTURINGS, PROBIT

Dependent Variable = Banking Crisis Dummy

	(1)	(2)	(3)
Post-default (year t or year $t-1$)	0.043***	0.043***	0.026*
	(0.008)	(0.007)	(0.015)
Weakly preemptive (year t or year $t-1$)	0.030**	0.028*	0.013
	(0.013)	(0.016)	(0.030)
Strictly preemptive (year t or year $t-1$)	0.027	0.025	0.044
	(0.020)	(0.023)	(0.050)
N. of observations	3,111	3,111	1,484
Country fixed effects		Yes	Yes
Country-specific and global variable controls			Yes

Notes: The estimated coefficients measure marginal effects. Delta-method standard errors are in parentheses. The banking crisis dummy takes 1 if there is a banking crisis at the contemporaneous year. The debt restructuring dummies take unity at the start of restructurings or the previous year. Country-specific controls include i) number of past restructurings (post-default, weakly and strictly preemptive), ii) external debt-to-GDP ratio, and iii) long-term and short-term interest payments-to-GDP ratios. Global variable controls include iv) US excess bond premium and term spreads, vi) US federal funds rates, and vii) equity capital gains and dividend yields for advanced economies. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

In turn, Table 3 reports probit regression results, where the dependent variable is a dummy variable indicating a restructuring strategy in the current year and the explanatory variable is banking crises in previous years. Countries which experienced banking crises in previous years are more likely to take restructure debt preemptively—quantitatively 7 percentage points—based on the results in

TABLE 3 – DEBT RESTRUCTURINGS AFTER BANKING CRISES, PROBIT

Dependent Variable = Dummy Taking 1 at the Start of Debt Restructuring

	(1)	(2)	(3)
	Panel A: Post-default		
Banking crisis dummy (year t or year $t-1$)	0.046***	0.043***	0.028*
	(0.009)	(0.009)	(0.016)
N. of observations	3,599	3,599	1,880
	*Panel B: Preemptive (weakly and strictly)*1/		
Banking crisis dummy (year t or year $t-1$)	0.067***	0.063***	0.071***
	(0.019)	(0.019)	(0.024)
N. of observations	1,647	1,647	770
Country fixed effects		Yes	Yes
Country-specific and global variable controls			Yes

Notes: The estimated coefficients measure marginal effects. Delta-method standard errors are in parentheses. The banking crisis dummy takes 1 if there is a banking crisis at the contemporaneous year or the previous year. The debt restructuring dummies take unity at the start of restructurings. For country-specific and global variable controls, see notes in Table 2. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

1/ The sample for the preemptive restructuring dummy combines observations for weakly and strictly preemptive restructuring dummies together due to the limited number of observations with data for the latter.

column 3. These differences suggest some degree of selection into the restructuring strategy, with bank weaknesses being a consideration in that choice (which we elaborate on the next section).

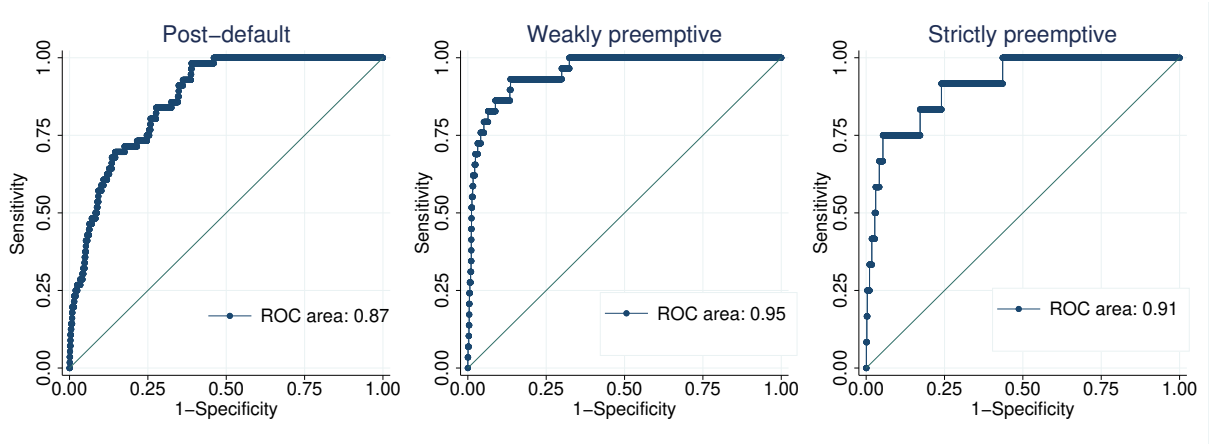
II. Local Projection Approach

A. *Endogeneity of Debt Restructuring Decisions*

Countries experiencing restructurings (treatment group) are likely to differ from others (control group) in many aspects. Moreover, the restructuring strategy (e.g., preemptive vs post-default) is an endogenous choice by the sovereign debtor (Asonuma and Trebesch, 2016). As a result, conventional ordinary least square (OLS) estimation results—reported in Table C2 in Online Appendix C.2—could be driven by the characteristics of countries experiencing restructurings rather than the effect of debt restructuring itself.

Table C1 in Online Appendix C.1 shows the difference in key macroeconomic and structural variables, among the different treatment groups—the start year and one year before the start year of debt restructurings—and the control group. Following the literature (Jordà and Taylor 2016; Jordà et al. 2019), we define a particular policy strategy (e.g., post default restructuring) and its complement as treatment and control groups, respectively. When estimating the treatment effect for a restructuring of type R, we include every observation in which there is not type R restructuring in the control group, even if there is another type of restructuring in that country and year.[10]

[10] Alternatively, in order to define the control group, we could use only non-restructuring observations, and observations corresponding to other debt restructuring events (strictly and weakly preemptive). Dropping these from the complement sample has negligible effects on our probit and AIPW estimation results given the much larger number of observations which did not experience any restructuring.



Notes: Panel shows the area under the ROC curve found based on excluded instruments. The area under the ROC ranges from 0.50 (regressors have no classification power when differentiating the start of debt restructurings from other observations) and 1 (perfect classification power). See Table 4 for the list of the instruments.

FIGURE 2 – CLASSIFICATION POWER OF THE FIRST STAGE REGRESSORS, ROC CURVES

Drawing on Jordà et al. (2019) and Kuvshinov and Zimmermann (2019), the variables considered include i) number of past restructurings (post-default, weakly and strictly preemptive),[11] ii) external debt-to-GDP ratio, iii) long-term and short-term interest payments-to-GDP ratios, iv) US excess bond premium and term spreads (both from Gilchrist and Zakrajsek 2012), v) US federal funds rates, and vi) equity capital gains and dividend yields for advanced economies (AMs). These variables will be the country-specific and global variable "excluded instruments" (i.e., not included in the second-stage regression) denoted by $\mathbf{Z}_{i,t}$ in Section II.B.

Following the convention in the literature (Jorda and Taylor 2016; Jorda et al. 2019), we also include the set of regressors (controls) in the second stage (denoted by $\mathbf{X}_{i,t}$ in Section II.B) which are also included in the first-stage regression. The set includes i) the cyclical component of log of GDP (based on the Hamilton 2018 filter), ii) banking crisis dummy, iii) terms of trade, iv) government expenditure-to-GDP ratio, and v) exchange rate depreciation dummies. We apply a probit model to estimate separate equations for the start of each type of restructuring.

Results are reported in Table 4. The results in columns (1), (2), and (3) will be used in our first stage regressions for the three types of restructuring. Figure 2 reports the area under the Receiver Operating Characteristic (ROC) curve, which ranges from 0.87 to 0.95, indicating a reasonably good classification power—a ROC curve above 0.7 is generally considered to be adequate (Schularick and Taylor, 2012).

Using these models, we predict probabilities for the three types of restructurings. Figure C1 in Online Appendix C.1 shows kernel density estimates for the predicted likelihood of each restructuring strategy. Each panel reports two kernel density estimates. One is for observations where the particular

[11] Countries that experienced a default or debt restructuring in the past are more likely to experience another default or restructuring (Reinhart et al. 2003; Asonuma 2016). We control for this feature by including as explanatory variables the number of post-default, weakly, and strictly preemptive restructurings that took place in the last six years.

TABLE 4 – PREDICTING THE START OF DEBT RESTRUCTURINGS, PROBIT

Dependent Variable = Dummy Taking 1 at the Start of Debt Restructuring

	Post-default (1)	Weakly preemptive (2)	Strictly preemptive (3)
Country-specific excluded instruments			
Past number of post-default	0.75***	-0.93	1.96*
	(0.16)	(0.61)	(1.11)
Past number of weakly preemptive	0.17	1.29***	0.01
	(0.24)	(0.38)	(0.45)
Past number of strictly preemptive	0.23	-1.09	-0.16
	(0.53)	(0.85)	(0.31)
External debt-to-GDP ratio	-0.91**	1.89	2.80
	(0.41)	(1.86)	(2.02)
Interest payments-to-GDP ratio (long-term)	0.09***	0.56**	0.14
	(0.03)	(0.23)	(0.26)
Interest payments-to-GDP ratio (short-term)	0.27	0.44	-2.17
	(0.19)	(0.47)	(1.47)
Global variable excluded instruments			
US excess bond premium	0.50*	-0.72	0.08
	(0.29)	(0.77)	(0.71)
US term spreads	-0.17*	-0.19	-0.02
	(0.10)	(0.20)	(0.28)
US federal funds rate	0.23***	0.35**	0.03
	(0.06)	(0.16)	(0.15)
AM equity capital gain	2.26***	2.57	0.39
	(0.74)	(1.83)	(1.55)
AM equity dividend yield	-0.19	3.47	-0.40
	(1.08)	(2.91)	(2.53)
Controls from the second-stage, country-specific			
Cyclical component of $\ln(GDP)$	5.65	10.61	16.56
	(3.75)	(8.02)	(12.76)
Banking crisis dummy 1/	0.23	1.27**	
	(0.36)	(0.55)	
Terms of trade	-0.49	-1.52	-7.01*
	(0.90)	(2.74)	(4.20)
Government expenditure-to-GDP ratio	0.03	0.04	0.29***
	(0.03)	(0.12)	(0.11)
Exchange rate depreciation dummy, 50th-75th percentiles	0.05	0.79	0.06
	(0.26)	(0.78)	(0.66)
Exchange rate depreciation dummy, 75th-90th percentiles	-0.20	0.23	-0.22
	(0.24)	(0.71)	(0.59)
Exchange rate depreciation dummy, above 90th percentile	-0.24	0.64	-0.19
	(0.35)	(0.82)	(0.82)
N. of observations	1,018	566	247
Pseudo R-sq.	0.26	0.58	0.42

Notes: Robust standard errors, clustered at the country-level, are in parentheses. All of the explanatory variables are from one year before the start of debt restructuring. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

1/ The coefficient on the banking crisis dummy is dropped because the number of banking crises preceding strictly preemptive restructurings is small. Once we include terms of trade and government expenditure-to-GDP ratio as controls, there are no such episodes left.

type of debt restructuring occurs (treatment group), and the other is for those without the particular restructuring (control group). A substantial difference in the distribution of predicted likelihoods between the treatment and control groups for all types of debt restructurings clearly indicates that our instruments have a high explanatory power to differentiate between groups.

B. *Augmented Inverse Probability Weighted (AIPW) Estimation*

Since the more salient macroeconomic features differ among the three restructuring strategies, we implement the Augmented Inverse Probability Weighted (AIPW).

In the first stage, we estimate propensity scores in the sample, which corresponds to the probability that a restructuring event occurs. We use probit models, treating each restructuring strategy separately, as follows:

$$Pr\left(R\right)_{i,t+1} = \Phi\left(\mathbf{Z}_{i,t}, \mathbf{X}_{i,t}, \boldsymbol{\gamma}^{R}\right) \quad \text{for} \quad R = PD, WP \text{ and } SP \tag{1}$$

where $Pr\left(R\right)_{i,t+1}$ denotes the probability that a type R debt restructuring event occurs in country i in year $t+1$; $\mathbf{Z}_{i,t}$ is a vector of lagged excluded instruments (in year t) used to predict the restructuring events with the three strategies defined in Section II.A. Note that regressors (controls) from the second stage, $\mathbf{X}_{i,t}$, are also included in the first-stage estimation (defined in Section II.A). Vector $\boldsymbol{\gamma}^{R}$ indicates the coefficients to be estimated for each type of debt restructuring strategies $R = PD, WP$ and SP. Finally, Φ denotes the normal cumulative distribution function. The results correspond to those presented in Table 4 above.

In the second stage, we use the inverse of the estimated propensity score obtained in the first stage, $1/\widehat{Pr\left(R\right)}_{i,t+1}$, to weight the second-stage observations and correct for potential selection biases. Under this weighting scheme, observations that are less likely associated with a restructuring (like those with low long-term interest payments-to-GDP ratio and no past restructurings) are given a greater weight in the AIPW estimates.

The coefficient estimates obtained through the AIPW bias correction process can be interpreted as the average treatment effects (ATE). We estimate local projections as follows:

$$\begin{aligned} g_{i,t+h} &= \alpha_i^{R,h} + \Lambda^{R,h} D_{i,t+1}^{R} + \mathbf{X}_{i,t}\boldsymbol{\beta}^{R,h} + \epsilon_{i,t+h}^{R}, \\ &\quad \text{for } R = PD, WP \text{ and } SP \text{ and } h = 1, 2, .., 5 \end{aligned} \tag{2}$$

where $g_{i,t+h} = 100 \times [\ln(GDP_{i,t+h}) - \ln(GDP_{i,t})]$ is the cumulative percentage GDP growth from time t to $t+h$ in country i. The cumulative percentage growth is also used when investment and private credit are the dependent variables, while the cumulative change is used for the capital inflows to GDP ratio and lending rates. Dummy variable $D_{i,t+1}^{R}$ takes unity if there is a type R debt restructuring at year $t+1$ in country i; $\Lambda^{R,h}$ and $\boldsymbol{\beta}^{R,h}$ indicate coefficients to be estimated; and $\epsilon_{i,t+h}^{R}$ is the error term for each regression. Following Jordà (2005) and Jordà and Taylor (2016), we include fixed effects, $\alpha_i^{R,h}$, which account for variation in the degree of financial liberalization and other macroeconomic differences across countries. We denote the predicted dependent variables as

$$\begin{aligned} \widehat{g}_{i,t+h}^{R} &= \widehat{\alpha}_i^{R,h} + \widehat{\Lambda}^{R,h} D_{i,t+1}^{R} + \mathbf{X}_{i,t}\widehat{\boldsymbol{\beta}}^{R,h}, \\ &\quad \text{for } R = PD, WP \text{ and } SP \text{ and } h = 1, 2, .., 5 \end{aligned} \tag{3}$$

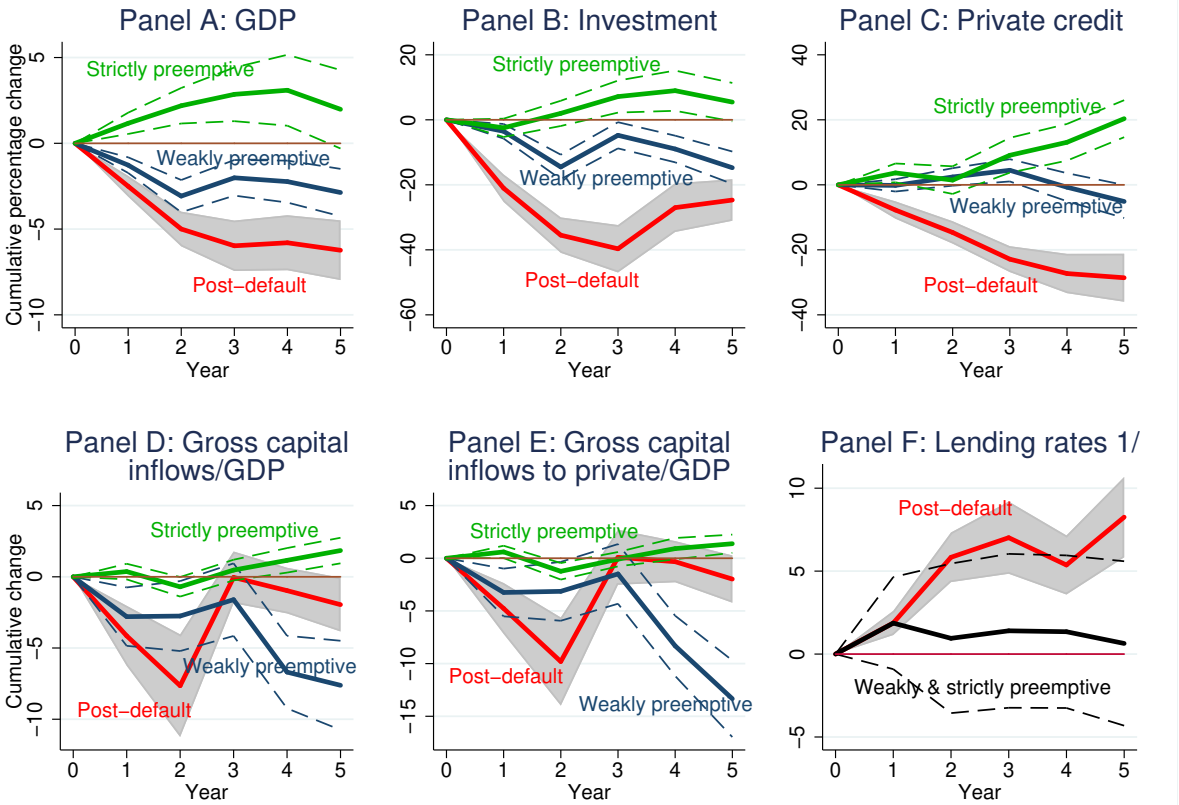
where a hat above a variable indicates its estimated value.

