Sovereign Debt: 200 years of creditor losses

Clemens Graf von Luckner

Sciences Po Paris

Josefin Meyer

DIW Berlin

Carmen M. Reinhart

Harvard University

Christoph Trebesch

Kiel Institute

November 2023 *

Abstract

We study sovereign external debt crises with a focus on creditor losses, or "haircuts". Our sample covers 321 sovereign debt restructurings with external private creditors over 200 default spells during 1815-2020. We show that creditor losses vary widely (from none to 100%), but "serial restructurings", meaning two or more debt exchanges in the same default spell, are on the rise. To account for the increasing number of debt renegotiations during a single crisis, we introduce the "Bulow-Rogoff haircut" – a cumulative measure that captures the combined creditor loss across all restructurings during a debt crisis. Using this measure, we highlight that longer debt crises deliver larger haircuts, both in history and today, and that creditor losses have been strikingly stable over the past 200 years. In this encompassing sample, the average haircut has been around 45%, with a standard deviation of around 30%. We examine past predictors for the size of haircuts and identify some "rules of thumb" applicable to future defaults, Poorer countries, first-time debt issuers, and those that borrowed heavily from external creditors all record significantly higher haircuts in case of a default. Geopolitical shocks - such as wars, revolutions, or the break-up of empires – deliver the deepest haircuts. (Geo-)political disasters are often investment disasters.

1 Introduction

Sovereign defaults are best avoided, since they tend to be painful for debtors and creditors alike. For sovereign debtors it may mean financial autarky, severe and protracted recession, and a worsening in poverty and other social indicators.[1] For creditors, it usually means (sooner or later) recognizing losses in their portfolio. Though there are many and recurrent common macroeconomic antecedents to a sovereign default, the exact timing is notoriously difficult to predict. Furthermore, measuring or predicting the "severity" of the debt crisis from either the vantage point of the debtor or creditor remains a relatively understudied area. The literature on sovereign debt crises (see Reinhart and Rogoff (2009) and references cited therein) has typically modelled a sovereign debt crisis rather crudely, especially when compared to other crises, like currency crashes, inflation, or even banking crises. For inflation and currency crashes it is straightforward to assess their severity; 30 and 300 percent currency depreciation or annual inflation are not the same thing. In the banking crisis literature, a distinction is often made between systemic crises and borderline episodes.[2] Debt crises, however, are usually characterized in a binary manner (crisis=1, no crisis=0), irrespective of whether the crisis was resolved with minor investor losses or whether the debt was repudiated altogether.

In this paper, we move beyond the binary characterization of sovereign external debt crises by examining the history of defaults with a comprehensive 200 plus-year dataset on the size of creditor losses, or "haircuts". To do so, we build on the earlier work of Cruces and Trebesch (2013) and Meyer, Reinhart and Trebesch (2022). The analysis stands in the tradition of Reinhart and Rogoff (2009) in that we examine the past to draw lessons for possible future crises and defaults. We find striking dispersion in creditor losses across space and time. Both then and now, there is a large variation in how sovereign default crises are resolved and how much creditors lose. To examine what drives the cross-episode variation in haircut size, we couple the haircut database with data on debt crisis spells, geopolitical shocks (wars, revolutions, and country break-ups), external debt, per capita income by country as well as a "world" measure, and we introduce a new data base on sovereign borrowers first time access to the international bond or loan market. The long-run data allow to identify broad "rules of thumb" for what to expect in terms of the size of creditor losses once a new default occurs.

Our analysis has been influenced by the seminal work of Bulow and Rogoff (1989), who were among the first to rigorously model sovereign debt renegotiations. The evidence that emerges

---

[1]See Borensztein and Panizza (2009); Farah-Yacoub et al. (2023) and, for a survey Mitchener and Trebesch (2023).
[2]For a recent discussion of banking crisis definitions see Baron et al. (2021)

from our new long-dated data lends support to two of the key propositions in their paper: (i) debt restructurings are a central feature of sovereign debt markets and often "serial" in nature; [3] and (ii) that defaults are partial rather than full. We show that both propositions are clearly backed by the extensive data we assembled here.

On the first point - of serial restructurings - we document that a rising share of debt crises (default spells) involve two or more sovereign debt restructurings. On average, it takes two restructurings to resolve a debt crisis, but some sovereigns have faced as many as seven debt exchange operations to "cure" (bring to an end) the default. This stylized fact of debt crisis resolution provides empirical grounding to Bulow and Rogoff (1989), who model sovereign debt as an asset with constant recontracting and who note that "all parties in a debt rescheduling negotiation realize that today's debt rescheduling agreement may itself have to be renegotiated in the future." To date, the empirical literature has often ignored this repeated game aspect in sovereign debt negotiations. The widely accepted approach has been to treat each restructuring (including those that are part of the same debt crisis) individually. Computed haircuts only quantify creditor's losses in a static manner for a particular debt exchange, even in cases when there are multiple debt exchanges in quick succession.

In this paper, we propose a new "cumulative" haircut measure that quantifies the size of creditor losses across all restructurings within the same default spell. This approach captures the dynamic nature of losses when there are more than one restructuring within a debt crisis episode. Because Bulow and Rogoff (1989) were visionary in characterizing sovereign defaults as a process of recurrent re-contracting involving serial restructurings, we term this cumulative measure the **Bulow-Rogoff (B-R) Haircut**. The B-R approach was a stark contrast to the dominant strand in the literature on sovereign debt crises, which, for another three decades, continued to assume full repudiation as being the norm, when in fact they are the rare exception. Only relatively recently there has been a shift in the literature towards incorporating partial defaults, restructuring events and haircuts - phenomena that had long been recognized by Bulow and Rogoff (see the survey by Mitchener and Trebesch, 2023).

Furthermore, a cumulative Bulow-Rogoff-type haircut measure is increasingly relevant, because serial restructurings have become widespread in modern-day sovereign debt crises, as we document. In the 19th and earlier part of the 20th centuries, defaults were very protracted, typically spanning

---

[3]Serial restructuring is not to be confused with serial default Reinhart et al. (2003). The latter refers to a country with a history of two or more default episodes or spells since independence. The term serial restructuring refers to two or more debt restructurings within a single default episode. Usually serial restructurings typically arise when the earlier restructuring deal(s) does not provide enough debt reduction to place the country on a sustainable debt path.

decades, but there were few restructurings. Today, default spells have shortened, on average, but we see many more "interim" restructurings. Interim deals are often "shallow" in that they deliver below-average haircuts and may only cover a modest share of outstanding debts. For those reasons the debt contracts need to be renegotiated again, possibly more than once.

