

SOVEREIGN DEBT RELIEF AND ITS AFTERMATH

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Abstract

This paper studies sovereign debt relief in a long-term perspective. We quantify the relief achieved through default and restructuring in two distinct samples: 1920–1939, focusing on the defaults on *official* (government to government) debt in advanced economies after World War I; and 1978–2010, focusing on emerging market debt crises with *private* external creditors. Debt relief was substantial in both eras, averaging 21% of GDP in the 1930s and 16% of GDP in recent decades. We then analyze the aftermath of debt relief and conduct a difference-in-differences analysis around the synchronous war debt defaults of 1934 and the Baker and Brady initiatives of the 1980s/1990s. The economic landscape of debtor countries improves significantly after debt relief operations, but only if these involve debt write-offs. Softer forms of debt relief, such as maturity extensions and interest rate reductions, are not generally followed by higher economic growth or improved credit ratings. (JEL: E6, F3, N0, H6)

1. Introduction

Should countries with a heavy debt burden and little prospect of repayment receive debt forgiveness? This is an old question with modern resonance.¹ Despite the policy relevance and controversy surrounding this issue, surprisingly little is known about the characteristics and the economic impact of sovereign debt relief. The literature

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1. See Ahamed (2010) for a discussion of the recurring international debates on debt relief during the 1920s and 1930s and Sachs (1990) and Cline (1995) on the debt overhang debate of the 1980s and 1990s. In the current context, the IMF emphatically called for further debt relief for Greece (*Financial Times*, 5 May 2015), while Larry Summers argued for a deep debt reduction for war-torn Ukraine (Summers 2015).

has mostly focused on the occurrence of debt crises, but not on their resolution.² We contribute towards filling this gap by studying two 20th century instances of debt relief that encompassed a substantial number of countries. These include the protracted debt overhangs in many advanced economies in the 1920s and 1930s and those of developing countries in the 1980s and early 1990s.

The paper is organized around two main contributions. In the first part, we document the process and magnitude of debt relief achieved through default and restructuring of external sovereign debt in 48 crisis spells. We focus, in particular, on the debt overhang that resulted from World War I, which was dominated by *official* external sovereign debt (i.e., debts owed to government creditors). This episode has been largely missed in previous empirical research, which has almost exclusively focused on sovereign defaults on private creditors. Its comparative obscurity is baffling given that intergovernmental war debts were regarded as one of the central economic challenges at the time (see, for example, Moulton and Pasvolsky 1932).³ The official debt overhang of the 1930s is also reminiscent of the situation in periphery Europe today, where much of the debts are now also in the hands of official creditors.⁴ Moreover, it is notable that the episode ended with a full cancellation of the war debt.

To analyze the 1930s defaults on official debts, we collect the details on official lending and debt relief events in a large network of war-related loans owed by 18 advanced debtor countries to the two main creditor countries during World War I and the 1920s: the United States and the United Kingdom. We next compare this intra-war episode to the better-documented emerging market (EM) debt crises of recent decades. These were dominated by defaults on *private* creditors, notably foreign banks and bondholders. For the modern sample, we rely on earlier estimates of haircuts in middle-income emerging markets between 1978 and 2010. However, we are the first to compute various measures of debt relief for a representative group of crises and countries.⁵ We also document the process of crisis resolution in detail.

2. Recent work focusing on debt crisis resolution and renegotiation includes Benjamin and Wright (2009), Pitchford and Wright (2012), Aguiar and Amador (2013), Hatchondo et al. (2014), Kaminsky and Vega-Garcia (2014), and Asonuma and Trebesch (2016). In addition, a small body of empirical work has shed light on specific debt relief episodes, such as the 16 Brady debt reduction deals of the 1990s (Cline 1989; Rieffel 2003; Arslanalp and Henry 2005), or the debt forgiveness for highly indebted poor countries (HIPCs) (Depretis Chauvin and Kraay 2005, 2007; Dias et al. 2013). However, a comprehensive picture on debt relief from the perspective of middle- and high-income debtor countries is missing. See Tomz and Wright (2013) for a survey.

3. Eichengreen and Portes (1986, 1990) and Eichengreen (1992) study the interwar defaults on external debt owed to private foreign bondholders.

4. Arslanalp and Tsuda (2014) document the sharp migration of periphery sovereign debt from private to public hands. The importance of official creditors is even higher if one takes into account the holdings of central banks.

5. Sturzenegger and Zettelmeyer (2006, 2008), Benjamin and Wright (2009), and Cruces and Trebesch (2013) estimate the scope of credit losses (“haircuts”) in past sovereign defaults from an investor’s perspective. Sturzenegger and Zettelmeyer (2007) and Zettelmeyer et al. (2013) compute debt relief to GDP for seven recent crisis spells.

Our second contribution is to examine the economic performance of debtor countries during and after sovereign debt relief operations. Theory is ambiguous as to whether debt relief is beneficial or not. Krugman (1988), Sachs (1989), and Obstfeld and Rogoff (1996) emphasize the potential welfare benefits of forgiving debt in a situation of debt overhang. In these models, both creditors and debtors can gain from a partial debt write-down, since an excessive debt stock and the prospect of large future debt repayments act as a tax on domestic investment and depress the present value of claims held by investors.⁶ On this basis, a reduction in the debt level should be followed by a period of higher growth.⁷ However, a substantial related literature suggests that a default or restructuring can cause reputational damage and trigger sanctions and output losses (e.g., Eaton and Gersovitz 1981; Bulow and Rogoff 1989; Cole and Kehoe 1998; Aguiar and Gopinath 2006; Arellano 2008). In addition, debt relief may reduce the incentives to implement economic reforms (Easterly 2002), and debt renegotiations can give rise to collective action problems and inefficient delays that reduce output (Benjamin and Wright 2009; Pitchford and Wright 2012). Determining the overall (net) impact of debt relief is, in the end, an empirical question.⁸

We study the aftermath of debt relief by tracing the evolution of real per capita GDP, sovereign credit ratings, debt servicing costs, and the level of government debt (external and total) in a ten-year window around the relief event.⁹ We describe stylized facts for the episodes and run difference-in-differences (DiD) regressions by comparing the performance of countries that received debt relief to a control group that did not.

There are (at least) two challenges in assessing the impacts of debt relief—both of which we address. First, the timing of debt relief may be endogenous, since countries often renegotiate their debt only after they start to recover (Kovrijnykh and Szentes 2007; Benjamin and Wright 2009). To account for this concern, we build on the identification strategy of Arslanalp and Henry (2005) and focus on episodes of debt reduction that were centrally orchestrated and, thus, synchronously applied across debtor countries, irrespective of their individual economic circumstances. In the interwar years, two such episodes emerge: the Hoover Moratorium of 1931 and the generalized war debt defaults of the summer of 1934, which occurred simultaneously in more than 15 debtor countries. In the modern period, we stress the two debt relief initiatives that were spearheaded by the United States: (i) the Baker plan of 1986, which granted debt relief by reducing interest rates and by lengthening the maturity of selected developing country debts and (ii) the Brady initiative of 1990, which set the stage for

6. In Aguiar et al. (2009), debt relief can be beneficial for governments with large debt stocks, although it is never a Pareto improvement and not necessarily beneficial for investors. In Fernandez and Martin (2014), creditors benefit from a debt restructuring if it is designed correctly. In Sunder-Plassmann (2015), high debt relief is not welfare improving, since it is associated with higher borrowing costs and more frequent defaults in equilibrium.

7. This prediction is broadly in line with the literature linking debt and growth, which has established a negative correlation between the level of public debt and economic performance. This literature is surveyed in Panizza and Presbitero (2013).

8. There is a nascent literature studying the effects of debt relief for households (Dobbie and Song 2015).

9. See Tomz and Wright (2007) for a related historical study on sovereign default and output.

face value debt reduction. These four events are useful for identification purposes, since debtor countries did not choose the timing of relief in an idiosyncratic manner. The approach alleviates, but does not necessarily eliminate, potential endogeneity.

A second challenge in analyzing the “before and after” of debt relief is the possible role of omitted variables and confounding factors. To address this, we include country and time fixed effects, in line with the empirical strategy in Mian et al. (2014), which takes care of any time-invariant variation and common trends. This approach also accounts for global factors that might have influenced the dating choice of the (synchronous) debt relief events. Finally, we account for time-varying confounders by running a battery of robustness checks, in particular by adding controls for inflation, banking crises, currency crises, wars and conflicts, and major political shocks. The results are robust, but they should nevertheless be interpreted with caution as our controls are not exhaustive.

With these caveats in mind, the evidence is clearly consistent with the notion that debt relief has beneficial economic effects for debtor countries. We can summarize the findings as follows.

Sovereign debt relief averaged 21% of GDP and 43% of external government debt for advanced economies crises in the 1930s, and 16% of GDP and 36% of external debt in middle/high-income emerging markets from 1978 to 2010. These estimates represent a lower bound of the true magnitude of relief. The results for emerging markets are quite similar to those of advanced economies, and relief estimates are not clustered in a particular range. More generally, like Gourinchas and Obstfeld (2012), we find striking parallels in the crisis patterns of the two country groups.

Regarding the aftermath of debt relief, we find that per capita GDP increases 11% and 20% during the five years following decisive debt relief, for emerging markets and advanced economies, respectively. Decisive here refers to the last debt reduction in a sequence, meaning the debt operation that allowed countries to exit the default.¹⁰ We also find a strong increase in average ratings for emerging markets. The Institutional Investor rating (IIR) index improves by 21% after two years following a decisive debt relief operation, and 40% after five years. In contrast, for the interwar years, there is no notable improvement in ratings. Regarding debt levels, we observe a strong decline following the crisis exit in both episodes. Within five years, total government debt/GDP falls by 27 percentage points across emerging market episodes and by 22 percentage points in the interwar sample. Also, the debt service burden (amortizations plus interest payments) decreases in the aftermath of debt relief, but the average decline is less pronounced than in the debt stocks.

These descriptive findings call into question theoretical models that assume credit events cast a long shadow. The DiD regressions amplify this message. The patterns revealed by the data suggest that economic activity picks up following a debt relief

10. In a significant number of instances there is only a single restructuring. However, there are numerous default spells where the number of restructurings ranges from two to eight. In the interwar years, the “decisive” event is the 1934 summer default, which was followed by a cancellation of the war debts across Europe.

operation, with one important caveat: we only find significant improvements in growth and ratings if the deal involves face value debt reductions. Rescheduling operations with maturity extensions and interest reductions were *not* followed by a significant improvement in economic growth, once we control for time and country fixed effects and conduct a counterfactual analysis. The regression results also point to a significant decline in debt stocks to GDP after decisive debt relief, but the results are less robust than with regard to growth and ratings. More surprisingly, we find no significant correlation of debt relief and subsequent debt servicing burdens. The decline we observe in the raw data seems to be due to a common trend in borrowing costs.

The paper proceeds as follows. In Section 2, we summarize the crisis and debt relief experiences of advanced economies and emerging markets that are the main focus of the paper. In Section 3, we study the aftermath of debt relief, by showing stylized facts across all event spells, while in Section 4 we present the methodology and results of our DiD analysis. In Section 5, we conclude and discuss avenues for future research.

2. Two Eras of Default and Relief: World War I Debts and Emerging Market Crises

In this section, we introduce the restructuring and default episodes that are the centerpiece of our study and compute the magnitudes of debt relief for each case. In both eras, we focus on external debt, meaning debt that is predominantly (but not exclusively) issued under foreign law, denominated in a foreign currency, and held by non-residents. Our aim is to quantify the magnitude of external debt relief of the entire debt crisis spell in each country, rather than just individual restructuring agreements.