The average treatment effect of each restructuring strategy on cumulative percentage GDP growth

for h-year horizon is then computed as follows:

$$ATE\left(\Lambda^{R,h}\right) = \frac{1}{N_R}\sum_i\sum_t \frac{\widehat{g}^R_{i,t+h}D^R_{i,t+1}}{\widehat{Pr\,(R)}_{i,t+1}} - \frac{1}{N_{Non-R}}\sum_i\sum_t \frac{\widehat{g}^R_{i,t+h}(1-D^R_{i,t+1})}{1-\widehat{Pr\,(R)}_{i,t+1}} \quad (4)$$
$$\text{for } R = PD, WP \text{ and } SP \text{ and } h = 1,2,..,5$$

where N_R indicates the number of type R debt restructurings; N_{Non-R} indicates the number of remaining observations; $\widehat{Pr\,(R)}_{i,t+1}$ denotes the estimated probability of type R debt restructurings.



Notes: The figure shows local projections of the variables shown in each panel for $h = 1,2,..,5$, where h indicates horizon. Solid lines in red, blue, green, and brown are point estimates for the indicated restructuring strategy. Gray bands and dotted lines in blue, green, and brown are the corresponding 95 percent confidence intervals.

1/ The sample for the lending interest rates combines observations for weakly and strictly preemptive restructurings together due to the limited number of observations with data for the latter.

2/ Restructuring sample is balanced across dependent variables except private credit and lending interest rates. Figure C4 and Table C5 in Online Appendix C.3 report AIPW estimates based on unbalanced restructuring sample (larger sample for each dependent variable) and yield similar results to our baseline estimates.

FIGURE 3 – LOCAL PROJECTIONS, AIPW, BALANCED RESTRUCTURING SAMPLE 2/

Based on the estimation results in Table C3 in Online Appendix C.3, Panels A–C in Figure 3 report the cumulative percentage changes from the pre-restructuring year ($t = 0$). Panels D–F in Figure 3 report the cumulative percentage point changes from the pre-restructuring year ($t = 0$). GDP, investment and credit growth maintain their pace or even experience a modest increase relative to their

(country-specific) average following strictly preemptive restructurings (green lines in Panels A, B and C). Post-default restructurings experience severe and prolonged adverse effects in GDP, investment and private credit (red lines in Panels A, B and C). Weakly preemptive restructurings experience milder episodes of below average growth in GDP and investment, while credit growth remains resilient (blue lines in Panels A, B and C, with the effect in between that for post-default and strictly preemptive restructurings). Figure C2 in Online Appendix C.3 reports the OLS local projections, which are broadly similar. Figure C3 in Online Appendix C.3 reports the cumulative percentage change for investment and private credit from the pre-restructuring year divided by pre-restructuring GDP. The results are similar, except that the scale gets compressed (because investment and private credit are measured as a percentage of the initial GDP as opposed to the percent change from their own starting levels). Figure C5 and Table C6 in Online Appendix C.3 report the results for the pre- and post-1990 subsamples. Post-default restructurings have a similar experience in both periods, but preemptive restructurings have markedly better outcomes in the post-1990 subsample than in the earlier period.

The results from our AIPW estimation in Figure 3 are in line with the descriptive results in Figure 1. One qualitative difference is that credit was adversely affected across all restructuring strategies in Figure 1. But once we control for differences in initial conditions and other explanatory variables in our AIPW estimates, private credit accelerates for strictly preemptive restructurings and remains resilient for weakly preemptive restructurings.

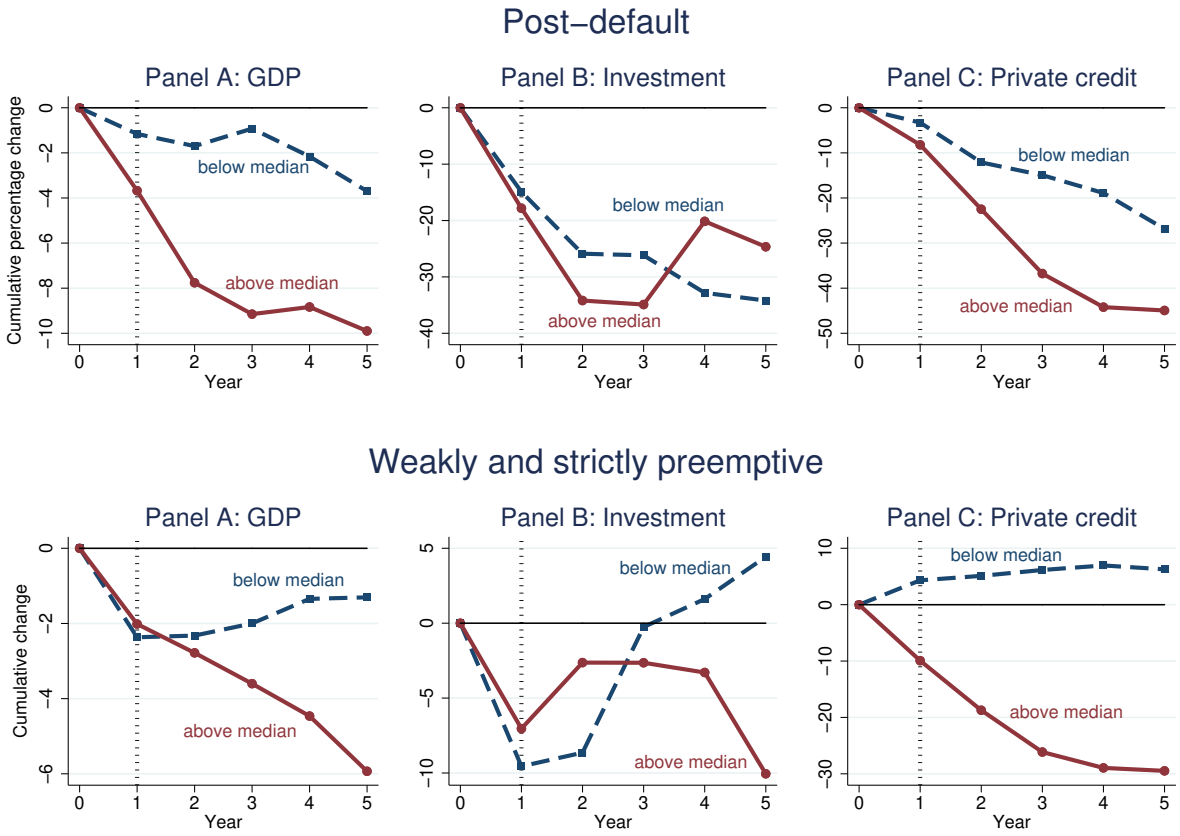
C. *Role of Credit-Investment Channel*

In order to shed light on the role of credit and investment, we compare the post-restructuring experience of countries with relatively large vs small banking sectors. We measure the relative importance of the banking sector by comparing countries' bank credit to the private sector as a share of GDP in the year prior to the restructuring with its sample median among restructuring observations. For each type of restructuring, we use that median to classify half of the episodes as having a relatively large banking sector (above median), and the remaining half of the episodes as having a relatively small banking sector. We use a common level threshold for both post-default and preemptive restructurings, which by construction classifies 50 percent of restructurings as having a relatively large banking sector. The implied threshold (19.3 percent of GDP) turns out to classify half of post-restructuring and half of preemptive restructurings as having a large banking sector (although this would not necessarily have been the case under our approach). Our results are similar when we use a time-variant level threshold accounting for financial deepening over the years (Figure D1 in Online Appendix D).

Figure 4 reports the dynamics of GDP, investment and private credit based on whether countries' banking sectors are large or small.[12] We combine weakly and strictly preemptive restructurings together due to the relatively small number of observations for the latter (which would not allow for a meaningful above vs below median comparison in isolation). Across all types of restructuring

[12]The role of banks' direct exposure channel, i.e., banks' holding of external debt is limited in external debt restructurings. This is shown by both limited changes in banks' holding of sovereign debt and the composition of creditor committee members in external debt restructurings (Asonuma and Joo forthcoming).

strategies, worse growth outcomes are experienced in countries with relatively larger banking sectors. The reaction of investment appears strong also when banks are small. This indicates a lesser role of the credit in determining investment where banks are small.



Notes: Restructuring episodes are divided into two groups based on countries' bank credit to private sector as a share of GDP in the year prior to the restructuring. Those which are above (below) the median among all restructuring observations (post-default and preemptive) are classified as relatively large (small) banking sectors. The cutoff is the median for all restructuring episodes (both post-default and preemptive). Black vertical lines correspond to the start of restructurings (at $t = 1$). GDP, investment and private credit are all in constant prices. Plots show demeaned cumulative percentage changes.

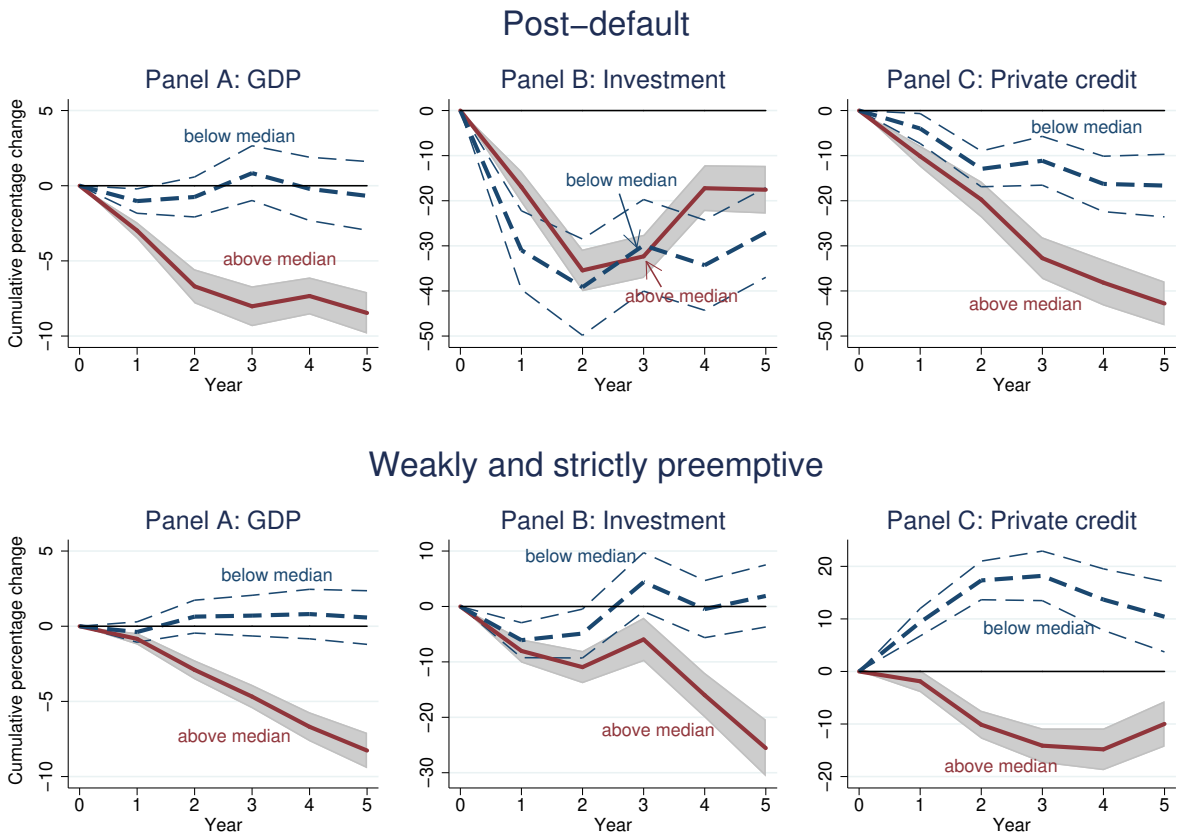
1/ With unbalanced restructuring subsamples across the dependent variables (larger sample for each dependent variable), we find similar results to our baseline results.

FIGURE 4 – GDP, INVESTMENT AND PRIVATE CREDIT AROUND DEBT RESTRUCTURINGS WITH RELATIVELY LARGE OR SMALL BANKING SECTORS, MEAN, BALANCED RESTRUCTURING SAMPLE

We follow Jordà and Taylor (2016) and Auerbach and Gorodnichenko (2016) to implement our estimation of the differential impact of a large banking sector on the effect of debt restructuring through the following local projection equation:

$$g_{i,t+h} = \alpha_i^{R,h} + \Lambda^{(BC,R,h)} D_{i,t}^{BC} D_{i,t+1}^{R} + \Lambda^{(Non-BC,R,h)} (1 - D_{i,t}^{BC}) D_{i,t+1}^{R} + \mathbf{X}_{i,t} \boldsymbol{\beta}^{R,h} + \epsilon_{i,t+h}^{R}, \quad (5)$$
$$\text{for } R = PD, WP \text{ and } SP \text{ and } h = 1, 2, .., 5$$

where $D_{i,t}^{BC}$ is a dummy variable taking unity if a banking sector in a country i in year t is relatively



Notes: Restructuring episodes are divided into two groups based on the relative size of bank credit to the private sector (see notes to Figure 4). Black vertical lines correspond to the start of restructurings (at $t = 1$). GDP, investment and private credit are all in constant prices. Plots show demeaned cumulative percentage changes.

1/ With unbalanced restructuring subsamples across the dependent variables (larger sample for each dependent variable), we find similar results to our baseline results.

FIGURE 5 – DEBT RESTRUCTURINGS WITH RELATIVELY LARGE OR SMALL BANKING SECTORS, AIPW, BALANCED RESTRUCTURING SAMPLE

large and zero otherwise. That dummy is interacted with the restructuring dummy $D^R_{i,t+1}$ and $\Lambda^{(BC,R,h)}$ and $\Lambda^{(Non-BC,R,h)}$ are the coefficients of interest to be estimated. The coefficient $\Lambda^{(BC,R,h)}$ captures the impact of a restructuring, for instance $R = PD$ (post-default), that occurred in year $t+1$ when the banking sector in the country i in year t is relatively large. The third term interacts $(1 - D^{BC}_{i,t})$ with $D^R_{i,t+1}$. In this setting, $\Lambda^{(Non-BC,R,h)}$ reflects the impact of the restructuring that occurred in year $t+1$ when the banking sector in the country i in year t is relatively small. Finally, $\mathbf{X}_{i,t}$ is the same vector of regressors (controls) defined in Section II.A.

In the first stage, we estimate the likelihood of restructurings when the banking sector is relatively large or small separately for each restructuring strategy. In the second stage, we estimate average treatment effects with the predicted dependent variable from equation (5) using AIPW with the first-stage weights. Results for the first-stage probit regression are reported in Table D1 in Online Appendix D.

