

Supplemental Appendix for Sovereign Debt Restructuring and Reduction in Debt-to-GDP Ratio

By SAKAI ANDO, TAMON ASONUMA, PRACHI MISHRA, AND ALEXANDRE SOLLACI

Appendix I. Definition of Debt Restructuring

A “sovereign debt restructuring” is defined as a debt distressed exchange, i.e., an exchange of outstanding sovereign debt instruments, such as syndicated (bank) loans or bonds, of a sovereign debtor under debt distress for new debt instruments and/or cash through a formal renegotiation process. It typically involves a net present value (NPV) loss for creditors (Asonuma and Papaioannou, forthcoming; Das et al., 2012).¹

“Sovereign debt” is defined as debt issued/contracted or guaranteed by the central or general government of a sovereign country.

“Under debt distress” refers to a circumstance where a sovereign government loses market access and/or faces difficulty in servicing principal and interest payments. Debt distressed exchanges should be differentiated from regular liability management operations (LMOs), i.e., debt swap including debt buybacks. LMOs are voluntary market exchanges and often implemented under normal times and are not generally implemented as a part of crisis resolution (Das et al. 2012).

In principle, the definition of debt restructuring applies to both domestic and external debt—a debt obligation governed by domestic and external law—and to debt held by both private and official (multilateral and bilateral) creditors. Specifically on a domestic debt restructuring, the definition is broader to include

¹ Credit rating agencies usually define restructurings as distressed debt exchanges at terms less favorable than the original bond or loan.

cases of changes to contractual payment terms to the detriment of the creditors through legislative/executive acts (IMF, 2021).

A sovereign default is highly correlated with a debt restructuring, but they may not always happen at the same time. This is because a sovereign debtor could approach the creditors and engage in restructuring preemptively (discussed below). A sovereign default is generally defined as the failure of a sovereign government to make a principal and/or interest payment by the time specified in debt contracts (i.e., beyond a grace period).²

While there is no universally agreed taxonomy on debt restructuring types, our paper follows Das et al. (2012), Asonuma and Papaioannou (forthcoming) and considers two types: (i) face value reduction—also called as principal (nominal) debt reduction—defined as a cut in the nominal amount of the old (existing) instruments; and (ii) debt rescheduling—also called a reprofiling, or cash flow relief without face value reduction—defined as maturity extension of the old instruments, sometimes with a coupon rate (interest rate) reduction which results in a change in cash flow streams of the old debt.

Alternative classifications for debt restructuring types include the one employed by the Paris Club creditors, which focus on (i) restructurings that reduce the present value (PV) of debt, whether through face value reduction or other modalities including maturity extensions and/or coupon rate reductions; and (ii) restructurings that do not reduce the PV of debt. Note that a classification based on PV of debt is not employed in our paper due to lack of data on present values of debt for a broad sample.

² Credit rating agencies, e.g., Moody's (2008) define a sovereign default either (i) a missed or delayed payments of principal and/or interest or (ii) a distressed debt exchange. Defaults can be full (complete), when a suspension of all debt payments to creditors occurs or partial, when only a fraction of the sovereign country's debt is not being serviced.

Appendix II. Impact of Restructuring on Debt and Output Growth

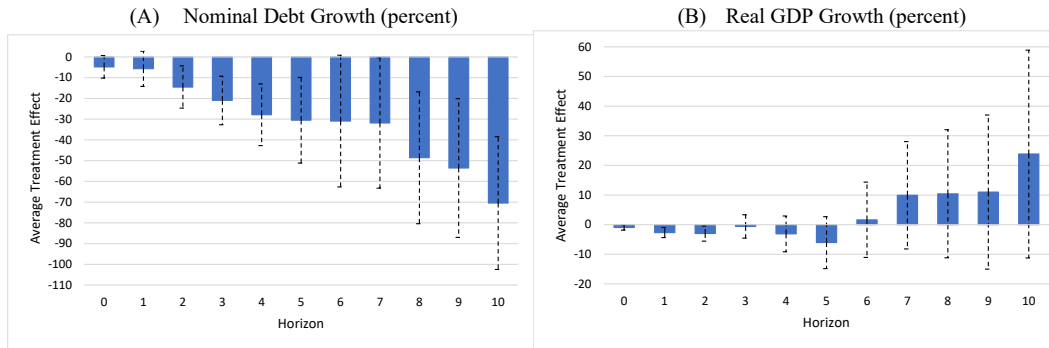


FIGURE 1. LONG HORIZON

Notes: The bars indicate the average treatment effects and dashed lines denote the 95 percent confidence interval. Nominal debt growth is winsorized at 1 percent in all periods.