2.1. *The World War I Debt Overhang and its Resolution*

For the 1920s and 1930s, we confine our attention to official World War I debt, where both the borrower and the lenders were sovereign governments. War debt is somewhat of a misnomer, since for most borrowers with the exception of the United Kingdom, much of the official debt was contracted after the war had ended and had the character of reconstruction and stabilization loans.¹¹ We focus, in particular, on official debts owed to the two main creditors of the interwar period: the United States, which was the largest creditor and did not have outstanding debts to any other sovereign connected with the war or its aftermath, and the United Kingdom, which also had lent large amounts to other European countries and owed significant amounts to the United States (see Moulton and Pasvolsky 1932, for an overview).

While our main focus is on the war debt relief events of the early and mid-1930s, and, in particular, the 1934 summer defaults and the subsequent debt cancellations,

11. See Bailey (1950), Lloyd (1934), and United States Treasury (1920, 1933).

we document how the payment irregularities on the war debt began much earlier. Table A.1 in Online Appendix A presents a detailed country-by-country chronology of official credit events and related milestones. It is evident from these country timelines that the debt overhang episode was very protracted, spanning more than a decade.¹² The first defaults on the war debt occurred in the early 1920s and these were quickly followed by a series of rescheduling agreements with the United States and the United Kingdom.

In chronological order, the United States rescheduled its war debt with Finland (May 1923), Great Britain (June 1923), Hungary (April 1924), Lithuania (September 1924), Poland (November 1924), Belgium (August 1925), Latvia (September 1925), Czechoslovakia (October 1925), Estonia (October 1925), Italy (November 1925), Romania (December 1925), France (April 1926), Yugoslavia (May 1926), Greece (May 1929), and Austria (May 1930). Similarly, the United Kingdom arranged debt rescheduling settlements with Belgium (December 1925), Romania (1925), Italy (January 1926), France (July 1926), Portugal (December 1926), Greece (April 1927), and Yugoslavia (August 1927).

The terms of these agreements were favorable for debtor countries, since the projected repayment periods were long, often exceeding 50 years, so that principal would only extinguish in the mid-1980s. The (nominal) interest rates charged were typically at or below 3.5% of principal outstanding. The detailed terms and repayment streams of each agreement were mainly gathered from the original documents reprinted in the authoritative study by Moulton and Pasvolsky (1932) and corroborated by documents from the US Treasury (see Table A.2 in the Online Appendix for details). In effect, the concessionary terms on the official war debt agreed in the crisis years of the 1920s closely resemble the rescheduling terms of the Greek official debt in 2010. The restructured Greek debt to the European official institutions also features repayment periods above 30 years and interest rates as low as 2.5% (see Zettelmeyer et al. 2013).

After the rescheduling agreements of the mid- and end-1920s, most countries continued to honor their scheduled interest and principal payments, at least partially. This state of affairs came to an end with the moratorium announced by US President Hoover on 20 June 1931, and approved by 15 creditor and debtor nations on 6 July 1931. Initially, Hoover's plan was to grant a suspension of interest and principal payments on all inter-allied war debts as well as Germany's reparations payments for one year, i.e. until late 1932.¹³ However, at the end of this temporary moratorium in 1932, scheduled payments did not resume in uniform and regular fashion. While the United Kingdom,

12. The same is true for the debt overhang on non-World War I public and private debts, which stretched into the post-World War II era. For example, Austria and Germany were in default through 1952; Italy was in default 1940–1945; Greece and Hungary had even longer stints in default status through 1964 and 1967, respectively. See Reinhart and Rogoff (2009).

13. For brevity, we do not delve into the complex issue of the German reparation debts, which have been studied at length elsewhere. These debts originated in the Treaty of Versailles in 1919, were restructured under the Dawes Plan in 1924, restructured again under the Young Plan in 1929, and ultimately defaulted on during 1932–1934 (for details see, e.g., Ritschl 2012).

Italy, Czechoslovakia, Finland, Greece, Latvia, Lithuania, Romania, and Yugoslavia made the scheduled 15 December payment on war debt, France, Belgium, Poland, Estonia and Hungary did not.¹⁴ In addition, the European countries suspended their war debt payments to the United Kingdom after the Lausanne war debt conference of July 1932, as did Australia and New Zealand.

The repayment irregularities came to a head in June 1934, with the announcement of full suspension of payments. All debtor countries except Finland, which fully repaid, suspended all payments on the war debt owed to the United States and the United Kingdom, and at various points in time removed this debt from their books.¹⁵ The 1934 defaults can thus be interpreted as a decisive “crisis exit” event of this period, in the sense that it was understood that those debts would not be repaid anytime in the foreseeable future. In retrospect, the summer defaults of 1934 thus brought to a close the war debt overhang episode of the 1920s and 1930s, against the strong opposition of the United States.¹⁶

What was the scope of debt relief achieved through the 1934 defaults and debt cancellations? Table 1 lists 18 countries that, as of 1934, owed debt to the US and the UK governments from World War I and its aftermath (Australia, New Zealand, and Portugal only owed debt to the United Kingdom). Finland, the only country to fully honor its war debt obligations to the United States, will drop out from the debt relief list. To encompass the range of “credit events” in the advanced economies at that time, we add to this list the default spell of Germany (which applied to all external debts, affecting both private and public creditors) and the United States’ 1934 haircut that resulted from the abrogation of the gold clause, which mostly affected domestic private creditors (Table A.3 in Online Appendix A provides the details of this episode). This brings the total number of 1930s episodes to 19.¹⁷

The first column of Table 1 gives the amount of debt outstanding plus interest arrears at the time of the generalized default in June 1934. These amounts owed to the United States and the United Kingdom vary somewhat across sources. For instance, the unpaid obligations that are recorded in the United Nations 1948 publication, *Public Debt, 1914–1946*, and in Bailly (1950, p. 701) are not strictly the same as those shown in Table 1, which are taken from the annual financial reports by the US Treasury Department and from the Moody’s Manuals on Foreign Securities (although

14. League of Nations, *World Economic Survey 1932/1933* (p. 332).

15. Some countries formally canceled their debt only years after 1934. For example, France removed the UK and US war debt from its books in 1938. Others, such as Belgium and the United Kingdom, kept the war debt in their official debt figures until the end of World War II. Nevertheless, in 1934, it became generally recognized that the war debts would not be serviced for years to come.

16. In reaction to the European payment suspensions, the US Congress enacted the Johnson Debt Default Act of 1934, which banned US citizens from granting loans to countries that had defaulted on their war debt to the United States. Moreover, the US Treasury still lists the unpaid 1934 war debt obligations in its financial accounts today.

17. In the various empirical exercises that follow, these countries are incorporated to the extent that the data permit. The core episodes with the most complete profile are: Austria, Belgium, France, Germany, Greece, Italy, and the United Kingdom.

TABLE 1. The 1934 summer defaults: unpaid allied wartime and postwar debt owed to the United States and the United Kingdom.

	Owed to US	Owed to UK	Total to US and UK	Debt relief to GDP (in %)		Debt relief as % of external public debt (6)
	Debt outstanding in US\$ (w/arrears) (1)	Debt outstanding in US\$ (w/arrears) (2)	Debt outstanding in US\$ (w/arrears) (3)	Face value (upper bound) (4)	Present value (lower bound) (5)	
United Kingdom	4,714,345,235	–	4,714,345,235	24.5	19.5	91.9
France	3,980,735,112	3,361,387,861	7,342,122,972	52.2	25.1	–
Italy	2,009,555,036	1,123,494,772	3,133,049,808	36.4	11.5	–
Belgium	413,430,000	64,631,010	478,061,010	4.1	2.7	11.3
Poland	226,248,308	17,107,860	243,356,167	–	–	–
Czechoslovakia	165,409,455	0	165,409,455	–	–	48.1
Yugoslavia	61,625,000	146,572,822	208,197,822	–	–	36.1
Romania	63,883,007	140,836,167	204,719,173	–	–	–
Greece	32,789,344	99,384,805	132,174,148	43.4	21.4	44.0
Austria	23,822,492	0	23,822,492	1.7	1.6	5.3
Estonia	18,079,383	1,432,045	19,511,429	–	–	95.8
Finland (fully repaid)	8,711,996	0	8,711,996	0.2	0.2	–
Latvia	7,435,784	6,222,619	13,658,403	–	–	97.8
Lithuania	6,650,080	–	6,650,080	–	–	–
Hungary	2,086,096	0	2,086,096	–	–	0.6
Australia	0	337,777,250	337,777,250	6.2	–	14.8
New Zealand	0	110,966,579	110,966,579	10.5	–	10.0
Portugal	0	99,459,373	99,459,373	10.3	–	66.6
Memorandum items:						
Total owed to the US:		US GDP		Owed/GDP (US)		
11,734,806,327		66,800,000,000		17.6		
Total owed to the UK:		UK GDP		Owed/GDP(UK)		
5,509,273,162		19,264,825,087		28.6		

Source: See Online Appendix Table A.2.

all numbers are quite close). Discrepancies may also arise from the exchange rate used to convert the debt into local currency, to construct a measure of debt relief relative to GDP. Our point estimates of debt relief (column (4)) are based on the nominal GDP and exchange rates shown in Online Appendix Table A.2, using 1934 values, since that year uniformly dates the “*de jure*” debt relief event towards the United States and the United Kingdom. The 1934 date is also appropriate for the domestic debt default of the United States case, since the abrogation of the gold clause came into force instantly.

These numbers are a conservative estimate of the true scope of the war debt relief of the 1930s for two main reasons. First, when in doubt about the best source on debt amounts, exchange rates, or GDP, we have always opted for the values that would yield the more conservative estimates of debt relief. Second, and more importantly, the defaults and debt write-downs of 1934 were not limited to debt owed the United States and the United Kingdom (which are the only ones we quantify here). Large amounts of governmental debt were also owed to France, Italy, and Belgium and these amounts are not part of our calculations.¹⁸

Methodologically, our preferred debt relief estimate for 1934 is simply the outstanding face value of war debts as a share of GDP, because the entire debt stock was written off and no new debt was issued. This stands in contrast to almost all emerging market debt restructurings, which involved an exchange of old loans or bonds against new ones. As an alternative, however, we also computed debt relief estimates in present value, based on the terms of the debt rescheduling agreements vis-à-vis the United Kingdom and the United States of the 1920s.¹⁹ To discount future payments in this exercise, we use a 5% annual rate, which follows the approach chosen in Moulton and Pasvolsky (1932). Figure 1 shows the results and compares them to our baseline numbers, focusing on the seven largest debtor countries: Austria, Belgium, France, Greece, Italy, Portugal, and the United Kingdom. Unsurprisingly, due to the long remaining maturity of the rescheduled war debts, the present value relief estimates are often considerably below the face value estimates, especially for France and Italy. Nevertheless, the magnitudes of debt relief are large with either method, exceeding 10% of GDP even in present value terms in most cases. Moreover, it should be kept in mind that these war loans would have long fallen due before 1934 had this debt not been rescheduled under very generous terms in the 1920s. The present value relief estimates for 1934 are therefore artificially small, while the face value debt reduction amounts are a more appropriate assessment of the true scope of relief during this period.

18. Belgium, France, and Italy were each owed total war debts of more than \$1bn 1933 US dollars (see Moulton and Pasvolsky 1932).

19. We could not gather details on the agreements of Australia and New Zealand, and Portugal on their debt owed to the United Kingdom. We are therefore not able to compute present value debt relief estimates for these cases.