We show that these type of timid or "too little, too late" restructurings (IMF, 2013)[4] are anything but new.[5] However, the prevalence of interim-type restructurings has been increasing over time, especially since the 1970s. The cumulative Bulow-Rogoff haircut accounts for this shift and allows to make creditor losses more comparable across our 200-year crisis sample. For example, based on the B-R haircut measure, we show that investor losses tend to increase in the number of restructurings needed to exit the default. Relatedly, across all eras, longer defaults are associated with deeper creditor losses. It is possible to characterize this stylized fact as suggestive of a trade-off for creditors between the timing and magnitude of realized losses.

The second of the above-mentioned B-R propositions – of defaults being "partial" – is clearly visible in the data. Median net present value haircuts (NPV) range from 38 percent for individual restructurings to a median of 42 percent using the cumulative Bulow-Rogoff haircut measure. Full repudiations (i.e., haircuts of 100%) account for about 3 percent of defaults and these occur in exceptional circumstances (wars, revolutions, or the break-up of countries/empires). In effect, about half (52 percent) of the distressed debt restructurings in our dataset are pure reschedulings, with maturities being extended without a face value debt reduction. The modelling of default as full repudiation, embedded in the influential Eaton and Gersovitz (1981) framework and other canonical sovereign debt models (e.g. Arellano (2008) has little empirical support.[6]

Beyond documenting the stylized facts of private foreign creditors losses over more than two centuries, we study a set of variables that help to predict the magnitude of creditor losses or haircut. Debtor capacity to repay (GDP per capita) and debtor borrowing patterns pre-default are both predictive for the magnitude of haircuts. Poorer countries see significantly higher haircuts in case of a default; Since 1950, 81% of defaults that required an above median haircut, were low-income-countries (LICs). Countries that enter a default with high external debt levels end up with higher creditor haircuts. Besides the level effect, we also find that the speed of the debt build-up is predictive, suggesting that high haircuts are "debt booms gone bust". Pre-default

---

[4]Specifically, an influential IMF (2013) report stated that "debt restructurings have often been too little and too late, thus failing to reestablish debt sustainability and market access in a durable way." (p. 1) https://www.imf.org/en/Publications/.../PP4772

[5]Our novel historical dataset is replete with examples of interim debt exchange agreements that did not cure the default, as we show below.

[6]See Arellano et al. (2023) for a recent model focused on partial defaults.

debt surges are associated with high creditor losses following a default. This is also a costly legacy for the debtor country, as larger haircuts may delay gaining re-access to new finance, possibly even official finance (Cruces and Trebesch, 2013). High haircuts are more common among first-time issuers that subsequently default. First-time issuers refers here to countries that tap international capital markets for the first time, e.g. after independence or after "graduating" to frontier economy status, are much more likely to restructure their debt with deep haircuts. The duration of the debt crisis also connects to the magnitude of the haircut; longer debt crises are cured with deeper haircuts. These findings hold both in the historical sample and in the modern data. For private creditors, the risks of lending to poor and inexperienced borrowers should not be underestimated.

In this sense, our long historical view is supportive of subsequent work by Bulow and Rogoff (1990, 2005), who have long argued that the poorest countries would be better off by staying away from accessing global private debt markets altogether. It suggests that rather than borrowing expensively from foreign banks or bondholders, the poorest countries should instead focus on grants and/or highly concessional loans by other governments or multilateral organizations. In such a world of increased official lending, Bulow and Rogoff (1990, p. 42) posit: "leaders will not be able to indenture the income of future generations quite so easily, and the imprudent borrowing policies of the 1970s could not be repeated." Of course, it is the wealthier official donor nations that ultimately determine the availability of grants and other forms of concessional finance.

We also provide some clarity on what haircuts may or may not reveal about the important question of debt relief, that is, the reduction in the outstanding debt stock as a result of the restructuring. We stress that when studying the size of creditor losses, it is crucial not to confuse "haircuts" and "debt relief" (see also Sturzenegger and Zettelmeyer (2007)). Our standard measure of haircuts captures the size of losses resulting to creditors in a restructuring, while the size of relief captures the reduction in the debt burden from the perspective of debtor governments. Restructurings with private external creditors often only cover a small share of total outstanding debts. Outstanding external debt includes both private and official, with the latter being particularly important for LICs. Then, of course, there is domestic debt, which is not a new phenomenon (although more prevalent in recent years with the development of the domestic financial sector, as documented in Reinhart and Rogoff (2009, 2011). Furthermore, many external restructurings with private creditors avoid any outright debt write down. As a result, only in about 40% of the restructurings since 1815 post a decrease in total debt

outstanding in that year.

Summarizing, the key empirical findings of our analysis boil down to 10 stylized facts:

1. There is a large heterogeneity in the size of haircuts

2. Defaults are partial, with a median haircut around 40 percent.

3. Serial restructurings are common, especially in recent decades

4. Interim restructurings have smaller haircuts than final restructurings

5. Haircuts are higher in the aftermath of (external) debt surges

6. Haircuts are higher for low-income sovereigns

7. Haircuts are higher for first time-issuers

8. Haircuts are especially high in case of geopolitical disasters (wars, revolutions, country-break ups)

9. Haircuts are higher for longer debt crises

10. Haircuts are higher for deeper output contractions

Our paper contributes to the literature in several ways. We complement earlier long-run studies on sovereign debt and default (Lindert and Morton 1989; Marichal 2000; Wynne 2000; Reinhart and Rogoff 2009; Suter 2019, among others) by providing one **big missing piece: haircuts**. Compared to Sturzenegger and Zettelmeyer (2008); Asonuma and Trebesch (2016); Cruces and Trebesch (2013); Schlegl et al. (2019), we study haircuts using an additional 150 years of data. Despite some work on historical sovereign default by rating agencies (Standard & Poor's, 2009) and some research on the history of corporate defaults Giesecke et al. (2014) we are not aware of historical studies on loss-given-default for the case of sovereigns and in a bigger picture view. As we discuss in Meyer, Reinhart and Trebesch (2022), previous work on long-run asset returns does not account for the size of haircuts on government debts (Dimson et al. 2002, Jorda et al. 2019). While building on Meyer, Reinhart, and Trebesch (2022), this paper delves much deeper into the characteristics and correlates of haircuts rather than tracing investor returns through the ages. We exploit the new long-dated data to uncover recurring patterns in sovereign debt crises and their resolution and identify a set of "rules of thumb" that shed light on the size of haircuts that can be expected as new defaults emerge.

