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Coming Down to Earth: How to Tackle Soaring Public Debt[1]

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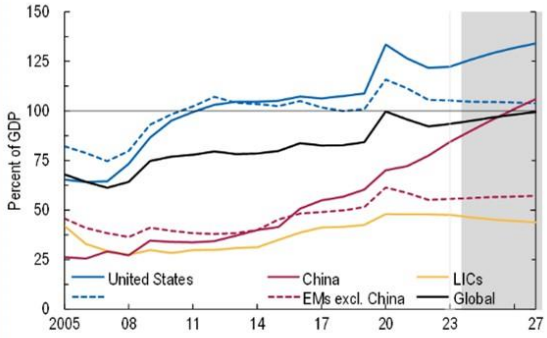
ABSTRACT

This paper examines policy options for reducing debt ratios, including the effects of fiscal consolidation and debt restructuring. We find that adequately timed and designed fiscal consolidations have a high probability of durably reducing debt ratios. In addition, the impact of restructuring on debt ratios is sizable and long lasting but can be affected by operational details and institutional features.

This paper is based on chapter 3 of the April 2023 edition of the IMF's World Economic Outlook, by Sakai Ando, Tamon Asonuma, Alexandre Balduino Sollaci, Giovanni Ganelli, Prachi Mishra, Nikhil Patel, Adrian Peralta Alva, and Andrea Presbitero.

Figure 1. Public Debt Trends
(Percent of GDP)



Source: author's calculations.
Note: Averages weighted by nominal GDP. Shaded area denotes forecast period. Sample covers 28 advanced economies from 1979 to 2021, 83 emerging market economies from 1991 to 2021, and 55 low-income countries from 1985 to 2021. AEs = advanced economies; EMs = emerging market economies; LICs = low-income countries.

Public debt as a ratio to GDP ("debt ratios" henceforth) has soared across the world during COVID-19. In 2020, the global average of this ratio approached 100 percent and is expected to remain above pre-pandemic levels for about half of the world. High public debt ratios are a significant concern for policymakers, particularly considering tightening global financial conditions, weak economic growth prospects, and a stronger US dollar.

This paper examines policy options for reducing debt ratios, including the effects of fiscal consolidation (increases in primary balances), growth, and inflation. We also draw on historical events of debt restructuring and analyze the factors that made them effective in reducing debt. It should be noted, however, that restructuring debt is often not a policy choice, as it involves a complex set of conditions, including negotiations with creditors. It can also entail several costs to the countries restructuring their debt, and therefore typically only used as a last resort.

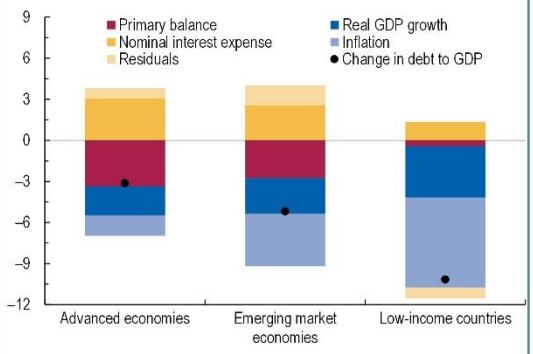
[1] The views expressed herein are those of the author and should not be attributed to the IMF, its Executive Board, or its management.

Macroeconomic Drivers of the Debt-to-GDP Ratio

We start by using a standard debt decomposition technique to quantify the contributions of real GDP growth, nominal interest expenses, primary balance, and inflation to debt reduction episodes.