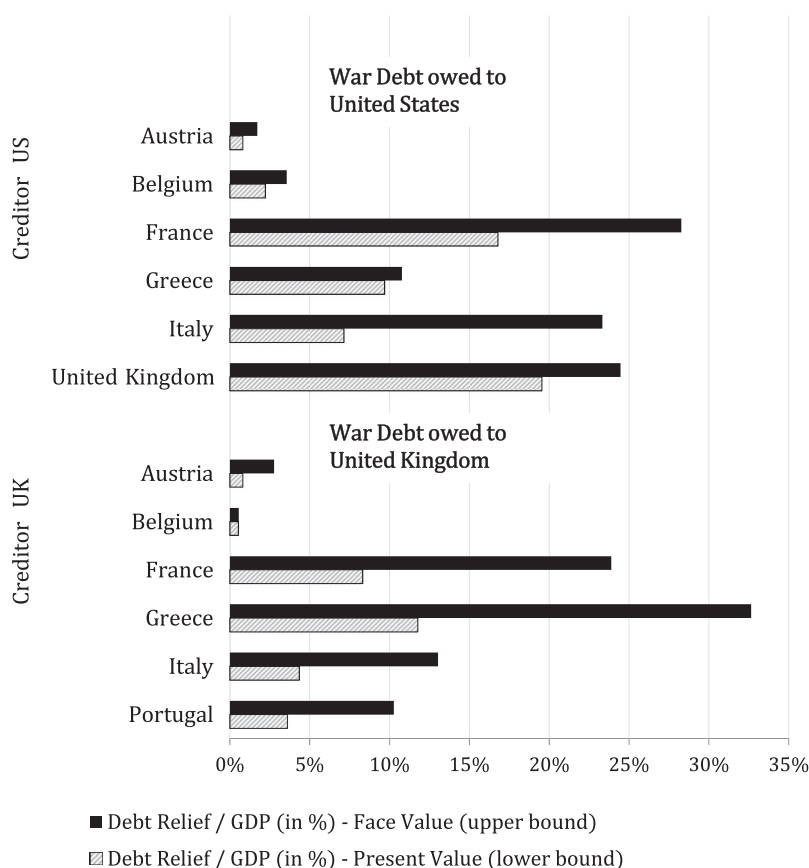


FIGURE 1. Debt relief of major European countries as a share of debtor country GDP in 1934. Figures are shown for debt owed to the United States and to the United Kingdom separately. The sources are the same as in Table 1. The present value estimates use an annual discount rate of 5% and the contractual debt service streams of the original agreements as in Moulton and Pasvolsky (1932).

2.2. External Sovereign Debt Crises in Emerging Markets since 1978

We now turn to a second significant era of sovereign debt relief of the past 100 years: the defaults and restructurings of emerging market debts vis-à-vis private creditors (foreign banks or bondholders). Our analysis is restricted to the middle-to-high income emerging markets. We rely on the Cruces and Trebesch (2013) database, which provides detailed information on the near-universe of sovereign debt restructurings with foreign banks and bondholders over 1978–2010, including data on the amount of debt affected as well as estimates on the size of creditor losses (haircuts) agreed upon in each deal. Their approach to estimate haircuts closely follows Sturzenegger and Zettelmeyer (2006, 2007, 2008), who estimate investor losses for eight emerging market crises.

The information on haircuts in individual debt restructurings allows us to compute a cumulative haircut measure for the entire default spell, thus summarizing the outcome

of individual restructuring agreements that are sequentially connected. The detailed approach and data inputs to compute the individual and cumulative haircuts are summarized in Online Appendix B, as well as in the original paper by Cruces and Trebesch (2013). The haircut estimate used here compares the present value of the old defaulted debt to the present value of the new restructured debt using the same market rate to discount future cash flows (the actual or imputed “exit yield”). To define a default spell, we use dating provided in Reinhart and Rogoff (2009). Table 2 lists 35 debt relief episodes in 30 middle- and high-income countries, as well as the start and end dates of each crisis spell.²⁰

The final column of Table 2 calculates debt relief as a percentage of GDP based on the cumulative haircut estimates that are also shown. The main take away is that the average debt relief estimate in this sample is 15.7% of GDP, with a large variation across events, ranging from a high of around 56% to nil.²¹

We also find a large variation in the number of restructurings before countries exited a crisis spell. In total, we count 97 restructuring deals in the 35 crises listed in Online Appendix B, Table B.1. This is a ratio of almost three to one, which suggests that in the average experience, prior to a “final” restructuring that allowed countries to exit default and re-access capital markets, there were two preliminary or “insufficient” restructuring efforts. Countries with the highest number of serial restructurings include Poland, with seven agreements before their “final” one in 1994, as well as Brazil, Mexico, and Jamaica, which each had six restructuring operations before the crisis exit in the mid-1990s.

Also noteworthy, these “final” restructurings (those at the end of a sequence) typically implied more debt relief than previous interim agreements. This was the case for the “final” Brady deals, for example, which resulted in actual debt write-offs, unlike almost all preceding restructurings of the 1980s, which typically only implied maturity extensions. While the average duration of the full default spells for the 35 episodes is a high 7.3 years, many crises took more than ten years to resolve, in line with the war debt experience of the 1920s. In the recent sample, the longest cumulative default spells were for Peru and Jamaica and lasted 18 and 16 years, respectively.

2.3. *Two Eras of Debt Relief: A Comparison*

Figure 2 presents a synopsis of 46 debt relief episodes in advanced and emerging market episodes, where the scope of relief to GDP is marked by dark and pale bars, respectively. For the interwar sample, Figure 2 shows nine of the 18 countries defaulting on war debt to the United States and the United Kingdom in the 1930s, because nominal

20. As was the case with the advanced economies interwar sample, not all episodes can be documented to the same extent. In particular the transition economies and smaller island nations lack data on ratings or GDP.

21. For completeness, we also calculate comparable debt relief estimates for lower-income countries. On the whole, debt relief estimates for the poorer countries run lower despite higher haircuts. The share of affected debt is smaller both in absolute dollar amounts and relative to domestic GDP, as private lending is limited and official sources and aid play a more prominent role.

TABLE 2. Debt relief in middle- to high-income emerging market episodes, 1978–2010.

Country	Full episode (1)	Debt affected (in m US\$) (2)	Debt affected/GDP (in %) (3)	Full episode haircut (C&T) (4)	Debt relief as % of external public debt (5)	Debt relief to GDP (in %) (6)
Algeria	1991–1996	4,657	9.9	0.054	0.9	0.5
Argentina	1982–1993	67,891	28.7	0.477	80.1	24.0
Argentina	2001–2005	60,572	33.4	0.425	25.7	14.2
Bosnia and H.	1992–1997	1,300	24.6	0.896	n.a.	22.1
Brazil	1983–1994	130,493	23.9	0.375	59.9	14.3
Bulgaria	1990–1994	7,910	98.7	0.563	45.9	55.6
Chile	1983–1990	21,731	64.8	0.379	n.a.	35.6
Costa Rica	1983–1990	2,433	42.6	0.791	59.9	43.4
Croatia	1992–1996	858	3.7	0.11	n.a.	0.4
Dominican Rep.	1982–1994	1,910	13.6	0.731	42.2	13.3
Dominican Rep.	2005	1,280	3.8	0.016	0.3	0.1
Dominica	2003–2005	144	39.9	0.54	34.6	21.6
Ecuador	1982–1995	12,714	54.3	0.512	83.1	31.2
Ecuador	1999–2000	6,700	35.9	0.334	16.8	12.0
Ecuador	2008–2009	3,190	5.5	0.528	16.7	2.9
Gabon	1986–1994	226	5.3	0.054	0.5	0.3
Grenada	2004–2005	210	30.2	0.339	20.5	10.2
Jamaica	1978–1993	1,452	31.1	0.516	24.4	24.4
Jordan	1989–1993	1,289	23.3	0.227	4.1	5.3
Macedonia, FYR	1992–1997	229	6.1	0.346	9.2	2.1
Mexico	1982–1990	177,771	61.8	0.42	105.1	36.2
Panama	1983–1996	4,967	53.3	0.389	52.3	22.9
Peru	1980–1997	11,320	19.1	0.64	40.4	13.8
Poland	1981–1994	30,912	29.8	n.a.	n.a.	15.1

(Continued)

TABLE 2. Continued.

Country	Full episode (1)	Debt affected (in m US\$) (2)	Debt affected/GDP (in %) (3)	Full episode haircut (C&T) (4)	Debt relief as % of external public debt (5)	Debt relief to GDP (in %) (6)
Romania	1981–1986	2,965	6.2	0.158	6.5	0.9
Russia	1991–2000	68,683	26.4	0.495	n.a.	11.3
Serbia Montenegro	2003–2004	2,700	11.5	0.709	23.1	8.1
Seychelles	2008–2010	320	32.9	0.562	25.4	18.5
Slovenia	1992–1996	812	3.9	0.033	n.a.	0.1
South Africa	1985–1993	23,400	17.9	0.377	n.a.	9.2
Trinidad & Tobago	1988–1989	446	10.3	0.155	n.a.	1.6
Turkey	1978–1982	5,067	5.8	0.316	18.0	0.9
Uruguay	1983–1991	5,913	47.8	0.46	n.a.	34.3
Uruguay	2003	3,127	26.0	0.079	n.a.	2.1
Venezuela	1983–1990	60,230	124.5	0.387	105.9	41.6
Averages		20,738	30.2	0.39	36.1	15.7

Note: Debt relief to external debt can exceed 100% since public debt numbers often do not include arrears.

Sources: Cruces and Trebesch (2013), Reinhart and Rogoff (2009, 2011), Online Appendix Table B.1 and sources cited therein.

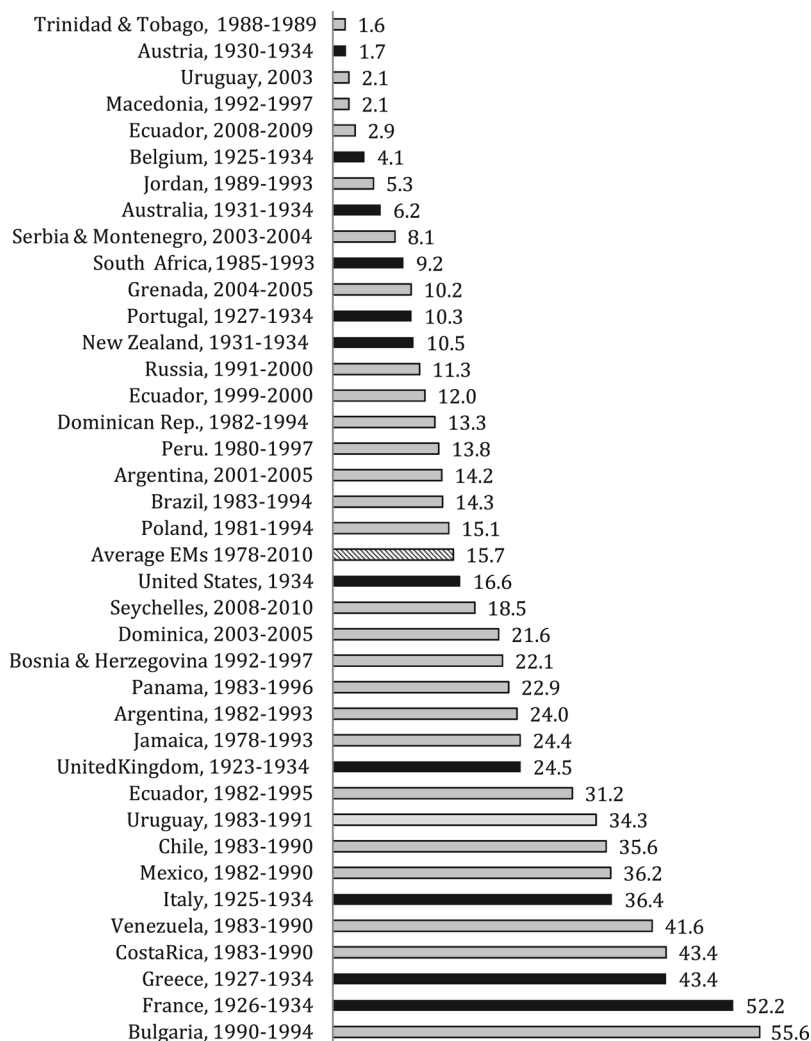


FIGURE 2. Default, restructuring, and debt relief: World War I debt to the United States and the United Kingdom, 1934; emerging markets, 1978–2010; United States, 1934. The figure compares debt relief as a percentage of GDP across episodes. We use the face value estimates for the 1934 events. For details on debt relief calculations in EMs see Online Appendix B. Seven EM restructuring episodes where debt relief was below 1% of GDP are not shown, but are included in the reported EM average in this figure, as well as in Table 2. Sources: Cruces and Trebesch (2013), Reinhart and Rogoff (2009), Online Appendix Tables A.2, A.3, and B.1, sources cited therein, and authors' calculations.