The remainder of the paper is structured as follows: The next section describes the data, the calculation of investor losses employed in our analysis, and introduces a new haircut measure that tallies investor losses across multiple restructurings during the same default spell. Section 3 presents some salient stylized facts on creditor losses over the past two centuries while Section 4 delves into some of the key factors that predict the size of the haircut and can serve as "rules of thumb' in assessing the scale of future haircuts. Section 5 highlights why creditor haircuts do not necessarily provide a good indication of debt relief. Concluding remarks touch on what may lie ahead in this area both in terms of research and policy.

2   Concepts and Measurements

2.1   Definitions and Data

Our analysis covers sovereign debtors and private external creditors over 1815-2020. Foreign creditors encompass foreign bondholders but also foreign commercial banks (e.g. the "London Club" creditor banks during the 1970s or 1980s). Following Cruces and Trebesch (2013), we employ the following set of criteria to select the relevant default and restructuring cases.

We focus on sovereign external debt restructurings, defined as the reorganization (recontracting) of public (government) or publicly guaranteed external debt and "haircuts", which is a measure of creditor losses due to that reorganization. Debt exchanges between private debtors and private creditors are thereby excluded, even in cases where substantial workouts of private sector debt were orchestrated by the sovereign, as seen during the Asian Crisis (Korea 1997 and Indonesia 1998). Importantly, we consider only "distressed" debt exchanges. Distressed restructurings arise in the context of crises and typically involve the exchange of an existing instrument(s) against a new financial instrument(s) with less advantageous terms to the creditor than the original bond(s) or loan(s). Routine liability management actions like voluntary debt swaps are not considered. Because our focus is on sovereign debt restructurings involving foreign private creditors, restructurings primarily affecting domestic creditors are excluded. Restructurings with official external creditors, including those negotiated under the auspices of the Paris Club (Schlegl et al., 2019; Cheng et al., 2016, 2019), as well as restructurings involving Chinese state creditors (Horn et al., 2021a) are not considered here. As in Cruces and Trebesch (2013), we narrow down the sample to defaults on and restructurings of medium and long-term debt, thereby excluding deals solely involving short-term debt, such as short-term credit line maintenance, 90-day debt

rollovers, or instances of short-term maturity extension of less than a year. Lastly, we only include restructurings that were finalized, excluding cases where an exchange offer or agreement was never implemented. The data on restructurings comes from Meyer, Reinhart, and Trebesch (2022) for the period when sovereign international finance was dominated by bonds after the emergence of that market in London around 1815 and before 1970; Cruces and Trebesch (2013) for the bank-debt dominated period between the 1970s and 1990s; and Asonuma and Trebesch (2016); Fang et al. (2021) and our own calculations thereafter.

For each restructuring, we then identify the sovereign default, which typically preceded it. We thereby rely on data from Asonuma and Trebesch (2016), for the period post-1970, Farah, Graf von Luckner, and Reinhart (2022), who collect data on defaults by retroactively applying the methodology used by the major sovereign credit rating agencies today, including for countries that were(are) not rated; and prior to 1918, when sovereign credit ratings did not yet exist. According to this methodology, a sovereign default occurs when either (1) the sovereign debtor misses debt payments beyond the grace period; (2) there are changes to the debt contract that are less favorable to the private external creditors than the original contract, thereby including distressed debt exchanges that reduce the debtor's obligations; or (3) unilateral changes imposed by the debtor resulting in diminished financial obligation, such as a forced currency re-denomination (see Ams et al. (2018) for a detailed discussion). In cases (2) and (3); when there are no prior missed payments, the default date coincides with the restructuring date. Historically, most defaults were triggered by the non-servicing of a debt obligation beyond a grace period, a classic payment default in the legal sense, while preemptive debt restructurings without default are a relatively recent phenomenon (Asonuma and Trebesch, 2016).[7]

The debt restructurings can be categorized into two types: final restructurings that effectively resolve the debt crisis and cure the default, and interim restructurings that fall short of establishing a sustainable debt trajectory and result in a relapse shortly after, meaning that a new round of restructuring becomes necessary within two years. It is important to note that classifying restructurings into these two groups is done with the benefit of hindsight, as predicting the success of restructuring deals in advance is a Herculean task. Default spells often encompass multiple interim restructuring deals; the spell traces a debt crisis from beginning (default) to its ultimate cure or resolution (final restructuring).

---

[7]As will be discussed in Section 4, to reduce endogeneity when analyzing the correlates of debt restructurings, we focus on the dynamics of the correlates at or before the time of the default, rather than at or before the time of the (later) restructuring.

2.2 "Individual" Haircuts: Sturzenegger and Zettelmeyer (2006 and 2007)

Whenever a restructuring takes place, old debt instruments are exchanged for new ones. The new instruments typically differ from the old ones in either or all of three dimensions: the interest rate, the maturity, and the face value of the obligation. Since sovereign debt restructurings take place when a sovereign's debt cannot be serviced as agreed in the original contract, the outcome almost always results in changes to debt obligations that are less favorable to creditors. Haircuts aim at measuring by how much the creditors' worth has declined because of an effectuated exchange. In measuring these sovereign haircuts, we adopt the standard approach as proposed by Sturzenegger and Zettelmeyer (2006, 2007), and rely on the data sources described.

To calculate the Net-Present-Value (NPV) -Haircut $H_{t,i}$ for restructuring i at time t, we compare the net present value of the contractual payment streams of the new debt issued during the restructuring with the NPV of the old debt in default, accounting for arrears and cash payments. Both payment streams are discounted using the same interest rate at time t.

$$H_{i,t} = 1 - \frac{NPV_{New}}{NPV_{Old}} \tag{1}$$

This measure accounts for the characteristics of both old and new debt in particular any changes in maturity and interest structure. Intuitively, $H_{t,i}$ compares the present value of the new and the old debt in a hypothetical scenario in which the sovereign continues to service any remaining outstanding old debts on an equal basis as the newly issued debt. $H_{t,i}$ thus captures the creditor loss of participating in a debt restructuring compared to a small holdout creditor who evades a haircut and whose old, non-exchanged bonds continue to be repaid as if no default happened. To obtain a meaningful comparison, we apply the same discount rate to compute the NPV of the new and the old (holdout) debts. Both old and new instruments are exposed to the risk of future defaults, and they both benefit from the debt relief effect of the restructuring.

2.3 "Bulow-Rogoff" Haircuts: A New Cumulative Measure Covering a Default Spell

"Sovereign lending is distinguished from domestic lending in three ways. [...] Third, the bargaining between debtors and creditors is ongoing, with contracts constantly subject to

renegotiation. By contrast, domestic bankruptcy negotiations have more of a one-time flavor."