Figure 5 (estimation results in Table D2 in Online Appendix D) reports the AIPW estimates for the cumulative percentage changes from the pre-restructuring year. Our results point to an important role of bank credit to the private sector on both investment dynamics and output costs of different restructuring strategies, especially where banks are large. Growth in GDP, investment and private credit declines significantly following restructurings when the banking sector is large (red lines). This is true for both post-default and preemptive restructurings. In contrast, countries where the banking sector is small tend to show more resilience (blue lines) in the immediate aftermath of post-default restructurings. In the case of preemptive restructurings, GDP and investment growth are largely unaffected in those episodes, while credit growth accelerates. Figure D2 in Online Appendix D reports results using a time-varying classification threshold (based on the median bank credit as a share of GDP in each year) to account for financial deepening over time. The results are very similar to the ones above. Figure D3 in Online Appendix reports OLS estimates. They are qualitatively similar to our baseline results, but with preemptive restructurings achieving even better outcomes under OLS.

III. Conclusion

In this paper, we shed new light on the costs of sovereign debt restructurings, by exploring output and banking sector costs, and linking them to the restructuring strategies chosen by the sovereign. The real economy, the financial sector and the government are all interconnected. We show that the transmission channels and associated output and banking sector costs depend on whether the restructuring takes place preemptively, or after a default has occurred. Our local projection estimates show large declines in GDP and investment, transmitted through a "credit-investment channel"—supported by both declines in private credit and capital inflows, and an increase in lending interest rates.

Our results have implications for the ongoing discussion on how to best resolve sovereign debt crises. When designing a debt restructuring strategy, it is crucial to understand the spillover and feedback channels that the restructuring can have on the domestic financial system. Our key finding suggests that countries that succeed in a restructuring without missing payments to creditors are largely able to avoid, or at least mitigate, both output and banking sector costs associated with restructurings. The countries' reliance on bank credit intermediation is an important determinant of how output and investment will respond to different restructuring strategies. This suggests an important role for the credit-investment channel.

Relatedly, our findings also have implications for the design of official financing, suggesting that where feasible, long-run costs can be attenuated if official financing and creditor cooperation allow countries to restructure without missing payments. Our analysis also highlights the costs that countries can face for trying to delay adjustment (and requests for official support) until a default becomes inevitable. One caveat to bear in mind is that our analysis has focused on the ex post costs of a default. Policies that facilitate preemptive restructurings may make restructurings less traumatic experiences, but affect ex ante incentives. These policies can lead to ex post welfare gains but ex ante welfare losses by leading governments to borrow more and face higher spreads, making them

more susceptible to debt crises.[13] Balancing ex ante vs ex post implications should be an important consideration in the design of future debt restructuring policy options, and an important avenue for future academic research.

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Appendix: Sample Countries and Data Sources

The dataset includes only countries that experienced debt restructurings. Among them, 60 countries experienced 111 episodes of post-default debt restructuring in 1978–2010:

> Albania, Algeria, Argentina, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Cameroon, Congo Rep., Costa Rica, Cote d'Ivoire, Croatia, Cuba, Dominican Republic, Ecuador, Ethiopia, Gabon, the Gambia, Guinea, Guyana, Honduras, Iraq, Jamaica, Jordan, Kenya, Liberia, Macedonia (FYR), Madagascar, Malawi, Mauritania, Moldova, Morocco, Mozambique, Nicaragua, Niger, Nigeria, Pakistan, Panama, Paraguay, Peru, the Philippines, Poland, Romania, Russian Federation, Sao Tome and Principe, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Slovenia, Sudan, Tanzania, Togo, Turkey, Uganda, Venezuela, Vietnam, Yemen, Rep. of, Zaire, and Zambia

26 countries experienced 46 episodes of weakly preemptive debt restructuring:

> Argentina, Belize, Brazil, Chile, Dominica, Dominican Republic, Ecuador, Grenada, Jamaica, Nigeria, Malawi, Mexico, Morocco, Niger, Panama, Peru, the Philippines, Romania, Senegal, South Africa, Trinidad and Tobago, Turkey, Ukraine, Uruguay, Venezuela, and Yugoslavia

13 countries experienced 23 episodes of strictly preemptive debt restructuring:

> Algeria, Chile, Dominican Republic, Jamaica, Mexico, Moldova, Nicaragua, Pakistan, Peru, South Africa, Ukraine, Uruguay, and Yugoslavia

Our main dataset

Variable	Data source
Private external debt restructuring data	Asonuma and Trebesch (2016)
Banking crisis data	Laeven and Valencia (2013, forthcoming)

Dependent variables

Variable	Data source
Real GDP, national currency	PWT9.0
Investment-to-GDP ratio	
Domestic credit to private sector (% of GDP)	WDI (World Bank, 2019b)
Domestic credit provided by banking sector (% of GDP)	
Lending interest rates	
Gross capital inflows-to-GDP ratio	IMF Balance of Payment Statistics
Gross capital inflows to private sector-to-GDP ratio	IMF World Economic Outlook (IMF 2017)
	WDI (World Bank, 2019b)

Excluded instruments

Variable	Data source
External debt (% of GDP)	WDI (World Bank, 2019b)
Long-term interest payments (% of GDP)	
Short-term interest payments (% of GDP)	
US excess bond premium	Gilchrist and Zakrajšek (2012)
US term spreads	
US federal funds rate	FRED Economic Data
AM equity capital gain	Jordá et al. (2019)
AM equity dividend yield	

Notes: PWT and WDI stand for the Penn World Table and the World Development Indicators, respectively.

The data on investment and private credit are in percent of GDP. These are multiplied by real GDP (level) in order to be expressed as in real terms. The data on external debt are in nominal USD. It is divided by nominal GDP (USD) from WDI in order to be expressed as a share of GDP. Interest payments on long-term debt are computed as 'interest payments on total debt' minus 'interest payments on short-term debt'. These variables are also originally in nominal USD and were converted to a ratio of GDP. The US federal funds rates are available at a monthly frequency. We collapse the data to an annual frequency by taking the simple average of 12 months. The data on advanced economies (AM) equity capital gains are available for 14 countries; Australia, Belgium, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, the U.K., the U.S., for the entire period of our analysis, 1970–2010. The data on AM equity dividend yields are available for 15 countries, including the previous set of countries and Canada. We compute GDP-weighted averages of these variables using the GDP data come from Jordá et al. (2019).

Control Variables

Variable	Data source
Cyclical component of $\ln(GDP)$	The authors' calculation based on PWT9.0
Terms of trade	The authors' calculation based on export price data and import price data from PWT 9.0
Official exchange rates	WDI (World Bank, 2019b)
Government expenditure-to-GDP ratio (% of GDP)	

Variables for Robustness Checks

Variable	Data source
Political stability index (civil liberties with 1(7) the greatest (smallest) degree of freedom)	Freedom House
Legislative and executive indices of electoral competitiveness (LIEC and EIEC)	Inter-American Development Bank's Database of Political Institutions 2015 (DIP2015)
S&P sovereign default data	Standard and Poor (2006) Laeven and Valencia (forthcoming)
Official external (Paris Club) debt restructuring data	Das et al. (2012) and Paris Club

Notes: PWT and WDI stand for the Penn World Table and the World Development Indicators, respectively.

Online Appendix to "Costs of Sovereign Defaults: Restructuring Strategies and the Credit-Investment Channel"

By Tamon Asonuma, Marcos Chamon, Aitor Erce, and Akira Sasahara

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A. Data

A.1. Data Statistics

TABLE A1 – SUMMARY STATISTICS, BALANCED RESTRUCTURING SAMPLE

	Obs.	Mean	Std. Dev.	Min	Max
Dependent variables					
GDP growth rate (%)	993	3.15	4.65	-18.81	23.44
Investment growth rate (%)	993	3.36	25.18	-134.48	134.05
Credit growth rate (%)	993	4.35	19.22	-127.27	113.90
Gross capital inflows/GDP (% point change)	993	-0.10	17.45	-174.38	307.96
Gross capital inflows to private/GDP (% point change)	993	-0.13	18.69	-178.45	305.67
Lending interest rates (% point change)	598	-1.79	25.04	-577.72	40.13
Controls					
Cyclical component of $\ln(GDP)$	993	0.00	0.03	-0.30	0.18
Banking crisis dummy	993	0.04	0.20	0	1
Terms of trade	993	1.00	0.14	0.28	1.68
Government expenditure-to-GDP ratio	993	0.14	0.05	0.03	0.34
Exchange rate change dummy, 50th-75th percentile	993	0.30	0.46	0	1
Exchange rate change dummy, 75th-90th percentile	993	0.24	0.43	0	1
Exchange rate change dummy, above 90th percentile	993	0.05	0.23	0	1
Instruments					
US excess bond premium (% points)	993	0.03	0.42	-0.63	1.15
US term spread (% points)	993	-1.62	1.29	-3.74	1.14
US Federal Funds rate (%)	993	6.13	3.62	0.16	16.38
AM equity capital gain	993	0.09	0.16	-0.40	0.34
AM equity dividend yield	993	0.50	0.16	0.28	0.83
External debt-to-GDP ratio	993	0.62	0.40	0	3.06
Interest payments-to-GDP ratio (long-term)	993	0.02	0.02	0	0.14
Interest payments-to-GDP ratio (short-term)	993	0.00	0.01	0	0.04
Past number of post-default	993	1.13	1.18	0	6
Past number of weakly preemptive	993	0.68	1.04	0	4
Past number of strictly preemptive	993	0.27	0.89	0	5

Notes: The table shows summary statistics of variables for the observations used in baseline AIPW estimations (Figure 3 in Section II.B). The growth rates of GDP, investment, and private credit are measured in rate of change, $100 \times [\ln(A_t) - \ln(A_{t-1})]$ for variable A. The changes in 'gross capital inflows-to-GDP ratio' and 'gross capital inflows to the private sector-to-GDP ratio' are measured in percentage change where it is $100 \times \left[\frac{A_t}{GDP_t} - \frac{A_{t-1}}{GDP_{t-1}}\right]$ for variable A.

A.2. Debt Restructurings, Banking Crises, and Sudden Stops

TABLE A2 – SUMMARY STATISTICS, BANKING CRISES PRIOR TO DEBT RESTRUCTURINGS

	Number of observations (1)	Banking crisis in year t or year $t-1$ (2)	Probability of Banking crisis (3) = (2)/(1) ×100
All restructuring episodes	123	19	15%
Post-default	68	9	13%
Preemptive	55	10	18%
Weakly preemptive	35	7	20%
Strictly preemptive	20	3	15%
Non-restructuring time	1165	58	5%

Notes: Column (2) shows the number of debt restructuring episodes where a banking crisis occurred in the contemporaneous year or the previous year.

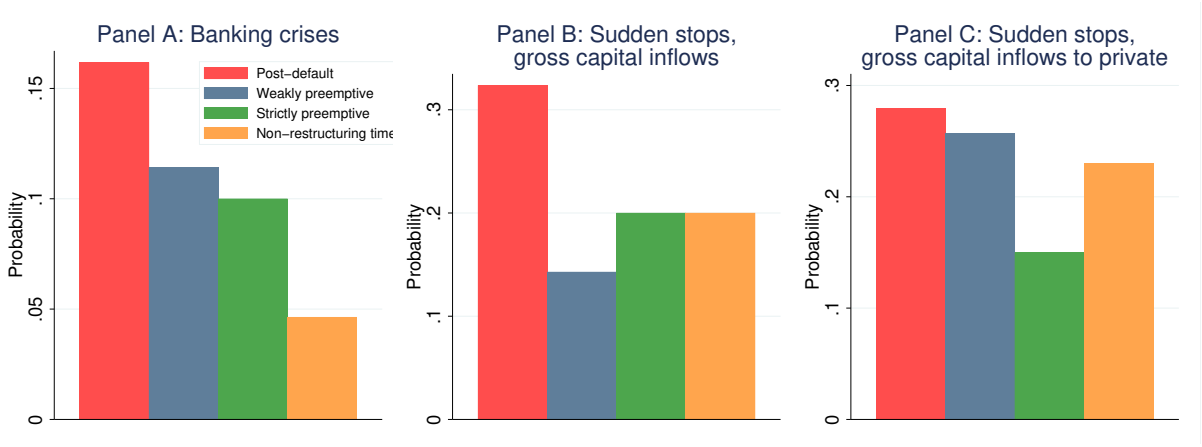
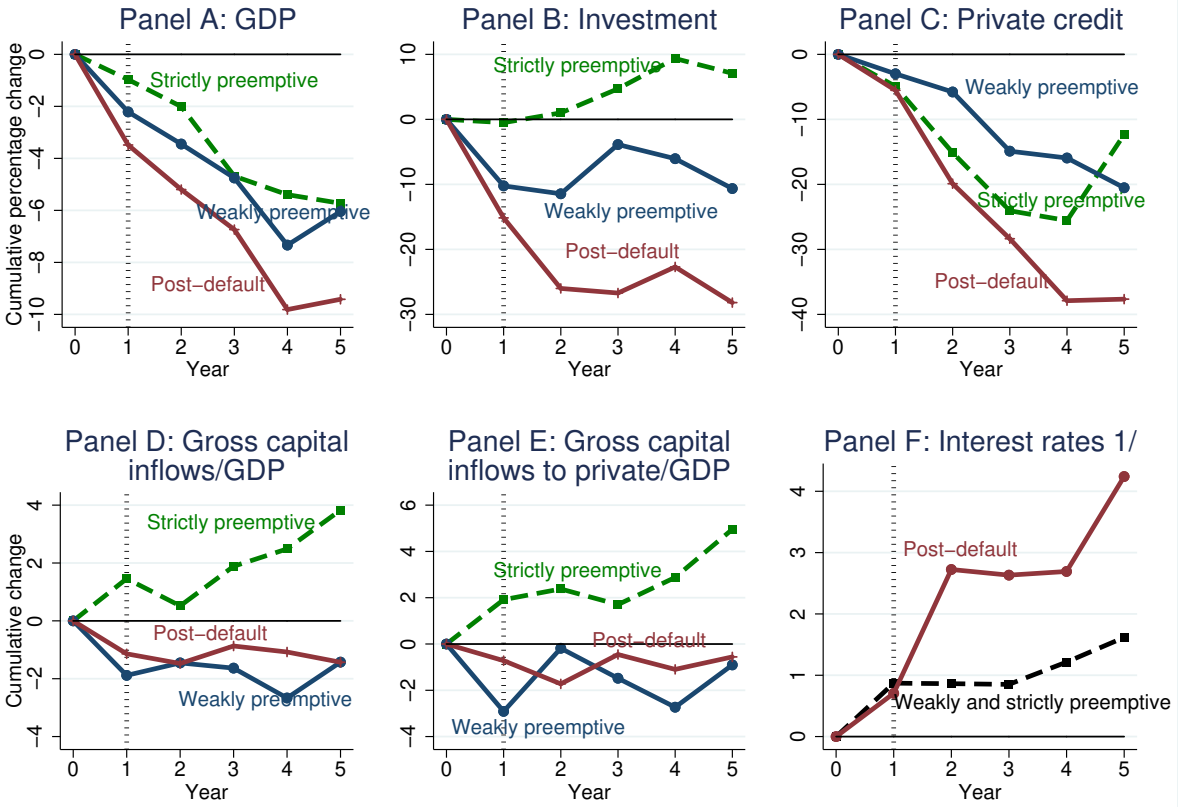


FIGURE A1 – BANKING CRISES AND SUDDEN STOPS AFTER DEBT RESTRUCTURINGS, BALANCED RESTRUCTURING SAMPLE

B. Stylized Facts: Evolution of Median Values around Restructurings



Notes: GDP (real), investment (real), private credit (real) are measured as a demeaned cumulative percentage change from the pre-crisis ($t = 0$) level. Capital inflows-to-GDP and lending interest rates are measured as a demeaned cumulative change from the pre-crisis level ($t = 0$) level. Vertical dotted lines correspond to the start of restructurings (at $t = 1$).