GDP data were not available for the other nine cases (Finland is excluded since it fully repaid). The figure also includes the haircut associated with the abrogation of the gold clause in the United States. The average debt relief/GDP for this interwar sample of 10 is 20.6%.

In the sample of 35 middle- to high-income emerging market episodes, the average debt relief estimate is about 4 percentage points lower, at 15.7%, as reported previously. Also, the range of variation is much higher than for the 1930 episodes. For example, we find seven emerging market episodes in which debt relief amounted to less than 1% of GDP. These cases are not shown in Figure 2 but they are included in the reported average (marked by a black bar).²² At the same time, there are cases such as Chile, Bulgaria, Mexico, Uruguay, and Venezuela in the 1990s where the total debt relief granted was very large, exceeding 30% of GDP.

We also compute debt relief as a share of debt stocks outstanding for both episodes. Tables 1 and 2 show that the debt write-downs in the 1930s amounted to an average of 43% of external government outstanding in 1934, or 25% of total government debt (domestic + external). For the EM episodes 1978–2010, debt relief accounted for 36% of external government debt, on average, or 25% of total external debt (see Online Appendix Table B.1).

The main conclusion drawn from this analysis is that the debt relief, averaging 16%–21% of GDP or 36%–43% of external government debt, was a quantitatively significant factor in helping governments resolve chronic debt overhangs. Furthermore, the orders of magnitude of the advanced economy debt write-downs are quite similar to the magnitudes seen in the modern vintage emerging market defaults and restructurings. It is also evident that the magnitude of the US debt relief arising from devaluation and the abrogation of the gold clause relative to GDP is about 16%–17% (Table A.3, Online Appendix A), a comparable order of magnitude to the amount it cost the United States to forgive European debts (see lower part of Table 1). Against this backdrop, the abrogation of the gold clause in the United States appears as a transfer of resources largely from private domestic holders of US debt to the defaulting governments of Europe.

3. The Aftermath of Sovereign Debt Relief: Stylized Facts

How does debt relief change the economic landscape of debtor countries? To address this question we examine the evolution of: (i) per capita GDP (levels and growth rates), (ii) sovereign credit ratings, (iii) debt servicing burdens, and (iv) levels of external and total debt, following debt relief events in the modern and interwar sample. This descriptive component of our analysis should not be (mis-)interpreted as indicating causal relationships, an issue we address explicitly in Section 4. Data sources and definitions are presented in Online Appendix C.

The starting point is a review of the performance of these indicators around the date of a “decisive” debt relief event, denoted in all figures and tables by *T*. Decisive debt relief events are those that allowed the borrower country to exit from a debt crisis. For the World War I and reconstruction debt defaults in advanced economies, *T* is 1934. This is the year of the generalized default (in June) on outstanding official

22. The episodes are Algeria 1991–1996, Croatia 1992–1996, Dominican Republic 2005, Gabon 1986–1994, Romania 1981–1986, Slovenia 1992–1996, and Turkey 1978–1982.

debt obligations to the United Kingdom and United States, with debtor countries subsequently writing these off. For emerging markets, the main event year T is simply that of the “final” restructuring in a series—the agreement that ended each of the debt crisis spells listed in Online Appendix Table B.1. In reviewing past experiences, it is straightforward to identify ex post the “decisive” debt operation that ends the debt crisis spell. In real time, such certainty is usually not possible as it is often difficult to ascertain whether a restructuring proposal will succeed.

Our baseline figures show a five-year window around the debt relief event T . The second leg, T to $T + 5$, is our main period of interest, while the first leg, $T - 5$ to T , provides a sense of the antecedents to debt relief. However, in many long-lasting default spells, the $T - 5$ to T window does not allow us to fully capture the conditions prior to a default. Thus, our analysis and results are not to be comingled with the literature on early warnings of debt crises (e.g., Manasse and Roubini 2009), which focuses on economic indicators in the run-up to the initial default, not in run-up to a crisis exit. Subject to data availability, we compare the average performance around 18 interwar debt relief episodes in advanced economies (excluding the US case) to that of 30 debt relief episodes in middle-income emerging markets. To avoid bias, we excluded the five recent debt restructurings of the former Yugoslav Republics (Bosnia Herzegovina, Croatia, Macedonia, Serbia and Montenegro, and Slovenia). These cases differ from all others in the sample since they overlap with the dissolution of a state and subsequent war and, at any rate, data availability is limited. Moreover, we exclude the US abrogation of the gold clause, as this was a haircut on domestic privately held debt and distinct from the other cases.

Income. Figure 3 plots average real per capita GDP levels (normalized to 1 at time T). The pale line shows averages around all 30 emerging markets debt relief events, while the dark line shows the comparable average for 15 of the 18 war debt default cases around 1934.²³ For the 1930s average, 1932 marks the trough in per capita GDP with little change through 1934. After 1934 there is a sharp rebound (cumulative growth is 20% from T to $T + 5$). Recovery notwithstanding, it takes eight years to recoup the real per capita income level recorded in $T - 5$. The emerging market countries show a relatively flat per capita GDP path during the default spell (through T) but a substantial increase thereafter (cumulative growth is 11% from T to $T + 5$).

Beyond these averages, there is broad evidence of a marked pick-up in economic activity following debt relief episodes. This can be seen by examining the episodes individually and is also evident in the measures of dispersion reported in Online Appendix C, Table C.2 and in Figure C.1, which plots median GDP and the 25th and 75th percentile in both episodes. The evolution of median GDP per capita paints a similar picture. Moreover, at each quartile, the level of GDP is higher in $T + 5$ compared to T (although the difference is very small for the 25th percentile in EMs). In total, we find that 38 out of 46 cases were accompanied by an increase in real

23. For the interwar years, we have no GDP data for the three Baltic countries Estonia, Latvia, and Lithuania.

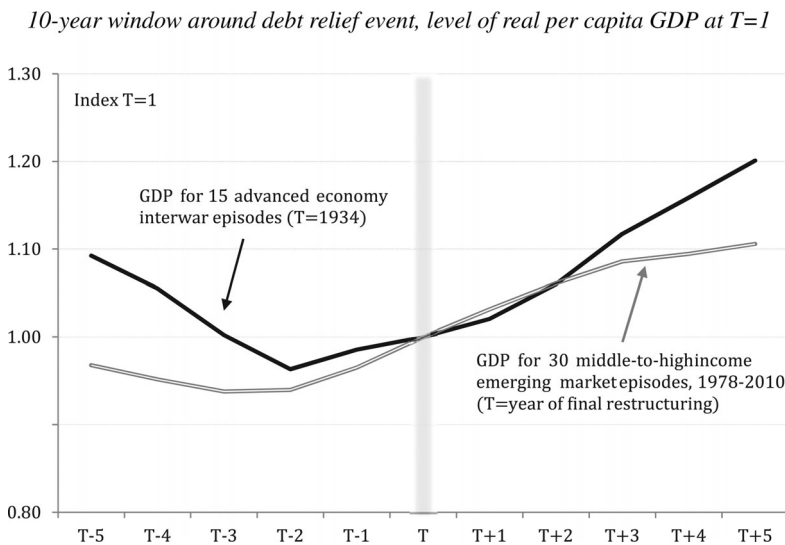


FIGURE 3. Real per capita GDP around debt relief events (exit from default) in middle- to high-income emerging markets (1978–2010) and advanced economies (1934).

Sources: Conference Board, Total Economy Database, Maddison (personal web page), World Bank World Development Indicators. See Online Appendix C for references and details.

per capita GDP over T to $T + 5$. In the 1930s, only Portugal had a negative growth performance post-relief, while for the EM episodes, we find six events with a negative cumulative growth record between T and $T + 5$ (Ecuador 1995; Gabon 1994; Grenada 2005; Jamaica 1993, Mexico 1990; and, by far, the worst growth record, Romania after 1986). Four out of the six poor EM performers entered another financial crisis in the T to $T + 5$ period (Ecuador, Mexico, Gabon, and Grenada). On the positive spectrum, there are EM countries such as Chile, Dominican Republic, Poland, Russia, and Uruguay, which witnessed a per capita GDP increase of more than 30 percentage points following relief. In the interwar years, the best performers include Austria, Germany, and New Zealand, with a cumulative GDP increase of more than 30 percentage points after 1934.

Sovereign Ratings. Sovereign credit ratings can be interpreted as a forward-looking summary indicator of macroeconomic and (often) political conditions, as these affect repayment prospects and borrowing capacity. For the interwar period, we use Moody's ratings and recode these to a numerical scale from a minimum of 1 to a maximum of 9.²⁴ For each country, we compute averages of all sovereign bond ratings reported in the Moody's Manuals on Foreign Securities as well as taken from Gaillard (2012), who also summarizes the rating methodology of the time. Table C.3 in Online Appendix C

24. A value of 1 corresponds to a C rating (defined as "practically worthless" according to the Moody's definitions of the 1930s) to a maximum of 9 for an Aaa rating (defined as borrowers with "intrinsic strength and security").

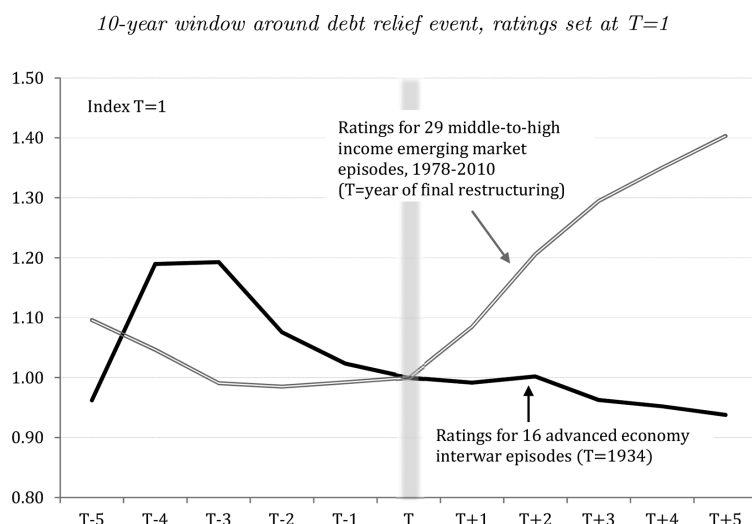


FIGURE 4. Credit ratings around debt relief events (exit from default) in middle- to high-income emerging markets (1978–2010) and advanced economies (1934).