- Bulow and Rogoff (1989)

The quote for Bulow and Rogoff (1989) sets the stage for the serial restructurings that are frequently observed over the course of a single but protracted debt crisis. For these cases where there is more than one debt exchange, there is a need to aggregate haircuts over the multiple restructurings with the aim to quantify the full extent of creditor losses between the start of debt distress and when it is finally resolved.

To estimate the cumulative impact of multiple debt restructurings during a single debt crisis (a default spell) on creditors, we introduce a new measure, which we term "Bulow-Rogoff" haircuts. This cumulative metric captures the compound loss experienced by a passive investor who held a face-value weighted portfolio of all the securities or loans placed by the country, including those restructured in the previous debt restructuring deals. Specifically, for the final restructuring event i, the Bulow-Rogoff haircut can be computed as:

$$\text{Cumulative } H_{SZ}^{i} = 1 - \prod_{j=1}^{J^i} WCR_{SZ}^{i,j} \tag{2}$$

where $J - 1$ represents the number of interim restructuring deals that occurred before the final deal i, and $WCR_{SZ}^{i,j}$ denotes the wealth conservation ratio in the j-th restructuring event. The wealth conservation ratio (often called recovery rate) is defined as 1 minus the effective estimated haircut for the particular restructuring event and is derived from debt data to private creditors at time t.

$$\begin{aligned} WCR_{SZ}^{i,j} &= \frac{DebtAffected^{i,j}}{TotalDebt_{t-1}^{i}}(1 - H_{SZ}^{i,j}) + (1 - \frac{DebtAffected^{i,j}}{Total\ Debt_{t-1}^{i}}) \\ &= \qquad 1 - Effective\ H_{SZ}^{i,j} \end{aligned} \tag{3}$$

Our BR-haircut metric allows for a comprehensive evaluation of the long-term compound impact of multiple debt restructurings on the wealth of investors holding the debt of a particular sovereign. It is useful when comparing across eras with different restructuring modalities. The B-R haircut is particularly pertinent when there are numerous interim restructurings with low haircuts that were followed by follow-up deals with deeper haircuts in the same crisis spell, as was the case during the 1980s. Averaging individual haircuts across the spell imparts a bias to

10

the creditor loss calculation, as it overweights interim low-haircut deals where the share of debt covered by the exchange also tends to be much lower. It can markedly understate creditor losses during a period when with serial restructurings were commonplace, such as the 1980s. The B-R haircut captures the dynamic aspect of multiple debt exchanges, offering a unified summary of creditor losses.

3   Sovereign debt restructurings and haircuts, 1815-2020

Stylized fact 1: There is a large heterogeneity in the size of haircuts.

Haircuts vary considerably across time and geography. The significant cross-country variation in haircut size on any given year is a common thread in external sovereign debt markets across history. The large variation is evident from the very early days of this high-yield bond market, when newly-formed Latin American sovereigns tapped the London market and subsequently defaulted for the first time alongside some of Europe's high risk borrowers (Greece, Portugal, and Spain). The significant dispersion in haircuts through time is also evident in Figure 1, which presents a scatter plot of the year of the (individual) restructuring and the NPV haircut (in percent) for that particular debt exchange. Country abbreviations accompany the dots, which in the 1980s and 1990s become intensely clustered, as the far-reaching emerging market and developing country debt crisis unfolds. The consistently less crowded space prior to WWII in Figure 1 is less indicative of a lower incidence of debt crises than of the fact that there were much fewer sovereigns in the era of colonial powers. Also, defaults were considerably longer prior to WWII and the number of interim restructurings more spaced out than in the modern era, as we shall discuss. See also Reinhart and Rogoff (2009) on an analysis of default duration.

Figure 1: Individual external debt restructuring episodes with private creditors: 1815-2020
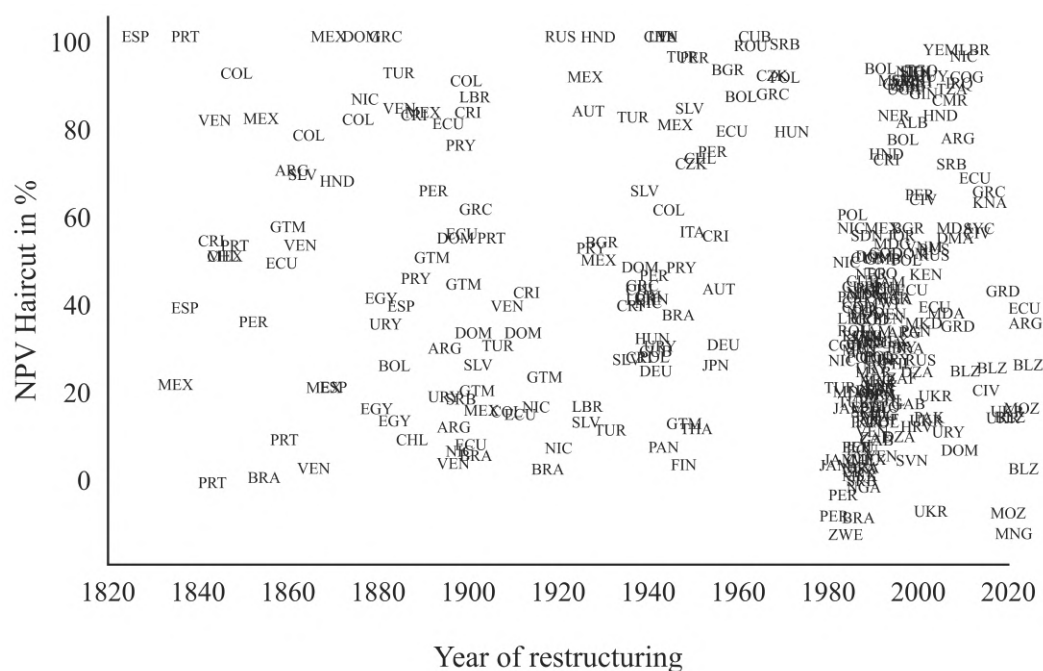
Note: Country-Markers represent the time of the 321 debt restructurings. *Sources*: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

As shown in Figure 1, in the lower bound of the haircut spectrum, there are a dozen cases where haircuts were actually negative (NPV was higher after the debt exchange). These restructurings are rare and almost always occurred in the early stages of a crisis. Eager to avoid a default, sovereigns may go to great lengths and, for example, extend debt maturities at higher interest rates than in the prior contract. These deals do not imply debt relief but may nevertheless be seen as beneficial for the government, at least in the short term, as recontracting may smooth out repayment and may reduce more imminent roll-over risks. [8]

At the other extreme, we have the even rarer full repudiation cases (100 percent haircut). There are 10 cases (out of a sample of 321) that fall into this category and theses are dominated by geopolitical turmoil, such as revolutions, and are examined more closely in the next section. The concept of odious debt applies to some of these cases, meaning that debts are declared as politically illegitimate by the legislative or executive branch (Jayachandran and Kremer, 2006). The low incidence of repudiation in the history of this market (3 percent of the cases) The low incidence of repudiation in the history of this market (less than 3 percent of the cases) is at odds with its prominence in the theoretical literature on sovereign default, as in Eaton and Gersovitz

---

[8]It is also important to remember that some of these haircuts apply to a single loan or bond. For example, one of the 12 cases of negative haircuts in our sample is Ukraine's 1999 restructuring of it's ING loan (haircut estimated at -8.2 percent, Cruces and Trebesch, 2013). Less than a year later, in a Global Exchange, Ukraine restructured a much larger share of its debt (about 10 times the size of the ING loan) with a haircut of 18 percent.