Results are based on 1069 observations (161 treated).

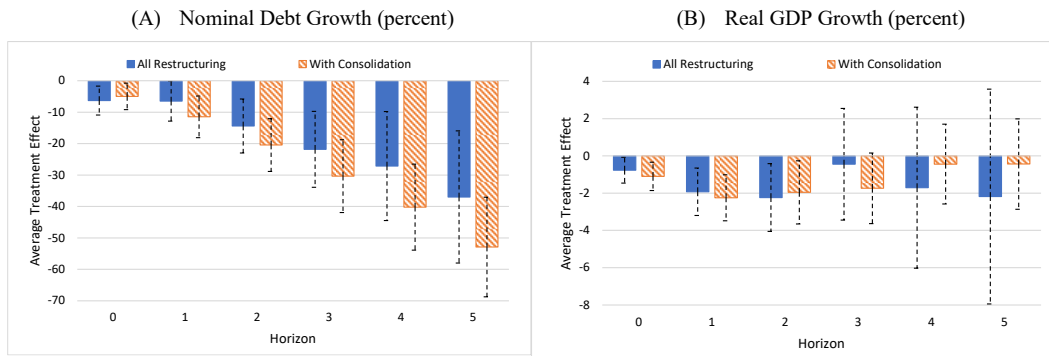


FIGURE 2. WITH CONSOLIDATION

Notes: The bars indicate the average treatment effects and dashed lines denote the 95 percent confidence interval. Nominal debt growth is winsorized at 1 percent in all periods.

All restructuring: 1069 observations (161 treated); With Consolidation: 456 observations (72 treated).

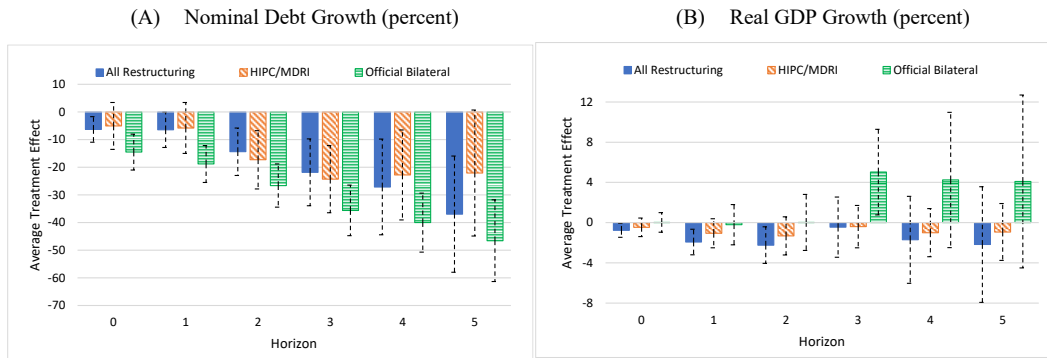


FIGURE 3. BY CREDITOR: HIPC/MRDI AND OFFICIAL BILATERAL

Notes: The bars indicate the average treatment effects and dashed lines denote the 95 percent confidence interval. Nominal debt growth is winsorized at 1 percent in all periods.

All restructuring: 1069 observations (161 treated); HIPC/MDRI: 549 observations (89 treated); Official Bilateral: 618 observations (91 treated).