Sources: Institutional Investor, Moody's, and authors' calculations. See Online Appendix C for details.

shows the average Moody's interwar ratings for each country and compares them to the available Fitch ratings. For the emerging market episodes, we rely on the widely used Institutional Investor ratings (IIR), which are compiled twice a year and are based on information provided by economists and sovereign risk analysts at leading global banks and securities firms. The ratings grade each country on a scale from a minimum of 0 to a maximum of 100.²⁵ The first ratings were published in 1979 and they cover almost all emerging markets in our sample. This stands in contrast to Moody's and Standard & Poor's, which do not report rating data for most emerging market sovereigns prior to the late 1990s. Figure 4 shows the evolution of country credit ratings, normalized to 1 around T and using data for 16 of the 18 war debt defaulters as well as 29 of the 30 EM episodes.²⁶

The figure shows striking differences between the two episodes. In the interwar years, sovereign credit ratings drifted steadily lower through most of the 1930s in Europe and elsewhere. They also decline, on average, after the financial crisis and Hoover Moratorium of 1931 (corresponding to $T - 3$) and the defaults on private external creditors after 1932 in a number of cases. However, ratings do not recover following the generalized 1934 default, despite the substantial debt relief received by the war debt defaulters and despite their positive GDP performance after 1934 (Figure

25. For details of the survey see <http://www.institutionalinvestor.com/Research/4142/Overview.html>. Although not critical to our analysis, one can interpret the ratings reported in each semi-annual survey as capturing the near-term risk of default within one to two years.

26. We have no interwar Moody's data for Latvia and Yugoslavia, and no IIR data for Dominica, 2003–2005.

3).²⁷ Emerging markets, in contrast, see a large variation in ratings both within and across debtor countries. For almost all sovereigns, the debt relief and crisis exit year is followed by a significant rebound in ratings. The average increases in the IIR index are 21% after two years and 40% after five years.

Debt Servicing. One of the expected benefits of debt relief is that it reduces the cost of debt servicing, thus increasing the “fiscal space” available to debtor governments (Ghosh et al. 2013). To examine this possibility, we gathered data on debt servicing outlays in both eras. For the interwar years, we compiled League of Nations data on central government total debt service (interest payments plus amortizations for both domestic and foreign public debt) and computed ratios to GDP and to government revenues. This was possible for 11 out of the 18 war debt default cases. For emerging markets, we use total external debt servicing to GDP (in %) from the World Bank’s International Debt Statistics (IDS) database, which was available for 22 of the 30 EM episodes.²⁸

Figure 5 shows that there is a gradual decline in debt servicing costs in the ten-year window around debt relief events in both eras. In the interwar period, debt servicing drops from a high of 4.2% to GDP in $T - 3$ to just 2.4% of GDP in $T + 5$ (a 45% reduction). In EM episodes, the cost of debt servicing is generally higher and it declines from around 8% of GDP in $T - 4$ to 6% of GDP in $T + 4$ (a 25% reduction). Despite this overall declining trend, there is little to suggest a significant decline at time T (the debt relief year). While this may appear counterintuitive, it is the case that by the time debt relief operations come to a close, many countries had implemented intermediate restructurings that reduced the interest and principal payments in the short and medium run.²⁹ Moreover, crisis exits are often followed by new bouts of borrowing, as capital markets reopen, especially in today’s EM episodes.³⁰ The reduction of debt payments due to debt relief can thus be offset by payments on any newly issued debt.³¹

27. As shown in Online Appendix C, Table C.3, the ratings are generally high and show little changes over time, at least when compared to ratings of today’s crisis countries. For example, it is puzzling that France and the United Kingdom could retain a rating of Aa or Aaa, despite defaulting on war debt exceeding 20% of their GDP. Similarly, it is surprising that Greece and Germany managed to retain a B rating from Moody’s when both had defaulted on all debts towards all creditors. Perhaps there was optimism in the recovery rates on German or Greek debt. Another possibility is that credit ratings at this time were simply not very informative, as suggested by Flandreau et al. (2011).

28. For the interwar years, we lack data on Czechoslovakia, Estonia, Latvia, Lithuania, Poland, Romania, and Yugoslavia. For EMs, we lack data around the debt relief events of Chile 1990, Poland 1994, Romania 1986, Russia 2000, Trinidad and Tobago 1989, Uruguay 1991, Uruguay 2003, and South Africa 1993.

29. Indeed, the ongoing Greek debt crisis illustrates this point, as debt servicing after the initial restructuring accounts for less than 3% of GDP.

30. Gelos et al. (2011) and Cruces and Trebesch (2013) find that most countries are able to reaccess international capital markets within two to three years after exiting default. Some of the emerging market debt relief events were even followed by exceptionally large capital inflows (compared to the historical average), or “capital flow bonanza”. Using the data and definition of such “bonanzas” from Reinhart and Reinhart (2009), we find that seven out of the 30 countries (22%) experienced a bonanza over T to $T + 4$.

31. Figures C.1 and C.2 in Online Appendix C complement the evidence in Figure 5 and trace debt servicing trends for the full sample of 1920–1939 and 1970–2011, both as shares of GDP and government

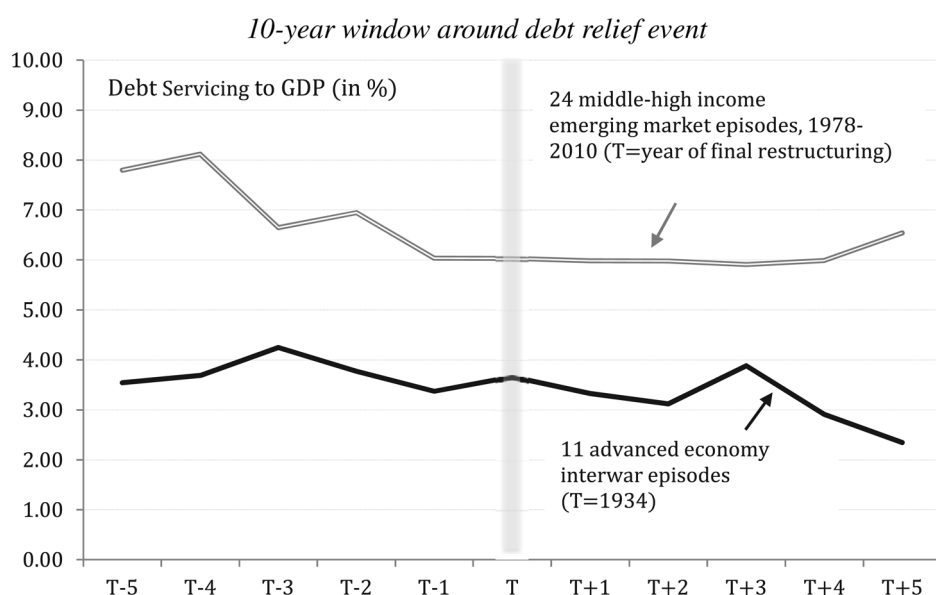


FIGURE 5. Total debt service to GDP (in %) around debt relief events (exit from default) in middle-to high-income emerging markets (1978–2010) and advanced economies (1934).

Sources: For EMs World Bank: World development indicators and international debt statistics. For interwar years: League of Nations (1936), United Nations (1948), and authors' calculations. See Online Appendix C for details.

Debt Stock Reduction. A successful debt relief operation should appreciably reduce the level of sovereign indebtedness. We have already shown that the average scope of debt relief corresponded to about 40% of external government debt—a notable reduction of the debt burden in the short run (see Section 2.3). Can this debt reduction effect also be observed in the medium and long run?³² To address this question, we use long time series on total, domestic, and external central government debt assembled in Reinhart and Rogoff (2009, 2011) as well as data on total government debt to GDP from Abbas et al. (2010). Moreover, we use data on total external debt of emerging markets from the World Bank, which aggregates public, publicly guaranteed, and private debts of each country. Following World Bank convention, we show this measure as a ratio to GNI and exports.

revenues. The main take away is that both periods see a declining trend in debt service burdens over time. For emerging markets, this is partly due to the strong decline in US real interest rates (also plotted in Figure C.3).

32. A common form of restructuring involves exchanges of short-term debt for longer maturities or exchanges of marketable debt for non-marketable instruments that pose lower rollover risks. Analyzing to what extent these compositional changes materialize is beyond the scope of this paper.

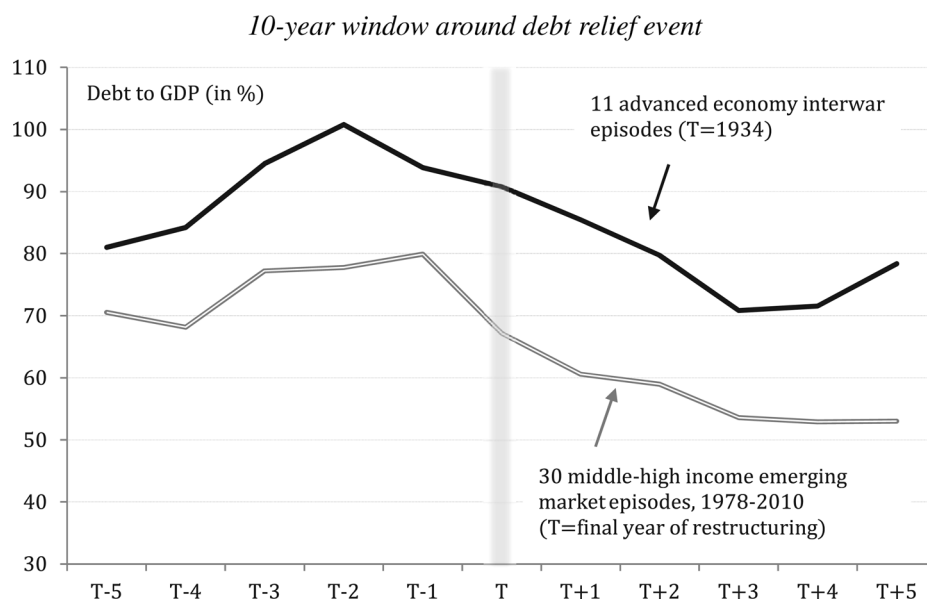


FIGURE 6. Debt to GDP (in %) around debt relief events (exit from default) in middle- to high-income emerging markets (1978–2010) and advanced economies (1934).

Sources: Abbas et al. (2010) and authors' calculations. See Online Appendix C for details.

Figure 6 shows that public debt ratios decline markedly after debt relief operations of both eras.³³ In the interwar period, the average debt/GDP level peaked at above 100% in $T - 2$ and drops to a low of 71% in $T + 3$. In emerging markets of recent decades, the average ratio is highest in $T - 1$, at 80%, and declines to 53% after year $T + 3$. We also find the median, and the upper and lower quartiles, to decline after period T (see Online Appendix C). The drop in year T is more pronounced for the EM sample, while the decline is more gradual around 1934. One explanation for this is that some countries, such as Australia or the United Kingdom, did not immediately write the war debts off their books after 1934, but only years later. The debt relief of 1934 therefore takes time to show up in the cross-country averages.

To shed further light on the evolution of debt burdens, Figure C.4 in the Online Appendix shows a bar chart on the scale of deleveraging or debt build-up around episodes of debt relief. There are four main take away points. First, the figure illustrates a large variation in the debt outcomes, ranging from a cumulative debt reduction of 92% of GNI to a debt build-up of 37% of GNI. Second, the number of countries which experienced deleveraging is considerably higher (27 episodes) than those ending up with a higher level of external debt (seven episodes). Third, it is evident that the observations corresponding to the advanced economies are not clustered in a particular

33. For the interwar years, we lack debt/GDP (mostly GDP) data on Czechoslovakia, Estonia, Latvia, Lithuania, Poland, Romania, and Yugoslavia. The data for EMs episodes are missing for Romania.

range and, indeed, their experience is distributed similarly to that of emerging markets. Finally, there are three yellow bars flagging countries where debt ratios decreased between $T - 4$ and T , but increased again strongly post-crisis (between T to $T + 4$). In two of the three cases, Argentina and Ecuador, this ended in a new default soon afterwards.