The average debt ratio reduction episode lasts five years and reduces the debt ratio by 3, 5, and 10 percentage points each year in advanced economies, emerging market economies, and low-income countries, respectively (black squares in Figure 2).[2] Decomposing those reduction episodes into its components provides three main insights. First, primary balance surpluses (red bars) followed by real GDP growth (dark blue bars) are the most important drivers of debt ratio reductions in advanced economies. Second, nominal interest expense (dark yellow bars) always contributes positively to the change in debt ratios. Third, real GDP growth and, notably, inflation (dark and light blue bars, respectively) play a relatively bigger role in reducing debt ratios in emerging market economies and low-income countries.[3]

Figure 2. Contribution to Debt to GDP Change during Reduction Episodes
(Percent change)



Sources: IMF, Global Debt Database; Mauro et al. (2013); and author's calculations.
Note: Contribution of real exchange rate to debt to GDP is reflected in the residual because the share of foreign currency-denominated debt is not available for all countries. Sample covers 28 advanced economies from 1979 to 2021, 83 emerging market economies from 1991 to 2021, and 55 low-income countries from 1985 to 2021.

The Role of Fiscal Consolidation, Growth, and Inflation

The results above focus on the main drivers of changes in the debt ratio in episodes when it fell. But how effective is fiscal consolidation in reducing debt ratios? And under what conditions is it more likely that a fiscal consolidation translates into lower debt ratios?[4]

Our results are based on annual data on fiscal and macroeconomic aggregates for a sample of 33 emerging market economies starting in 1990 and 21 advanced economies starting in 1980. An updated version of the narrative fiscal consolidations data developed by Devries et al. (2011) and Carrière-Swallow, David, and Leigh (2021) is also constructed for the analysis.

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[2] The reduction episodes are identified in two steps. The first step involves identifying turning points in the time series for each country based on the business cycle dating methodology of Harding and Pagan (2002). A minimum of two years between successive peaks and troughs and a minimum length of four years for a complete cycle are imposed. This step decomposes the entire time series into nonoverlapping periods of surges and reductions. Second, stable periods with minimum length of three years are identified within these episodes if the cumulative change in the debt-to-GDP ratio is either less than 5 percentage points in levels or less than 10 percentage points of the country-specific standard deviation.

[3] While Figure 2 focuses on debt reduction episodes, high inflation could also lead to higher debt, including through unexpected devaluations.

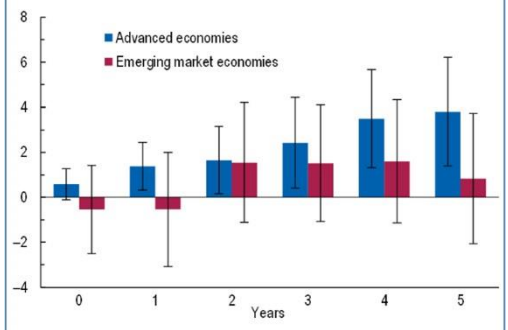
[4] While we focus on the ex-post effects of fiscal consolidation on public debt ratios, it is important to note that fiscal adjustments may not be intended to reduce debt and could happen for different reasons, for example to offset spending public sector entities, or combat inflation.

Does the Average Consolidation Reduce the Debt-to-GDP Ratio?

A stylized fact is that simultaneous consolidations and debt ratio reductions are infrequent: only 52 percent of increases in primary balance are accompanied by a decrease in debt ratios. This aligns with research by Balasundharam et al. (2023), who document that only about half of fiscal consolidations achieve their fiscal targets—including debt reduction.

A broad range of econometric methods confirm that fiscal consolidations on average do not statistically significantly reduce debt ratios. These methods draw from a large literature to account for biases that arise when both consolidations and debt are driven by other factors, including the macroeconomic environment. For example, the aforementioned "narrative shocks" are used to select cases in which governments implemented tax hikes or spending cuts with the explicit intention of reducing the public deficit and putting public finances on a more sustainable footing, irrespective of current and prospective macroeconomic conditions. In addition, we employ an augmented inverse-probability-weighted (AIPW) estimator (Jordà and Taylor 2016) to account for the fact that consolidations do not happen randomly. This estimator first predicts the probability of experiencing a narrative shock, using indicators such as GDP growth and debt levels. It then estimates the impact of narrative shocks on the debt ratio using local-projection methods, while reweighting observations using the predicted probabilities. As shown in Figure 3, those adjustments do not change the finding that the average narrative fiscal consolidation does not have a statistically significant impact on the debt ratio (see IMF, 2023 and its online appendix for full details).

