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How the Brady Plan Delivered on Debt Relief:

Lessons and Implications

Neil Shenai and Marijn A. Bolhuis

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How the Brady Plan Delivered on Debt Relief: Lessons and Implications

Prepared by Neil Shenai and Marijn A. Bolhuis*

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ABSTRACT: Rising debt vulnerabilities in low- and middle-income countries have rekindled interest in a Brady Plan-style mechanism to facilitate debt restructurings. To inform this debate, this paper analyzes the impact of the original Brady Plan by comparing macroeconomic outcomes of 10 Brady countries to 40 other emerging markets and developing economies. The paper finds that following the first Brady restructuring in 1990, Brady countries experienced substantial declines in public and external debt burdens and a sharp pick-up in output and productivity growth, anchored by a comparatively strong structural reform effort. The impact of the Brady Plan on overall debt burdens was many times greater than initial face value reductions, indicating the existence of a "Brady multiplier." Brady restructurings took longer to complete than non-Brady restructurings. Today, similar mechanisms could be helpful in delivering meaningful debt stock reduction when solvency challenges are acute, but Brady-style mechanisms alone would not solve existing challenges in the sovereign debt landscape, including those related to creditor coordination, domestic barriers to economic reforms, and the increased prevalence of domestic debt, among others.

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Author's E-Mail Address:	nshenai@imf.org, mbolhuis@imf.org

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WORKING PAPERS

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Glossary

AE	-	Advanced economy
DDSRO	-	Debt- and debt-service reduction operation
DiD	-	Difference-in-differences
EM	-	Emerging market
EMDE	-	Emerging markets and developing economy
HIPC	-	Heavily Indebted Poor Country Initiative
IDA	-	International Development Association
IFI	-	International financial institution
IMF	-	International Monetary Fund
LIC	-	Low-income country
MONA	-	Monitoring of Fund Arrangements database
MYRA	-	Multi-year rescheduling agreements
NPC	-	Negative pledge clause
NPV	-	Net-present value
OSI	-	Official sector involvement
PRGT	-	IMF's Poverty Reduction and Growth Trust
PWT	-	Penn World Table
QPC	-	Quantitative performance criteria (IMF programs)
RSBs	-	Recovery and Sustainability Bonds
SCDI	-	State-contingent debt instrument
SCM	-	Synthetic control method
TFP	-	Total factor productivity
UCT	-	Upper-credit tranche

Introduction

In March 1989, U.S. Treasury Secretary Nicholas Brady launched a plan for distressed sovereigns to restructure unsustainable debts via the issuance of so-called "Brady bonds." Under Brady exchanges, creditors accepted face value and net-present value (NPV) haircuts in exchange for greater assurances about debtors' capacity to repay, while debtors used the debt relief provided to restore debt sustainability and growth. Several inducements helped achieve voluntary creditor participation in Brady exchanges, including collateralized interest and principal payments of Brady bonds, debtors' commitments to economic reform under International Monetary Fund (IMF) programs, and the enhanced liquidity of the restructured claims. Overall, the original Brady plan was viewed as a success as it reduced emerging market (EM) debt burdens, restored market access, diversified the EM creditor base, took illiquid loans off of advanced economy (AE) commercial bank balance sheets and converted them into tradeable securities, and safeguarded economic reform momentum (EMTA, 2022).

Some analysts have recently recommended rebooting a Brady-style mechanism. For instance, Lee Buchheit and Adam Lerrick proposed a Brady bond-style exchange structure in which low-income governments restructure the entire stock of their external debt under one of two Brady-like structures (Buchheit & Lerrick, 2023).[1] Brahima S. Coulibaly and Wafa Abedin argued that the World Bank and IMF could manage a Brady-style debt exchange mechanism for heavily indebted countries, which in turn would reduce debt risks (Coulibaly & Abedin, 2023). Ying Qian also claimed that Brady-like restructurings could be useful in reducing post-COVID sovereign debt loads while enhancing the resilience of debt portfolios by introducing, for instance, state-contingent debt instruments (SCDIs) or commodity-linked provisions in the restructured bonds (Qian, 2021).[2] Previously, Nicholas Economides and Roy C. Smith argued that so-called "Trichet Bonds" could be used to resolve the European sovereign debt crisis.[3]

However, these perspectives raise several unanswered questions. Authors such as Buchheit & Lerrick and Coulibaly & Abedin do not spell out how the Brady Plan delivered on debt relief and enabled better macroeconomic outcomes, taking its benefit for debtors as given. They also do not explain the underlying mechanisms by which Brady exchanges can catalyze better outcomes than alternative approaches. Moreover, many advocates for a rebooted Brady Plan do not emphasize the critical role played by structural reforms in enhancing outcomes in Brady restructurers, nor do they explain why a mechanism designed for emerging markets with market access would help address debt issues in low-income countries, whose debt stocks are often held by official creditors. This paper thus contributes to the debate by elucidating the mechanisms by which original Brady restructurers achieved better outcomes in debt restructuring and growth.

Several authors have studied the impact of the Brady Plan previously. For instance, Gumbau-Brisa & Mann (2009) argue that Brady restructurings improved the market for distressed sovereign debt by improving solvency and better aligning prices with fundamentals, rather than short-run factors such as sentiment. Moreover, Brady restructurers also undertook economic reforms before and after restructurings that were seen

[1] One option includes a cash down-payment structure, which would guarantee an up-front payment to the creditor for agreeing to restructure, while the other option had a "floor of support" structure, where a highly rated zero-coupon financial instrument collateralizes the restructured bond. See also (Wolf, 2022) for a summary of the Buchheit-Lerrick plan, as well as Annex II for more details.

[2] SCDIs and other commodity-linked structures were used in Brady restructurings as well.

[3] Under this scheme, the European Central Bank would issue zero-coupon bonds to serve as collateral for restructured sovereign claims of Euro Area members, see (Economides & Smith, 2011).

as growth- and credit-enhancing (EMTA, 2022), including those reforms envisaged, urged, and helped implemented by the World Bank. As argued by Arslanalp & Henry (2005), Brady treatments led to significant stock market appreciations in Brady restructuring countries relative to the control group. The authors also show that Brady restructurings were not a zero-sum game between creditors and debtors: commercial banks with significant developing country loan exposure (i.e., those most exposed to Brady restructurers) experienced a notable rise in their market capitalization relative to a control group of financial institutions.[4]

To add to this discussion, this paper analyzes how the original Brady Plan delivered on debt relief and growth using several empirical methods. [5] In so doing, it contributes to the literature on sovereign debt restructuring. Specifically, this paper estimates the impact of the Brady Plan by comparing macroeconomic outcomes of 10 Brady countries for which data are available to 40 other emerging markets and developing economies (EMDEs) using non-staggered and staggered difference-in-differences and synthetic control approaches. To the authors' knowledge, it is the first attempt of using these three methods to analyze the impact of the Brady Plan.

Results show Brady countries achieved better outcomes than non-Brady peers. Brady restructurers tended to achieve lower public debt, lower external debt, higher growth, and lower inflation relative to the non-Brady control group. The long-term impact of Brady face value reductions on debt levels was multiplied many times over—mainly driven by the more than doubling of the growth rate of Brady countries in the 1990s relative to the 1980s. This pick-up in growth followed largely from total factor productivity growth, which is consistent with the relatively strong structural reform effort in Brady countries.[6]

The rest of this paper proceeds as follows. Section II provides background and context for the original Brady Plan. Section III presents the paper's empirical analysis. Section IV discusses the lessons that follow from this paper's analysis. Section V concludes. Annex I provides additional information on the empirical results of the paper. Annex II summarizes the menu of options for the original Brady Plan and options for a rebooted Brady Plan in the 2020s presented by other authors.

[4] As found by Arslanalp & Henry (2005), when developing countries announced debt relief agreements under the Brady Plan, their stock markets appreciated by an average of 60 percent in real dollar terms—a $42 billion increase in shareholder value. There is no significant stock market increase for a control group of countries that do not sign Brady agreements. The stock market appreciations successfully forecast higher future resource transfers, investment, and growth. Since the market capitalization of U.S. commercial banks with developing country loan exposure also rises—by $13 billion—the results suggest that both borrower and lenders can benefit from debt relief when the borrower suffers from debt overhang.

[5] Hereafter, the terms "Brady Plan" and "Brady restructurings" will be used interchangeably and refer to the suite of economic policy actions taken by debtors, creditors, and IFIs to reduce the face value of existing debt while undertaking complementary and related economic reforms.

[6] These primary results are confirmed via two robustness checks.

Background on the Brady Plan

The 1970s saw a rise in bank lending to EMDEs, mainly in Latin America, with a reversal in the early 1980s that contributed to debt sustainability challenges for many heavily indebted countries. The 1970s oil price shocks caused large balance of payments surpluses in oil-exporting countries, which deposited their foreign exchange earnings in U.S. commercial banks. In turn, banks lent to Latin American sovereigns, with the total stock of outstanding debt rising from about $30 billion in 1970 to $330 billion in 1982. As U.S. interest rates rose and the world economy entered a recession in 1981, many Latin American countries lost market access and could no longer service their debts as commercial banks retrenched their lending (Sims & Romero, 2013).

Latin America's debt troubles were originally treated as a liquidity—rather than a solvency—problem by creditors. During the initial phase of the 1980s Latin American debt crisis, international lenders and IFIs expected that macroeconomic adjustment policies could help these countries restore sustainability and regain market access. Debtors adopted multiyear rescheduling agreements (MYRAs) to continue to service interest payments on existing debt while rescheduling principal payments. The total face value of Latin America's external debt stocks was thus left unchanged during this liquidity-oriented period. However, the lack of growth and new private sector lending indicated that these initial strategies were not working, and that the NPV reduction provided by MYRAs was insufficient to restore sustainability. Thus, United States Treasury Secretary James Baker developed the Baker Plan in 1985, in which long-term structural reforms, rather than short-term macroeconomic adjustment, were emphasized. Baker further called on commercial banks and IFIs to lend $30 billion in fresh capital to the 15 countries eligible for the Baker Plan.[7] Again, debt stock reduction was not supported (Sturzenegger & Zettelmeyer, 2006), (Truman, 2020).

By the late 1980s, it was clear that face value reduction was needed to restore debt sustainability. During the initial phase of the Latin American debt crisis, there was a worry that defaults would lead to capitalization problems for the region's lenders. Initial debt restructurings and IFI assistance, coupled with adjustment programs, helped distressed sovereigns service their debts and gave time for lenders to rebuild buffers. By end-1988, major commercial banks reduced their exposure to Latin America's troubled sovereigns by nearly 50 percent. Moreover, as more banks recognized the reduced market value of their claims on distressed sovereigns, they were more inclined to provide debt relief. Many debtors also made efforts to retire their external debt as well. Together, systemic stability concerns had declined by the late 1980s, though the region was constrained by low growth, limited new lending, and unsustainable debt loads. These factors opened the door to a more fulsome debt relief process (Clark, 1994).

U.S. Treasury Secretary Nicholas Brady announced a plan for reducing the debts of heavily indebted emerging markets in March 1989. The plan proposed to offer debt relief in the form of, among others, face value reductions, face value preservation but lower coupon payments and a maturity extension, or creditors putting in new money via voluntary exchanges (see Annex II). The new debt would have reduced interest and principal payments while including credit enhancements to encourage creditor participation in the restructuring process. Credit enhancements included the use of IFI funds to purchase and provide collateral for restructured bonds, usually in the form of zero-coupon U.S. Treasury securities, as well as macroeconomic stabilization and

[7] The list of countries in the Baker plan included Argentina, Bolivia, Brazil, Chile, Colombia, Cote d'Ivoire, Ecuador, Mexico, Morocco, Nigeria, Peru, the Philippines, Uruguay, Venezuela, and Yugoslavia. These countries were selected as they were the ones for which commercial banks had large exposures, see Clark (1994).

reform programs anchored by IMF programs and World Bank engagement to strengthen debtors' capacity to repay creditors.[8] The IMF's Executive Board also introduced its lending into arrears policy to allow debtors to run temporary arrears to creditors provided debtors were negotiating debt relief in good faith. This policy positively impacted Brady deals since it mitigated delays to restructurings and to IMF support.[9] Further, commercial banks were urged to waive negative pledge clauses (NPCs)—or conditions that prohibit issuing new collateralized debt unless incumbent debt holders are given equivalent amounts of collateral—on the old debt. The aim of these policies was to restore debt sustainability, provide a credible plan for macroeconomic reform via IMF programs, and employ sufficient carrots and sticks to urge participation in debt treatments (Clark, 1994), (Sturzenegger & Zettelmeyer, 2006), (Truman, 2020).