4. Difference-in-Differences Analysis

In this section we address causality by comparing “treated” countries (those granted debt relief) to a control group, and by running DiD type regressions for the main debt relief episodes of interest. The main identification challenge we face is that the timing of debt relief and restructurings could potentially be endogenous to the economic situation of crisis countries. This concern closely relates to recent theory work, in particular Kovrijnykh and Szentes (2007) and Benjamin and Wright (2009), who argue that debt restructurings and debt reductions are more likely to occur after a sequence of good shocks. The intuition behind this is that both the sovereign and its creditors have an incentive to “wait for a larger cake” and, thus, to delay the haircut and crisis exit until output recovers. The positive growth performance around debt relief episodes observed previously may thus not be the outcome of relief, but rather a precursor to the renegotiation.

4.1. Statistical Design and Event Timing

In our research design, we make use of the aforementioned four episodes of debt relief which were synchronous across countries.³⁴ All four debt relief operations were centrally orchestrated and simultaneously affected a large group of debtor countries. This makes the timing of these events exogenous (at least in principle) and not obviously dependent on country-specific economic conditions.

Most importantly, the starting date of these initiatives was not the outcome of an idiosyncratic debt renegotiation process between creditors and sovereign debtors, as is usually the case in debt relief operations. For example, at the start of the Hoover Moratorium, more than 15 highly indebted countries interrupted their war debt servicing at the same time, with barely any payments made between 1931 and 1933, thus resembling a “temporary stay”. We have also shown that the 1934 default occurred simultaneously across 18 advanced countries, irrespective of the specific economic situation in each of these countries.

As to the Baker and Brady debt relief initiatives of the 1980s and 1990s, both plans were introduced by US Secretaries of Treasury (James Baker and Nicolas Brady), both were coordinated with more than 100 countries, and they were both financially supported by the US government and the IMF (see Cline 1995, and Rieffel 2003,

34. To reiterate, these are the 1931 Hoover Moratorium and the 1934 defaults and debt write-offs, as well as the Baker initiative of the mid-1980s and the Brady initiative of the early 1990s.

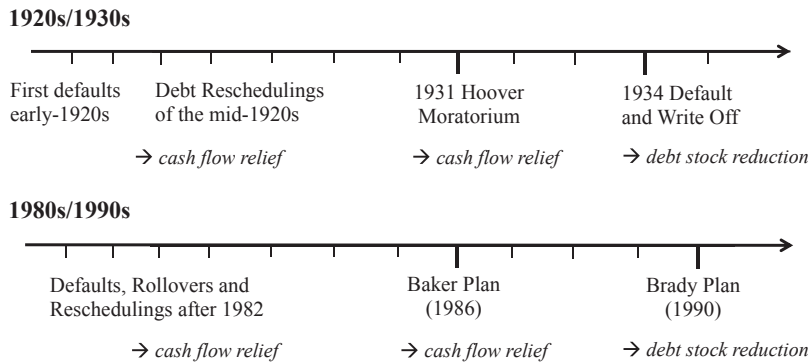


FIGURE 7. Stylized crisis timeline of the 1920s/1930s and 1980s/1990s. Sources: The authors based on Appendix A, Table A.1, Cline (1989, 1995), and Rieffel (2003).

for details). The Baker plan of the mid-1980s aimed to encourage voluntary capital inflows and structural reforms in the crisis countries. It also involved large sums of new preferential lending from commercial banks and multilateral institutions, as well as a series of rescheduling agreements that extended debt maturities by up to 15 years. According to Cline (1989), the Baker initiative failed to spur growth and voluntary capital flows, but it did provide debt servicing relief to the target countries. Due to the limited success of the Baker initiative, Secretary Brady announced a more ambitious plan in March 1989, which took another year to form shape. The Brady plan also aimed to spur growth, capital flows, and reforms, but contrary to the Baker plan it involved deep face value haircuts. Moreover, all outstanding bank loans were to be swapped into more widely held sovereign bonds. In February 1990, Mexico became the first country to implement a Brady deal and thus became a blueprint for 16 subsequent restructuring agreements.

We also make use of variation in the type of debt relief granted across events. While the Hoover and Baker operations implied *debt flow relief* via rescheduling and delayed repayments, the 1934 and Brady operations implied *debt stock relief* and reduced the nominal value of outstanding debt. This heterogeneity allows us to compare the effect of debt relief within the same countries over time and, hence, to shed light on the aftermath of intermediate versus decisive debt relief. Figure 7 shows a stylized timeline for the two main episodes covered by our regression analysis and the type of debt relief involved.

Methodologically, we exploit the cross-sectional variation between target and non-target countries and use the same intervention year in each of these episodes. This allows us to apply a classic DiD regression of the following type:

$$Y_{it} = \beta_0 + \beta_1 \text{after} + \beta_2 (\text{treat} * \text{after}) + \delta_i + \gamma_t + \varepsilon_{it}, \quad (1)$$

where i denotes countries and t the year of observation with $t \in \{\tau_i - 5, \dots, \tau_i - 1, \tau_i, \tau_i + 1, \dots, \tau_i + 5\}$, *treat* is a dummy variable that takes on the value of one for

treated countries (the debt relief group) and zero otherwise, *after* is a dummy that turns one after the treatment occurs (e.g., post-1934), and ε_{it} is the error term.³⁵ The coefficient of interest, β_2 , captures the effect of debt relief. For instance, if the debt forgiveness induces an economic recovery (an increase in real per capita GDP), then, $\beta_2 > 0$. The country fixed effects δ_i account for unobserved, time-invariant country heterogeneity, such as differences in institutions, openness, etc., while the time effects γ_t capture a common time trend, which can reflect the global business cycle and the economic and financial conditions of the main creditor country (the United States). Allowing for a common trend is important, as it takes into account the potential endogeneity of the US-driven debt relief initiatives (the Hoover moratorium or the Brady and Baker plans).³⁶ We employ an eleven-year window, as we use observations from five years before until five years after the treatment years.

As with any DiD analysis, the timing of events is crucial. Here, the treatment years in the interwar period are 1931 and 1934, since both the Hoover Moratorium and the summer defaults of 1934 went into effect immediately. For the Baker initiative, the treatment year is 1986, since the plan was initiated in early that year, after having been announced in October of 1985. The Brady initiative started four years later, in 1990, the first year with an actual Brady agreement.

Our timing choices are as conservative as possible. This can be seen when comparing our research design to that of Arslanalp and Henry (2005), who also study the effects of the Brady initiative. We adopt 1990 as the uniform treatment year for all Brady countries, while they use the date of the actual Brady debt renegotiations, which differ country by country and were sometimes concluded only in the mid-1990s.³⁷ Choosing the years of each Brady deal is problematic, since the conclusion of the Brady negotiations is clearly a choice variable by the government and its creditors. Indeed, after early 1990 all target countries *could* request Brady debt relief based on the Mexican blueprint deal. As a result, the treatment year becomes endogenous, and the interpretation of the results is more challenging. We therefore prefer using the uniform treatment year of 1990. It is not a surprise that the point estimate of the debt relief coefficient, β_2 , in the subsample of treated countries is typically larger if we consider the actual years of the Brady agreements. In this sense, our Brady estimation results can be interpreted as a lower bound. Nevertheless, we conducted a variety of robustness checks on our results by altering the treatment year and estimation windows in various ways.

35. Note that the *treat* coefficient is a country-specific constant and will therefore be absorbed by the fixed effect.

36. Sachs (1990) argues that the timing of the Brady initiative can be largely explained by political and financial consideration in the United States. By 1988, US banks were recording record profits and had considerably reduced their exposures to developing-country debts. For the first time since 1982, face value debt write-offs in Latin America no longer threatened the solvency of the US financial system, so that debt forgiveness became a viable political option. We control for these considerations (including the state of the US financial system) by including year dummies in each regression.

37. Most restructurings were completed between 1990 and 1995, but Peru took until 1997 to close its deal.

A second fundamental issue in DiD analyses is the choice of treatment and control group. In the interwar years, we are constrained by data availability and by the relatively small number of independent countries at the time. The treatment group in the 1930s includes all 18 war debt default cases, 16 of which are European countries. We compare the performance of this target group to two control groups, subject to data availability. As a baseline approach, we use a relatively homogeneous group of other advanced economies as counterfactual, which broadly resemble the treatment group. Specifically, we include all European countries that did not default or receive debt relief in the 1930s and for which GDP data were available. This list is comprised of Ireland, Spain, Switzerland, and the Nordic countries of Denmark, Finland, Norway, and Sweden.³⁸ As part of our sensitivity analysis, we also broaden the treatment group in various ways and make it more heterogeneous, by adding non-European countries and by mixing defaulters and non-defaulters. One control group also includes all Asian countries that were independent in the 1930s and for which GDP data were available (China, Russia, Japan, Thailand, and Turkey) as well as Bulgaria, a European country that had defaulted on its private creditors. Another version includes all South American countries for which GDP data were available (Argentina, Brazil, Chile, Colombia, Mexico, Peru, Uruguay, and Venezuela). Of these, all but Argentina had defaulted on their private creditors in the 1930s. We estimate the parameters of interest using various combinations of these subgroups and show results using both the small European counterfactual and the largest counterfactual possible—that is, including European, Asian, and South American countries alike.

In the contemporaneous sample, the Brady target group includes all middle-income EMs with a Brady deal, namely Argentina, Brazil, Bulgaria, Costa Rica, Dominican Republic, Ecuador, Jordan, Mexico, Panama, Peru, Poland, Uruguay, and Venezuela. The Baker country sample is the same, plus Chile, which was a target country in the mid-1980s, but were not part of the “Brady bunch”. Again, our baseline counterfactual includes all middle- and high-income countries that did not default nor received debt relief in this period and for which we have data, namely China, Colombia, Czech Republic, Egypt, Hungary, India, Israel, Malaysia, Mauritius, Singapore, South Korea, Taiwan, Thailand, and Turkey. For robustness, we also ran regressions with the exact same counterfactual used by Arslanalp and Henry (2005), which includes defaulters and non-defaulters,³⁹ and also check results with other counterfactual choices, such as Latin American countries only.

Taken together, the DiD design and the inclusion of fixed effects allow for much tighter identification of debt relief effects compared to the descriptive before-and-after analysis described in Section 3. However, we cannot exclude the possibility that

38. We do not include the United States, since it is a creditor country and because the abrogation of the gold clause in 1934 was a domestic default and thereby differs from the external defaults in the sample. We also exclude Canada, due to the unclear status of its war debt payments to the United Kingdom. However, the main results are robust when either country is added to the counterfactual group of advanced economies.

39. Their counterfactual includes Chile, China, Colombia, Czech Republic, Greece, Hungary, India, Indonesia, South Korea, Malaysia, Pakistan, South Africa, Sri Lanka, Thailand, Turkey, and Zimbabwe.