Figure 3. Effect of Fiscal Consolidation on Debt to GDP
(Percentage points)



Sources: IMF, Global Debt Database; IMF, Historical Public Debt Database; and author's calculations.
Note: Figure shows the average treatment effect of fiscal consolidation on debt to GDP using augumented inverse propensity weighted estimation. Vertical lines represent the 90 percent confidence interval. *X*-axis denotes the number of years from fiscal consolidation. Sample consists of 17 advanced ecoonmies from 1978 to 2020 and 14 emerging market economies from 1989 to 2020 with narrative consolidation shocks.

What Conditions Improve the Chances of Consolidation Reducing the Debt-to-GDP Ratio?

While the findings above might not be encouraging, they suggest our next question: under which conditions are fiscal consolidations more likely to reduce debt ratios? A structural vector autoregression (SVAR) model that jointly considers all drivers of changes in the debt ratio (real GDP growth, interest rates, inflation, government revenues, and primary balance) is applied to answer this question. The model uses a sign-restriction-based identification, following the method of Mountford and Uhlig (2009).

Table 1. Structural Vector Autoregression Sign Restrictions

	GDP	Real Revenue	Primary Balance to GDP	Debt to GDP	Interest Rate	Inflation
Demand Shock	+	+				+
Supply Shock	+	+				−
Successful Primary Balance Shock	−		+	−		
Unsuccessful Primary Balance Shock	−		+	+		

Source: IMF staff calculations.
Note: Sign restrictions on debt to GDP and GDP growth for consolidation shocks are imposed one period ahead. All other sign restrictions are imposed on impact only.

Consistent with the previous analysis, the SVAR approach also suggests consolidations do not

reduce debt ratios, on average (see IMF, 2023 for details). The result is robust to estimation through narrative sign restrictions based on the narrative data discussed earlier (as in Antolín-Díaz and Rubio-Ramírez 2018).

The flexibility of the SVAR can be used to study the features of consolidations that reduce debt ratios. To do so, the primary balance shock (defined as a change in the primary-balance-to-GDP ratio outside of a business cycle) is split into two different (orthogonal) components: a *successful* shock, after which the debt ratio declines, and one that is *unsuccessful,* after which the debt ratio rises in response to a positive shock or an improvement in the primary-balance-to-GDP ratio (Table 1). Note that the method puts restrictions on the sign of the co-movement between the variables and does not impose any other constraint, say, on the magnitude of the responses.

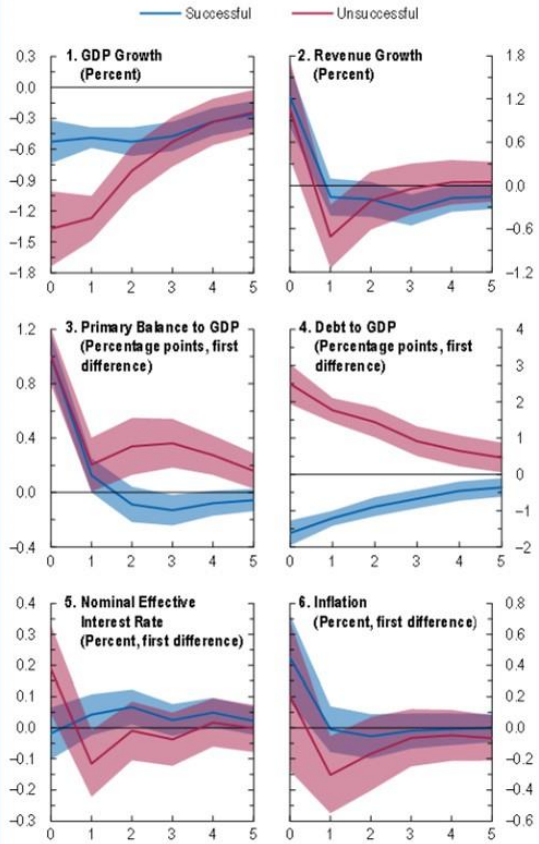
Characteristics of Consolidations That Drive the Debt-to-GDP Ratio