Seventeen countries undertook Brady restructurings beginning in 1990 through 1998 (Table 1). The first Brady restructuring took place in February 1990 with Mexico, which ultimately restructured about $54 billion of debt (worth about 19 percent of Mexico's 1990 GDP) and included a 13 percent face value reduction. The average face value reduction of all Brady restructurers was about 22 percent of GDP worth of restructured debt (Asonuma & Trebesch, 2016). Many of the early Brady restructurers, including Mexico, Nigeria, and Venezuela were oil exporters originally targeted for structural adjustment under the preceding Baker Plan (Bogdanowicz-Bindert, 1986). Debt restructurings under the Brady Plan tended to take longer than other restructurings, with an average time to settlement of about 6 years, which is longer than the average duration of debt restructurings from 1978-2020 (about 3 years, see (Asonuma & Trebesch, 2016)).

Brady exchanges had several features. Restructurings were done on a case-by-case basis. Debtors and creditors negotiated debt relief packages among a menu of options that was tailored to each restructuring request. The primary two options pursued via Brady exchanges were par bond exchanges and discount bond exchanges. Both restructuring options included an upfront cash payment, usually between 7 to 13 percent of the principal and interest payments of the original debt, while the remaining new obligations were securitized and restructured according to the respective exchange's features. In par bonds exchanges, the face value of the new bonds would be the same as the old bonds, while the new bonds would have lower fixed interest rate payments. Discount bonds involved face value reductions of about 30-35 percent, with variable interest rate structures (EMTA, 2022) (see Annex II). Relative to Non-Brady debt restructurings that involved commercial creditors, Brady exchanges were more likely to include new money, affect principal coming due, and include larger haircuts (see Figure 1, panel B).

Brady bonds had credit and liquidity enhancements. Their principal payments were collateralized by zero-coupon U.S. Treasury securities, while interest payments were secured by high-grade investment securities purchased with IMF program augmentation and set asides that were earmarked for these debt operations. These zero-coupon structures were particularly appealing in the context of the 1980s and 1990s interest rate environment, where zero-coupon securities could be purchased at a deep discount relative to regular coupon-bearing structures given the former's higher duration (or interest rate sensitivity). Rolling interest rate guarantees—enabled by IFI lending and additional bilateral new money held in a trust at the Federal Reserve—

[8] Under Brady restructurings, debtors would receive debt relief in exchange for undertaking economic reforms anchored by IMF programs. Reforms generally focused on lowering inflation, current and capital account liberalization (including reducing trade barriers), and structural reforms. See (Cline, 1995) for a summary. Recent research suggests that when countries are in debt distress, fiscal consolidation and debt relief combined produce the best outcomes for reducing long-term debt ratios. Often, such consolidations can be targeted via IMF-supported programs with UCT-quality conditionality. See (IMF, 2023)..

[9] The debt- and debt-service reduction operation (DDSRO) policy was part of a broader set of IMF policy reforms in 1989, adopted in the context of the Brady Plan, aimed at resolving the EM debt crisis by facilitating market-based restructurings. Under the policy, the Fund provided financial support to DDSROs on 11 occasions between 1989 and 1998 (see IMF (2021)).

also alleviated near-term default concerns. These *credit enhancements* helped induce private sector involvement in Brady restructurings. Brady bonds also had *liquidity enhancements* as commercial creditors were able to turn their claims into tradable financial securities. Indeed, one of the benefits of the Brady Plan was to offer the opportunity to bilateral creditors to turn illiquid loans into tradable securities, thereby strengthening the liquidity of restructured claims while reducing creditor concentration (Miles, 1999).[10] Brady bonds helped open new categories of institutional investors that were attracted to the relatively higher returns offered by Brady bonds while taking advantage of still seeking the safety provided by their collateralized structure. This potential benefit is further evidenced by the fact that external sovereign bonds generally offer excess returns over compensation for the risk of default, while the same may not necessarily be true for bilateral claims (Meyer, Reinhart, & Trebesch, 2022).

Brady countries undertook economic reforms. These reforms included measures in UCT-quality IMF programs and structural reforms encouraged by the World Bank. These programs served two purposes: they enhanced the capacity to repay restructured claims while signaling debtors' commitment to reform and sound public finances. Brady Plan era reforms often followed several years' worth of macroeconomic adjustment programs undertaken during the MYRA and Baker Plan eras.

The Brady Plan had strong ownership by the United States. In the 1980s, the United States in close collaboration with Japan underwrote the Brady Plan by providing enhancements for interest and principal payments on the restructured bonds. The United States government used its influence at the IFIs, as well as its connections to its commercial creditors, to urge debt relief via Brady exchanges. The United States took a leadership role in helping to address the challenges of engaging multiple stakeholders in debt restructuring, including by helping restructurers navigate the stigma and operational opacity associated with debt restructuring. Additionally, the United States provided leadership to the IFIs to build a consensus to support implementation of the plan.[11]

[10] Of course, creditors may need to overcome domestic legal constraints that would hamper their willingness to convert existing bilateral loans into tradable bonds, such as obtaining parliamentary approval.

[11] The United States paved the way to debt relief by urging its commercial creditors to waive NPCs, for instance, when engaging in Brady exchanges. For more on the U.S. role in the Brady Plan, see (Clark, 1994).

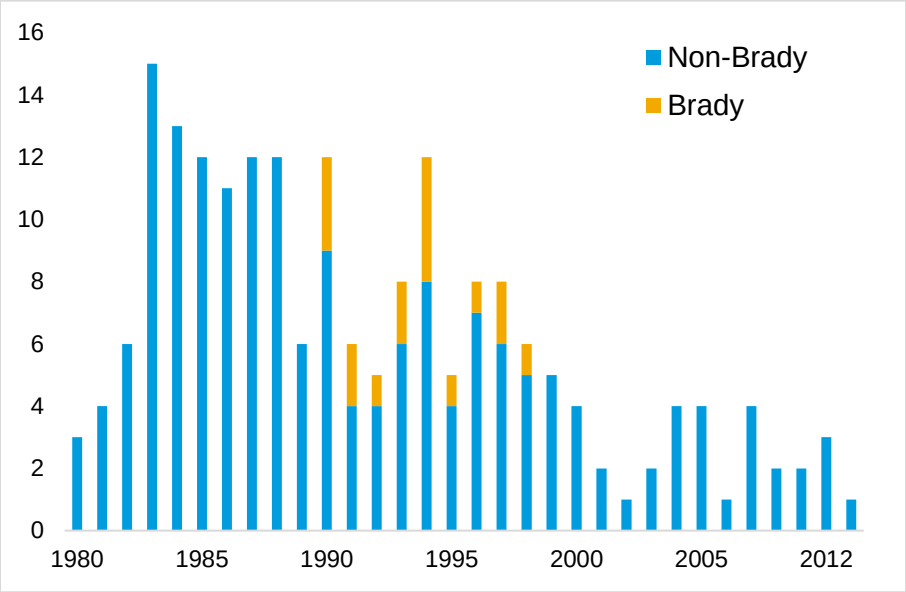
Table 1: Brady Restructurings

Brady country	Date of restructuring (MM / YYYY)	Debt restructured (USD millions)	Debt restructured (% of GDP)	Face value reduction	Time to settlement (months)
Mexico	02 / 1990	54,300	18.7	13.1%	14
Costa Rica	05 / 1990	1,384	24.1	47.0%	49
Venezuela	12 / 1990	19,585	40.5	6.8%	23
Uruguay	01 / 1991	1,610	12.0	16.4%	19
Nigeria	12 / 1991	5,883	9.8	34.6%	31
Philippines	12 / 1992	4,471	7.4	13.2%	29
Argentina	04 / 1993	28,476	10.8	9.5%	64
Jordan	12 / 1993	1,289	23.0	28.7%	60
Brazil	04 / 1994	43,257	7.9	9.1%	59
Bulgaria	06 / 1994	7,910	81.4	31.1%	53
Dom. Rep.	08 / 1994	1,087	7.4	39.7%	88
Poland	10 / 1994	13,531	13.0	31.9%	62
Ecuador	02 / 1995	7,170	31.2	16.4%	104
Panama	04 / 1996	3,936	39.2	0.7%	90
Peru	03 / 1997	10,600	18.8	34.2%	155
Vietnam	12 / 1997	782	2.3	26.1%	194
Cote d'Ivoire	03 / 1998	6,462	37.1	60.2%	180

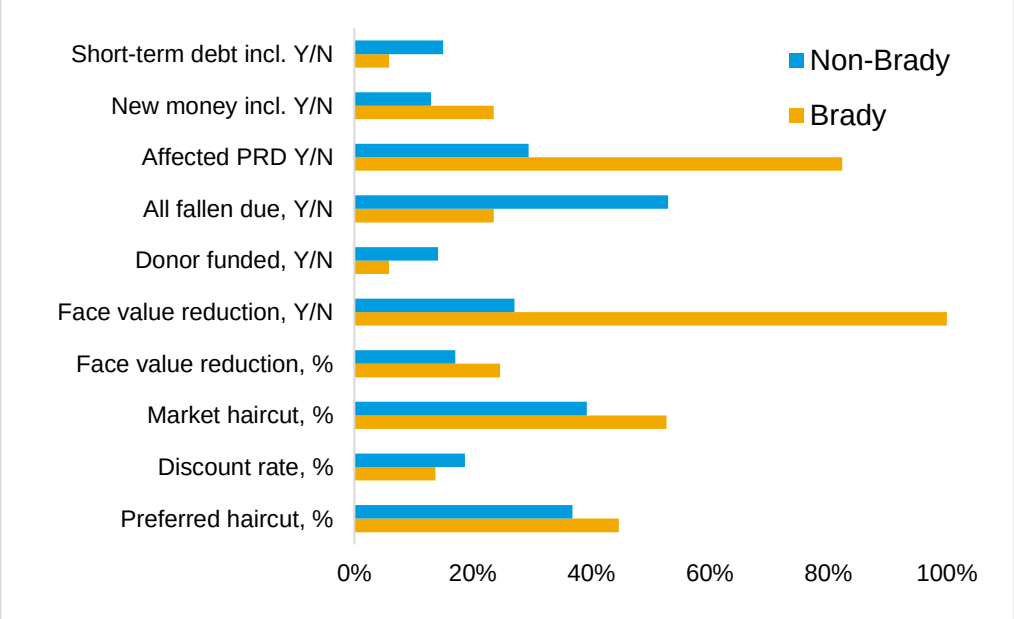
Notes: (Asonuma & Trebesch, 2016)**,** (Cruces & Trebesch, 2014), and authors' calculations. GDP data from World Economic Outlook. Note that Russia also had a Brady-like restructuring in 1998 but was not an original Brady Plan country.

Figure 1. Brady Restructurings in Historical Context (1980-2013)

(A) Number of debt restructurings per year



(B) Characteristics of Brady restructurings compared to other debt restructurings



Notes: (Asonuma & Trebesch, 2016), (Cruses & Trebesch, 2014), and authors' calculations. Dataset includes defaults on commercial creditors and does not include Paris Club treatments.

Analyzing the Impact of the Brady Plan

To analyze the macroeconomic impact of the original Brady Plan, this paper studies the impact of the Brady restructurings using a sample of 50 EMDEs. To distinguish the effect of debt relief from that of common shocks, the change in macroeconomic outcomes for Brady countries with a similar group of EMDEs that did not receive debt relief under the Brady Plan are compared. This paper's research design addresses the non-random nature of achieving debt relief treatment by using difference-in-differences (DiD) and synthetic control methods to compare the outcomes of Brady restructurings with otherwise observationally similar countries.[12] This section details the empirical strategy and presents the results of the paper.