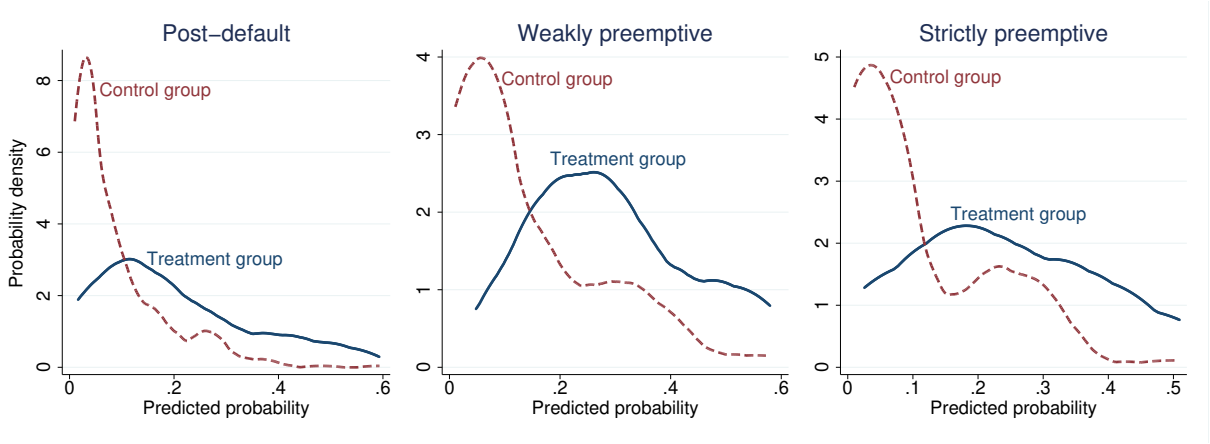
1/ Weakly and strictly preemptive restructurings are combined due to the limited number of observations with lending rate data for the latter.

FIGURE B1 – GDP, INVESTMENT, PRIVATE CREDIT, CAPITAL FLOWS, AND LENDING RATES AROUND DEBT RESTRUCTURINGS, MEDIAN, BALANCED RESTRUCTURING SAMPLE

C. Estimation Results from Local Projections

C.1. Characteristics of Treatment and Control Groups

Figure C2 shows kernel density estimates of predicted probabilities of debt restructurings for the treatment group and the control group for the three restructuring strategies. Table C3 presents results from examining a difference between the treatment and the control groups for each of the control variables and instruments.



Notes: The figure shows kernel density estimates of the distribution of predicted probability of treatment (debt restructurings) for the treatment and the control groups, for each of the three restructuring strategies. The treatment group is the group of observations experiencing the indicated type of debt restructuring and the control group includes all other observations. The kernel density estimates are shown for the range $[0.01, 0.6]$.

FIGURE C1 – KERNEL DENSITY ESTIMATES FOR TREATMENT AND CONTROL GROUPS

TABLE C1 – CHARACTERISTICS OF TREATMENT AND CONTROL GROUPS

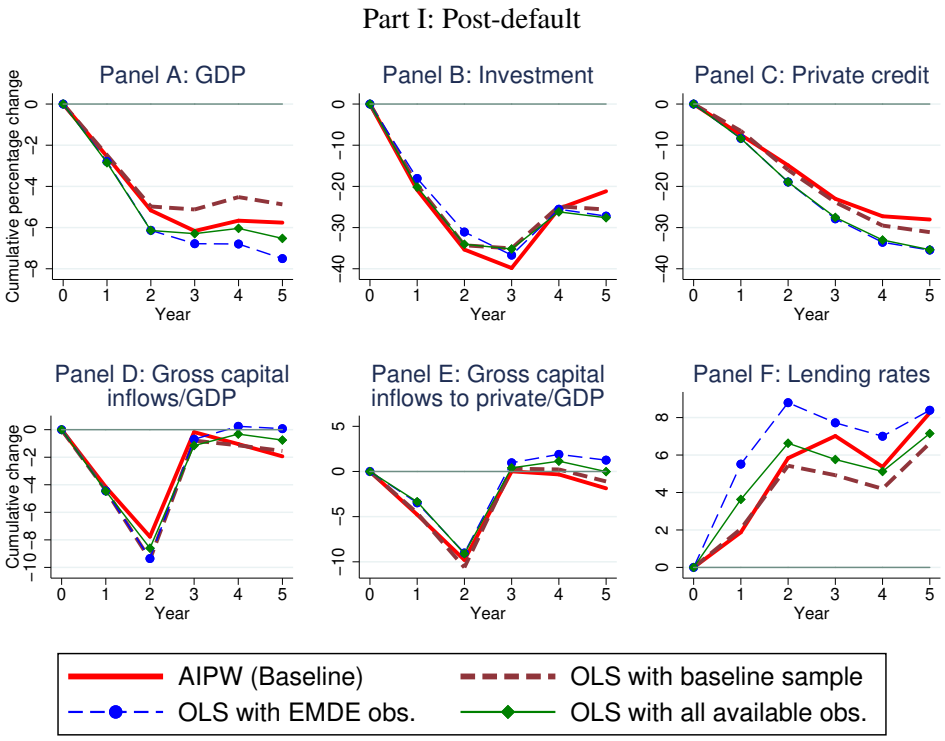
	Number of past post-default (1)	Number of past weakly preemptive (2)	Number of past strictly preemptive (3)	External debt-to-GDP ratio (4)	Long-term interest payments-to-GDP ratio (5)	Short-term interest payments-to-GDP ratio (6)	US excess bond premium (7)	US term spread (8)
Post-default	0.22**	0.02	0.01	0.08	1.05***	0.23***	0.15***	-0.21
	(0.09)	(0.05)	(0.02)	(0.08)	(0.17)	(0.07)	(0.03)	(0.13)
Weakly preemptive	-0.24*	0.29***	-0.11	0.19***	1.98***	0.31***	0.09**	-0.40***
	(0.12)	(0.07)	(0.11)	(0.04)	(0.26)	(0.07)	(0.04)	(0.15)
Strictly preemptive	-0.24	0.02	0.19	0.09*	1.08***	0.02	0.05	0.22
	(0.16)	(0.22)	(0.26)	(0.05)	(0.34)	(0.07)	(0.08)	(0.24)
Constant	0.88***	0.33***	0.17***	0.75***	1.76***	0.28***	0.02***	-1.60***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.01)
R-squared	0.004	0.005	0.003	0.001	0.019	0.009	0.006	0.002
N. of observations	2,788	2,788	2,788	2,125	2,125	2,125	2,584	2,720
N. of countries	68	68	68	59	59	59	68	68

	US federal funds rates (9)	AM capital gain (10)	AM dividend yield (11)	Cyclical comp. of ln(GDP) (12)	Banking crisis dummy (13)	Terms of trade (14)	Government expenditure--to-GDP ratio (15)	Nominal exchange rate (level) (16)
Post-default	2.26***	5.27***	3.27**	-0.01*	0.07**	-0.03**	1.31*	-5.94
	(0.36)	(1.65)	(1.39)	(0.00)	(0.03)	(0.01)	(0.74)	(118.04)
Weakly preemptive	2.58***	11.41***	2.60	-0.01	0.05	-0.02	0.03	-83.62
	(0.51)	(1.66)	(2.56)	(0.01)	(0.04)	(0.02)	(0.69)	(62.15)
Strictly preemptive	1.97*	0.34	3.62	0.02***	0.08	-0.07***	1.95*	-14.48**
	(1.00)	(2.85)	(5.84)	(0.01)	(0.08)	(0.02)	(1.06)	(6.10)
Constant	6.01***	7.75***	51.16***	0.00***	0.02***	1.00***	15.03***	329.74***
	(0.02)	(0.07)	(0.08)	(0.00)	(0.00)	(0.00)	(0.03)	(3.51)
R-squared	0.023	0.010	0.002	0.003	0.009	0.003	0.005	0.000
N. of obs.	2,788	2,788	2,788	2,706	2,788	2,527	2,156	2,479
N. of countries	68	68	68	66	68	66	64	68

Notes: All regressions include country fixed effects. Robust standard errors, clustered at the country-level, are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

C.2. Ordinary Least Square (OLS) Estimator

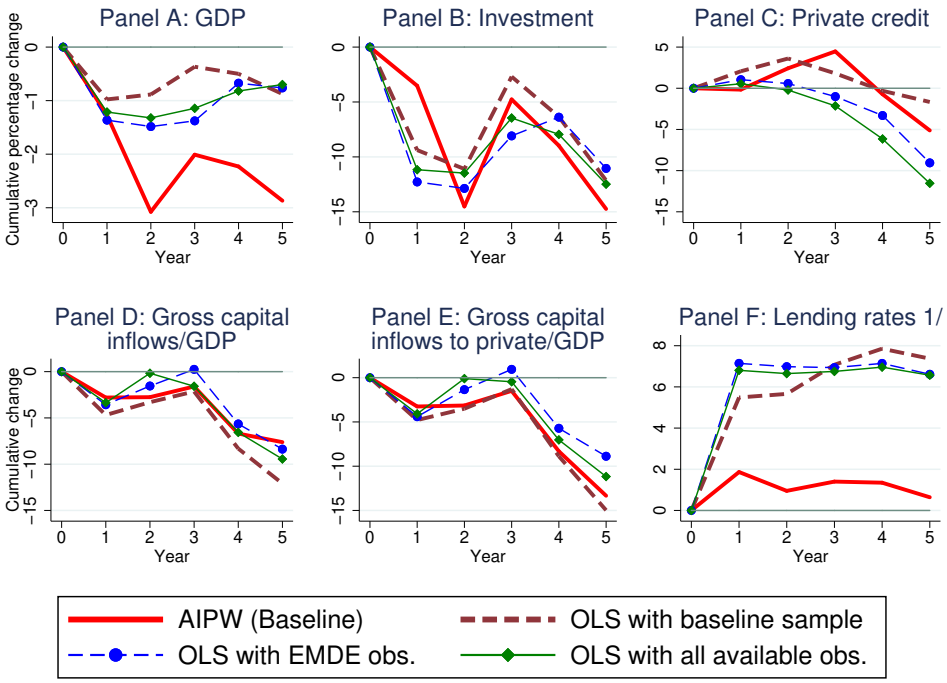
Previous studies on sovereign defaults use a wider coverage of countries including those that have never defaulted. For instance, on defaults on private extenral debt, Furceri and Zdzienicka (2012) and Kuvshinov and Zimmermann (2016) use a sample of 154 countries and 114 countries, respectively. We set our sample to follow as close as possible the conventional approach in these studies. We exclude high income countries where the Purchasing Power Parity (PPP) adjusted GDP per capita is higher than the 80th percentile of the entire sample in 2000 since we do not have any restructuring episodes for advanced economies (Greece's 2011–12 restructuring takes place outside of the time sample used in this paper). That leaves 96 countries in the sample, a similar number to that in Furceri and Zdzienicka (2012) and Kuvshinov and Zimmermann (2016). Figure C2 reports the OLS estimates based on three samples of observations together with our baseline AIPW estimates; (i) our baseline sample; (ii) sample based on emerging market and developing economies (EMDE)—following the IMF WEO classification—; (iii) sample based on the aforementioned 96 countries. Table C2 summarizes point estimates plotted in Figure C2 where it only reports results from employing the annualized sum over 5 years — e.g., $\frac{1}{5}\sum_{k=1}^{5}[\ln(GDP_{i,t+k}) - \ln(GDP_{i,t})]$ for GDP — as the dependent variable.



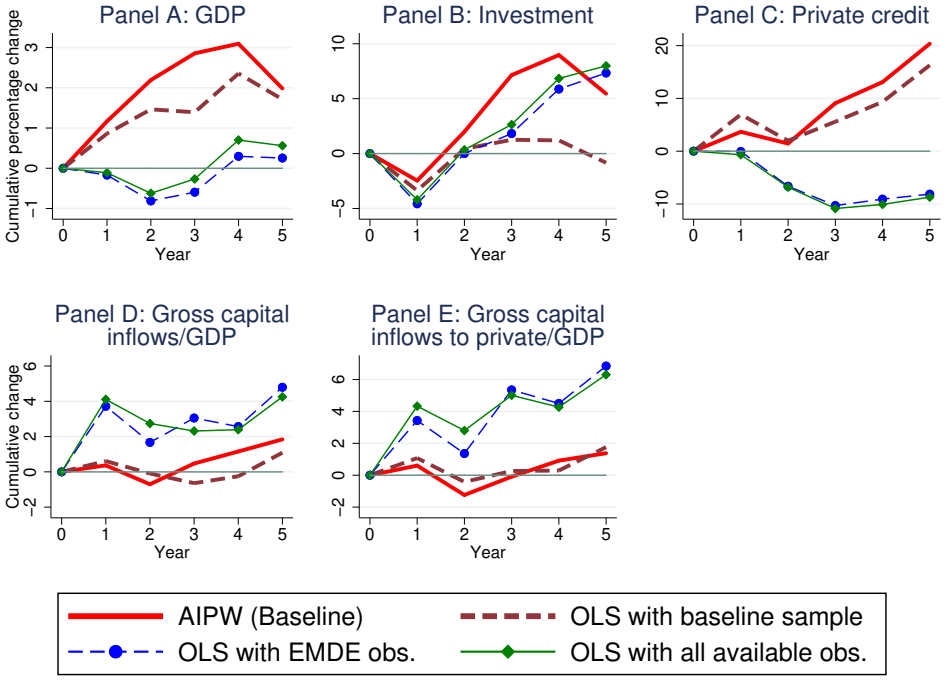
Notes: The figure shows point estimates from AIPW (baseline), OLS with baseline sample, OLS with EMDE observations, and OLS with all available observations (based on 142 countries).

FIGURE C2 – LOCAL PROJECTIONS, OLS

Part II: Weakly preemptive



Part III: Strictly preemptive



Notes: The figure shows point estimates from AIPW (baseline), OLS with baseline sample, OLS with EMDE observations, and OLS with all available observations (based on 142 countries).

1/ Panel F of Part II shows lending interest rates for weakly and strictly preemptive due to a small number of available observations for the lending interest rates.

Table C2 – Local Projections, OLS

Dependent Variable = Annualized Sum of Cumulative Losses over 5 Years

	Panel A: GDP				Panel B: Investment				Panel C: Private credit			
		OLS				OLS				OLS		
	AIPW	Baseline sample	EMDE obs.	All obs.	AIPW	Baseline sample	EMDE obs.	All obs.	AIPW	Baseline sample	EMDE obs.	All obs.
Post-default	-4.98***	-4.39***	-5.92***	-5.50***	-28.5***	-28.0***	-27.6***	-28.6***	-19.4***	-21.5***	-25.1***	-24.9***
	(0.68)	(1.11)	(1.21)	(1.19)	(3.09)	(5.39)	(5.52)	(5.15)	(2.30)	(3.98)	(4.19)	(3.96)
N. of obs.	793	793	2030	2724	793	793	2026	2720	754	754	1955	2599
N. of countries	29	29	96	142	29	29	96	142	28	28	95	139
N. of episodes	51	51	49	54	51	51	48	53	49	49	47	52
Weakly preemptive	-2.61***	-0.80	-1.18	-1.11	-9.72***	-8.58	-10.4	-10.3	-0.03	-0.52	-4.49	-5.77
	(0.49)	(3.10)	(2.14)	(2.09)	(1.80)	(9.31)	(7.69)	(7.44)	(1.64)	(4.34)	(6.35)	(5.91)
N. of obs.	432	432	2028	2722	431	431	2024	2718	412	412	1949	2593
N. of countries	16	16	96	142	16	16	96	142	16	16	95	139
N. of episodes	28	28	31	32	28	28	31	32	24	24	27	28
Strictly preemptive	1.46**	1.37	-0.28	-0.07	1.70	-1.29	1.29	1.60	7.69***	7.97	-8.59	-9.14
	(0.65)	(2.68)	(2.06)	(2.35)	(2.21)	(8.90)	(6.41)	(6.13)	(2.31)	(14.77)	(11.51)	(10.72)
N. of obs.	194	194	2028	2722	194	194	2024	2718	187	187	1949	2593
N. of countries	8	8	96	142	8	8	96	142	8	8	95	139
N. of episodes	12	12	17	18	12	12	16	17	10	10	15	16

	Panel D: Gross capital inflows/GDP				Panel E: Gross capital inflows to private/GDP				Panel F: Lending interest rates			
		OLS				OLS				OLS		
	AIPW	Baseline sample	EMDE obs.	All obs.	AIPW	Baseline sample	EMDE obs.	All obs.	AIPW	Baseline sample	EMDE obs.	All obs.
Post-default	-3.08***	-3.38*	-2.52	-2.79	-3.74***	-3.46*	-1.85	-2.59	5.66***	4.65***	6.93	4.99
	(0.85)	(1.98)	(2.05)	(1.74)	(1.00)	(2.04)	(2.34)	(1.98)	(0.84)	(1.63)	(5.98)	(4.35)
N. of obs.	732	732	1843	2502	655	655	1657	2277	332	332	956	1371
N. of countries	28	28	94	140	28	28	90	135	17	17	74	102
N. of episodes	50	50	47	52	46	46	43	48	24	24	20	24
Weakly preemptive 1/	-4.40***	-6.32	-3.78**	-5.30	-5.97***	-6.73*	-3.84	-5.67	1.49	6.91	6.22	6.19
	(1.15)	(4.25)	(1.99)	(3.35)	(1.24)	(4.05)	(2.02)	(3.62)	(2.15)	(5.19)	(10.89)	(9.23)
N. of obs.	404	404	1843	2502	374	374	1657	2277	195	195	954	1369
N. of countries	16	16	94	140	16	16	90	135	10	10	74	102
N. of episodes	28	28	31	32	24	24	27	28	24	24	23	24
Strictly preemptive	0.54	0.04	2.95*	2.29	0.04	0.42	4.29**	3.85**				
	(0.28)	(0.72)	(1.68)	(1.74)	(0.29)	(0.53)	(1.81)	(1.58)				
N. of obs.	176	176	1843	2502	171	171	1657	2277				
N. of countries	8	8	94	140	8	8	90	135				
N. of episodes	11	11	16	17	11	11	16	17				

Notes: All regressions include country fixed effects and controls used in the baseline model. Robust standard errors, clustered at the country-level, are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

1/ For Panel F: Lending interest rates, the rows for 'Weakly preemptive' report the results for 'Preemptive (weakly and strictly)'.