Two characteristics distinguish consolidations that lead to a reduction in debt ratios (successful) versus those that do not (unsuccessful) (Figure 4). First, the decline in growth is smaller (0.5 percent reduction on impact) in consolidations that reduce debt ratios compared with those that do not (1.3 percent reduction). As expected, successful consolidations reduce debt ratios because the negative effects on output are mitigated. At the same time, it is important to note that movements in GDP alone are not the most important factor determining the difference between successful and unsuccessful consolidations. This point is evident in a comparison of the response of GDP and the debt-to-GDP ratio (panels 1 and 4). In successful cases (blue lines) GDP falls, and the debt-to-GDP ratio also *falls*; in unsuccessful cases (red lines) GDP falls, but the debt-to-GDP ratio almost doubles. That is, the difference between successful and unsuccessful consolidations is driven primarily by movements in debt.

Second, the response of inflation to the consolidation shock is positive (Figure 4, panel 6). Several factors could contribute to this positive impact on inflation. For instance, the typical consolidation entails a revenue (tax increase) component that could push prices up. Moreover, any exchange rate depreciation concomitant with the consolidation could also

Figure 4. Impulse Resonses to a One Percentage Point of GDP Primary Balance Shock, Advanced Economies

Successful consolidations entail lower GDP losses and higher inflation.

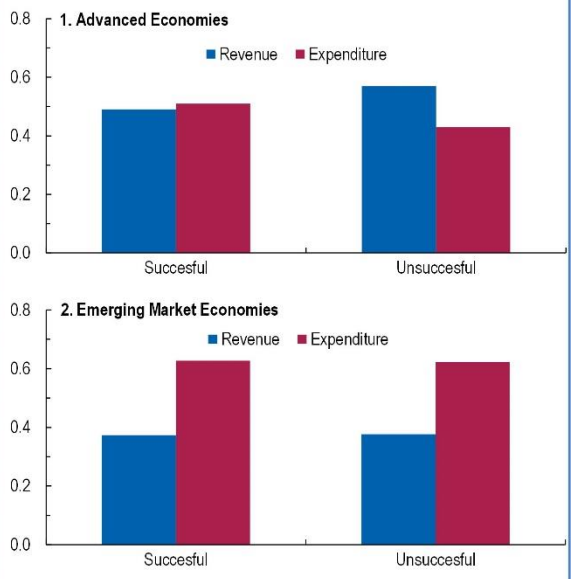


Sources: Canova and Ferroni (2022); IMF, Global Debt Database; IMF, Historical Public Debt Database; and author's calculations.
Note: Primary balance shock is scaled to one percentage point of GDP on impact on average. Displayed impulse responses are inverse variance weighted means across countries from a Bayesian vector autoregression estimated country by country with 2 lags at annual frequency. Shaded areas represent the 16th–84th percentile range of the posterior distribution. Sample consists of 21 advanced economies from 1981 to 2019.

increase import prices and contribute to inflation.[5] The differential response of effective interest rates on impact in successful versus unsuccessful consolidations (panel 5) suggests that monetary policy remains more accommodative on impact and hence allows higher inflation in the case of successful consolidations.