(1981) and other canonical models that equate sovereign default with full default / repudiation.

Stylized Fact 2: Defaults are partial, with a median haircut around 40 percent.

As Table 1 highlights, the statistical properties of haircuts over the full sample is remarkably stable over time, especially when the Bulow-Rogoff cumulative haircut measure is adopted. The median haircut in the full sample is 38% for individual restructurings, while the mean is 43%. Both the mean and median are somewhat higher (47% and 44%, respectively), for the cumulative BR haircut, which computes losses for the full debt crisis. The usefulness of the B-R haircut measure is highlighted when comparing the sub-samples over time (Panels B and C in Table 1). The standard haircut measure suggests that the creditors fared relatively well during the 1980s debt crisis involving syndicated bank loans. Indeed, in Panel B, bank debt haircuts in the 1970-1989 are comparatively low, at 34%, which is 10 percentage points lower than in the rest of the sample. This average across all individual restructuring episodes, however, is biased downwards by separately counting each of the many interim deals of the early and mid-1980s which usually had low haircuts. As that crisis became the "lost decade," it became clearer that these shallow restructurings merely delayed restoring debt sustainability to the debtor, without curing the default (Cline et al., 1995).

The B-R haircut measure corrects for this bias by accounting for the increasingly serial nature of restructurings and cumulating creditor losses across all restructurings in the same default spell. The results change markedly for that period. For the bank debt period 1970-1997, the average haircut increases from a low 34% when counting individual restructurings (Panel B) to 47% when computing cumulative haircuts per default spell (Panel C), while the median rises from 30% to 45%. A pattern emerges in the modern bond era (1998-2020) where average haircuts climb from 40% in Panel B to 47% in Panel C. Also of note, the B-R haircut shows a much more stable average over time, at around 47% for all eras, than the classic individual haircut measure, for which the average drops from 51% in the historical sample to 34% in the bank debt era and jumps up again to 45% in the modern bond era. Once we account for the phenomenon of serial restructurings during a debt crisis, the statistical properties of creditor losses turn out to have been remarkably stable over the past 200 years, as shown by the mean, median and standard deviations in Panel C. The stability in default outcomes is remarkable given the fundamental changes in the way sovereign debt markets operate today compared to the 19th century. It is also remarkable in light of the deep shocks suffered by investors over the 19th and 20th century, including global wars, communist revolutions, or the disintegration of once-dominant hegemons

such as the British, Austria-Hungarian or Ottoman Empires.

Table 1: Sovereign debt haircuts - descriptive statistics, 1815-2020

|	Cases	Mean	Median	SD in p.p.	25th Percentile	75th Percentile
Panel A: Full Sample						
Individual haircuts (by restructuring)	321	43%	38%	30	18%	65%
Bulow-Rogoff haircuts (Cumulative, by default spell)	200	47%	44%	33	18%	79%
Face value haircuts (by restructuring)	321	23%	0%	33	0%	40%
Panel B: Subsamples - using standard NPV haircuts (individual restructurings)						
Bonds (individual haircuts), historic (1815-1970)	136	51%	48%	31	25%	81%
Bank debt (individual haircuts), modern (1970 - 1997)	138	34%	30%	26	16%	46%
Bonds (individual haircuts), modern (1998 - 2020)	47	45%	42%	32.	15%	69%
Panel C: Subsamples – using the new cumulative Bulow-Rogoff haircut measure						
Bonds (BR haircuts), historic (1815-1970)	106	46%	42%	35	13%	79%
Bank debt (BR haircuts), modern (1970 - 1997)	55	47%	45%	30	22%	75%
Bonds (BR haircuts), modern (1998 - 2020)	39	51%	54%	33	23%	86%

Sources: World Bank International Debt Statistics; Horn et al. (2023); Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

Stylized fact 3: Serial restructurings are increasingly common

As noted, sovereign defaults often involve multiple rounds of restructuring (Graf von Luckner et al., 2021). Figure 2 shows that on average, default spells required 1.6 restructurings before finding the exit, with some cases having required as many as seven distinct restructurings. More than one third of the 200 default spells covered in this study required two or more debt restructurings to cure the default.

Importantly, the phenomenon of serial restructurings has grown in importance in recent decades. This can be seen in Figures 3a and 3b, which shows the full history of external defaults and restructurings country by country. It is evident that recent decades feature a much higher

Figure 2: Serial restructurings during prolonged debt crises: 1815-2020
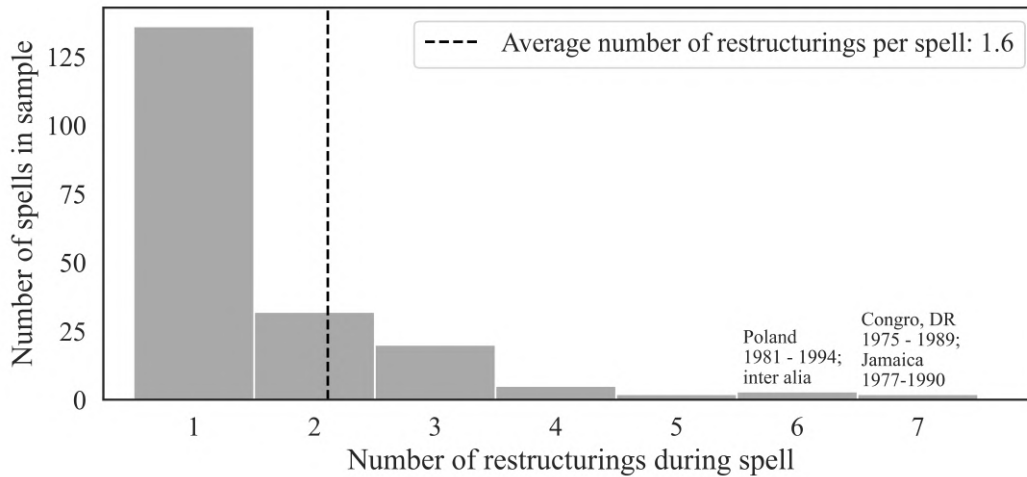
Note: Histogram of restructurings during spell. The figure considers N = 200 default spells. A spell consists of serial restructurings until a restructuring achieves to *cure* the default, which is measured by the sovereign not re-defaulting for at least 24 months after the restructuring. Sources: Meyer et al. (2022); Cruces and Trebesch (2013); Graf von Luckner et al. (2021); Fang et al. (2021); Farah-Yacoub et al. (2023) and authors' calculations.

incidence of restructurings in short succession – often in the same default spell.