C.3. Augmented Inverse Probability Weighted (AIPW) Estimator

Table C3 presents baseline AIPW estimates plotted in Figure 3 in Section II.B. Figure C3 shows AIPW estimates where the dependent variable is the cumulative percentage change of the variable of our interest divided by the initial GDP, $100 \times \frac{A_t - A_{t-1}}{GDP_{t-1}}$ for variable A. Point estimates are reported in Table C4.

Figure C4 shows AIPW estimates with an unbalanced restructuring sample. Point estimates are reported in Table C5. Figure C4 and Table C5 yield similar results to our baseline estimates.

Figure C5 shows AIPW estimates with pre- and post-1990 subsamples. Point estimates are reported in Table C6. These show that post-default restructurings have a similar experience in both periods, but preemptive restructurings have markedly better outcomes in the post-1990 subsample than in the earlier period.

Table C3 – Baseline Estimation Results, AIPW

	Panel A: GDP						Panel B: Investment					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-2.55***	-5.16***	-6.16***	-5.66***	-5.76***	-4.98***	-20.8***	-35.3***	-39.8***	-25.4***	-21.2***	-28.5***
	(0.32)	(0.55)	(0.83)	(0.90)	(0.98)	(0.68)	(2.35)	(3.02)	(4.10)	(4.19)	(3.48)	(3.09)
N. of obs.	906	877	849	821	793	793	906	877	849	821	793	793
N. of countries	29	29	29	29	29	29	29	29	29	29	29	29
N. of episodes	52	52	52	51	51	51	52	52	52	51	51	51
Weakly preemptive	-1.36***	-3.21***	-2.26***	-2.61***	-3.19***	-2.61***	-3.64***	-14.2***	-4.84**	-9.47***	-15.1***	-9.72***
	(0.25)	(0.50)	(0.53)	(0.62)	(0.69)	(0.49)	(1.25)	(2.12)	(2.23)	(2.19)	(2.75)	(1.80)
N. of obs.	495	479	463	447	432	432	494	478	462	446	431	431
N. of countries	16	16	16	16	16	16	16	16	16	16	16	16
N. of episodes	28	28	28	28	28	28	28	28	28	28	28	28
Strictly preemptive	0.68*	1.14**	1.47**	1.16	-0.17	0.57	-4.83***	-1.71	1.77	2.81	-0.21	-1.29
	(0.33)	(0.51)	(0.74)	(1.00)	(1.13)	(0.66)	(1.51)	(1.98)	(2.48)	(3.16)	(3.04)	(2.18)
N. of obs.	245	236	228	219	210	210	245	236	228	219	210	210
N. of countries	9	9	9	9	9	9	9	9	9	9	9	9
N. of episodes	13	13	13	13	13	13	13	13	13	13	13	13

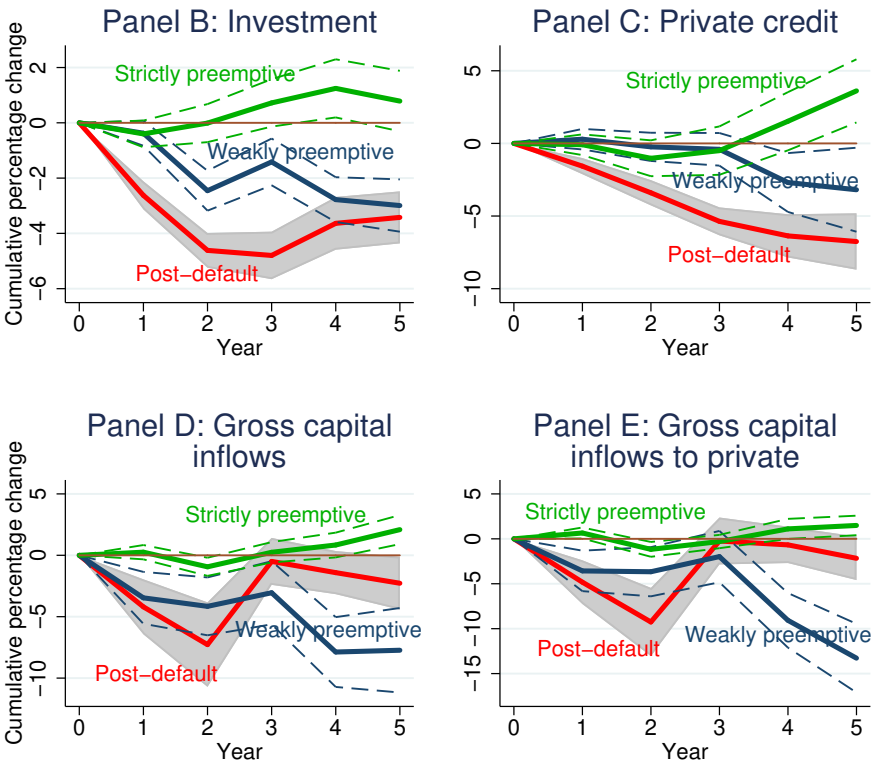
	Panel C: Private credit						Panel D: Gross capital inflows/GDP					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-7.49***	-14.9***	-23.0***	-27.2***	-28.0***	-19.4***	-4.16***	-7.77***	-0.18	-1.04	-1.94*	-3.08***
	(1.38)	(1.87)	(2.14)	(3.38)	(4.22)	(2.30)	(1.15)	(1.97)	(0.99)	(0.87)	(1.03)	(0.85)
N. of obs.	869	840	812	783	755	754	843	814	787	761	735	732
N. of countries	28	28	28	28	28	28	28	28	28	28	28	28
N. of episodes	51	51	51	49	49	49	51	51	51	50	50	50
Weakly preemptive	-0.45	2.04	4.65**	0.12	-3.78	-0.03	-2.79**	-2.76*	-1.60	-6.66***	-7.68***	-4.40***
	(1.00)	(1.45)	(1.81)	(2.28)	(2.70)	(1.64)	(1.13)	(1.36)	(1.42)	(1.42)	(1.76)	(1.15)
N. of obs.	487	468	450	433	417	412	467	451	435	419	404	404
N. of countries	16	16	16	16	16	16	16	16	16	16	16	16
N. of episodes	28	27	26	25	25	24	28	28	28	28	28	28
Strictly preemptive	3.16**	0.14	6.84**	10.1***	17.1***	7.69***	-0.03	-0.95***	0.70*	1.13***	2.29***	0.43
	(1.54)	(2.22)	(2.78)	(2.83)	(2.87)	(2.31)	(0.28)	(0.34)	(0.36)	(0.43)	(0.45)	(0.28)
N. of obs.	222	213	206	198	190	187	228	219	210	200	190	190
N. of countries	8	8	8	8	8	8	9	9	9	9	9	9
N. of episodes	11	11	10	11	11	10	12	12	11	11	11	11

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

	Panel E: Gross capital inflows to private/GDP						Panel F: Lending interest rates					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-4.78***	-9.79***	0.02	-0.32	-1.86	-3.74***	1.88***	5.83***	7.02***	5.37***	8.25***	5.66***
	(1.24)	(2.16)	(1.35)	(1.01)	(1.17)	(1.00)	(0.37)	(0.76)	(1.11)	(0.91)	(1.24)	(0.84)
N. of obs.	812	771	737	707	676	655	400	382	366	349	333	332
N. of countries	28	28	28	28	28	28	17	17	17	17	17	17
N. of episodes	51	51	50	49	46	46	25	25	25	24	24	24
Weakly preemptive 1/	-3.28***	-3.16**	-1.46	-8.28***	-13.4***	-5.97***	1.74	0.99	1.43	1.33	0.97	1.48
	(1.17)	(1.45)	(1.48)	(1.49)	(1.90)	(1.24)	(1.31)	(2.11)	(2.20)	(2.19)	(2.38)	(2.01)
N. of obs.	455	434	414	396	377	374	252	240	229	218	208	207
N. of countries	16	16	16	16	16	16	11	11	11	11	11	11
N. of episodes	28	28	27	24	24	24	25	25	25	25	25	25
Strictly preemptive	0.27	-1.70***	-0.10	0.40	1.60***	-0.22						
	(0.31)	(0.41)	(0.34)	(0.59)	(0.43)	(0.33)						
N. of obs.	224	214	204	192	181	180						
N. of countries	9	9	9	9	9	9						
N. of episodes	12	12	11	11	11	11						

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

1/ For Panel F: Lending interest rates, the rows for 'Weakly preemptive' report the results for 'Preemptive (weakly and strictly)'.



Notes: The figure shows local projections of the variables shown in each panel for $h = 1, 2, .., 5$, where h indicates horizon. Solid lines in red, blue, and green are point estimates for restructuring strategies. Gray bands and dotted lines in blue and green are 95 percent confidence intervals for restructuring strategies.

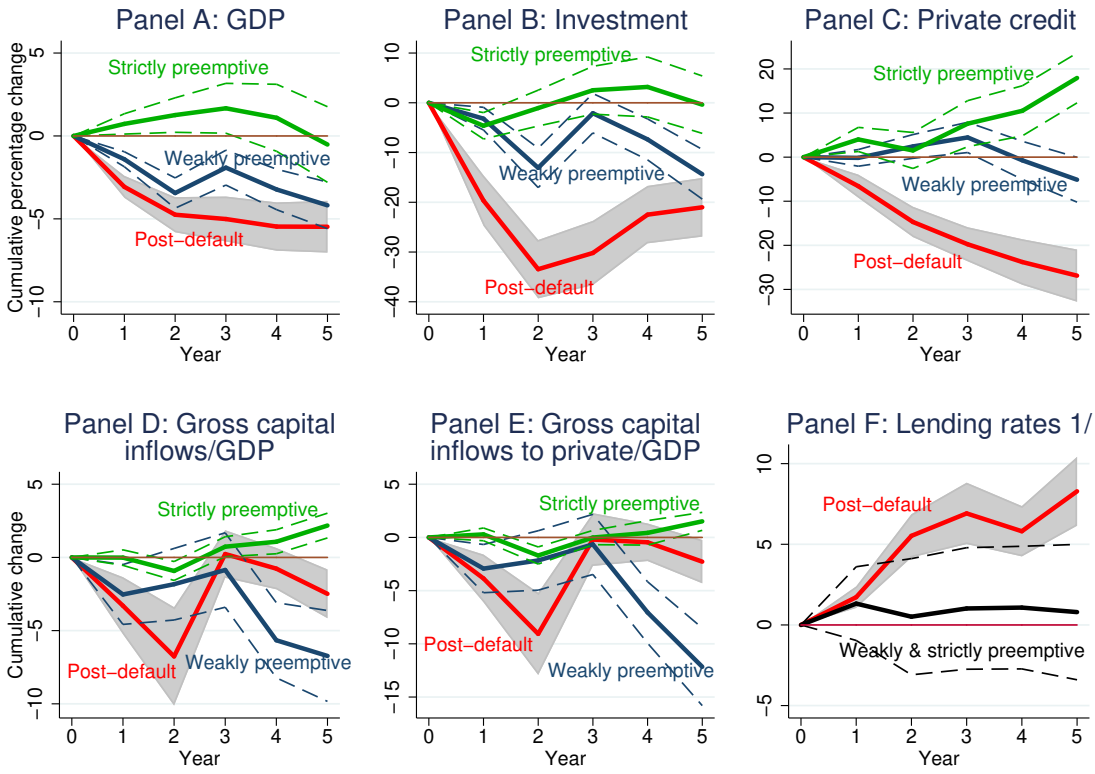
FIGURE C3 – LOCAL PROJECTIONS, AIPW, ROBUSTNESS, DEPENDENT VARIABLE IS CUMULATIVE CHANGE FROM YEAR 0 DIVIDED BY GDP AT YEAR 0

TABLE C4 – LOCAL PROJECTIONS, AIPW, ROBUSTNESS, CUMULATIVE PERCENTAGE CHANGES FROM YEAR 0 DIVIDED BY GDP AT YEAR 0

	Panel B: Investment						Panel C: Private credit					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-2.62***	-4.61***	-4.80***	-3.64***	-3.42***	-3.80***	-1.57***	-3.40***	-5.37***	-6.37***	-6.75***	-4.74***
	(0.26)	(0.32)	(0.44)	(0.49)	(0.48)	(0.34)	(0.28)	(0.44)	(0.49)	(0.76)	(0.99)	(0.53)
N. of obs.	906	877	849	821	793	793	869	840	812	783	755	754
N. of countries	29	29	29	29	29	29	28	28	28	28	28	28
N. of episodes	52	52	52	51	51	51	51	51	51	49	49	49
Weakly preemptive	-0.38	-2.46***	-1.41***	-2.78***	-2.99***	-2.00***	0.29	-0.24	-0.41	-2.69***	-3.19**	-1.64***
	(0.23)	(0.37)	(0.43)	(0.41)	(0.48)	(0.33)	(0.36)	(0.50)	(0.57)	(1.03)	(1.47)	(0.52)
N. of obs.	494	478	462	446	431	431	488	469	451	434	418	413
N. of countries	16	16	16	16	16	16	16	16	16	16	16	16
N. of episodes	28	28	28	28	28	28	28	27	26	25	25	24
Strictly preemptive	-1.11***	-0.87**	-0.50	-0.23	-0.72	-0.82*	-0.09	-1.02	-0.50	1.53	3.62***	0.03
	(0.28)	(0.38)	(0.51)	(0.61)	(0.65)	(0.44)	(0.36)	(0.63)	(0.85)	(1.02)	(1.11)	(0.72)
N. of obs.	245	236	228	219	210	210	222	213	206	198	190	187
N. of countries	9	9	9	9	9	9	8	8	8	8	8	8
N. of episodes	13	13	13	13	13	13	11	11	10	11	11	10

	Panel D: Gross capital inflows						Panel E: Gross capital inflows to private					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-4.20***	-7.27***	-0.50	-1.41	-2.27**	-3.19***	-4.82***	-9.26***	-0.24	-0.67	-2.16*	-3.82***
	(1.14)	(1.76)	(0.97)	(0.90)	(1.10)	(0.84)	(1.24)	(1.94)	(1.33)	(1.03)	(1.24)	(0.99)
N. of obs.	842	813	786	760	734	731	812	771	737	707	676	655
N. of countries	28	28	28	28	28	28	28	28	28	28	28	28
N. of episodes	51	51	51	50	50	50	51	51	50	49	46	46
Weakly preemptive	-3.46***	-4.16***	-3.05**	-7.88***	-7.73***	-5.42***	-3.57***	-3.66***	-1.98	-9.07***	-13.3***	-6.40***
	(1.08)	(1.20)	(1.31)	(1.45)	(1.76)	(1.09)	(1.15)	(1.40)	(1.46)	(1.55)	(1.95)	(1.25)
N. of obs.	466	450	434	418	403	403	455	434	414	396	377	374
N. of countries	16	16	16	16	16	16	16	16	16	16	16	16
N. of episodes	28	28	28	28	28	28	28	28	27	24	24	24
Strictly preemptive	-0.12	-1.10***	0.50	0.70	2.43***	0.29	0.34	-1.61***	-0.22	0.63	1.64***	-0.17
	(0.29)	(0.36)	(0.40)	(0.50)	(0.57)	(0.32)	(0.32)	(0.43)	(0.37)	(0.63)	(0.54)	(0.36)
N. of obs.	227	218	209	199	189	189	224	214	204	192	181	180
N. of countries	9	9	9	9	9	9	9	9	9	9	9	9
N. of episodes	12	12	11	11	11	11	12	12	11	11	11	11

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.