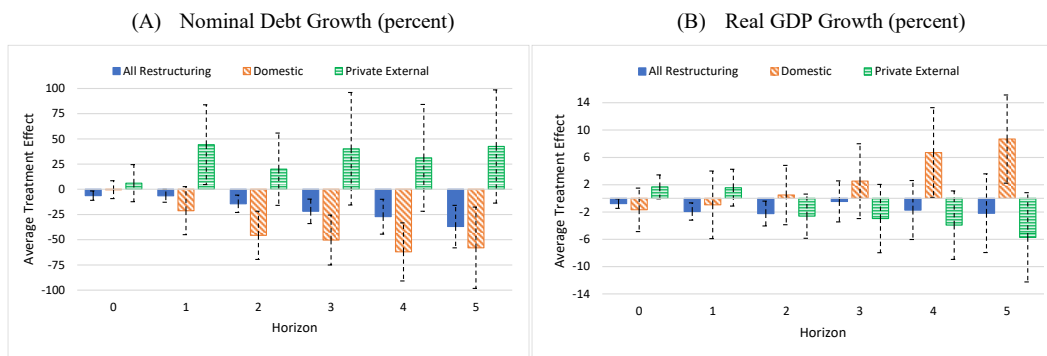


FIGURE 4. BY CREDITOR: DOMESTIC AND PRIVATE EXTERNAL

Notes: The bars indicate the average treatment effects and dashed lines denote the 95 percent confidence interval. Nominal debt growth is winsorized at 1 percent in all periods.

All restructuring: 1069 observations (161 treated); Domestic: 149 observations (17 treated); Private External: 124 observations (16 treated).

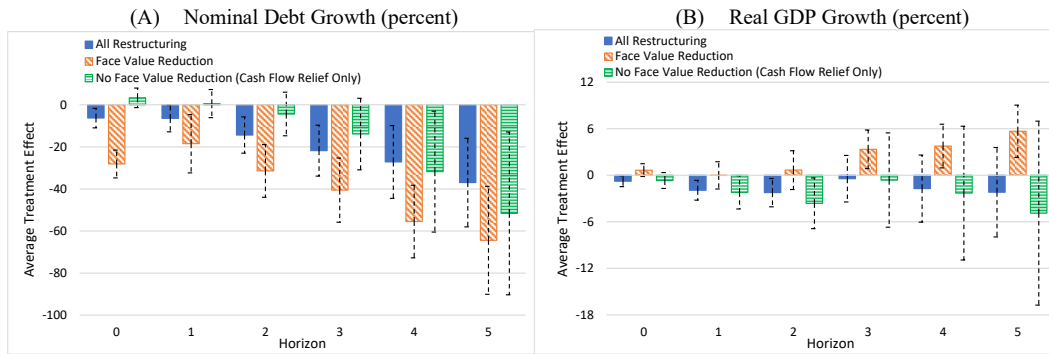


FIGURE 5. BY TYPE OF DEBT RELIEF

Notes: The bars indicate the average treatment effects and dashed lines denote the 95 percent confidence interval. Nominal debt growth is winsorized at 1 percent in all periods.

All restructuring: 1069 observations (161 treated); Face Value Reduction: 377 observations (48 treated); No Face Value Reduction: 554 observations (68 treated).

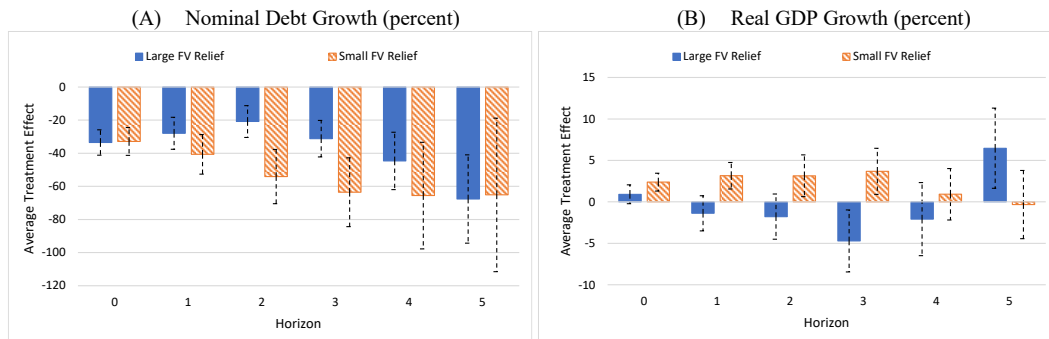


FIGURE 6. BY SIZE OF DEBT RELIEF: LARGE VS SMALL FACE VALUE RELIEF (FV RELIEF)

Notes: The bars indicate the average treatment effects and dashed lines denote the 95 percent confidence interval. Nominal debt growth is winsorized at 1 percent in all periods. Note that because we employ a linear estimator without any constraints, the confidence interval can sometimes include values that are smaller than -100, even though the change is measured in percent terms. Large FV Relief refers to cases when the FV relief is above the sample median, and “Small FV Relief” refers to below median levels. In all cases, the top and bottom 5 percentiles of the FV relief distribution are removed to avoid outliers.