The trend towards more interim restructurings has coincided with shorter default spells, as shown in Figure 3a. In the 19th century, during the long nation-building process in Latin America and elsewhere (Greece), defaults were commonly stretched out over decades, as countries faced border wars and internal revolutions and disarray.[9] When greater political stability emerged later in the 19th century and earlier part of the 20th, defaults also became shorter (Figure 3a). As the emergence of multilateral institutions' involvement in emerging markets and developing countries crises escalated in the 1970s to the present, defaults became shorter still–but they now typically involve more interim restructuring deals (that often deliver low haircuts).[10]

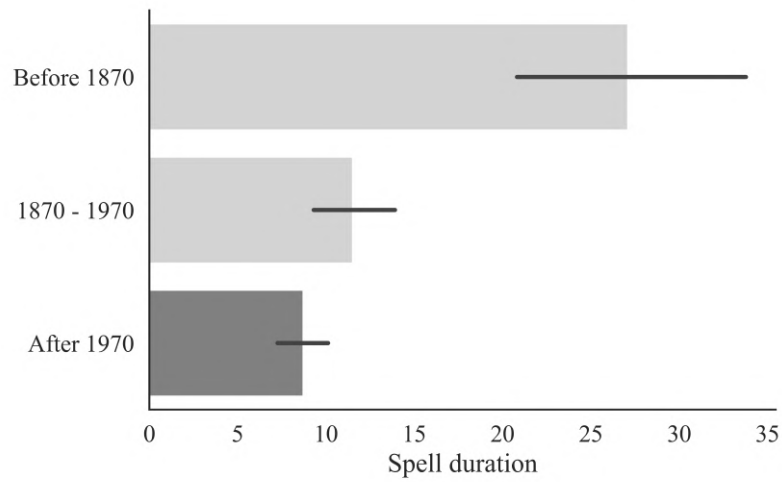[9]See Centeno (2002), for an excellent analysis of this era.

[10]See Reinhart and Trebesch (2016) for a historical perspective on the evolving mandate of the International Monetary Fund.