Table 2: Variables and Data Sources[13]

Variable	Source(s)
Gross government debt	Global Debt Database (Mbaye, Moreno Badia, & Chae, 2018), Historical Public Debt Database, World Economic Outlook
External debt	World Bank Development Indicators
Real GDP	Penn World Table 10.0 (Feenstra, Inklaar, & Timmer, 2015)
GDP deflator	World Economic Outlook and World Bank Development Indicators
Trade openness	Penn World Table 10.0 (Feenstra, Inklaar, & Timmer, 2015)
FDI stock, external liabilities	External Wealth of Nations (Lane & Milesi-Ferretti, 2018)
Physical capital stock	Penn World Table 10.0 (Feenstra, Inklaar, & Timmer, 2015)
Human capital index	
Employment	
Population	
Labor income share	

Sample and sources

The sample for this paper's empirical analysis includes 10 Brady countries for which data could be obtained. These countries included Argentina, Brazil, Costa Rica, Dominican Republic, Ecuador, Jordan, Mexico, Nigeria, Peru, and the Philippines.[14] Data sources are presented in Table 2. The control group consists of 17 countries that received debt restructuring between 1970 and 2013 but did not sign Brady deals and 23 other EMDEs that did not seek debt treatments (see Table 2). Summary statistics of the main macroeconomic variables under consideration are reported in Table 4.

[12] Recent applications of synthetic control methods include studies on the macroeconomic impacts of economic liberalization episodes (Nannicini & Billmeier, 2011) and (Billmeier & Nannicini, 2013); structural and tax reforms (Newiak & Willems, 2017), (Adhikari, Duval, Hu, & Loungani, 2016), and (Adhikari & Alm, 2016); the recent Debt Service Suspension Initiative (Lang, Mihalyi, & Presbitero); IMF precautionary lending programs and rescue loans (Essers & Ide, 2019) and (Kuruc, 2022), respectively; and Brexit (Born, Müller, Schularick, & Sedlacek, 2019).

[13] Any potential biases or omissions in data sources could impact the paper's results. The use of multiple methods and robustness checks helps reduce, but not eliminate, the risks associated with issues from data coverage.

[14] The sample does not include Brady cases of Bulgaria, Cote d'Ivoire, Panama, Poland, Uruguay, Venezuela, and Vietnam due to incomplete data. Note that Russia had a Brady-like deal in 1998 but was not an original Brady Plan nor Baker Plan country, and hence was omitted from this paper's analysis.

Table 3: Sample of Countries

Brady (10)	Non-Brady Restructurings (17)	Non-Brady non-Restructurings (23)
Argentina*	Bolivia	Bangladesh
Brazil	Cameroon	Benin
Costa Rica	Congo, Rep.	Botswana
Dominican Republic	Gabon	Burundi
Ecuador*	Honduras	Colombia
Jordan*	Jamaica	Egypt, Arab Rep.
Mexico	Kenya	El Salvador
Nigeria*	Madagascar	Eswatini
Peru	Malawi	Fiji
Philippines	Morocco	Ghana
	Niger	Guatemala
	Pakistan	Haiti
	Paraguay	India
	Senegal	Indonesia
	Sierra Leone	Iran, Islamic Rep.
	Togo	Lesotho
	Türkiye	Mali
		Mauritius
		Myanmar
		Nepal
		Sri Lanka
		Thailand
		Tunisia

Notes: Table lists EMDEs included in the full sample for the differences-in-differences analysis. The sample excludes Brady cases Bulgaria, Cote d'Ivoire, Poland, Uruguay, Venezuela, and Vietnam due to incomplete data. * denotes oil exporter

Table 2: Selected Summary Statistics

Variable		Brady	Non-Brady Restructurings	Non-Brady Non-Restructurings
Gross government debt, % of GDP, 1989	Mean	70.7	71.1	56.7
	Median	58.9	53.9	48.8
Gross government debt, % of GDP, 1999	Mean	55.4	73.9	54.6
	Median	48.3	63.4	44.3
External debt, % of GDP, 1989	Mean	77.9	81.1	60.8
	Median	75.2	80.0	43.2
External debt, % of GDP, 1999	Mean	54.9	89.5	52.7
	Median	51.3	68.3	40.4
Real GDP growth, %, 1985-1989 av.	Mean	2.8	2.7	4.5
	Median	2.4	3.1	4.6
Real GDP growth, %, 1990-1999 av.	Mean	3.4	1.9	4.6
	Median	3.4	2.3	4.8
Inflation %, 1985-1989 av.	Mean	220	163	11.0
	Median	21.2	6.1	10.0
Inflation %, 1990-1999 av.	Mean	186	18.3	12.7
	Median	21.7	10.0	10.2
Trade openness, 1989	Mean	21.5	28.5	25.2
	Median	17.2	18.1	15.3
Trade openness, 1999	Mean	39.7	34.9	31.5
	Median	36.8	20.4	20.4
FDI stock, share of external liabilities, 1989	Mean	12.3	10.7	18.9
	Median	10.3	8.6	13.4
FDI stock, share of external liabilities, 1999	Mean	26.1	15.8	24.5
	Median	27.6	14.1	20.3
Current account, % of GDP, 1985-1989 av.	Mean	-2.4	-5.2	-.3
	Median	-2.0	-4.6	-2.2
Current account, % of GDP, 1990-1999 av.	Mean	-2.9	-5.0	-3.1
	Median	-2.8	-4.6	-2.3
Net investment income, % of GDP, 1985-1989	Mean	-5.2	-4.7	-3.0
	Median	-4.9	-3.9	-2.3
Net investment income, % of GDP, 1985-1989	Mean	-3.5	-4.8	-1.6
	Median	-3.7	-3.1	-1.5

Methodology

A differences-in-differences (DiD) regression was run to assess the impact of Brady restructurings on various variables of interest (see Table 3).[15] The proposed specification is described below in equation (1):

$$(\mathbf{1})\ y_{it} = \beta \cdot brady_i \times post_t + \gamma_i + \gamma_t + \epsilon_{it}\ ,$$

where $post_t$ is a dummy equal to one in 1999, and equal to zero in 1989. $brady_i$ is a dummy equal to one for Brady countries. γ_i and γ_t are country- and year-specific fixed effects. Coefficient β thus captures the impact of the Brady restructuring—i.e., it captures the difference in the outcome variable y_{it} for Brady countries relative to the pre-Brady period and non-Brady countries. Note that both average treatments (with an event study at 1989) and a staggered treatment (to accommodate the timing of when Brady restructurings took place in each treated country) are used. Results of these (DiD) regressions are presented in Tables 6 and 7.

As an additional robustness check, a synthetic control method was also used. The SCM provides a useful analytical tool to assess the impact of treatment (in this case, a Brady restructuring) on a country relative to a *synthetic control*, or a combination of comparator countries.[16] This study is interested in the effect α_{it} of the Brady Plan on macro outcome y_{it} in country *i* at time $t \geq t_0$, where t_0 is the time period when the Brady Plan starts to impact the outcome. This effect can be stated as per equation (2):

$$(\mathbf{2})\ \alpha_{it} = y_{it}^I - y_{it}^N,$$

where y_{it}^I is the value of y_{it} when the Brady Plan takes place, and y_{it}^N is the value of y_{it} in the absence of the Brady Plan. y_{it}^I is observed, whereas y_{it}^N is not. The SCM estimates a counterfactual (i.e., the synthetic control) for y_{it}^N using a weighted average of the observations from the control group (the comparator pool) such that:

$$(\mathbf{3})\ \hat{y}_{it}^N = \sum_{n \neq i} w_n y_{nt}\ ,$$

where the weights w_n are constructed such that the synthetic control matches pre-treatment characteristics of the treated country as closely as possible. Specifically, the vector of weights solves the following equations (4):

$$(\mathbf{4})\ \min_W ||\, X_1 - X_0 W ||_V = \sqrt{(X_1 - X_0 W)' V (X_1 - X_0 W)}$$

$$subject\ to\ \ w_n \geq 0\ \forall n \neq i$$

$$\sum_{n \neq i} w_n = 1$$

where V is a symmetric and positive semi-definite matrix that weighs the importance of pre-treatment characteristics, constructed to minimize the mean-squared prediction error for the level of the outcome variable (e.g. external debt to GDP) in the pre-treatment periods (1981-1989). As an example, Table 5 includes the

[15] For a background on the DiD approach, see (Baker, Larcker, & Wang, 2021)

[16] (Abadie & Gardeazabal, 2003) developed the SCM, which was subsequently extended by (Abadie, Diamond, & Hainmueller, 2010). For more detailed discussions of the SCM in a macro context, see (Newiak & Willems, 2017) and (Kuruc, 2022).

weights of the synthetic controls for gross public debt. After obtaining the weights, the treatment effect of the Brady Plan at time *t* is constructed as per equation (5):

$$(\mathbf{5})\ \hat{\alpha}_{it} = y_{it}^{I} - \hat{y}_{it}^{N}\ .$$

To assess the macroeconomic impact of the Brady Plan, decompositions of growth and debt dynamics are calculated. For real GDP growth, Cobb-Douglas production functions of real GDP with physical capital and effective labor as inputs is specified as per equation. The growth of real GDP can be decomposed in first differences as per equation (6):

$$(\mathbf{6})\ \Delta \ln Y_t = \Delta \ln TFP_t + \frac{\alpha}{1-\alpha}\Delta \ln k_t + \Delta \ln h_t + \Delta \ln(\frac{L_t}{P_t}) + \Delta \ln P_t\ ,$$

where Y_t is real GDP, TFP_t is total factor factor productivity, k_t is capital per unit of output, h_t is a country's human capital index, $\frac{L_t}{P_t}$ is the employment to population ratio, and P_t is population. α is the capital share, which is measured as one minus the labor share in Penn World Table 10.0.

The change in debt-to-GDP ratio can be decomposed into the contributions from debt relief, economic growth, and a residual. This change is decomposed as per equation (7):

$$(\mathbf{7})\ d_t - d_{t-1} = -relief_t - \frac{g_t}{1+g_t}d_{t-1} + o_t$$

Where d_t is gross government debt to GDP, $relief_t$ is debt relief to GDP, g_t is the growth rate of real GDP, and o_t is the residual that captures the primary balance, exchange rate and inflation effects, and stock-flow adjustments. To assess the contribution of higher output growth of Brady countries to changes in the debt to GDP ratio, the exercise iterates forward from 1989 using a counterfactual growth rate that is 2 percentage points lower than the observed growth rate. Note that two percentage points is about the magnitude of the uptick in trend growth of Brady countries in 1990-1999 relative to 1980-1989 (Figure 3).