Furthermore, in advanced economies, successful consolidations tend to be balanced between spending cuts and tax or revenue increases, whereas those that are unsuccessful are biased toward revenue and involve fewer spending cuts (Figure 5). This pattern is not found in emerging market economies, consistent with studies that find tax increases hurt growth and debt ratios more than equivalent spending cuts in advanced economies but not necessarily in emerging market economies (Guajardo, Leigh, and Pescatori 2014; Carrière-Swallow, David, and Leigh 2021; Alesina, Favero, and Giavazzi 2019). Indeed, for low-income countries, where the tax-revenue-to-GDP ratio is particularly low, revenue-mobilizing consolidations may be more desirable.[6]

Figure 5. Contribution to Primary Balance Shock on Impact
(Percent change)



Sources: Canova and Ferroni (2022); IMF, Global Debt Database; IMF, Historical Public Debt Database; and author's calculations..

Fiscal consolidation may also fail to reduce debt ratios if countries conduct below-the-line operations that can offset the impact of fiscal consolidation on debt. Examples include transfers to state-owned enterprises in Mexico (2016), clearance of arrears in Greece (2016), and contingent liabilities in Italy (2013).[7]

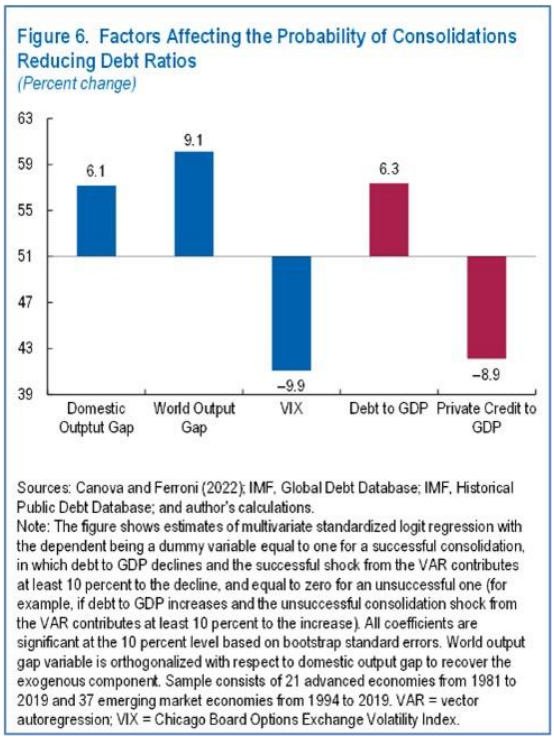
Finally, the historical decompositions from the SVAR are used to isolate periods of successful consolidations and identify the conditions that improve the probability that fiscal consolidation will translate into a lower debt ratio (Figure 6). Consolidations are more likely to reduce debt ratios during good times (for example, domestic and global booms, as well as periods of less financial tightening and less volatility and uncertainty captured by the Chicago Board Options Exchange Volatility Index [VIX]). This is also the case when the initial public-debt-to-GDP ratio is high, and the initial private-credit-to-GDP ratio is low. On possible explanation is that consolidations hurt output less when initial

[5] Consolidations may boost the economic outlook and investor sentiment too and lead to an appreciation of exchange rates, but evidence for such effects is weak (Beetsma et al., 2015). The exchange rate implications are vital for low-income countries where foreign-currency-denominated debt forms a significant share of public debt.

[6] Peralta Alva et al (2018) study the welfare implications of fiscal consolidation in low-income countries and compare the trade-off between efficiency and distributional effects for different tax schemes.

[7] See IMF (2016), IMF (2017) and IMF (2013), respectively. The phenomenon is not limited to advanced and emerging market economies. The contribution of such below-the-line operations to rising debt ratios has been persistently high in recent times in sub-Saharan Africa (see, for example, the IMF's April 2023 *Regional Economic Outlook: Sub-Saharan Africa*).

debt is high, likely because of greater crowding out of private investment (Ilzetzki, Mendoza, and Vegh 2013; Kirchner, Cimadomo, and Hauptmeier 2010).