Notes: The figure shows local projections of the variables shown in each panel for $h = 1, 2, .., 5$, where h indicates horizon. Solid lines in red, blue, and green are point estimates for restructuring strategies. Gray bands and dotted lines in blue and green are 95 percent confidence intervals for restructuring strategies.

FIGURE C4 – LOCAL PROJECTIONS, AIPW, ROBUSTNESS, UNBALANCED RESTRUCTURING SAMPLE

TABLE C5 – LOCAL PROJECTIONS, AIPW, ROBUSTNESS, UNBALANCED RESTRUCTURING SAMPLE

	Panel A: GDP						Panel B: Investment					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-3.07***	-4.75***	-5.01***	-5.46***	-5.47***	-4.73***	-19.7***	-33.4***	-30.2***	-22.5***	-21.0***	-25.7***
	(0.34)	(0.54)	(0.69)	(0.74)	(0.80)	(0.58)	(2.59)	(3.00)	(3.29)	(2.95)	(3.01)	(2.66)
N. of obs.	1382	1341	1301	1260	1219	1219	1383	1342	1302	1261	1220	1220
N. of countries	41	41	41	41	41	41	41	41	41	41	41	41
N. of episodes	71	71	71	70	70	70	71	71	71	70	70	70
Weakly preemptive	-1.40***	-3.44***	-1.91***	-3.23***	-4.18***	-2.91***	-3.19***	-13.1***	-2.09	-7.35***	-14.4***	-8.28***
	(0.23)	(0.47)	(0.54)	(0.62)	(0.72)	(0.49)	(1.16)	(2.02)	(2.02)	(2.10)	(2.55)	(1.71)
N. of obs.	566	550	534	518	502	502	566	550	534	518	502	502
N. of countries	16	16	16	16	16	16	16	16	16	16	16	16
N. of episodes	29	29	29	29	29	29	29	29	29	29	29	29
Strictly preemptive	0.73**	1.26**	1.67**	1.10	-0.51	0.56	-4.62***	-1.06	2.52	3.19	-0.37	-0.92
	(0.31)	(0.53)	(0.77)	(1.03)	(1.16)	(0.71)	(1.35)	(1.84)	(2.45)	(3.08)	(2.94)	(2.12)
N. of obs.	283	274	266	257	248	248	283	274	266	257	248	248
N. of countries	9	9	9	9	9	9	9	9	9	9	9	9
N. of episodes	13	13	13	13	13	13	13	13	13	13	13	13

	Panel C: Private credit						Panel D: Gross capital inflows/GDP					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-6.58***	-14.7***	-19.8***	-23.8***	-26.9***	-18.1***	-3.30***	-6.76***	0.23	-0.77	-2.49***	-2.71***
	(1.34)	(1.76)	(1.97)	(2.64)	(3.03)	(1.86)	(0.99)	(1.71)	(0.83)	(0.72)	(0.85)	(0.71)
N. of obs.	1165	1127	1091	1053	1018	1012	1081	1046	1012	978	944	940
N. of countries	34	34	34	34	34	34	35	35	35	35	35	35
N. of episodes	61	61	62	60	60	59	59	59	59	58	58	58
Weakly preemptive	-0.16	2.43*	4.47**	-0.73	-5.12**	-0.09	-2.53**	-1.83	-0.86	-5.66***	-6.73***	-3.61***
	(0.96)	(1.37)	(1.75)	(2.20)	(2.59)	(1.60)	(1.04)	(1.25)	(1.30)	(1.31)	(1.58)	(1.05)
N. of obs.	549	531	514	497	481	473	510	494	478	462	446	446
N. of countries	16	16	16	16	16	16	16	16	16	16	16	16
N. of episodes	28	27	26	25	25	24	29	29	29	29	29	29
Strictly preemptive	4.02***	1.52	7.59***	10.5***	18.0***	8.74***	-0.01	-0.93***	0.73**	1.07**	2.18***	0.40
	(1.39)	(2.08)	(2.67)	(2.90)	(2.88)	(2.30)	(0.27)	(0.33)	(0.35)	(0.42)	(0.43)	(0.27)
N. of obs.	270	260	251	241	231	227	236	227	218	208	198	198
N. of countries	9	9	9	9	9	9	9	9	9	9	9	9
N. of episodes	11	11	10	11	11	10	12	12	11	11	11	11

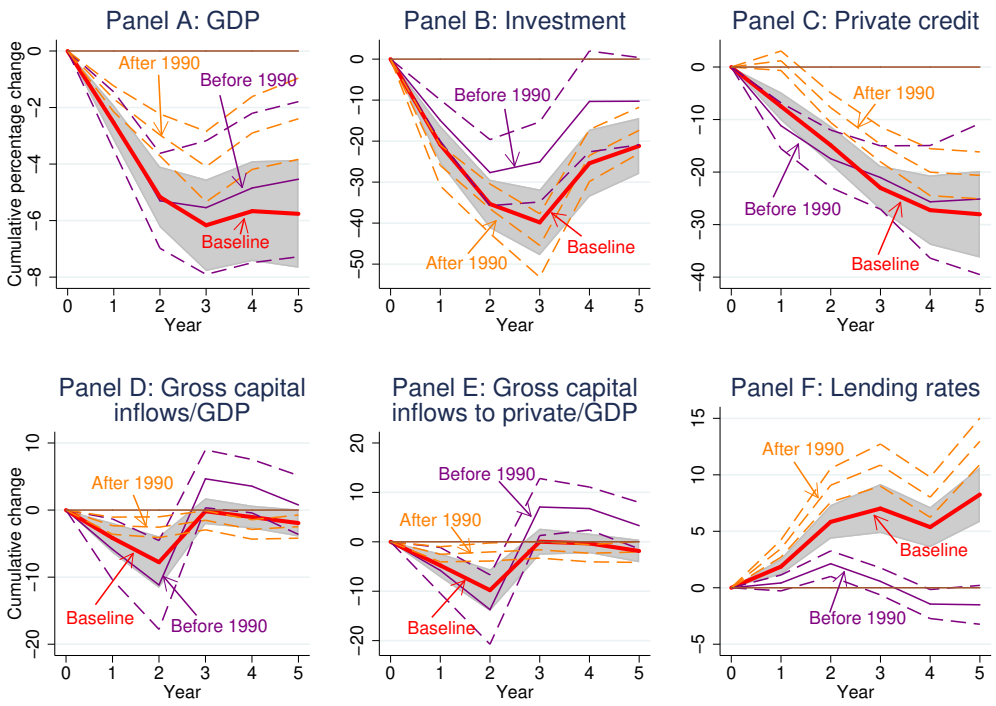
Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

	Panel E: Gross capital inflows to private/GDP						Panel F: Lending interest rates					
	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean	$h=1$	$h=2$	$h=3$	$h=4$	$h=5$	Mean
Post-default	-3.85***	-9.06***	-0.20	-0.46	-2.28**	-3.68***	1.72***	5.52***	6.92***	5.81***	8.28***	5.66***
	(1.15)	(1.97)	(1.26)	(0.90)	(1.04)	(0.91)	(0.34)	(0.68)	(0.97)	(0.80)	(1.09)	(0.74)
N. of obs.	941	897	861	822	786	751	462	443	425	406	387	386
N. of countries	34	34	34	34	34	34	18	18	18	18	18	18
N. of episodes	57	56	56	55	51	50	26	26	26	25	25	25
Weakly preemptive 1/	-2.93**	-2.16	-0.65	-7.05***	-12.2***	-4.99***	1.32	0.51	1.02	1.08	0.80	1.23
	(1.16)	(1.42)	(1.44)	(1.47)	(1.86)	(1.23)	(1.17)	(1.84)	(1.92)	(1.94)	(2.14)	(1.77)
N. of obs.	462	441	423	404	386	381	284	272	261	249	237	236
N. of countries	16	16	16	16	16	16	11	11	11	11	11	11
N. of episodes	29	29	28	25	25	25	26	26	26	25	25	25
Strictly preemptive	0.29	-1.70***	-0.01	0.43	1.51***	-0.21						
	(0.31)	(0.41)	(0.34)	(0.59)	(0.43)	(0.33)						
N. of obs.	225	215	206	194	183	181						
N. of countries	9	9	9	9	9	9						
N. of episodes	12	12	11	11	11	11						

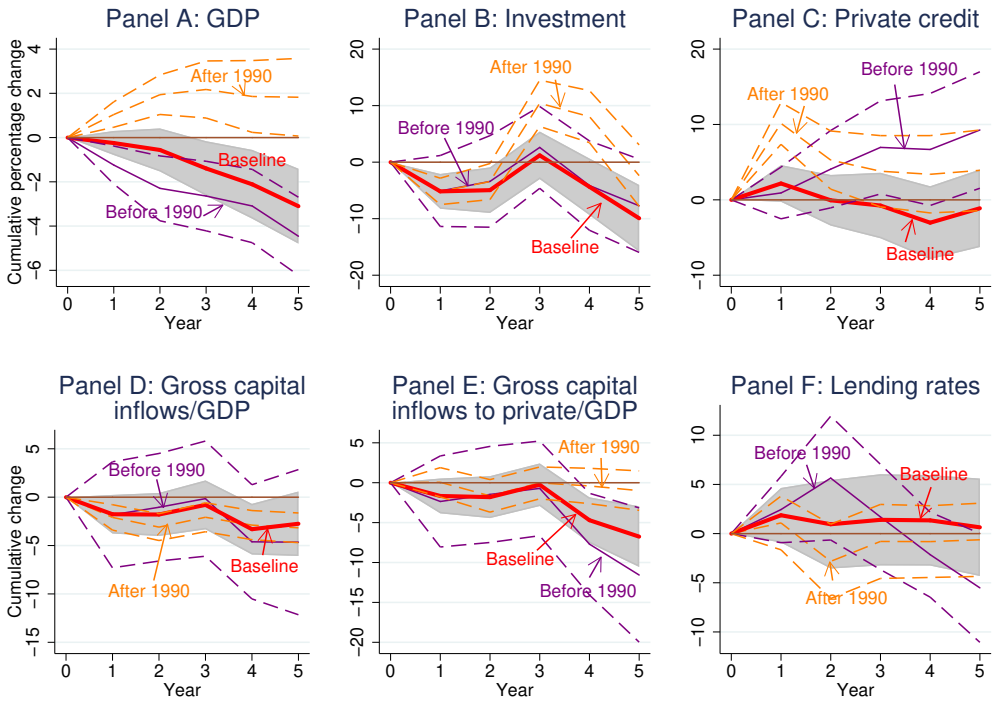
Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

1/ For Panel F: Lending interest rates, the rows for 'Weakly preemptive' report the results for 'Preemptive (weakly and strictly)'.

Part I: Post-default



Part II: Preemptive (weakly and strictly)



Notes: The figure shows local projections of the variables based on the baseline sample, the subsamples of 1970–1989 and 1990–2010.

FIGURE C5 – LOCAL PROJECTIONS, AIPW, ROBUSTNESS, SUBSAMPLE

TABLE C6 – LOCAL PROJECTIONS, AIPW, ROBUSTNESS, SUBSAMPLE

Dependent Variable = Annualized Sum of Cumulative Losses over 5 Years

	Panel A: GDP			Panel B: Investment			Panel C: Private credit		
	Baseline	1970–1989	1990–2010	Baseline	1970–1989	1990–2010	Baseline	1970–1989	1990–2010
Post-default	-4.98***	-4.54***	-3.10***	-28.5***	-17.7***	-31.3***	-19.4***	-20.0***	-12.5***
	(0.68)	(0.97)	(0.50)	(3.09)	(3.88)	(2.97)	(2.30)	(3.72)	(1.51)
N. of obs.	793	367	453	793	367	453	754	348	431
N. of countries	29	28	29	29	28	29	28	27	28
N. of episodes	51	40	11	51	40	11	49	38	11
Preemptive	-1.69***	-2.75***	1.35**	-5.28***	-3.55	-0.02	-1.90	5.35*	3.84*
	(0.57)	(0.61)	(0.61)	(1.89)	(3.07)	(1.74)	(1.88)	(2.78)	(2.12)
N. of obs.	474	205	285	474	205	285	455	192	276
N. of countries	18	16	18	18	16	18	18	16	18
N. of episodes	40	31	9	40	31	9	34	26	8

	Panel D: Gross capital inflows/GDP			Panel E: Gross capital inflows to private/GDP			Panel F: Lending interest rates		
	Baseline	1970–1989	1990–2010	Baseline	1970–1989	1990–2010	Baseline	1970–1989	1990–2010
Post-default	-3.08***	-1.61	-2.92***	-3.74***	-0.67	-2.68***	5.66***	0.03	9.35***
	(0.85)	(1.34)	(0.74)	(1.00)	(1.58)	(0.91)	(0.84)	(0.51)	(0.73)
N. of obs.	732	313	446	655	295	383	332	115	229
N. of countries	28	27	28	28	27	27	17	13	17
N. of episodes	50	39	11	46	36	10	24	18	6
Preemptive	-2.28**	-2.45	-3.48***	-3.13***	-4.53*	-1.49	1.49	0.43	-0.07
	(1.02)	(2.21)	(0.69)	(1.15)	(2.51)	(1.11)	(2.15)	(1.57)	(1.88)
N. of obs.	443	177	282	413	159	267	195	69	133
N. of countries	18	16	18	18	16	18	10	8	10
N. of episodes	39	30	9	35	26	9	24	15	9

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Robust standard errors, clustered at the country-level, are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

D. Role of Credit-Investment Channel

Table D1 shows the first-stage estimation results for our AIPW estimates exploring the role of credit and investment. Table D2 summarizes point estimates plotted in Figure 5 in Section II.C. Table D2 applies a balanced restructuring sample for the three variables—GDP, investment, and private credit—only. Figures 4 and 5 in Section II.C divide restructuring observations into two subsamples based on bank credit to the private sector as a share of GDP in the year prior to the restructuring. For each type of restructuring, we use its median among restructuring observations to classify half of the episodes as having a relatively large banking sector (above median), and the remaining half of the episodes as having a relatively small banking sector.

Figures D1 and D2 report one additional set of results applying a time-varying level threshold. We measure the relative importance of the banking sector by the difference between bank credit to the private sector as a share of GDP and its sample median in the year prior to the restructuring. Specifically, the level threshold is median of

$$\frac{\text{Bank credit}_{i,t-1}}{GDP_{i,t-1}} - \underset{k}{\text{median}}\left(\frac{\text{Bank credit}_{k,t-1}}{GDP_{k,t-1}}\right),$$

where i and k indicate country and t denotes year. We base the comparison on the previous year rather than on the entire sample median in order to take into account financial deepening over time (so what was a relatively large banking sector in 1980 may not be as large by 2000 standards). For all restructuring observations, we use that difference to classify half of the episodes as having a relatively large banking sector (above median difference), and the remaining half of the episodes as having a relatively small banking sector. Since we use a common level threshold (i.e., -1.4 percent of GDP) for both post-default and preemptive restructurings, 52 percent of post-default restructurings are classified as having a relatively large banking sector compared to 47 percent for weakly and strictly preemptive restructurings (with the combined share across all restructurings being 50 percent by construction). Figure D1 reports means of two subsamples and yields similar results to Figure 4 in Section II.C. Figure D2 reports AIPW estimates of two subsamples and yields similar results to Figure 5 in Section II.C.

Figure D3 reports OLS estimates corresponding to Figure 5 in Section II.C. They are qualitatively similar to our baseline results, but with preemptive restructurings achieving even better outcomes under OLS.