Table 3: Country Weights of Synthetic Controls for Gross Public Debt

Brady	Argentina	Brazil	Costa Rica	Dominican Republic	Ecuador	Jordan	Mexico	Nigeria	Peru	Philippines
Control										
Bangladesh	0	0	0	0	0.547	0	0	0.281	0	0
Benin	0.518	0	0	0	0	0	0	0	0.274	0
Bolivia	0	0	0	0	0	0	0	0	0	0
Botswana	0	0	0	0	0	0	0	0	0.141	0
Burundi	0	0	0.624	0	0	0	0	0	0.519	0
Cameroon	0	0	0.335	0	0	0	0	0	0	0
Colombia	0.053	0	0	0	0	0.121	0	0	0	0
Congo, Rep.	0	0	0	0	0	0	0	0	0	0
Egypt, Arab Rep.	0	0	0.042	0	0	0	0	0	0	0
El Salvador	0	0	0	0	0	0	0	0	0	0
Eswatini	0	0.161	0	0	0	0	0.134	0.154	0	0
Fiji	0	0	0	0	0	0	0	0.362	0	0
Gabon	0	0	0	0	0	0	0	0	0.009	0
Ghana	0	0	0	0	0	0	0	0	0.058	0
Guatemala	0.266	0	0	0	0.009	0	0	0.204	0	0
Haiti	0	0	0	0	0	0	0.006	0	0	0.418
Honduras	0	0	0	0	0	0	0	0	0	0
India	0	0.048	0	0	0	0	0.236	0	0	0
Indonesia	0	0.196	0	0	0	0	0	0	0	0
Iran, Islamic Rep.	0	0	0	0	0	0	0	0	0	0
Jamaica	0	0	0	0	0	0	0	0	0	0
Kenya	0	0	0	0.005	0	0	0	0	0	0
Lesotho	0	0	0	0	0	0	0	0	0	0
Madagascar	0	0	0	0.363	0.091	0	0	0	0	0.198
Malawi	0	0	0	0	0	0	0	0	0	0
Mali	0.13	0	0	0	0.352	0.879	0	0	0	0
Mauritius	0	0	0	0	0	0	0	0	0	0
Morocco	0	0	0	0	0	0	0	0	0	0
Myanmar	0	0	0	0	0	0	0	0	0	0
Nepal	0	0	0	0	0	0	0	0	0	0
Niger	0	0	0	0	0	0	0	0	0	0
Pakistan	0	0	0	0.632	0	0	0	0	0	0
Paraguay	0	0	0	0	0	0	0	0	0	0
Senegal	0	0	0	0	0	0	0.086	0	0	0.006
Sierra Leone	0.032	0	0	0	0	0	0	0	0	0.238
Sri Lanka	0	0	0	0	0	0	0.485	0	0	0
Thailand	0	0	0	0	0	0	0	0	0	0
Togo	0	0.595	0	0	0	0	0.051	0	0	0.14
Tunisia	0	0	0	0	0	0	0	0	0	0
Turkiye	0	0	0	0	0	0	0	0	0	0

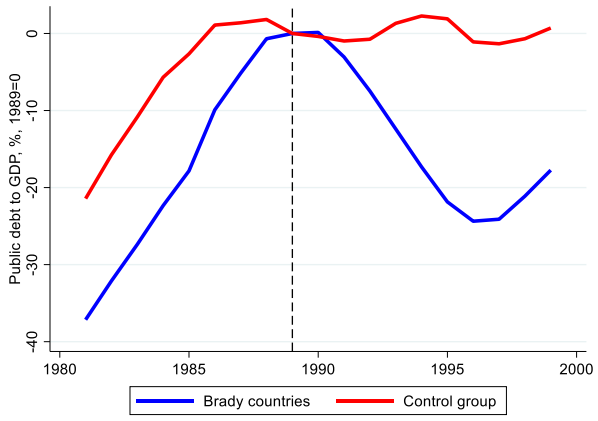
Source: Authors' calculations

Results

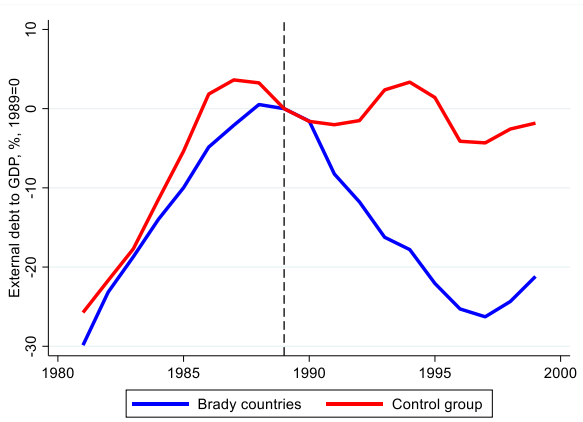
In the decade following the first Brady deal, public debt levels of Brady countries dropped by 20 percentage points of GDP relative to non-Brady countries. Public debt levels of Brady countries grew faster than those of the control group in the decade before 1990 (Figure 2, panel A). After the first Brady deal, debt levels of Brady countries declined by about 25 percentage points of GDP, albeit from a much higher level, while debt levels of the control group flatlined. Similarly, average external debt burdens of Brady countries, which grew at similar rates to non-Brady countries before 1990, fell by roughly 25 percentage points relative to the control group in the following decade (Figure 2, panel B). These findings suggest the Brady Plan had the first-order effect of bringing down debt burdens and thereby enhancing debt sustainability, in line with its goals. Tables 6 and 7 in Annex I summarize the results of the DiD regressions.[17]

Figure 2. Evolution of Public and External Debt Following the First Brady Deal (1980-1999)[1]

(A) Public debt, % of GDP
(3y average, deviation from 1989)



(B) External debt, % of GDP
(3y average, deviation from 1989)



[1] Public and external debt (as percent of GDP) from 1980 to 1999 in sample of 11 Brady countries and 53 EMDEs that serve as the control group. Lines show group averages by year relative to 1989, the year before the first Brady restructuring. See Annex I for data details.

Brady countries experienced a return of economic growth to trend after their restructurings. In the decade prior to the first debt relief, real GDP of Brady countries grew at an average rate of 1.5 percent per year, whereas non-Brady countries grew at an average rate of more than 3 percent. During the decade following the first Brady deal in 1990, the growth rate of Brady countries more than doubled to 3.4 percent. Economic growth in the control group was unchanged relative to its pre-1990 growth path (Figure 3, Panel A). In 1999, output of Brady countries was 26 percent higher relative to their pre-restructuring trend.

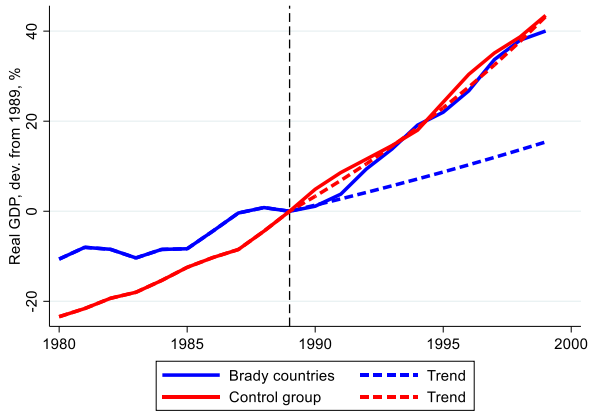
Following debt relief, inflation rates of Brady countries declined significantly relative to the control group. Inflation was high in Brady countries before the restructurings (Figure 3, panel B). The mean of the

[17] In conducting this analysis, the contribution of changes in fiscal stances to overall debt burden reductions was considered but not pursued due to the lack of granular fiscal data on Brady countries in the 1980s and early 1990s.

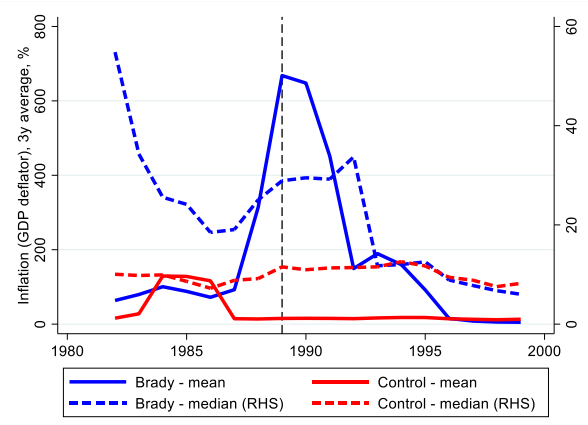
annual growth rate of Brady countries' output deflator peaked at a mean of 600 in 1989, and the median peaked at 30 percent in 1992. Yet by 1999, both mean and median inflation rates of the Brady group had fallen below the control group.

Figure 3. Evolution of Output and Inflation Following the First Brady Deal (1980-1999)[1]

(A) Real GDP
(% deviation from 1989)



(B) Inflation
(3y average of GDP deflator growth, %)



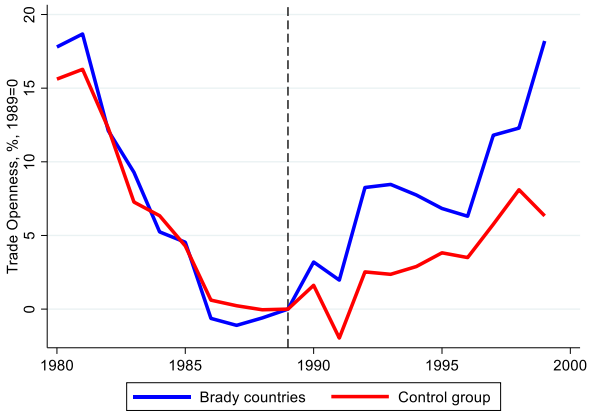
[1]Real GDP from 1980 to 1999 in sample of 11 Brady countries and 53 EMDEs that serve as the control group. Lines show group averages by year relative to 1989, the year before the first Brady restructuring. Dashed lines plot group trend growth between 1980 and 1989. Panel B also plots group medians because means are impacted by hyperinflationary episodes, like Brazil. See Annex I for data details.

The faster growth of Brady countries was achieved through greater integration into global trade and direct investment. Trade openness of EMDEs declined in the 1980s, falling from 40 percent of GDP to less than 25 percent in 1989. Following the first Brady restructuring, openness of Brady countries increased back to 40 percent in 1990, 10 percentage points above the control group (Figure 4, Panel A). Brady countries also achieved greater exposure to foreign technologies by shifting a larger share of external liabilities into foreign direct investment (FDI). Between 1989 and 1999, the share of FDI in external liabilities increased by 13 percentage points, more than double the increase relative to the control group (Figure 4, Panel B).

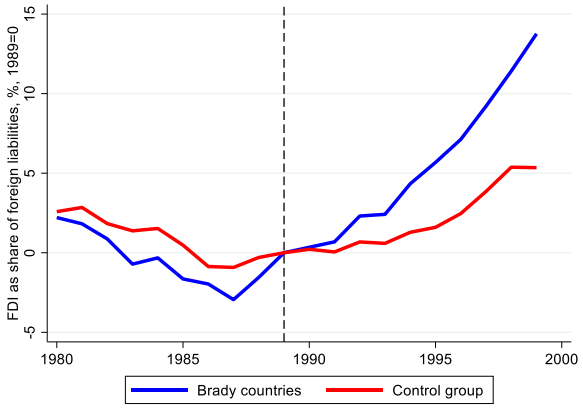
By reducing external debt service, Brady deals increased the net resource inflow into Brady countries, providing space for the imports of growth-enhancing investment goods. In the 1980s, current account deficits narrowed in EMDEs, as external inflows dried up and external debt service increased (Figure 5, Panel A). After the first Brady restructuring, the path of current accounts did not diverge between Brady countries and the control group. But net investment income went up substantially in Brady countries, increasing by close to 3 percentage points of GDP in 1997 relative to 1989 (Figure 5, Panel B).

Figure 4. Evolution of Trade and FDI Following the First Brady Deal (1980-1999)[1]

(A) Trade Openness
(% deviation from 1989)



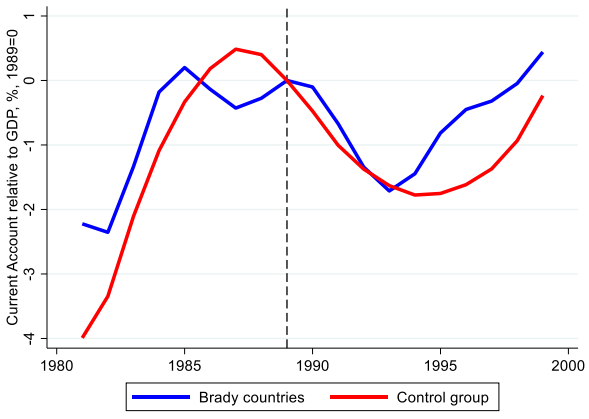
(B) FDI Stock (share of external liabilities)
(% deviation from 1989)



[1] Trade openness is sum of imports and exports as percentage of GDP. FDI stock is stock of foreign direct investment as share of all external liabilities, expressed as percentage. Lines show group averages by year relative to 1989, the year before the first Brady restructuring. See Annex I for data details.