Figure 3: Number of restructurings per spell and spell duration, 1815 - 2020

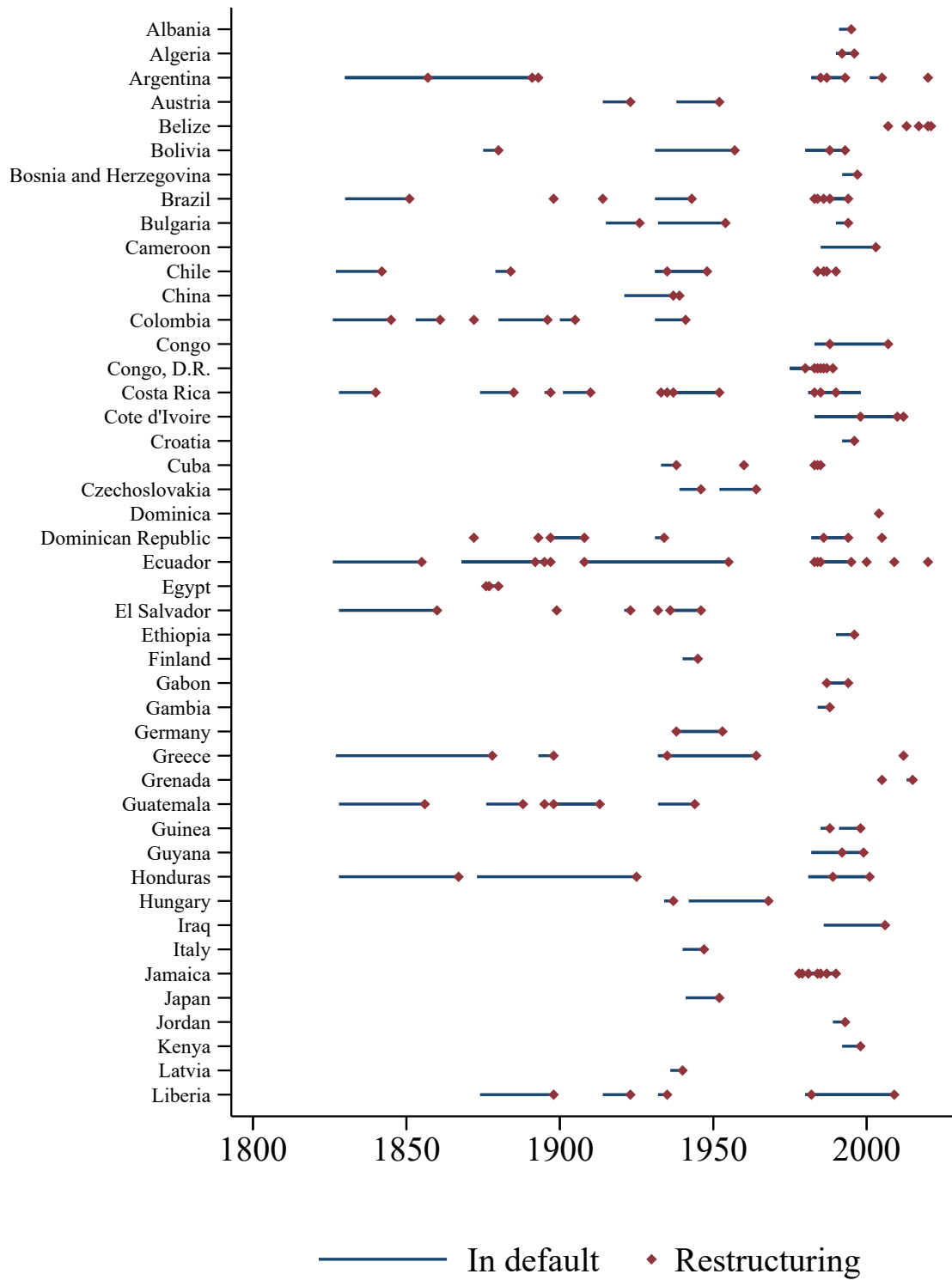**(a)** Number of debt restructurings per default spell, 1815-2020
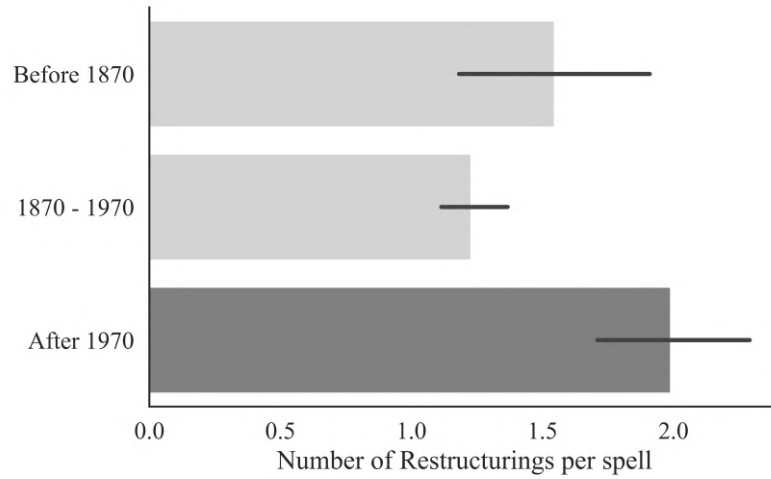
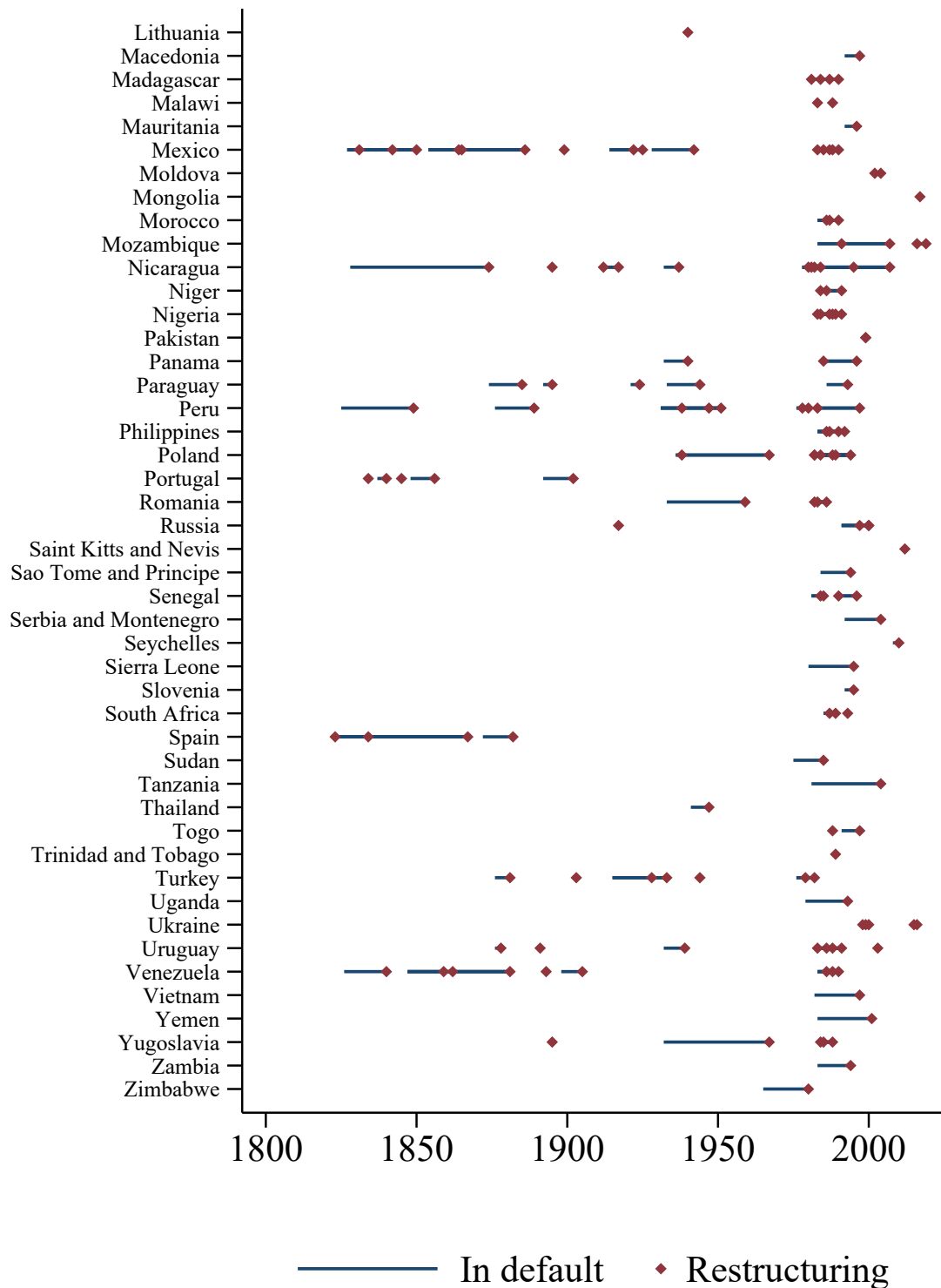**(b)** The duration of default, 1815-2020.

Source: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); Farah Yacoub et al. (2022) and authors' calculations.

Figure 4: 200 years of serial restructurings, Panel A, 1815 - 2020

Figure 5: 200 years of serial restructurings, Panel B, 1815 - 2020
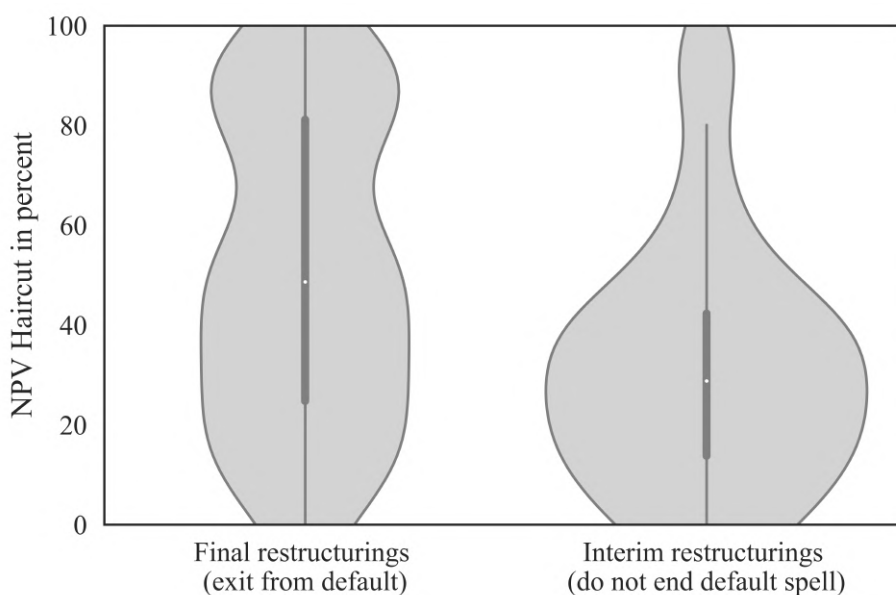

Source: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); Farah-Yacoub et al. (2023) and authors' calculations.