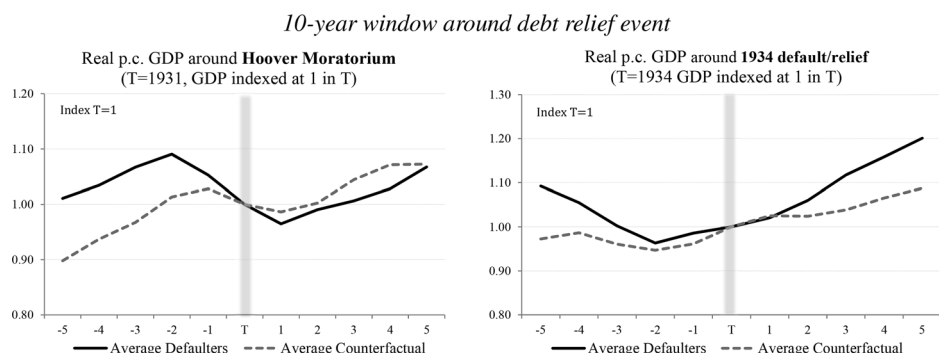


FIGURE 8. GDP trends around 1931 and 1934: target versus counterfactual groups. See Online Appendix Figures C.6 and C.7 and Table C.1 for sources and further details.

omitted variables may be biasing the estimates of treatment coefficient. To address this remaining concern, we run robustness checks by controlling for other types of financial crises (banking and currency crises) and inflation (based on data from Reinhart and Rogoff 2009), as well as wars and conflicts (Correlates of War data set) and major political shocks (government crises, revolutions, and riots from the Arthur Banks data set). Despite this, it is beyond the scope of this paper to apportion a precise number to the debt relief effect per se. Many factors shaped GDP, borrowing patterns, and ratings of the crisis countries and we cannot account for all of them in an encompassing manner.⁴⁰

4.2. Difference-in-Differences Results: 1931 and 1934

We start with the Hoover Moratorium of 1931 and take a preliminary view of the data in Figure 8 and Figure C.5 in the Online Appendix. The figures compare the development of our main economic indicators for treatment and control groups, where the control groups is our baseline sample of European non-defaulters. Figure 8 (left panel) shows that the growth performance of the treatment group is significantly worse than that of the counterfactual around 1931. Average real per capita GDP declines 6 percentage points between $T - 3$ and $T + 3$ for the defaulters, while it increases for the counterfactual group in this same spell. Panel A in Figure C.5 accounts for country heterogeneity by showing residuals from a regression of annual real p.c. growth on a constant and country-specific dummies. Residual growth declines markedly for both

40. For example, regarding the 1930s episodes, Eichengreen (1992) stressed the importance of stimulus provided by exits from the gold standard. However, these exits from the golden fetters were spread over a five-year period, from the early British and Greek exits in 1931 to the French exit five years later in 1936. In contrast, the defaults and debt write-downs were tightly clustered in 1934. On the fiscal front, public works programs were also initiated after 1934, but as with monetary policy there was considerable dispersion in their timing. For emerging markets, the currency depreciations that often accompany debt crises may have been an additional powerful force influencing growth and ratings (we do control for currency crises later on).

groups prior to 1931 and recovers strongly afterwards, but there is no evidence that treatment countries perform better than the counterfactual. The picture is similarly bleak with regard to Moody's credit ratings, which decline across the board after 1931, with no notable difference between the two groups (Panel B). Similarly, the debt/GDP level does not decline significantly more for the target countries (Panel D). Only the debt servicing burden improves, as payments to revenue drop relatively more than those countries not receiving relief.⁴¹

The aftermath of the 1934 defaults looks more favorable for the defaulter group, at least with regard to GDP. The treatment group sees significantly higher real per capita growth rates compared to non-defaulters, particularly between $T + 2$ and $T + 5$. Figure C.6 shows the same when using residual growth rates (Panel A). In addition, we find that the average debt servicing costs continues to decline across the board. Over the entire spell (1928–1938), the debt servicing to revenue drops from 31% to just 21% for the treated countries. Furthermore, Panel D shows that the debt/GDP ratio declines after 1933, in particular for the target countries. However, the rating performance continues to look unfavorable for both groups.

The regression results in Tables 3 and 4 broadly confirm the descriptive evidence. In Table 3, we find few significant treatment coefficients post-1931. The only β_2 coefficients that are marginally significant are those of GDP and of credit ratings (at the 10% level). However, both results are not robust, as the coefficients turn insignificant once we change the counterfactual or add additional controls. Thus, we find no convincing evidence that the Hoover Moratorium significantly altered the economic trajectory of countries receiving relief.

The results are more notable for the 1934 debt relief spell. Table 4 indicates that real per capita growth is 4.7 percentage points higher for treated countries in the post-1934 period, with a highly significant coefficient (column (1)). Moreover, the debt levels decrease significantly (columns (6) and (8)), compared to the counterfactual on European non-defaulters. We find no significant coefficient for debt servicing (column (4)) and a highly significant negative coefficient for ratings. These results, however, are rather sensitive to the choice of counterfactual, as can be seen in columns (2), (5), and (7), which use the “World” counterfactual including European, Asian, and South American countries. The treatment coefficient for debt servicing becomes highly significant and large, while the coefficient for debt/GDP turns insignificant. Notably, however, the growth coefficient remains large and significant across all counterfactuals chosen, albeit sometimes only at the 10% level.

We conduct an extensive list of additional robustness checks regarding our key result of post-debt relief growth effects after 1934 (column (1) in Table 4). First, we add controls for inflation, banking and currency crises, wars and conflicts, and government crises, revolutions, and riots. Second, we assess the role of timing choice: by varying the estimation time window from ± 5 years in the baseline to ± 3 , 4, and

41. In this section, we focus on the debt service to revenues as opposed to GDP (as in Section 3), since revenue data for the interwar years are available for more countries than nominal GDP series, especially for the counterfactual.

TABLE 3. 1931 Hoover Moratorium: DiD regressions.

Dependent variable	Growth, real p.c. Small (Europe)	Growth, real p.c. Large (World)	Credit Ratings (change) Small (Europe)	Debt Service to Revenue Small (Europe)	Debt Service to Revenue Large (World)	Total Public Debt/GDP Small (Europe)	Total Public Debt/GDP Large (World)	External Debt/GDP Small (Europe)
Counterfactual	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-intervention dummy (after 1931)	0.03 (1.27)	0.82 (1.55)	2.19 (2.05)	-0.00 (1.62)	3.75 (3.38)	4.54 (2.70)	6.16* (3.23)	-0.70 (4.21)
Treatment (moratorium) × post-intervention dummy	2.60* (1.36)	0.86 (1.33)	-4.31* (2.39)	-3.39 (2.34)	-5.65 (4.20)	7.31 (6.94)	3.82 (6.90)	-0.51 (5.61)
Constant	0.55 (0.78)	3.03** (1.12)	21.11*** (1.68)	20.09*** (1.20)	0.91 (2.06)	65.22*** (3.41)	50.21*** (3.00)	23.80*** (4.93)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	237	373	223	326	230	172	248	167
Countries	22	35	23	21	31	18	27	16
Adjusted R ²	0.237	0.206	0.043	0.062	0.185	0.166	0.199	0.007

Notes: The table shows results from a DiD fixed effects panel regression as in equation (1). All specifications include country and year fixed effects. The dependent variable in columns (1) and (2) are annual real growth rates based on the Maddison data set; column (3) shows credit ratings (yoy changes in %) using Moody's ratings and transforming these to a numerical scale from 0 (lowest) to 9 (highest, Aaa); columns (4) and (5) give external debt service to government revenue from various sources (see Online Appendix C); columns (6) and (7) are total public debt to GDP from Abbas et al. (2010); and column (8) is external debt to GDP from Reinhart and Rogoff (2009, 2011). Robust standard errors clustered on the country level in parentheses.

*** Significant at 1%; ** significant at 5%; * significant at 10%.

TABLE 4. 1934 Default/relief: DiD regressions.

Dependent variable	Growth, real p.c. Small (Europe) (1)	Growth, real p.c. Large (World) (2)	Credit Ratings (change) Small (Europe) (3)	Debt Service to Revenue Small (Europe) (4)	Debt Service to Revenue Large (World) (5)	Total Public Debt/GDP Small (Europe) (6)	Total Public Debt/GDP Large (World) (7)	External Debt/GDP Small (Europe) (8)
Counterfactual								
Post-intervention dummy (after 1934)	-1.91 (1.32)	-0.39 (1.07)	-4.28 (2.79)	-5.09*** (1.84)	4.53* (2.60)	-9.03 (5.57)	0.29 (2.47)	-3.49 (3.26)
Treatment (debt relief) × post-intervention dummy	4.66*** (1.44)	2.21* (1.24)	-6.03* (2.99)	-2.74 (2.93)	-8.18*** (2.66)	-12.21** (5.67)	-7.93 (6.18)	-9.51** (3.83)
Constant	2.40*** (0.64)	2.77*** (0.76)	23.09*** (0.95)	21.26*** (0.79)	0.25 (2.18)	69.72*** (3.17)	59.57*** (2.38)	25.87*** (1.75)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	237	378	216	324	249	175	258	162
Countries	22	35	23	21	31	18	27	16
Adjusted R ²	0.270	0.226	0.167	0.153	0.199	0.283	0.243	0.342

Notes: The table shows results from a DiD fixed effects panel regression as in equation (1). All specifications include country and year fixed effects. The dependent variable in columns (1) and (2) are annual real growth rates based on the Maddison data set; column (3) shows credit ratings (yoy changes in %) using Moody's ratings and transforming these to a numerical scale from 0 (lowest) to 9 (highest, Aaa); columns (4) and (5) show external debt service to government revenue from various sources (see Appendix C); columns (6) and (7) show total public debt to GDP from Abbas et al. (2010); and column (8) shows external debt to GDP from Reinhart and Rogoff (2009, 2011). Robust standard errors clustered on the country level in parentheses.

***Significant at 1%; ** significant at 5%; * significant at 10%.

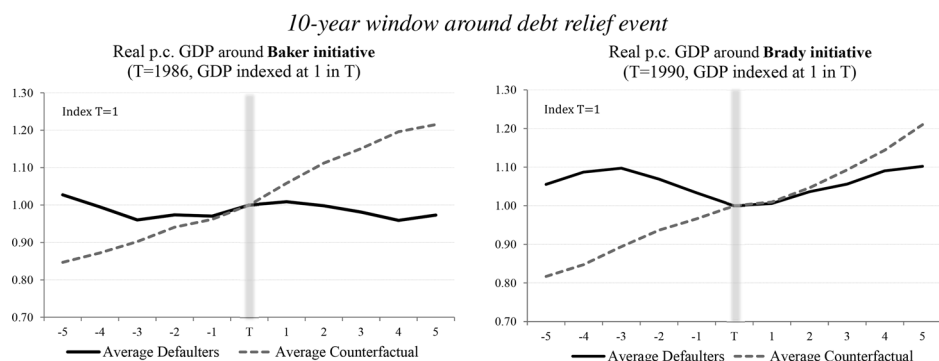


FIGURE 9. GDP trends around Baker and Brady initiatives: Target versus counterfactual groups. See Online Appendix Figures C.8 and C.9 and Table C.1 for sources and further details.

6 years around 1934; by excluding the treatment year (1934); by dropping the time fixed effects; and by conducting a placebo regression with 1933 as pseudo-treatment year. Third, we address country heterogeneity: by dropping special cases, in particular Germany and all Eastern European countries; by constraining the sample to European countries only (i.e., dropping Australia and New Zealand); by excluding the three best GDP performers between 1934 and 1939 (Austria, Germany, New Zealand) and the three worst GDP performers (Belgium, Greece, Portugal), respectively; by dropping the three countries with the highest war debt relief to GDP (France, Greece, Italy) and those with the lowest relief to GDP (Austria, Australia, Belgium), respectively; and by running quantile regressions at the median. The main insight of these exercises is that the coefficient for the interaction term on growth remains statistically significant at the 1% or 5% level in all specifications and samples, and with a size ranging between 2 and 5. Moreover, we find the coefficient to be insignificant when using the pseudo-treatment year 1933, giving further assurance that we are not just picking up the effects of the post-1933 recovery.

Overall, the results for the interwar period are therefore consistent with the view that a debt write-down operation such as that of 1934 is followed by an improvement of growth and debt sustainability.