Figure 5. Evolution of Current Accounts Following the First Brady Deal (1980-1999)

(A) Current Account, % of GDP
(% deviation from 1989)



(B) Net Investment Income, % of GDP
(% deviation from 1989)

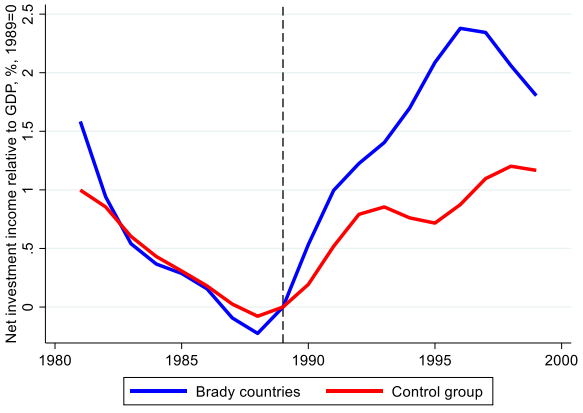
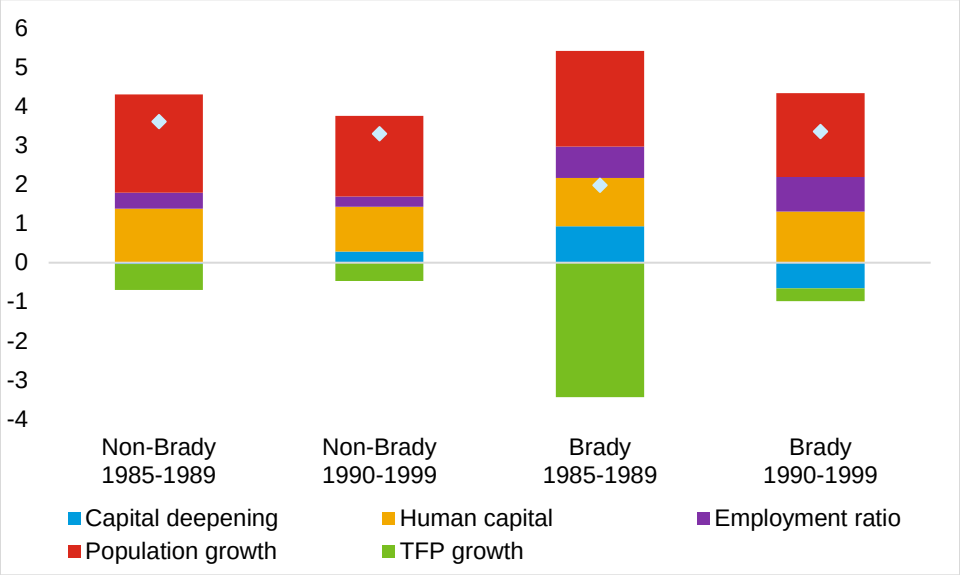


Figure 6. Drivers of Output and Public Debt Growth Following First Brady Deal[1]

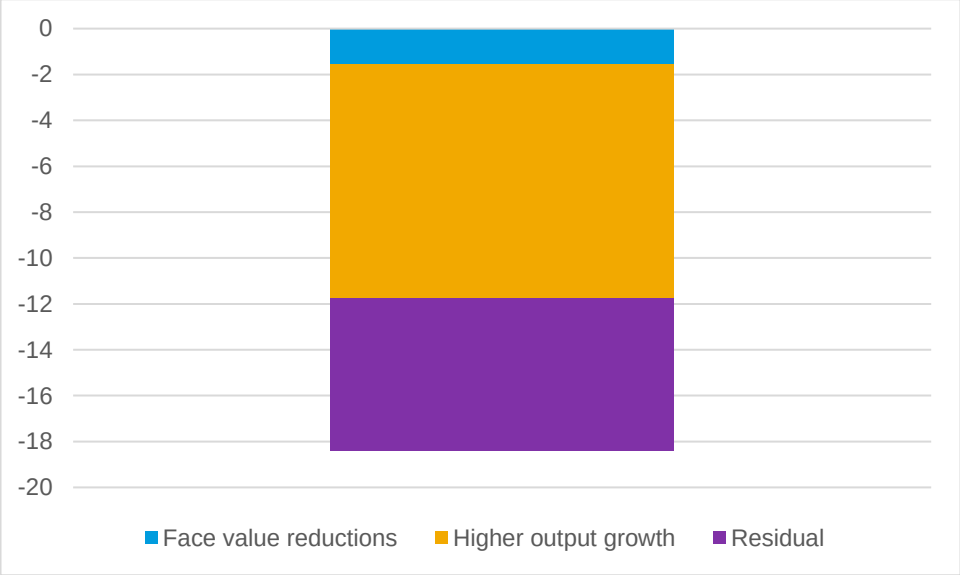
(A) Growth decomposition

(average annual contribution to growth, 1990-1999 vs. 1985-1989)



(B) Debt decomposition

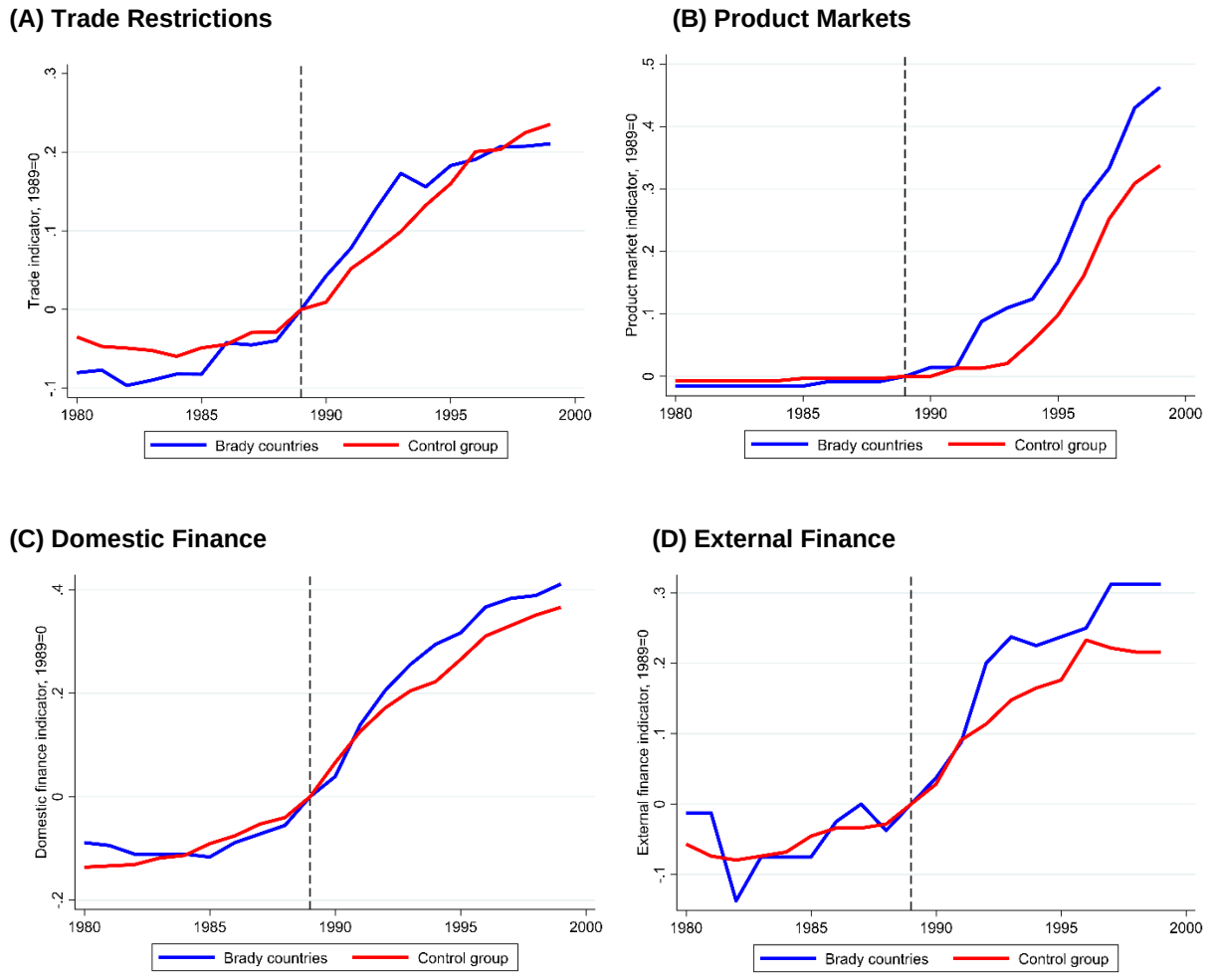
(average total change in gross government debt to GDP relative to control group, 1989-1999)



[1] Growth data from PWT 10.0. See Annex for details on growth and debt decompositions.

Figure 7. Reforms in Brady Restructurers vs. Comparators

(1989 = 0 for both groups)



Source: IMF Structural Reforms Database and author calculations

Higher total factor productivity growth was the main driver of the pick-up in economic growth following the Brady restructurings. In the 1980s, average growth of total factor productivity was negative in Brady countries. Output growth was mainly driven by population growth and output per capita stagnated. In the decade following the first Brady deal, TFP growth increased by 2.5 percentage points per year (Figure 6, Panel A).[18] The pick-up in market access of Brady countries, anchored by the marketability of collateralized

[18] Capital deepening (measured as the change in the capital to output ratio, see Annex I) contributed negatively to growth in Brady countries. This result may indicate that the increase in TFP growth in Brady countries was labor-biased.

restructured instruments and assured interest payments, may have contributed to this boost in total factor productivity growth as well as investment, as mentioned above.[19]

Brady countries achieved better macroeconomic performance compared to both other countries that restructured during the same period and countries that did not restructure. Annex Table 1 shows output for separate regressions that use only other restructurings (countries that underwent a non-Brady restructuring between 1980 and 2007) and non-restructurings as control groups. Government debt and inflation fell by similar magnitudes in Brady countries compared to both control groups. External debt fell more relative to other restructuring cases. The growth impact of the Brady Plan was largest relative to other restructurings. These findings are suggestive that it was the Brady Plan itself, and not the macroeconomic context that gave rise to the restructuring, that led to the improvement of macroeconomic fundamentals in Brady countries.

The long-term impact of the Brady restructurings on debt levels was many times greater than the face value reductions. The average face value reduction of a Brady deal was 3.3 percent of 1999 GDP. With public debt levels of Brady countries 20 percentage points lower in 1999 relative to the control group, and attributing this difference to the Brady Plan, this implies a 'Brady multiplier' of about 6 times the initial face value reduction. More than half of this effect is accounted for by the marked increase in output growth (Figure 6, Panel B).

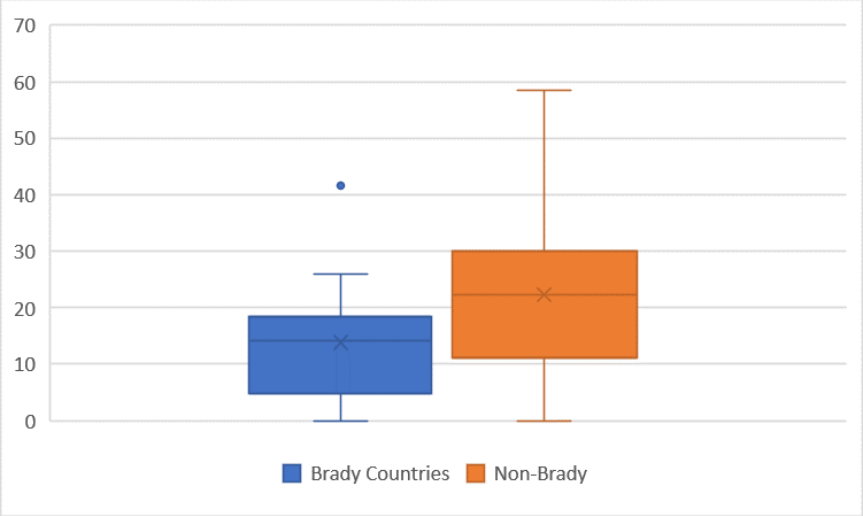
Brady countries undertook more ambitious structural reforms than non-Brady restructurers. One of the potential explanations of higher TFP growth in Brady restructurers could relate to their successful implementation of structural reforms relative to non-Brady restructurers. Furthermore, Brady countries made more progress on product market reforms relative to non-Brady. Brady countries also achieved greater levels of financial deepening, as evidenced by their better performance on both domestic and external finance (see Figure 7).[20] Furthermore, Brady countries tended to meet more of their IMF program quantitative targets relative to non-Brady peers, indicating a generally higher quality of macroeconomic policymaking in Brady countries (see Figure 8). These results would indicate that the structural reform efforts of Brady countries were greater than non-Brady countries.