TABLE D1 – PREDICTING THE START OF DEBT RESTRUCTURINGS WITH RELATIVELY LARGE OR SMALL BANKING SECTORS, PROBIT

Dependent Variable = Dummy Taking 1 at the Start of Debt Restructuring				
	Post-default		Preemptive	
Relative size of banking sector	Large	Small	Large	Small
	(1)	(2)	(3)	(4)
Country-specific excluded instruments				
Past number of post-default	1.56***	0.25*	-0.83*	-0.35
	(0.48)	(0.14)	(0.46)	(0.79)
Past number of weakly preemptive	-0.07	0.83*	0.43	0.49
	(0.33)	(0.46)	(0.39)	(0.46)
Past number of strictly preemptive	0.37	-0.57	-0.33*	2.58**
	(0.50)	(0.78)	(0.18)	(1.19)
External debt-to-GDP ratio	-1.70**	-0.43	-2.82***	2.64*
	(0.84)	(0.66)	(0.87)	(1.52)
Interest payments-to-GDP ratio (long-term)	0.18*	0.04	0.63***	0.61
	(0.10)	(0.04)	(0.18)	(0.40)
Interest payments-to-GDP ratio (short-term)	1.07**	-0.42	0.77	-0.97**
	(0.46)	(0.34)	(0.53)	(0.48)
Global variable excluded instruments				
US excess bond premium	0.60	0.58	-0.23	0.09
	(0.38)	(0.40)	(0.63)	(1.12)
US term spreads	-0.27*	-0.34**	-0.12	-0.72***
	(0.15)	(0.17)	(0.23)	(0.24)
US federal funds rate	0.27***	0.35***	0.10	0.69***
	(0.09)	(0.09)	(0.10)	(0.21)
AM equity capital gain	3.32***	1.65**	1.67***	3.20
	(0.97)	(0.81)	(0.61)	(2.15)
AM equity dividend yield	-0.74	-0.00	0.60	3.18
	(1.19)	(1.79)	(1.77)	(2.83)
Controls from the second-stage, country-specific				
Cyclical component of $\ln(GDP)$	8.04	2.28	27.34***	9.02
	(6.53)	(6.63)	(8.59)	(9.37)
Banking crisis dummy	0.32	0.45	2.46***	1.23**
	(0.50)	(0.54)	(0.67)	(0.52)
Terms of trade	-1.25	-0.56	1.55	-6.74*
	(1.88)	(1.18)	(1.11)	(3.59)
Government expenditure-to-GDP ratio	0.00	-0.01	-0.04	0.12*
	(0.03)	(0.06)	(0.06)	(0.07)
Exchange rate depreciation dummy, 50th-75th percentiles	-0.26	0.42	-0.01	1.48*
	(0.31)	(0.53)	(0.91)	(0.84)
Exchange rate depreciation dummy, 75th-90th percentiles	-0.87**	-0.19	1.15***	-0.15
	(0.37)	(0.37)	(0.35)	(0.54)
Exchange rate depreciation dummy, above 90th percentile	-0.18	-0.71	-1.16**	1.56
	(0.34)	(0.49)	(0.47)	(0.96)
N. of observations	851	636	429	325
Pseudo R-sq.	0.35	0.38	0.47	0.61

Notes: Robust standard errors, clustered at the country-level, are in parentheses. All of the explanatory variables are from one year before the start of debt restructuring. The restructuring episodes are divided into two subsamples based on the median of bank credit-to-GDP ratio from the pre-crisis year. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

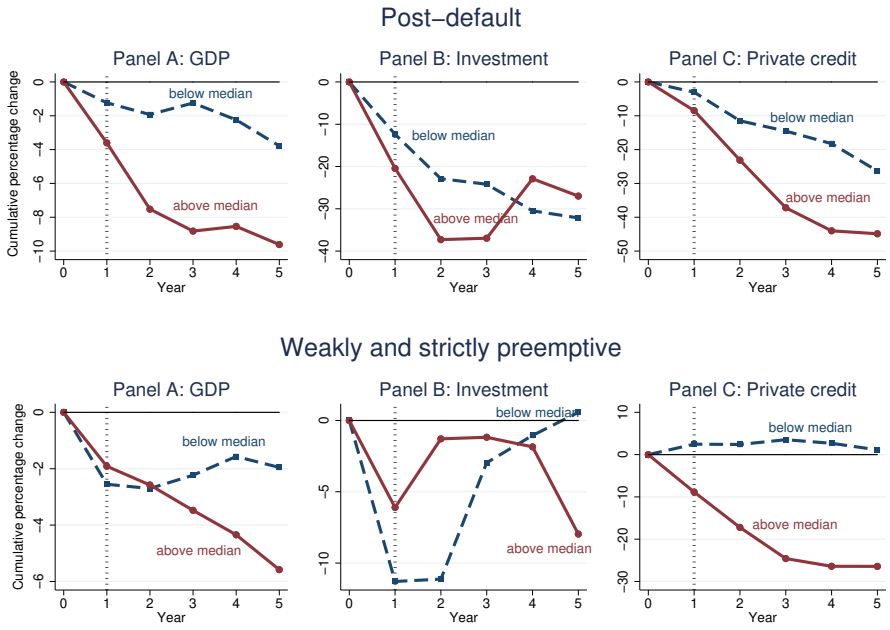
TABLE D2 – RESTRUCTURINGS WITH RELATIVELY LARGE OR SMALL BANKING SECTORS, BASELINE AIPW

	Panel A: GDP						Panel B: Investment					
	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	Mean	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	Mean
Post-default, large banking sector	-2.98***	-6.70***	-8.02***	-7.34***	-8.46***	-6.77***	-17.0***	-35.4***	-32.3***	-17.2***	-17.6***	-24.0***
	(0.28)	(0.58)	(0.68)	(0.63)	(0.71)	(0.54)	(1.80)	(2.37)	(2.45)	(2.60)	(2.71)	(2.15)
N. of obs.	851	827	804	780	756	756	851	827	804	780	756	756
N. of countries	24	24	24	24	24	24	24	24	24	24	24	24
N. of episodes	33	33	33	32	32	32	33	33	33	32	32	32
Post-default, small banking sector	-1.02**	-0.75	0.84	-0.21	-0.67	-0.04	-31.0***	-39.2***	-29.9***	-34.3***	-27.0***	-31.6***
	(0.41)	(0.68)	(0.93)	(1.07)	(1.17)	(0.81)	(4.45)	(5.44)	(5.18)	(5.10)	(5.07)	(4.79)
N. of obs.	636	617	598	579	560	560	636	617	598	579	560	560
N. of countries	19	19	19	19	19	19	19	19	19	19	19	19
N. of episodes	32	32	32	32	32	32	32	32	32	32	32	32
Preemptive, large banking sector	-0.84***	-2.90***	-4.68***	-6.69***	-8.27***	-4.82***	-8.02***	-10.9***	-5.95***	-16.0***	-25.6***	-13.7***
	(0.20)	(0.33)	(0.40)	(0.50)	(0.60)	(0.36)	(1.08)	(1.49)	(2.01)	(2.07)	(2.62)	(1.50)
N. of obs.	429	417	405	393	381	381	429	417	405	393	381	381
N. of countries	12	12	12	12	12	12	12	12	12	12	12	12
N. of episodes	20	20	20	20	20	20	20	20	20	20	20	20
Preemptive, small banking sector	-0.38	0.64	0.71	0.81	0.58	0.35	-6.08***	-4.88**	4.40	-0.47	1.90	-1.54
	(0.35)	(0.56)	(0.69)	(0.84)	(0.91)	(0.64)	(1.61)	(2.25)	(2.71)	(2.63)	(2.86)	(2.10)
N. of obs.	325	315	305	295	285	285	324	314	305	295	285	285
N. of countries	10	10	10	10	10	10	10	10	10	10	10	10
N. of episodes	20	20	20	20	20	20	20	20	20	20	20	20

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

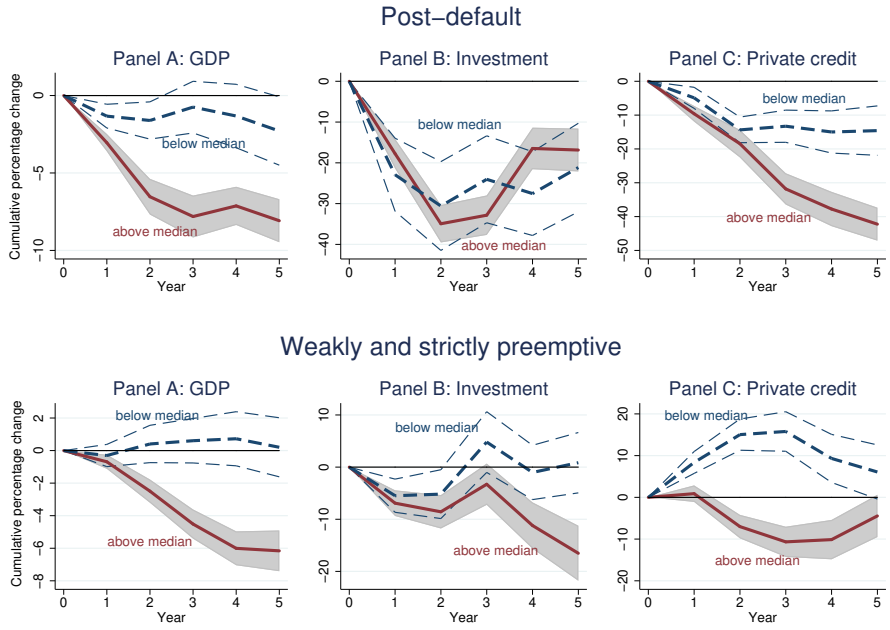
	Panel C: Private credit					
	$h = 1$	$h = 2$	$h = 3$	$h = 4$	$h = 5$	Mean
Post-default, large banking sector	-10.1***	-19.7***	-32.7***	-38.2***	-42.8***	-29.7***
	(1.21)	(2.05)	(2.37)	(2.60)	(2.49)	(1.92)
N. of obs.	845	819	795	770	745	742
N. of countries	24	24	24	24	24	24
N. of episodes	30	30	31	30	30	29
Post-default, small banking sector	-4.00**	-12.9***	-11.1***	-16.3***	-16.6***	-10.7***
	(1.69)	(2.02)	(2.76)	(3.13)	(3.54)	(2.28)
N. of obs.	608	588	568	547	529	526
N. of countries	18	18	18	18	18	18
N. of episodes	31	31	31	30	30	30
Preemptive, large banking sector	-1.87*	-10.1***	-14.1***	-14.8***	-9.98***	-13.9***
	(1.07)	(1.36)	(1.68)	(2.03)	(2.21)	(1.43)
N. of obs.	421	407	394	381	368	361
N. of countries	12	12	12	12	12	12
N. of episodes	19	19	17	17	17	15
Preemptive, small banking sector	9.37***	17.3***	18.2***	13.7***	10.4***	13.9***
	(1.33)	(1.87)	(2.41)	(2.99)	(3.42)	(2.22)
N. of obs.	310	300	293	282	274	273
N. of countries	10	10	10	10	10	10
N. of episodes	20	19	19	19	19	19

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.



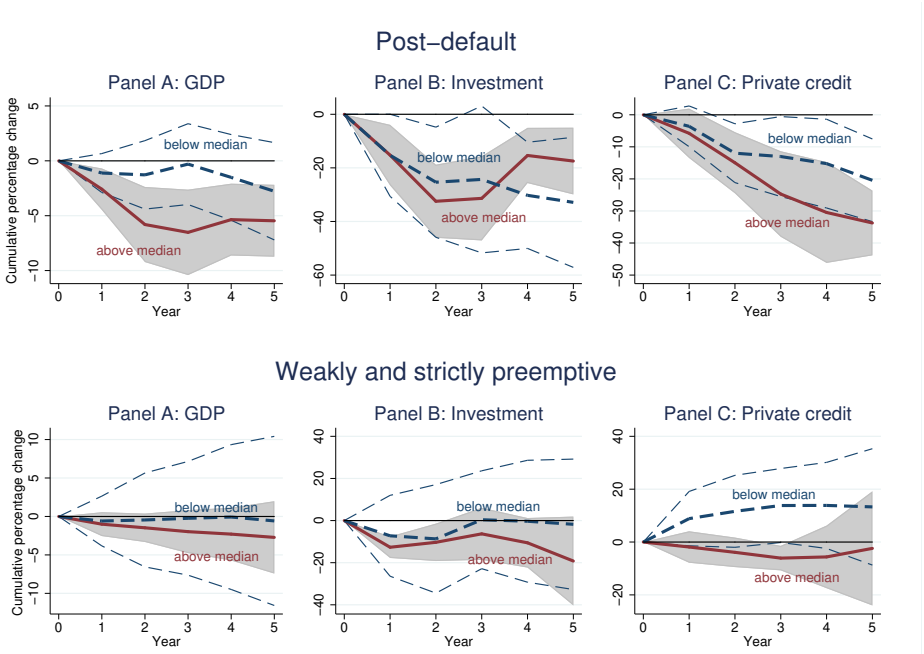
Notes: The figure shows the average of cumulative percentage changes of the variables shown in each panel for $h = 1, 2, .., 5$, where h indicates horizon.

FIGURE D1 – DEBT RESTRUCTURINGS WITH RELATIVELY LARGE OR SMALL BANKING SECTORS, TIME-VARYING THRESHOLD, MEAN



Notes: The figure shows AIPW estimates of the variables shown in each panel for $h = 1, 2, .., 5$, where h indicates horizon.

FIGURE D2 – DEBT RESTRUCTURINGS WITH RELATIVELY LARGE OR SMALL BANKING SECTORS, TIME-VARYING THRESHOLD, AIPW



Notes: The figure shows OLS estimates of the variables shown in each panel for $h = 1, 2, .., 5$, where h indicates horizon.

FIGURE D3 – DEBT RESTRUCTURINGS WITH RELATIVELY LARGE OR SMALL BANKING SECTORS, FIXED THRESHOLD, OLS

E. Additional Robustness Check

E.1. Standard Poor's and Laeven and Valencia's Default Episodes

Some studies on sovereign debt use S&P default data, for instance Borensztein and Panizza (2009), Levy-Yeyati and Panizza (2011), and Kuvshinov and Zimmermann (2016). S&P data do not differentiate restructuring strategies and cover only 88 'default' episodes in countries where ratings are assigned: (i) post-default restructurings and (ii) only exchange events—not duration from the start to the exchange—for preemptive restructurings. In this regard, the S&P default sample is quite similar to those of post-default restructurings in our sample. Table E1 and Figure E1 report the AIPW estimates.

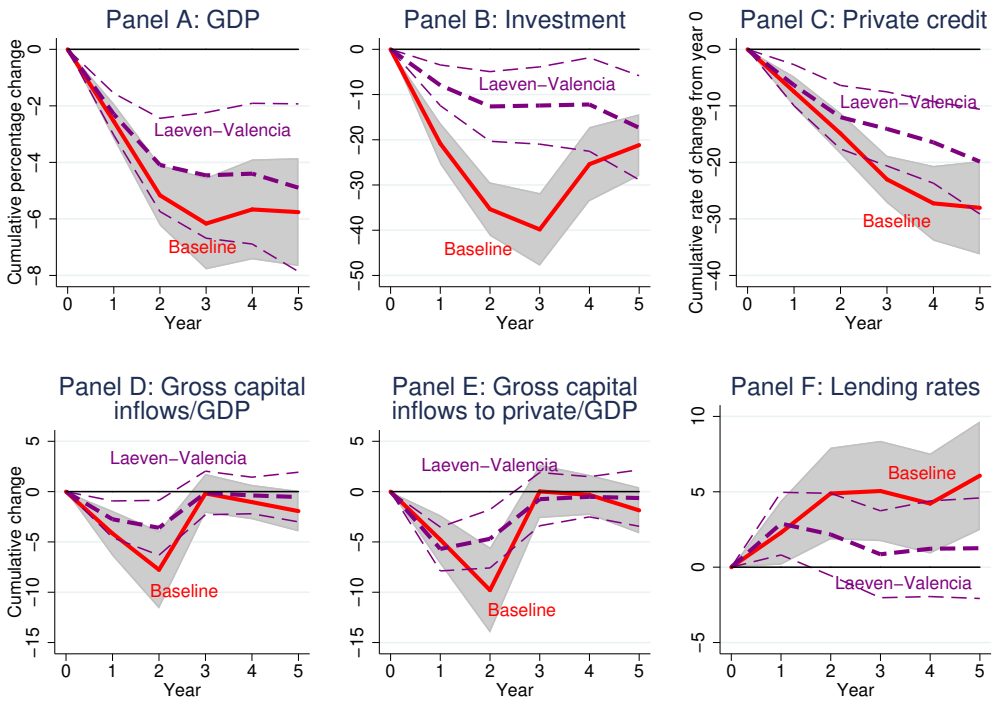
TABLE E1 – S&P DEFAULTS, AIPW

Dependent Variable = Annualized Sum of Cumulative Losses over 5 Years

	GDP		Investment		Private Credit	
	Post-default	LV default	Post-default	LV default	Post-default	LV default
Crisis dummy	-4.98***	-3.74***	-28.5***	-12.3***	-19.4***	-13.4***
	(0.68)	(1.01)	(3.09)	(4.02)	(2.30)	(2.97)
N. of obs.	793	963	793	963	754	914
N. of countries	29	39	29	39	28	37
N. of episodes	51	72	51	72	49	66

	Gross capital inflows/GDP		Gross capital inflows to private/GDP		Lending rates	
	Post-default	LV default	Post-default	LV default	Post-default	LV default
Crisis dummy	-3.08***	-1.28	-3.74***	-2.34**	4.51***	1.96
	(0.85)	(0.89)	(1.00)	(0.98)	(1.70)	(1.54)
N. of obs.	732	896	655	801	417	555
N. of countries	28	38	28	38	27	36
N. of episodes	50	68	46	59	25	37

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively. "LV default" corresponds to Laven and Valancia sovereign default dataset.