Debt Restructuring and Its Effects

While fiscal consolidation, growth, and inflation can help reduce debt ratios, they may not be sufficient for countries facing disruptive levels of debt. In such cases, debt restructuring may be necessary. It is important to note that debt restructuring is often not a policy choice and is used as a last resort after other efforts have failed and there is an urgent need to reduce debt or provide clear signals of a reduction. It is a complex process involving negotiations between debtors and creditors and can come with large costs, reputational risks, and negative impacts on the economy overall.[8] In addition, it can adversely affect creditors, reduce their ability to provide concessional financing, and lead to spillovers in global markets.

Definition and Characteristics of Restructuring

Public debt restructuring is broadly defined as a "debt distress" event in which the terms of contractual payments of some outstanding government instruments are renegotiated, typically with a net present value loss for the creditor.[9]

Restructurings can differ along at least three dimensions. First, the types of creditors can be official or private. Official creditors include Paris Club countries, non–Paris Club G20 creditors (for example, China, India, and South Africa), and other official creditors.[10] Private creditors can be external or domestic residents. Second, the timing of restructuring can be preemptive (that is, before any payments are missed) or after default. Third, the implementation of debt restructuring can take different forms. For example, restructuring can take place through a reduction in the face value of debt (which reduces the debt stock immediately) or through cash flow relief with no face value

[8] Preemptive restructurings can be associated with smaller costs and relatively muted impact on the overall economy compared with postdefault restructurings (Asonuma and Trebesch 2016; Asonuma et al., 2021), though historically preemptive restructurings have also been less deep.

[9] An external debt restructuring refers to a formal renegotiation process of outstanding debt instruments issued under foreign jurisdiction and held by external creditors, which may involve a net present value loss for creditors (Asonuma and Papaioannou, forthcoming; Das, Papaioannou, and Trebesch 2012). A domestic sovereign debt restructuring has a similar definition, but the debt instruments are issued under domestic jurisdiction and held mainly by domestic creditors. There are also legal considerations unique to domestic debt restructuring (IMF 2021).

[10] Note that information on debt restructurings by non–Paris Club creditors is available only for China.

reduction (for example, an extension of maturity or a reduction in coupon payments). Cash flow relief with no face value reduction reduces the present value of debt through changes in the schedule of payments.

Table 2. Summary Statistics of Restructuring
(Percent)

		Emerging Market Economies	Low-income Countries
Treatment	Cash flow relief without face value reduction	85.8	73.5
	Face value reduction	14.2	26.5
Timing	Preemptive	58.4	54.3
	Post default	21.6	31.1
	Both + unidentified	20.0	14.6
Creditor Type	Paris Club	48.1	73.5
	China	8.4	5.6
	Private external	24.8	10.1
	Private domestic	6.8	4.5
	Joint	11.9	6.3

Sources: Asonuma, Niepelt, and Ranciere (2023); Asonuma, and Trebesch (2016); Asonuma and Wright (2022); Cheng, Diaz-Cassou, and Erce (2018); Cruces and Trebesch (2013); Horn, Reinhart, and Trebesch (2022); IMF (2021); and author's calculations.
Note: Data are based on the number of restructuring events, which can last for several years. The sample includes 310 restructuring events in emerging market economies and 396 in low-income countries from 1950 to 2021.

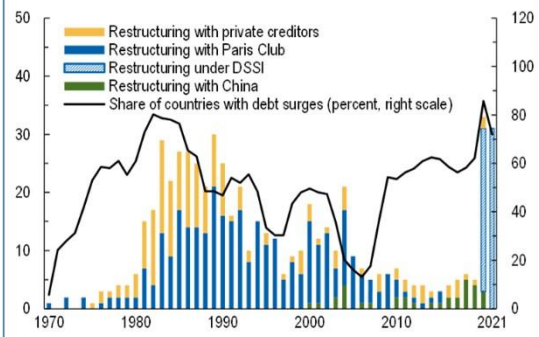
Drawing from a compilation of databases, 709 restructuring events were reported from 1950 to 2021, across 115 countries. Almost all events were in emerging market economies and low-income countries. Debt restructurings often involve cash flow relief with no face value reduction, tend to happen preemptively (rather than post-default), and most frequently involve official creditors, especially in low-income countries (Table 2). Restructurings with domestic creditors are rare and may reflect intentions to avoid risks in the domestic financial sector; these are also less likely to involve face value reduction, and even when they do, the reduction tends to be shallower compared with restructurings with external creditors.[11]