[19] The pick-up in market access after Brady deals is documented in Henry and Arslanalp (2005), who show that Brady countries experienced a subsequent increase in net resource transfers (net resource flows minus interest payments on long-term loans and foreign direct investment profits).

[20] The sample of countries with data on structural reforms is too small to evaluate these differences statistically, but the magnitudes suggest these differences are economically meaningful. For example, between 1989 and 1999, the difference in product market standards widened by about one half of a standard deviation.

Figure 8. IMF Program Performance in Brady Restructurers vs. Comparators[1]

(Percentage of QPCs breached during IMF programs 1993-2002)



Source: IMF MONA database and author calculations.

[1] Variable measures the share of quantitative performance criteria (QPC) that were either not met or for which a waiver was requested. Average per country between 1993 and 2002. QPCs that were modified are not included. Brady countries includes all listed in Table 1 excluding Nigeria. Non-Brady countries include all other countries in MONA database between 1993 and 2002.

Robustness checks

Baseline difference-in-differences (DiD) results are in line with the results of a synthetic control method (SCM). The key assumption in the DiD method is that, in the absence of treatment (a Brady restructuring) the average outcomes in both treated and control groups follow "parallel trends", i.e., in the absence of treatment the difference between Brady and non-Brady countries would be constant over time. The pre-trends in Figures 3-6 are broadly parallel. As a robustness check, a synthetic control method is employed, which broadly confirm the results obtained in the DiD regression (see Figure 9). Indeed, the SCM results show that Brady restructurers had more favorable outcomes compared to synthetic controls on public debt, external debt, real GDP growth, and inflation. Brady restructurers also saw an increase in trade openness and their FDI stock relative to the synthetic control. They also experienced a faster and larger turnaround in their current account balances around 1993.

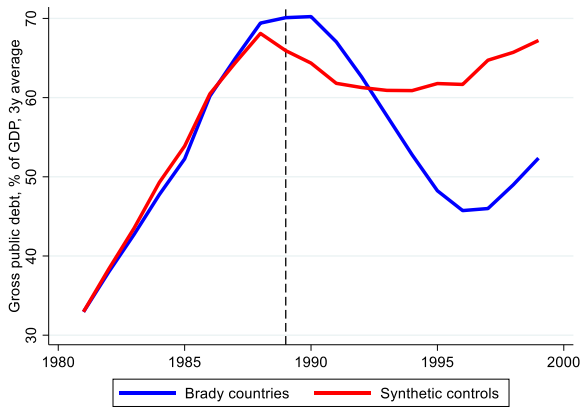
Accounting for variation in the timing of Brady restructurings confirms the main findings of the paper. We summarize results from a staggered DiD in Figures 12 and 13, which are consistent with the original DiD presented previously. The staggered treatment, which studies the impact of Brady restructurings before and after the start of the Brady restructuring (see Table 1), showed some improvement in the years running up to the Brady exchanges. This improvement could reflect confidence effects provided by the announcement of the Brady Plan, of which Arslanalp and Henry (2005) provide evidence. Another potential explanation is that the prior actions taken by Brady restructurers, including through the Baker Plan and other policy actions required to

achieve UCT-quality IMF programs, yielded early dividends prior to the agreement of debt relief under the Brady Plan.

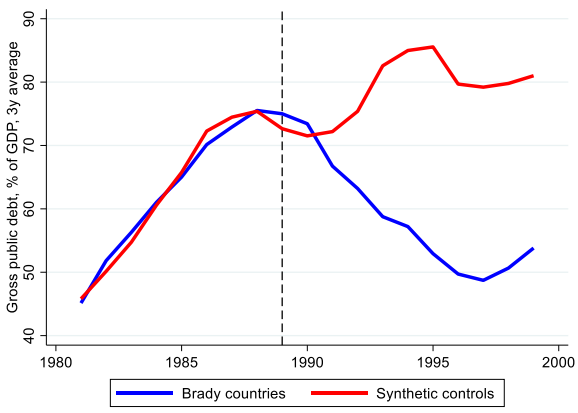
Figure 9. Evolution of Macroeconomic Outcomes Following the First Brady Deal (1980-1999)

(Synthetic Control Method)

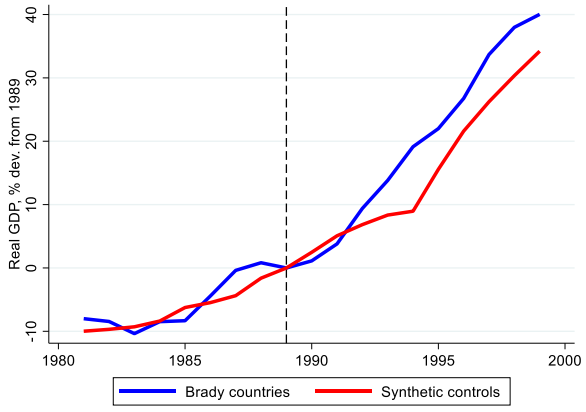
(A) Public debt, % of GDP
(3y average, deviation from 1989)



(B) External debt, % of GDP
(3y average, deviation from 1989)



(C) Real GDP
(% deviation from 1989)



(D) Inflation
(3y average of GDP deflator growth, %)

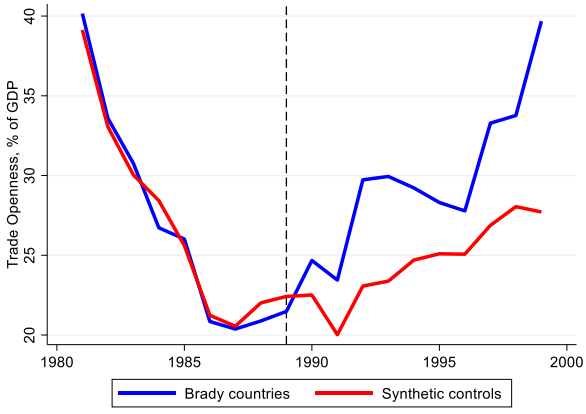
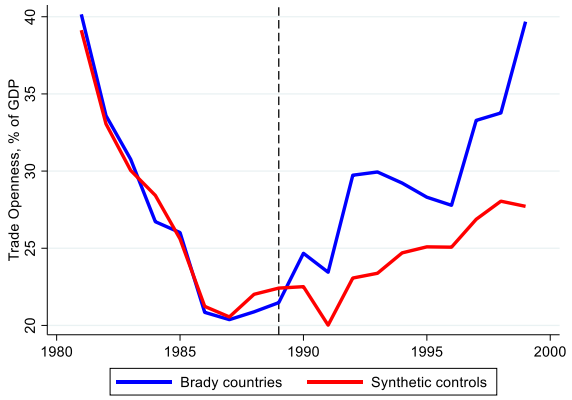


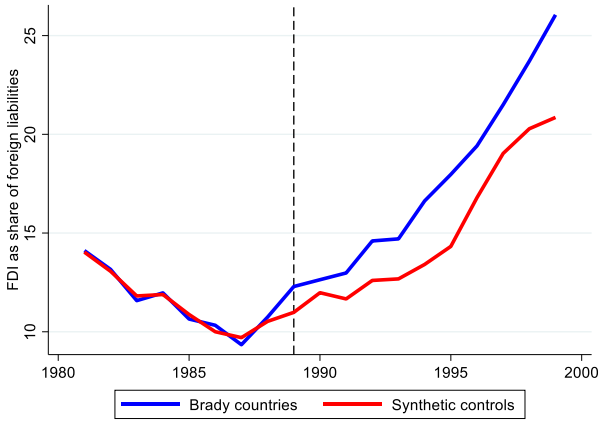
Figure 9. Evolution of Macroeconomic Outcomes Following the First Brady Deal (1980-1999) (continued)

(Synthetic Control Method)

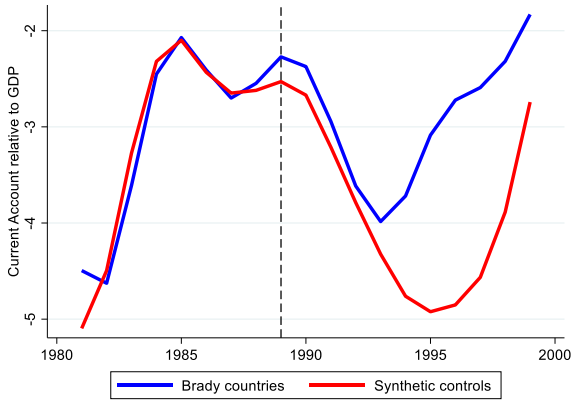
(E) Trade Openness, % of GDP



(F) FDI Stock (share of external liabilities)



(G) Current Account, % of GDP



(H) Net Investment Income, % of GDP

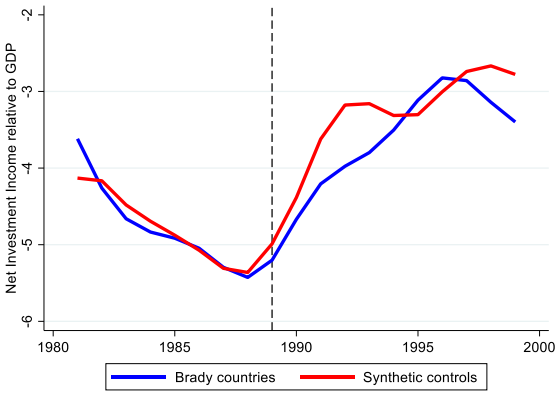
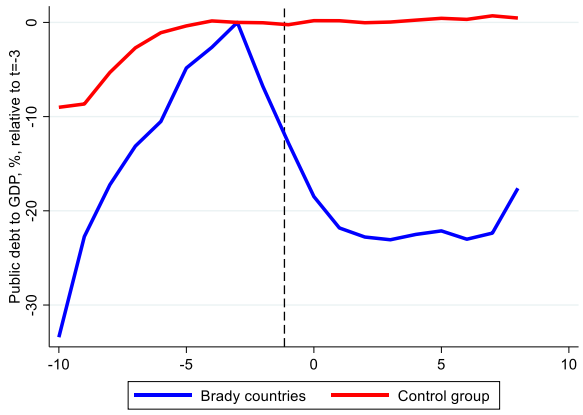


Figure 10. Evolution of Macroeconomic Outcomes Following the Brady Deals

(Differences-in-differences, Staggered)

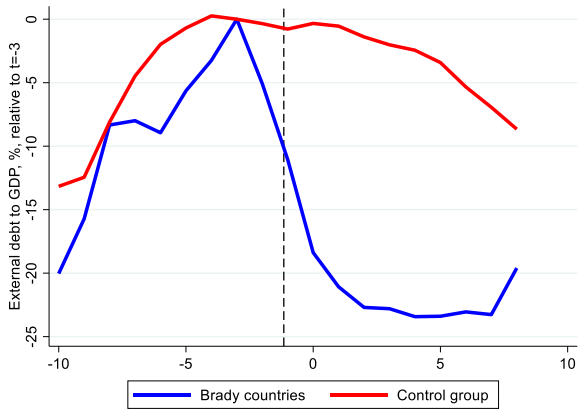
(A) Public debt, % of GDP

(3y av., dev. from 3 years before Brady deal)