4.3. Difference-in-Differences Results: Baker Plan (1986) and Brady Plan (1990)

We now study the economic performance before and after the Baker and Brady initiatives. Figure 9 (left panel) and Figure C.7 in the Online Appendix show that output growth was anemic for the highly indebted crisis countries before and after 1986, especially when compared to the group of non-crisis economies. Furthermore, we find that the average credit ratings see a drastic decline after the outbreak of the crisis in 1982 and remain at this low level in the following years (Panel B of Figure C.7), while debt/GDP continues to *increase* for countries targeted by the Baker

plan (Panel D). Only the debt servicing burden⁴² of target countries shows signs of betterment compared to the control group.

Appendix Figure C.8 shows the corresponding indicators for the Brady episode. After 1990, the crisis countries see a remarkable pick-up in real per capita GDP growth. While the non-default emerging markets see a continuation of their prolonged output boom, the “Brady bunch” now starts to catch up (right panel of Figure 9). The uptick is even more pronounced for country credit ratings. On average, the Brady treatment group see an increase in the IIR index of more than 40% until $T + 5$, compared to just 15% in the control group. Also the average debt servicing burden continues to decline for Brady countries (to below 20% of exports), as does the debt/GDP burden, especially after 1992. However, these trends in the debt burden are similar for the non-defaulter counterfactual.

Another forward-looking measure we can look at during this era is the secondary market prices for developing country loans (see Figure C.9 in the Online Appendix). These had fallen to new lows before and during the Baker plan period 1986–1988, but recover markedly after the Brady plan had been announced. The fact that the market value of sovereign debt increases after the announcement of a restructuring plan with deep creditor losses is puzzling, but consistent with the notion that both creditors and debtors may benefit from debt relief in a situation of a debt overhang.

The regressions in Tables 5 and 6 support the descriptive findings. In Table 5, the treatment coefficient for output growth is negative and insignificant for the Baker episode. Also, debt/GDP continues to grow post-treatment. On the positive side, we find evidence that the credit ratings of the Baker countries increase significantly more than the counterfactual (also because the time window includes the 1990/1991 Brady years). Moreover, the treatment coefficient for debt servicing is negative and marginally significant, indicating that the Baker plan indeed brought cash flow relief.

The most notable change between the Baker and Brady regression results (Tables 5 and 6) is in column (1). The treatment coefficient for real per capita GDP growth turns positive and highly significant, indicating that the Brady debt relief operation translated into 3 percentage point higher growth, compared to the counterfactual of non-crisis emerging markets. This is a sizable coefficient, which resembles that of the 1934 episode (Table 4). Also, the credit ratings of Brady countries see a large improvement relative to the counterfactual (of 7 IIR index points, on average), while government debt levels drop significantly more (by 15 percentage points). Surprisingly, however, we find no significant effect on debt servicing or for total external debt/GDP, possibly because the actual Brady restructurings took place with a lag in many countries, as discussed previously.

We again conduct a large number of robustness checks, focusing on our main findings on post-Brady growth and credit ratings (columns (1) and (2) of Table 6). We

42. Due to the lack of revenue data for many developing countries, we use (external) debt servicing to exports as the preferred debt servicing measure, since this measure is readily available in the IDS data set and is also widely used in analytical work by the World Bank. The results are very similar when using debt servicing to GDP.

TABLE 5. Baker initiative (1986): DiD regressions.

Dependent variable	Growth, real p.c. (1)	Credit Ratings (change) (2)	Debt Service to Exports (3)	Total Public Debt/GDP (4)	External Debt/GNI (5)
Post-intervention dummy (after 1986)	0.82 (1.26)	4.53 (3.16)	-5.76 (3.43)	-10.25 (10.20)	-8.88 (6.25)
Treatment (Baker plan) × post-intervention dummy	-1.92 (1.33)	6.31* (3.12)	-9.05* (4.72)	22.99** (9.36)	17.43 (10.80)
Constant	2.55*** (0.65)	-8.88*** (2.53)	33.54*** (1.72)	65.26*** (4.59)	61.66*** (2.35)
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	275	279	189	226	199
Number of countries	28	28	19	26	20
Adjusted R^2	0.077	0.170	0.106	0.203	0.145

Notes: The table shows results from a DiD fixed effects panel regression as in equation (1). All specifications include country and year fixed effects. The dependent variable in column (1) is annual real growth rate based on the Maddison, TED, and WDI data sets; column (2) shows country credit ratings from the Institutional Investor magazine (min = 0, max = 100); column (3) shows debt service to exports (in %) from IDS; column (4) shows total public debt to GDP from Abbas et al. (2010); column (5) gives external debt to GNI from IDS. Robust standard errors clustered on the country level in parentheses.

***Significant at 1%; **significant at 5%; *significant at 10%.

TABLE 6. Brady initiative (1990): DiD regressions.

Dependent variable	Growth, real p.c. (1)	Credit Ratings (change) (2)	Debt Service to Exports (3)	Total Public Debt/GDP (4)	External Debt/GNI (5)
Post-Intervention Dummy (after 1990)	1.21 (1.35)	5.06* (2.50)	-1.88 (2.46)	-2.31 (5.58)	-10.82 (9.07)
Treatment (Brady plan) × post-intervention dummy	3.09*** (1.05)	6.99** (3.09)	-1.57 (3.54)	-14.51* (7.38)	-1.82 (10.68)
Constant	2.31*** (0.73)	-1.66 (1.23)	22.43*** (1.13)	69.28*** (2.43)	62.42*** (4.21)
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	270	270	190	233	200
Number of countries	27	27	19	26	20
Adjusted R^2	0.099	0.213	0.259	0.242	0.041

Notes: The table shows results from a DiD fixed effects panel regression as in equation (1). All specifications include country and year fixed effects. The dependent variable in column (1) is annual real growth rate based on the Maddison, TED, and World Bank WDI data sets; column (2) shows country credit ratings from the Institutional Investor magazine (min = 0, max = 100); column (3) shows debt service to exports (in %) from World Bank IDS; column (4) shows total public debt to GDP from Abbas et al. (2010); column (5) shows external debt to GNI from World Bank IDS. Robust standard errors clustered on the country level in parentheses.

***Significant at 1%; **significant at 5%; *significant at 10%.

again control for banking and currency crises, inflation, wars, conflicts, and political events; we again alter the treatment window (two, three, and six years around 1990); we again drop the treatment year; and we again run a placebo regression using 1988 as a pseudo-treatment year (yielding an insignificant coefficient). To address the problem of country heterogeneity, we drop all Eastern European countries from the sample; we drop the fast-growing “Asian Tigers” (Malaysia, Taiwan, Thailand, South Korea, Singapore) and China from the counterfactual; we check the results without the top three (and the three worst) performers on GDP growth and ratings, respectively; and we check results without the three countries with the highest (and the lowest) scale of debt relief to GDP. We also drop the subset of early-movers—namely, the countries which received a Brady deal in 1990/1991 (Costa Rica, Mexico, Uruguay, Venezuela).

For all these robustness checks, we find that the treatment coefficients for GDP growth and ratings remain significant and large, although they vary in size depending on the specification chosen. We also find the results to be little affected by the counterfactual chosen. The coefficients look very similar when dropping the various groups of countries mentioned previously or when using the exact same counterfactual as in Arslanalp and Henry (2005). The results also hold in a sample with only Latin American countries, even if that counterfactual includes a more heterogeneous group of low-income and lower-middle-income Latin American countries, such as Guatemala, Haiti, or Honduras. The only regression that yields an insignificant treatment coefficient for GDP growth is a quantile regression at the median. At closer inspection, this seems to be due to the Mexican crisis of 1995 that led to turbulence in many other emerging markets, so that the dispersion in growth outcomes is particularly large in that year. The growth coefficient turns significant again once we shorten the treatment period to four years or less in the median regressions, thus excluding the EM bust of 1995. Moreover, the credit rating variable continues to show a highly significant DiD coefficient, including in the quantile regressions.

Overall, these results confirm our previous conclusion that “kicking the can down the road” via cash flow relief and debt rescheduling does not facilitate economic recovery in debtor countries. In protracted crises, growth only picks up after deeper debt relief, such as after the Brady plan and after 1934.

In a final step, we assess whether the magnitude of debt relief is correlated with economic performance post-crisis. For this purpose, we replace the treatment dummy in the DiD regressions with a continuous measures of debt relief to GDP (in %). The resulting treatment coefficient is insignificant in our main regressions post-1934 and post-1990. We only find significant coefficients when using debt relief as a share of public external debt for the Brady debt relief episode.⁴³ One interpretation of this

43. For the Brady deal specification, the interaction term using debt relief as a share of external public debt is significant at the 10% level in the growth regression and at the 5% level in the credit ratings regression. The coefficient size is economically large in both cases. Yet, the analogous regression does not show a significant coefficient for the 1934 episode.

finding is that it is important to reach a decisive restructuring agreement (crisis exit) for growth to materialize, while the scope of debt relief matters only indirectly—for example, by helping to avoid a follow-up default or restructuring.

5. Conclusion

A central finding of this paper is that the resolution of debt overhangs in advanced and emerging market economies has much in common—even when they are separated by more than half a century. Both developed and less developed countries resorted to default and restructuring in economically hard times, and the magnitudes of debt relief delivered are comparable. We also find that the debt crises in both advanced and emerging countries have been protracted and cumbersome, often spanning more than ten years.

In both eras, debtor countries experimented with “soft” and “hard” forms of crisis resolution. The 1920s saw more than a dozen rescheduling agreements, involving new lending, interest rate reductions and maturity extensions. Similarly, there were almost 100 rescheduling and debt roll-over deals over the course of the 1980s in developing countries all of which failed in solving the debt overhang. However, the crisis exit in both episodes came only after deep face value debt write-offs had been implemented, in particular after the debt cancellations of 1934 and the Brady debt relief initiative of 1990. These experiences speak to the current debate concerning countries such as Greece and Ukraine.

Our emphasis on debt reduction via restructuring and default is not meant to suggest that other forms of debt reduction were not quantitatively important in dealing with challenging debt overhangs as well. Fiscal retrenchment, structural reform, financial repression, and (in the case of domestic currency denominated debt) inflation often co-existed in these episodes of debt write-offs (see, e.g., Bordo 2012). However, we show here that the magnitude of debt relief was often large (even by conservative estimates) and contributed importantly in solving debt overhang situations of the past.

We also study the aftermath of debt relief and conduct DiD regressions for several centrally orchestrated debt relief initiatives. We find that the economic panorama tends to improve in terms of growth, ratings and debt sustainability. This is particularly the case after debt operations that imply face value debt reduction, such as in the mid-1930s and early 1990s. In contrast, we find that softer forms of crisis resolution, such as debt rescheduling, temporary payment standstills, and bridge lending operations were not generally followed by higher growth and better ratings. These crisis resolution tools were ineffective in solving debt crises that had been dragging on for several years.

Research could delve deeper into disentangling to what extent the post-crisis improvement in the economy is attributable to debt relief per se and what role other factors have played. We also see ample scope for research on the fiscal effects of debt restructurings, which remain understudied. Here, we find no significant effect of debt relief on the subsequent cost of debt servicing, which is puzzling. More micro-level data on fiscal expenses could shed light on how much fiscal space was really achieved

in past debt relief operations. Finally, it could be rewarding to conduct a comparison of sovereign debt relief towards private and official creditors for a larger sample than we gathered here, so as to further inform the current debate on what to do about the large-scale debt overhang in Europe and elsewhere.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher’s web site:

Appendix A: Debt Relief in the 1920s and 1930s: Country Chronologies, Data, and Sources

Appendix B: Debt Relief in Emerging Markets 1978–2010: Methods and Data

Appendix C: Stylized Facts/Regression Analysis: Supplementary Material and Data Replication