Large FV Relief: 161 observations (17 treated); Small FV Relief: 150 observations (21 treated).

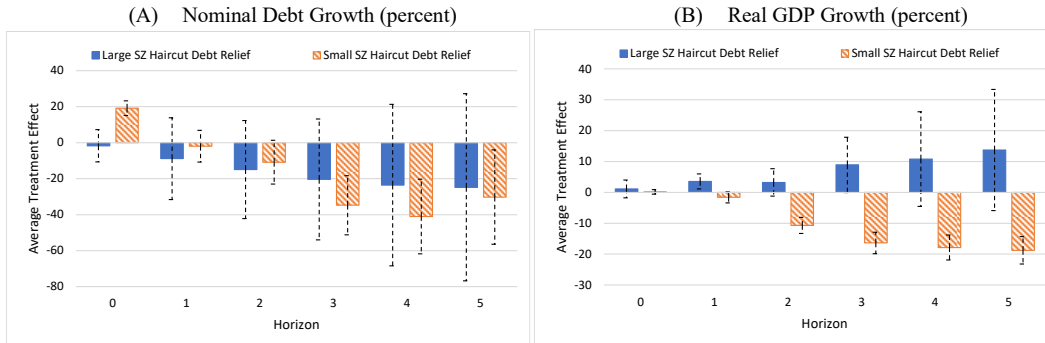


FIGURE 7. BY SIZE OF RELIEF: LARGE VS SMALL SZ HAIRCUT DEBT RELIEF (DOMESTIC & PRIVATE EXTERNAL)

Notes: The bars indicate the average treatment effects and dashed lines denote the 95 percent confidence interval. Nominal debt growth is winsorized at 1 percent in all periods. “Large SZ Haircut Debt Relief” refers to cases when the SZ haircut debt relief is above the sample median, and “Small SZ Haircut Debt Relief” refers to below median levels. In all cases, the top and bottom 5 percentiles of the SZ haircut debt relief distribution are removed to avoid outliers. Note that the SZ NPV haircuts are only available for private external and domestic restructurings, which makes the sample too small to implement the AIPW estimator used throughout the paper. As a result, the findings in this figure are estimated via ordinary least squares (OLS) in a standard local projections (LP) model.

Large SZ Haircut Debt Relief: 1508 observations (7 treated); Small SZ Haircut Debt Relief: 1477 observations (1 treated).

When comparing the results found in Figures 6 and 7 here with those in Figure 7 of the main text, please note that the ATE displayed here is in units of *percent changes* of debt and GDP. In addition, larger face value reliefs tend to be granted to countries with higher debt ratios: the average debt level is about 80 percent larger for countries in the “Large FV Relief” sample compared to those in the “Small FV Relief” sample. As a result, even though the impact on the *percent change* in debt is similar for both large and small FV relief (approximately 30-35 percent), this represents a much larger change in debt *level* for countries in the “Large FV Relief” sample. This explains why the impact on the debt ratio is much larger for large FV relief relative to small FV relief restructurings.

Finally, while consistent with our main findings, the results in Figures 7 should be interpreted with due caution given the small sample sizes (especially for the treatment groups) and potential issues with selection into treatment (as it is not possible to perform the full AIPW estimation procedure in those cases.)

REFERENCES

- Asonuma, Tamon, and Michael Papaioannou. Forthcoming. “External Sovereign Debt Restructurings and Economic Consequences: What Do We Know?” In *Private Debt*, edited by Moritz Schlarick.
- Das, Udaibir S., Michael G. Papaioannou, and Christoph Trebesch. 2012. “Sovereign Debt Restructurings 1950–2010: Literature Survey, Data and Stylized Facts.” IMF Working Paper.
- International Monetary Fund. 2021. “Issues in Restructuring of Sovereign Domestic Debt.” *Policy Paper, International Monetary Fund*.