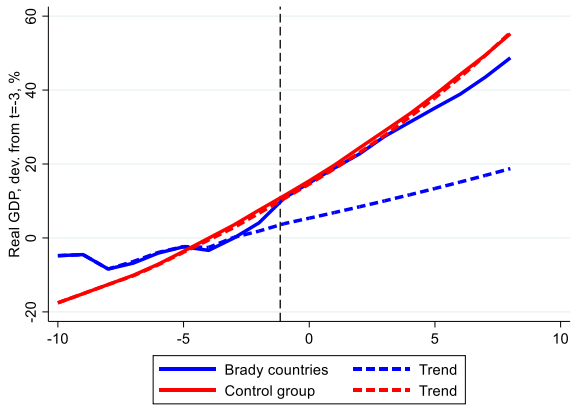
(B) External debt, % of GDP

(3y av., dev/ from 3 years before Brady deal)



(C) Real GDP

(dev. from 3 years before Brady deal)



(D) Inflation

(3y average of GDP deflator growth, %)

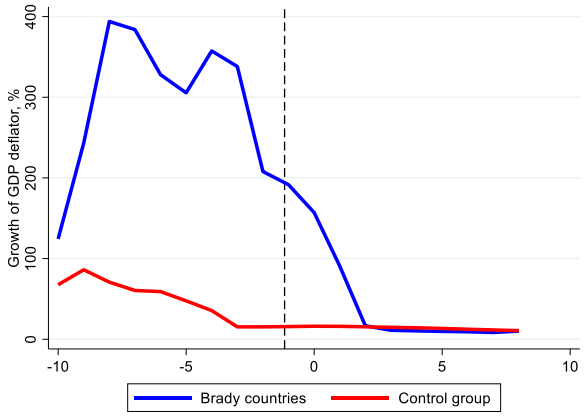
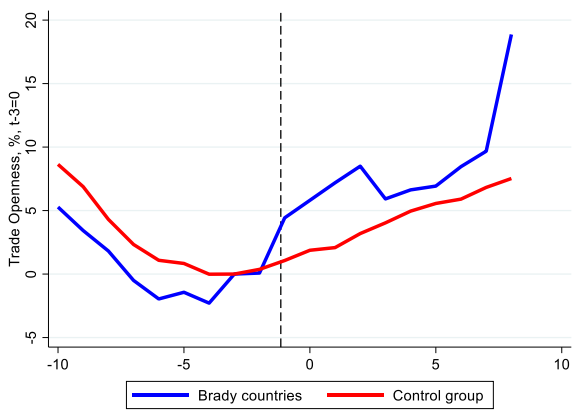


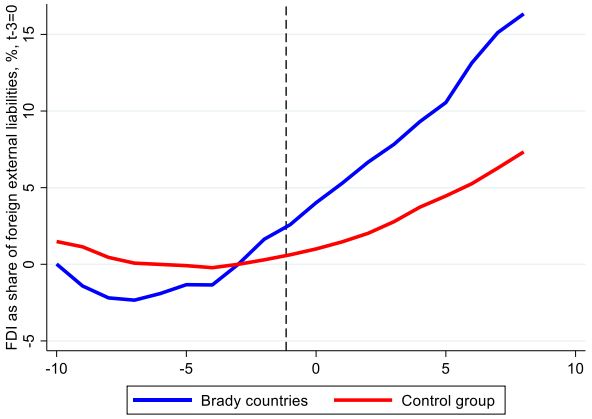
Figure 10. Evolution of Macroeconomic Outcomes Following the Brady Deals (continued)

(Differences-in-differences, Staggered)

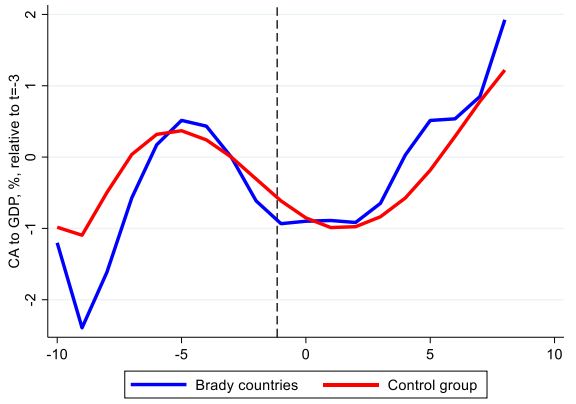
(E) Trade Openness, % of GDP



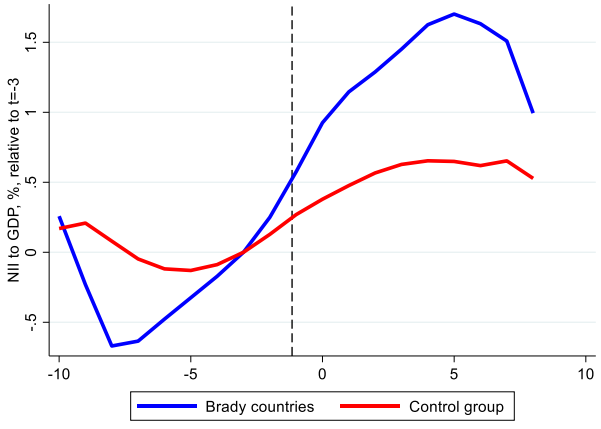
(F) FDI Stock (share of external liabilities)



(G) Current Account, % of GDP



(H) Net Investment Income, % of GDP



Discussion

The results of this paper are broadly consistent with other studies. For instance, Cheng, Diaz-Cassou, and Erce (2018) find that larger nominal debt relief in official Paris Club debt restructurings led to an acceleration of per-capita income growth, which is consistent with this paper's findings that Brady exchanges (with relatively larger debt relief) contributed to faster growth than compared to non-Brady comparators. This paper confirms the findings of Ando, Asonuma, Mishra, and Sollaci (2023), who find that restructurings with different types of creditors (external private, official, domestic) with face value reductions and stronger creditor coordination (conditions prevalent during the Brady period) were more effective in reducing debt-to-GDP ratios. Arslanalp and Henry (2005) find that the real value of stock markets in Brady countries appreciated by 60 percent relative to non-Brady countries after announcements of debt relief, which is consistent with this paper's findings regarding productivity growth (which would imply greater asset market returns). Reinhart and Trebesch (2016) estimate that Brady countries experienced a substantial reduction in public debt levels and significantly faster economic growth after the first Brady restructuring in 1990, which is also confirmed by this paper's baseline DiD and robustness check results. By contrast, the results of this paper challenge arguments made by Vásquez (1996), who highlighted that non-Brady reformers, such as Colombia and Chile, tended to have strong performance despite not receiving a Brady treatment. The results also contrast with the analysis of Berthélemy & Lensin (1992), who found heterogeneity in the economic performance of Brady restructurers and argued that the short-term growth effects of Brady restructurings were limited.

While these findings would suggest a correlation between Brady deals and favorable debt and macroeconomic outcomes, results should be interpreted with caution. The results indicate that countries that engaged in Brady exchanges achieved better outcomes than the control group, but it should be acknowledged that this paper's results do not provide clear evidence about which elements of Brady restructurings—such as pre-Brady reforms, face value haircuts, UCT-quality IMF programs, regained market access, and broadly favorable macroeconomic conditions in the 1990s—were decisive. Based on the results of this paper, it is possible that the depth of reforms and haircuts together may have led to better outcomes in Brady restructurers than compared to the control group. That said, it is likely that different aspects of the Brady package had different effects on specific outcomes. Face value write-downs may have proximately contributed to the decline in Brady country debt stocks, while reforms anchored by IMF programs and World Bank engagement may have contributed to a stronger structural reform effort and thus faster TFP growth, for instance. To the extent that the combination of the reduction in debt overhangs and stronger structural reform efforts combined to produce better results in Brady restructurers, then it follows that debt relief efforts coupled with renewed structural reforms in debtors can maximize benefits of restructuring and face value haircuts.

Brady-style restructuring mechanisms could be helpful in delivering meaningful debt stock reduction when solvency challenges are acute, as they were in the Brady period. In general, debt operations require an ex-ante assessment about whether a sovereign is experiencing liquidity or solvency challenges, which risk either Type I or Type II errors in debt relief. Liquidity operations attempt to provide near-term debt service relief to the troubled sovereign (e.g., via the Baker Plan), while solvency operations seek to restore solvency by reducing the face value of existing debt, with larger haircuts (e.g., the Brady Plan). Ex-post economic performance can validate the appropriateness of each ex-ante judgment. Trouble emerges either when debt servicing problems are diagnosed as a solvency challenge, when in fact liquidity relief would have restored sustainability (i.e., a Type 1 error, or false positive of the necessity of a Brady treatment), or when liquidity relief is offered while face value write-downs were in fact needed (i.e., a Type 2 error, or false negative, see Figure

12). In cases where the downside risks of providing too little relief are assessed to be greater than providing too much relief (i.e., where risks of a Type 2 error outweigh a Type 1 error), Brady-style exchanges may be useful because they historically were accompanied by larger debt stock reduction compared to other restructuring and reprofiling options—such as debt service suspension—and were anchored by enhancements to debtors' capacity-to-repay via reforms as well as credit enhancements that, at least during the Brady period, helped incentivize creditors to provide larger face value haircuts.[21] These mechanisms could also be used to facilitate pre-default restructurings when solvency challenges are acute, which can mitigate cumulative output losses (see Asonuma, Chamon, Erce, and Sasahara (2023)).

Figure 12. Managing Tradeoffs in Debt Restructuring Given Uncertainty

Ex-post \ Ex-ante[1]	*Liquidity*	*Solvency*
Liquidity	Correct	Type I error (false positive)
Solvency	Type II error (false negative)	Correct

[1]Debt operations require an ex-ante judgment about whether the sovereign's challenges reflect illiquidity or insolvency.

Source: Authors

However, Brady-style restructurings would not be a panacea to solve debt sustainability and debt restructuring challenges today. The results of this paper show that the Brady Plan's success applied to debtors under specific conditions relating to, inter-alia, countries that previously had market access and had been targets for the original Baker Plan due to commercial banks' outsize exposure to them; creditors' desire to achieve assurances about debtors' capacity-to-repay via policy adjustment and collateralization; existing claims that would benefit from enhanced liquidity and securitization; debtors willing to undertake ambitious reforms anchored by strong performance under IMF programs to achieve debt relief; and creditors willing to provide substantial face value relief. Critically, most Brady restructurers also had a modicum of institutional strength relative to, for instance, HIPC restructurers.[22] Brady deals also took place during a time of strong global economic growth and a relatively favorable commodity price outlook, which can be contrasted to the tepid growth outlook and uncertain commodity price outlooks today. While Brady exchanges could be useful tools in a diverse toolkit to facilitate sovereign debt restructuring, Brady-style mechanisms alone would not solve existing challenges in the sovereign debt landscape today, including those related to creditor coordination, debtors' weak institutional capacity coupled with political economy challenges that prevent structural reforms, and some countries' reliance on domestic debt, among others. Progress in these areas is being made under separate efforts, such as through the G20's Common Framework for Debt Treatments beyond the DSSI and the Global Sovereign Debt Roundtable (see G20 and Paris Club (2020) and Global Sovereign Debt Roundtable

[21] As explained by (Chuku, et al., 2023), to date, even though solvency and liquidity challenges have risen for LICs, they are generally better today than in the pre-HIPC period.

[22] See Arslanalp and Henry (2006).

(2023)).[23] Moreover, many debt vulnerable countries today are LICs with external debt held by official sector creditors. More work would need to be done to assess the potential benefits of collateralized restructured instruments for these types of debtors, including those that lacked market access prior to experiencing debt challenges.

Conclusions

The Brady Plan helped achieve fast and durable debt stock reduction, with macroeconomic dividends for debtors. Brady-style exchanges led to significant and persistent declines in public and external debt for Brady restructurers relative to the control group. Additionally, Brady restructurers saw broadly better macroeconomic outcomes, including faster growth, relative to the non-Brady control group. Taken together, the 'multiplier' effect of the face value reductions on debt burdens of the Brady countries was particularly large, making a Brady-style mechanism an effective tool for debt relief. This result is consistent with recent research on debt reductions, including as discussed in International Monetary Fund (2023) and Ando, Asonuma, Mishra, and Sollaci (2023).