Fiscal consolidations, measured by an increase in the primary-balance-to-GDP ratio, are commonly implemented prior to debt restructuring. Indeed, 60 percent of debt restructuring events in our sample are preceded by an increase in the primary-balance-to-GDP ratio, indicating that countries often undertake fiscal measures before resorting to debt restructuring.

High Chances of Restructuring

An important question to ask in the current environment is: How likely will debt restructuring be in the future? One way to gauge chances of future restructuring is to look at the past and note that restructurings have followed surges in debt ratios. In fact, waves of restructurings followed debt ratio surges in both the 1980s and early 2000s (Figure 7). The share of countries with surging debt ratios has also been on the rise since the global financial crisis. This may suggest that, if history repeats itself, there could be a good chance of more restructurings in the near future. So far—possibly because of low interest

Figure 7. Risk of Restructuring
(Number of restructuring episodes, unless noted otherwise)



Sources: Asonuma and Trebesch (2016); Asonuma and Wright (2022); Horn, Reinhart, and Trebesch (2022); IMF (2021a); IMF, Global Debt Database; Mauro and others (2013); World Bank, International Debt Statistics; and author's calculations.
Note: Unbalanced sample of 123 economies over 1970–2021. DSSI = Debt Service Suspension Initiative.

[11] In each country, a year is counted as a restructuring event if restructuring starts in that year. Restructurings could involve multiple creditors, in which case the count of events is still 1 if they happen in the same year. A restructuring event can last multiple years. See Online Annex 3.6 in IMF (2023) for details on the sources on the episodes of restructurings. IMF (2021) contains further discussion on restructuring of domestic debt.

rates and ease of financing conditions—a wave of restructurings has not occurred. However, note the peak in the number of countries which, in 2020 and 2021, were under the G20 Debt Service Suspension Initiative, designed to mitigate the economic costs of the pandemic in developing economies. The changing global environment (for example, low growth, tightening financing conditions, strong dollar) could also raise these risks. That said, the process could differ significantly from the past, given the changing composition of creditors, the enhanced use of collective action clauses in sovereign bonds, and the G20 Common Framework initiative.

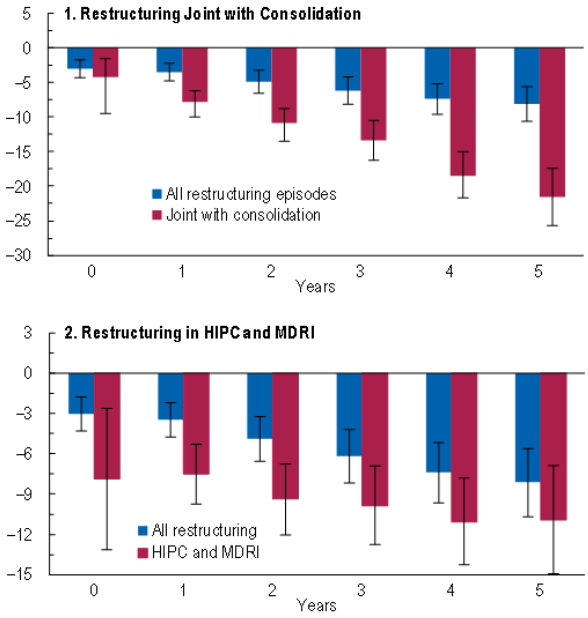
Estimated Effects of Debt Restructuring

To estimate the impact of debt restructuring, this section employs the AIPW estimator, which considers the nonrandom nature of restructuring events. As discussed earlier, the procedure first estimates the probability that a country will begin debt restructuring negotiations based on macroeconomic factors and uses this information to reweight observations in an outcome model, as detailed in Online Annex 3.5 in IMF (2023).