Notes: The figure shows AIPW estimates of the variables shown in each panel for $h = 1, 2, .., 5$, where h indicates horizon.

FIGURE E1 – S&P DEFAULTS, AIPW

E.2. Restructurings with IMF-Supported Programs and Paris Club (Official External) Restructurings

Next, we check how the GDP and investment respond under the three different restructuring strategies once we take into account whether the country has an IMF-supported program or an official debt (Paris Club) restructuring. Under an IMF-supported program or an official debt restructuring, the availability of official (multilateral or bilateral) financing with official debt being restructured through Paris Club deals can mitigate some of the adverse effects on GDP and investment.

We apply local projections with AIPW to capture the influence of an IMF-supported program or an official debt restructuring occurred over the forecast horizon. Figure E2 reports AIPW estimates for the five dependent variables for post-default and preemptive with and without IMF-supported programs or Paris Club restructurings. Table E1 shows the annualized sum of cumulative losses over 5 years for baseline and without 'IMF or Paris Club programs'. Part I of Figure E2 shows that declines in GDP and investment following a post-default restructuring or a preemptive restructuring are, to some extent, moderated by official financing or official debt treatment.

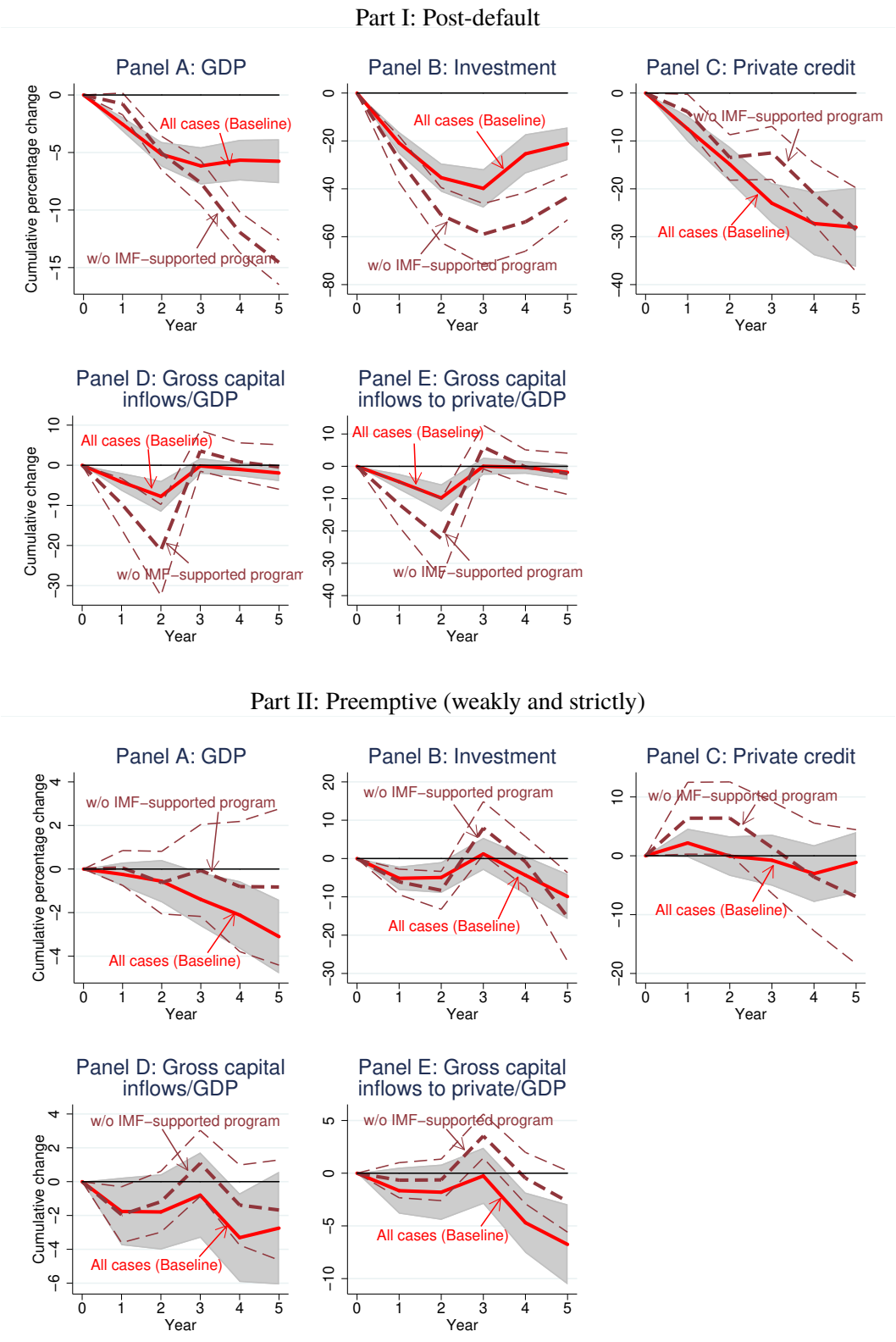
Part II of Figure E2, showing local projections for preemptive debt restructurings, is based on a fewer number of controls and instruments. This is due to the fact that we do not have enough preemptive restructuring episodes without IMF-supported program or Paris Club Official debt restructurings, making it impossible to estimate local projections with the full set of controls and instruments. As a result, local projections for 'All cases' are slightly different from the baseline.

Table E2 – Private External Debt Restructurings with or without IMF-Supported Programs or Paris Club (Official External) Restructurings, AIPW

Dependent Variable = Annualized Sum of Cumulative Losses over 5 Years

	GDP		Investment		Private Credit		Gross capital inflows/GDP		Gross capital inflows to private/GDP	
	Baseline	w/o IMF or Paris	Baseline	w/o IMF or Paris	Baseline	w/o IMF or Paris	Baseline	w/o IMF or Paris	Baseline	w/o IMF or Paris
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Post-default	-4.98***	-8.57***	-28.5***	-52.5***	-19.4***	-15.5***	-3.08***	-6.24***	-3.74***	-7.70***
	(0.68)	(0.76)	(3.09)	(4.87)	(2.30)	(2.55)	(0.85)	(2.14)	(1.00)	(2.49)
N. of obs.	793	224	793	224	754	224	732	212	655	189
N. of countries	29	9	29	9	28	9	28	9	28	9
N. of episodes	51	10	51	10	49	10	50	10	46	10
Preemptive	-1.69***	-0.74	-5.28***	-6.31***	-1.90	-0.36	-2.28**	-1.19	-3.13***	-0.42
	(0.57)	(1.06)	(1.89)	(2.68)	(1.88)	(3.83)	(1.02)	(0.95)	(1.15)	(0.85)
N. of obs.	474	230	474	226	455	222	443	217	413	210
N. of countries	18	9	18	9	18	9	18	9	18	9
N. of episodes	40	16	40	15	34	14	39	16	35	16

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.



Notes: The figure shows AIPW estimates of the variables based on the baseline sample and without IMF-supported programs or Paris Club official debt restructurings.

FIGURE E2 – PRIVATE EXTERNAL DEBT RESTRUCTURINGS WITH OR WITHOUT IMF-SUPPORTED PROGRAMS OR PARIS CLUB (OFFICIAL EXTERNAL) RESTRUCTURINGS, AIPW

E.3. 'Single' External Debt Restructurings

We consider whether large costs in restructurings (in particular post-default cases) are driven solely by external debt restructurings or also by associated domestic debt restructurings. Asonuma and Papaioannou (2016) provide a domestic debt restructuring dataset based on both jurisdiction and creditor residence criteria. Alternatives are domestic default databases based on the jurisdiction and residence criteria provided by Reinhart and Rogoff (2011) and Erce and Mallucci (2018). These are all consistent with jurisdiction and creditor residence criterion used to define external debt restructurings in Cruces and Trebesch (2013) and Asonuma and Trebesch (2016). For the sake of consistency of definition on restructurings rather than defaults, we combine our external debt restructuring dataset with the dataset on domestic debt restructurings. We define a 'single' external debt restructuring if no domestic debt restructuring occurs during the duration of an external debt restructuring and a 'dual' domestic-external debt restructuring if otherwise.

TABLE E3 – EXTERNAL DEBT RESTRUCTURINGS WITH OR WITHOUT DOMESTIC DEBT RESTRUCTURINGS

Asonuma and Trebesch (2016) and Asonuma and Papaioannou (2016)				
	All	Post-default	Weakly preemptive	Strictly preemptive
Debt Restructuring Episodes	179	111	45	23
"Single" External Debt Restructurings (No domestic debt restructuring occurs during duration of external debt restructurings)	156	95	41	20
Share of Single External Debt Restructurings	87%	86%	91%	87%

Table E4 – 'Single' External Debt Restructurings, AIPW

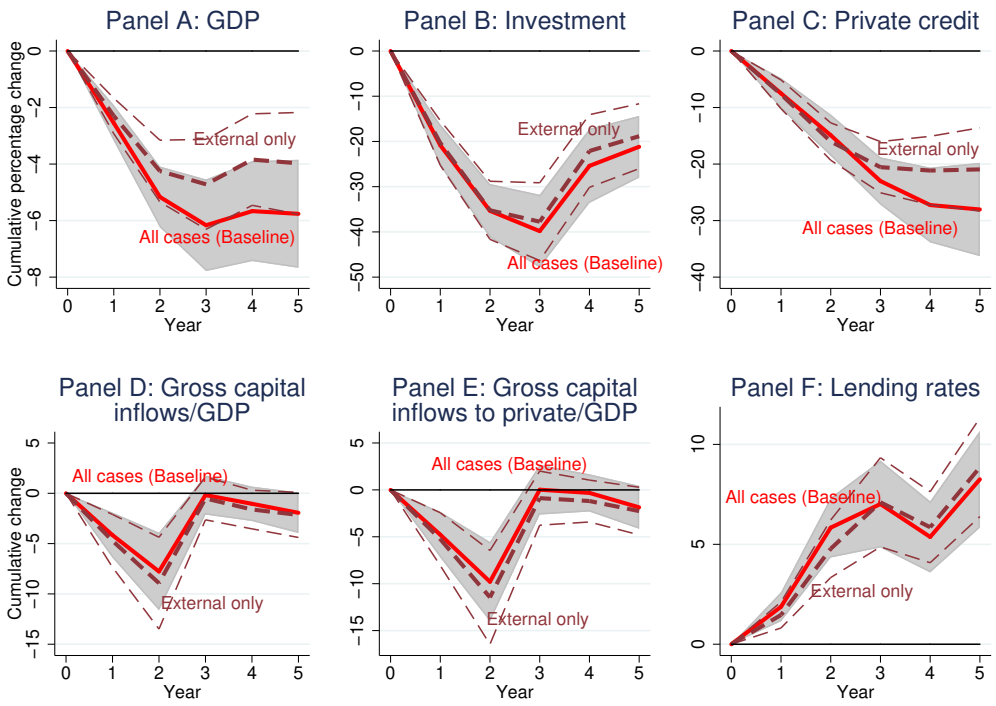
Dependent Variable = Annualized Sum of Cumulative Losses over 5 Years

	GDP		Investment		Private Credit	
	Baseline	Single External only	Baseline	Single External only	Baseline	Single External only
Post-default	-4.98***	-3.79***	-28.5***	-27.3***	-19.4***	-16.7***
	(0.68)	(0.65)	(3.09)	(3.26)	(2.30)	(2.20)
N. of obs.	793	714	793	714	754	704
N. of countries	29	26	29	26	28	26
N. of episodes	51	43	51	43	49	42
Preemptive	-1.69***	-1.55***	-5.28***	-4.60**	-1.90	-2.64
	(0.57)	(0.56)	(1.89)	(1.85)	(1.88)	(1.72)
N. of obs.	474	474	474	474	455	455
N. of countries	18	18	18	18	18	18
N. of episodes	40	37	40	37	34	32

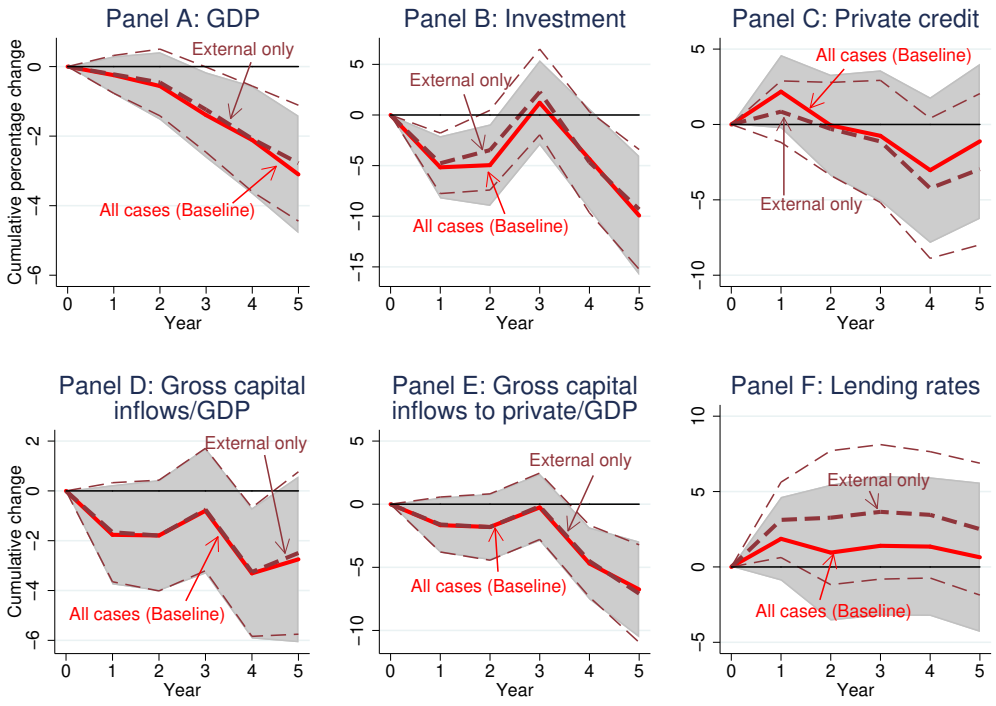
	Gross capital inflows/GDP		Gross capital inflows to private/GDP		Lending interest rates	
	Baseline	Single External only	Baseline	Single External only	Baseline	Single External only
Post-default	-3.08***	-3.65***	-3.74***	-4.75***	5.66***	5.61***
	(0.85)	(0.97)	(1.00)	(1.13)	(0.84)	(0.87)
N. of obs.	732	659	655	588	332	321
N. of countries	28	25	28	25	17	16
N. of episodes	50	42	46	39	24	23
Preemptive	-2.28**	-2.19**	-3.13***	-3.11***	1.49	3.52*
	(1.02)	(1.01)	(1.15)	(1.15)	(2.15)	(1.94)
N. of obs.	443	443	413	413	195	195
N. of countries	18	18	18	18	10	10
N. of episodes	39	36	35	32	24	22

Notes: All regressions use the same specification as the baseline model, including the control variables and country fixed effects and using the same instruments. Standard errors are in parentheses. *, **, *** denote statistical significance at the 10, 5, and 1 percent level, respectively.

Part I: Post-default



Part II: Preemptive (weakly and strictly)



Notes: The figure shows AIPW estimates of the variables based on the baseline sample and the sample of 'single' external debt restructurings.

FIGURE E3 – 'SINGLE' EXTERNAL DEBT RESTRUCTURINGS, AIPW

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