The Brady Plan allowed for illiquid and non-transparent claims were be converted to marketable securities, with liquidity benefits for creditors and debtors. Brady exchanges also allowed for a diversification of the sovereign creditor base, from commercial banks, which tended to hold debt to maturity, to capital markets, in which there was active buying and selling in the restructured claims. One of the key benefits of the original Brady Plan was strengthening the liquidity of restructured claims while reducing creditor concentration (Miles, 1999).[24] Brady bonds thus opened new categories of institutional investors that would be attracted to the relatively higher returns offered by Brady bonds while still seeking the safety provided by their collateralized structure.[25]

Policy commitments achieved through the Brady Plan helped foster macroeconomic sustainability and safeguard reform momentum among debtors. The empirical results of this paper show that Brady restructurers had more favorable outcomes relative to the control group, driven mainly by the sharp pick-up in productivity growth and likely anchored by strong structural reform efforts of Brady countries in the 1990s. IMF programs and macroeconomic stabilization programs likely served as commitment devices of Brady restructurers to undertake needed but potentially difficult-to-implement reforms. Overall, Brady restructurers structural reform effort was stronger than peer countries.[26]

Future research could examine why the Brady Plan was relatively more successful than other debt relief initiatives while also employing complementary analytical methods. An additional avenue of future research could compare the Brady Plan and the Heavily Indebted Poor Country (HIPC) debt relief initiative, Multilateral Debt Relief Initiative, and the Vienna Initiative. This research could build on the work done by

[23] For a good summary of the IMF's views on the sovereign debt restructuring architecture, including some limitations, see IMF (2020). See also (Dielmann, 2021) for a summary of the recent rise in cross-border lending by non-Paris Club creditors, as well as an assessment of the terms and implications of such lending.

[24] Of course, creditors may need to overcome domestic legal constraints that would hamper their willingness to convert existing bilateral loans into tradeable bonds, such as obtaining parliamentary approval.

[25] This potential benefit is further evidenced by the fact that external sovereign bonds generally offer returns in excess of the compensation for the risk of default, while the same may not necessarily be true for bilateral claims (Meyer, Reinhart, & Trebesch, 2022).

[26] Such improvements in restructurers' institutional contexts and reform momentum are key distinguishing features of Brady restructurings compared to other debt relief efforts, such as HIPC.

Arslanalp and Henry (2006), who showed that debt relief alone is not a panacea for growth. Often, the barriers to growth in distressed sovereigns is not principally debt overhang, but instead follow from their low institutional quality. Thus, the most likely success stories of debt relief will be countries with a minimum level of institutional quality or those with a willingness to enhance their institutional quality. One avenue of future research could attempt to disambiguate further the relative weights of the drivers of favorable macroeconomic outcomes in Brady restructurers compared to other cases of debt restructuring. Indeed, the present study shows that the suite of reforms and write-downs undertaken and provided via Brady restructurings combined to provide better outcomes than in cases that did not have similar treatments. Additionally, future research can try to extend the political economic analysis of Brady restructurers to understand why their structural reform were stronger than non-Brady countries. In so doing, additional granularity on the types and quality of structural reforms pursued can be obtained. Finally, future research can use different empirical methods, including a permutation-based inference to better tease out causal links and weight caps in SCM calculations. It can also use more case studies of individual Brady cases for granularity.

Future research can also consider how Brady exchanges can complement existing debt restructuring mechanisms. This paper showed that Brady restructurings helped deliver good outcomes for emerging markets with a strong structural reform effort who had illiquid debts that would benefit from capacity-to-repay assurances (via IMF programs and collateral) and securitization, including for market development. There could be debt restructuring cases for which similar conditions apply today, and in those cases, Brady-style exchanges could be considered. If there existed a demand from both creditors and debtors, it is possible that Brady-style debt restructurings could be incorporated existing multilateral frameworks, which can be a subject of future research. Future research can also perform more granular assessments of debt vulnerabilities and try to map these modalities to potential qualification in a rebooted Brady Plan, as well as assess how today's more shock-prone and uncertain global conditions may affect the implementation of a new Brady-style mechanism, including by altering the incentives of creditors, debtors, and sponsors differently.

Annex 1. Detailed Regression Results

Annex Table 1: Average Treatment Effects, Differences-in-Differences Regressions

Panel A

Dependent variable	**Gross government debt to GDP, %, 3y average**			**External debt to GDP, %, 3y average**		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	-18.4* (10.2)	-19.7 (12.3)	-17.5 (10.9)	-19.4* (9.8)	-26.9** (10.9)	-13.8 (12.4)
Constant	64.5*** (1.0)	72.4*** (2.3)	59.9*** (1.7)	69.9*** (1.0)	82.4*** (2.0)	61.2*** (1.9)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	100	54	66	100	54	66
Countries	50	27	33	50	27	33
Adjusted R^2	.67	.65	.66	.62	.72	.52

Panel B

Dependent variable	**Real GDP relative to pre-1990 trend, %**			**Inflation rate of GDP deflator, 3y average**		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	24.4** (9.8)	31.7*** (10.3)	19.0 (13.5)	-661* (342)	-660* (348)	-662* (346)
Constant	.14 (1.0)	-3.5* (1.9)	2.8 (2.0)	145*** (34.2)	257*** (64.4)	211*** (52.3)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	100	54	66	100	54	66
Countries	50	27	33	50	27	33
Adjusted R^2	.53	.15	.0	.22	.16	.18

Notes: Table summarizes regression results from simple differences-in-differences regressions, specified above. Robust standard errors clustered at the country level in parentheses. ***: significant at 1%; **: significant at 5%; *: significant at 10.

Panel C

Dependent variable	Trade Openness			FDI Stock		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	11.9*** (4.4)	11.8** (4.5)	11.9** (5.0)	8.4*** (2.9)	8.7** (3.8)	8.2** (3.1)
Constant	28.7*** (.4)	29.1*** (.8)	27.2*** (.8)	17.5*** (.29)	13.8*** (.70)	19.7*** (.48)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	100	54	66	100	54	66
Countries	50	27	33	50	27	33
Adjusted R^2	.88	.93	.80	.72	.45	.80

Panel D

Dependent variable	Current Account, % of GDP, 3y average			Net Investment Income, % of GDP, 3y average		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	.68 (1.5)	-.03 (1.5)	1.2 (2.1)	.64 (.74)	1.4 (1.1)	.02 (.80)
Constant	-2.7*** (.15)	-3.4*** (.28)	-1.9*** (.33)	-3.6*** (.10)	-4.8*** (.19)	-2.9*** (.13)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	100	54	66	100	54	66
Countries	50	27	33	50	27	33
Adjusted R^2	0.0	.24	0.0	.59	.61	.43

Notes: Table summarizes regression results from simple differences-in-differences regressions, specified above. Robust standard errors clustered at the country level in parentheses. ***: significant at 1%; **: significant at 5%; *: significant at 10.

Annex Table 2: Average Treatment Effects, Differences-in-Differences Regressions, Staggered Treatment

Panel A

Dependent variable	**Gross government debt to GDP, %, 3y average**			**External debt to GDP, %, 3y average**		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	-10.2 (6.6)	-12.1 (7.5)	-8.8 (7.0)	-10.7 (8.9)	-14.0 (9.4)	-8.2 (9.8)
Constant	62.9*** (.08)	74.3*** (.21)	54.2*** (.15)	68.5*** (.11)	86.1*** (.26)	55.2*** (.20)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	820	360	480	820	360	480
Countries	50	27	33	50	27	33
Adjusted R^2	.87	.86	.86	.86	.87	.82

Panel B

Dependent variable	**Real GDP relative to pre-1990 trend, %**			**Inflation rate of GDP deflator, 3y average**		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	12.6** (5.3)	15.8*** (5.4)	10.2 (7.3)	-180 (165)	-179 (167)	-180 (166)
Constant	1.0*** (.06)	-3.1*** (.15)	4.3*** (.15)	19.3*** (2.0)	27.6*** (4.6)	20.1*** (3.5)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	820	360	480	820	360	480
Countries	50	27	33	50	27	33
Adjusted R^2	.55	.63	.52	.53	.52	.52

Notes: Table summarizes regression results from differences-in-differences regression with staggered treatment. Post period refers to the 5th year after the pre-treatment (restructuring) year. Robust standard errors clustered at the country level in parentheses. ***: significant at 1%; **: significant at 5%; *: significant at 10.

Panel C

Dependent variable	Trade Openness			FDI Stock		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	-1.7 (3.2)	-3.2 (3.6)	-.58 (3.3)	3.6** (1.6)	3.9* (2.1)	3.4* (1.8)
Constant	30.1*** (.04)	31.3*** (.10)	29.2*** (.07)	17.6*** (.02)	12.9*** (.06)	21.1*** (.04)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	820	360	480	820	360	480
Countries	50	27	33	50	27	33
Adjusted R^2	.94	.94	.94	.89	.67	.92

Panel D

Dependent variable	Current Account			Net Investment Income		
Control group	All EMDEs	Restructurings	Non-Restructurings	All EMDEs	Restructurings	Non-Restructurings
$brady_i \times post_t$	.92 (1.5)	.87 (1.5)	.96 (1.6)	.67 (.60)	1.0 (.77)	.38 (.60)
Constant	-3.7*** (.02)	-4.8*** (.04)	-2.8*** (.04)	-3.1*** (.01)	-4.7*** (.02)	-1.8*** (.01)
Country fixed effects	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y
Observations	820	360	480	820	360	480
Countries	50	27	33	50	27	33
Adjusted R^2	.61	.65	.53	.85	.87	.51

Notes: Table summarizes regression results from differences-in-differences regression with staggered treatment. Post period refers to the 5th year after the pre-treatment (restructuring) year. Robust standard errors clustered at the country level in parentheses. ***: significant at 1%; **: significant at 5%; *: significant at 10.

Annex II. Brady Options

1980s-1990s Brady menu

Option	Enhancements	Restructured obligations
Buyback	Up-front cash payment	N/A
Par exchange transaction	Principal prepayment and up to 12% of remaining interest	Securitized with a fixed income stream at about 6.25% or less depending on term structure at time of deal. Generally, a 6.25% coupon payment was less than the prevailing rate on the original debt, thus providing cash flow and NPV relief to the borrower.
Discount exchange transaction	Principal prepayment and up to 13% of remaining interest	Securitized with a floating interest stream at LIBOR + 13/16 plus 30-35% face value haircut on the original obligations.
Temporary interest reduction exchange	Prepayment of up to 10% of remaining interest	Securitized with a submarket fixed income stream for first 5-6 years, followed by a floating interest rate of LIBOR + 13/16 as well as amortization of principal.
Debt conversion/new money	New loans equal to about 20% of the existing exposure of creditors	Securitized with an interest rate of LIBOR + 7/8 and amortization of principal repayments (based on the original amount).

Source: (Clark, 1994)

Other authors' proposed 2020s Brady menu (indicative)

Source	Option	Enhancements	Restructured obligations
Buchheit and Lerrick (2023)	Cash down-payment structure	Investors receive 30-35% up front of the bond's current market value	3-3.5% interest rate with 25-30 year maturity, amortization of original principal due in final 3 years
Buchheit and Lerrick (2023)	Floor of support structure	Collateralized with a zero-coupon World Bank bond	New bond has initial value of 60-70% of bond's current market value, with the minimum value rising to 100% of the nominal amount of the original (i.e., non-restructured) claims at maturity. 3-3.5% interest rate with 35-40 year maturity.
Coulibaly and Abedin (2023)	Recovery and Sustainability bonds (RSBs)	RSBs have preferred creditor status and are collateralized by zero-coupon bonds issued by, for example, the World Bank	30% haircut on outstanding private external debt. RSBs have 5% coupon rate with 30-year maturities, with fully amortized principal.
Qian (2021)	IFI or sovereign guarantee	IFI guarantees principal and interest rate of collateralized borrowing structure	Restructured bonds have haircuts and SCDI (e.g., commodity)-linked features

Sources: (Buchheit & Lerrick, 2023), (Coulibaly & Abedin, 2023), (Qian, 2021)

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