The findings suggest that the debt restructuring process in emerging market economies and low-income countries can have a significant and long-lasting impact on debt ratios (Figure 8, panel 1). On average, debt ratios decrease by 3.4 percentage points in the first year and 8 percentage points within five years of restructuring. We also find that this effect is heightened when accompanied by fiscal consolidation; note also that the difference between the joint and baseline effects grows over time, possible indicating that the restructuring and fiscal consolidation are complementary.

The identity and composition of creditors, the nature of negotiations, and the context in which restructuring takes place can greatly affect its outcome as well. Figure 8 (panel 2) shows that restructuring episodes under the HIPC or MDRI programs were more successful in reducing debt ratios than the typical restructuring, both on impact and over longer horizons.[12] These results are as expected, as the HIPC and MDRI programs were (1) characterized by coordination among

Figure 8. Impact of Restructuring on Debt to GDP
(Percentage point change)



Sources: Asonuma, Niepelt, and Ranciere (2023); Asonuma and Trebesch (2016); Asonuma and Wright (2022); Cheng, Díaz-Cassou, and Erce (2018); Cruces and Trebesch (2013); Horn, Reinhart, and Trebesch (2022); IMF (2021a); and author's calculations.
Note: Figure shows the ATE of restructuring on debt to GDP using augumented inverse propensity weighted estimation. Vertical bars indicate the 90 percent confidence interval. *X*-axis shows the number of years since the restructuring event starts. Sample consists of 111 emerging market and developing economies from 1987 to 2021. See Online Annex 3.5 for details on the estimation of the ATE of restructuring with face value reduction. ATE = average treatment effect; HIPC = Heavily Indebted Poor Countries Initiative; MDRI = Multilateral Debt Relief Initiative.

[12]Treatment in this case is identified as a restructuring event that (1) involved an official creditor (Paris Club or multilateral institution) and (2) happened in a country that benefited from either the HIPC Initiative or MDRI.

creditors, (2) involved deep face value reductions, and (3) included IMF programs. It should be noted, however, that both HIPC and MDRI were designed to be one-off initiatives, and not necessarily replicable going forward. They were also more likely to involve restructuring with face-value reduction, which can be more effective in reducing the debt ratio (see IMF, 2023).

To summarize, debt restructuring in emerging market economies and low-income countries typically has a large, negative, and long-lasting effect on the debt ratio. This effect is heightened when the restructuring is accompanied by fiscal consolidation and coordination mechanisms and according to the conditions under which it occurs.

Conclusions

Adequately timed and appropriately designed fiscal consolidations have a high probability of durably reducing debt ratios. The debt-reducing effects of fiscal adjustments are reinforced when accompanied by growth-enhancing structural reforms and strong institutional frameworks. At the same time, because these conditions and accompanying policies are not always present, and because fiscal consolidation tends to slow GDP growth, on average, fiscal consolidations have a statistically negligible effect on debt ratios.

The impact of restructuring on debt ratios can be sizable and long lasting. The average observed restructuring reduces debt ratios by 3.4 percentage points in the first year and, cumulatively, 8.0 percentage points after five years. However, this effect can be affected by the composition of creditors, type of restructuring, and other operational details and local institutional features.

Finally, debt restructuring and fiscal consolidation are not mutually exclusive options. Indeed, the impact of restructuring events on the debt ratio is considerably larger when it is combined with fiscal consolidation. We also note that fiscal consolidation and especially debt restructuring can be costly processes. This paper focuses on one of their potential benefits, which is to reduce the debt ratio. The decision on whether to adopt those policies, however, should be carefully considered by country authorities based on each specific case.

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