Stylized fact 4: Interim restructurings have smaller haircuts than final restructurings

Figure 6 presents a violin chart that pools the 322 individual restructurings into two buckets: On the left are shown "final" restructurings that cured a default and resulted in the country exiting from its debt crisis status; on the right are interim restructurings, which can be as few as one or as many as six in our sample. These are the restructurings that do not end the default spell. Not only do interim restructurings have a much lower median haircut than their spell-ending counterparts, (about 30 percent versus 50 percent), but the most significant bunching is at the bottom, with interim deals showing haircuts of just 10 or 20 percent. This is a significant contrast to all other restructurings, where the dispersion of outcomes is evenly distributed across haircut size. Figure 7 is consistent with the view that serial restructurings are the result of shallow debt exchanges – with low haircuts and limited amounts of debt covered by the exchange; these half-hearted exchanges do not cure the default and soon need to be renegotiated again.
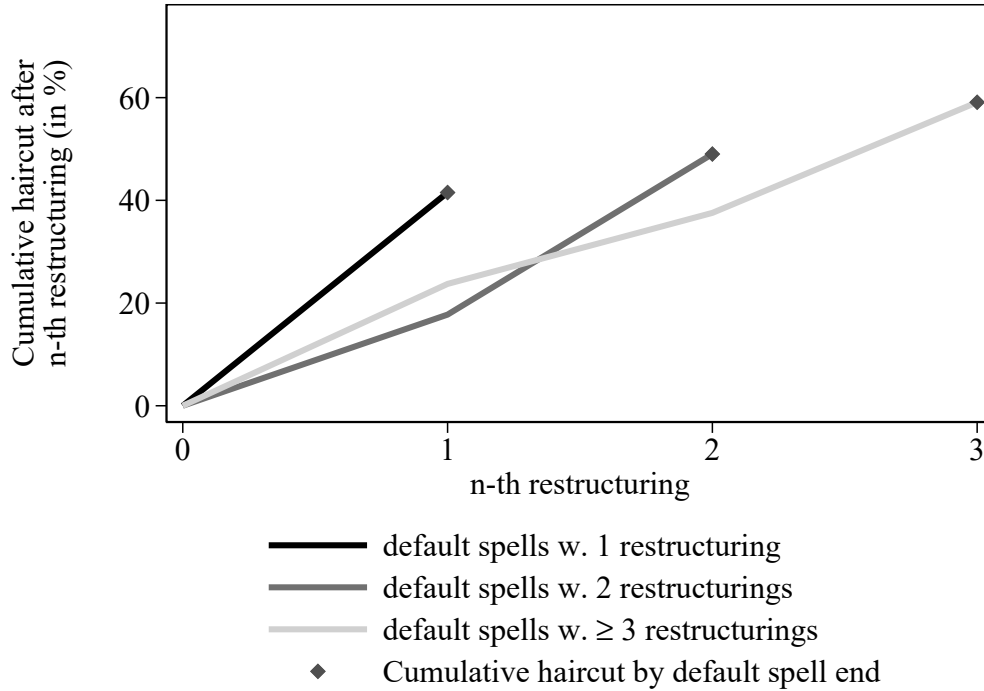
Figure 6: Interim and final debt restructurings and haircut size: 1815-2020

Note: 321 cases. Sources: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); and authors' calculations.

Figure 7 lends further support to this view. Based on our new, cumulative Bulow-Rogoff haircut measure, we find that creditor losses increase as more restructurings become necessary. The first restructuring shows haircuts of slightly above 40%, while defaults with 3 or more restructurings show cumulative haircuts of 60%, on average. Mistaking insolvency for illiquidity can, among other reasons, give rise to debt exchanges that are shallow and need to be revisited soon after, a point that is consistently emphasized by Bulow and Rogoff (1989, 1988).

Figure 7: Haircuts increase as more restructurings become necessary

Note: The haircut at each n-th restructuring considers the unweighted average of cumulative haircuts by the n-th restructurings across all spells with at least n restructurings. The sample is winsorized above three restructurings, because of the reduced sample size of default spells with more than three restructurings, as is shown in Figure 2 Sources: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

# 4 Predicting the size of haircuts: Some rules of thumb

In this section we examine some of the factors that help to "predict" the size of the haircut. Some of these factors are known and measurable at the time of default and can thus be useful to gauge the possible magnitude of the haircut that may eventually follow. For example, what is the income per capita of the defaulting sovereign? How high are the sovereign's (foreign) liabilities? Other factors that influence the size of the haircut only become apparent over the course of time. The time elapsed since default (duration of default) is a dynamic rather than a static factor that correlates with the size of the haircut. No doubt, a host of drivers beyond those analyzed here affect restructuring outcomes. The longer list includes idiosyncratic factors of the debtor country, global circumstances, the bargaining strengths of the debtors and creditors, legal considerations, and so on. A catalog of these is beyond the scope of our study.

4.1 Pre-default warning signals

Stylized fact 5: High haircuts often follow debt surges

Boom-bust cycles in sovereign (and private) debt often end badly. Mendoza and Terrones (2008), who study the nexus between credit cycles and banking crises, observe that not all credit booms end with a crisis but most if not all (banking) crises are preceded by a credit boom. The parallels to sovereign external debt surges and default are strong. In their influential paper on "Rules of thumb for sovereign debt crises", Manasse and Roubini (2009), for instance, find total external debt/GDP and public debt/fiscal revenue among their top-ten predictors. Here, we take this line of work further to show that both the debt stock and the magnitude of the debt build-up helps to predict the size of the haircut. Since our haircuts are calculated for restructurings of public or publicly guaranteed debt to private external creditors, we focus on debt owed to these same creditors (as ratio to GDP). Figure 8 shows that the pre-default debt surge was about twice as large in the cases that ended up with large haircuts (above the median) than for the cases where haircuts were small (below the median).

Figure 8: The pre-default build-up in debt to private creditors: High and low haircut cases, 1815 - 2020.
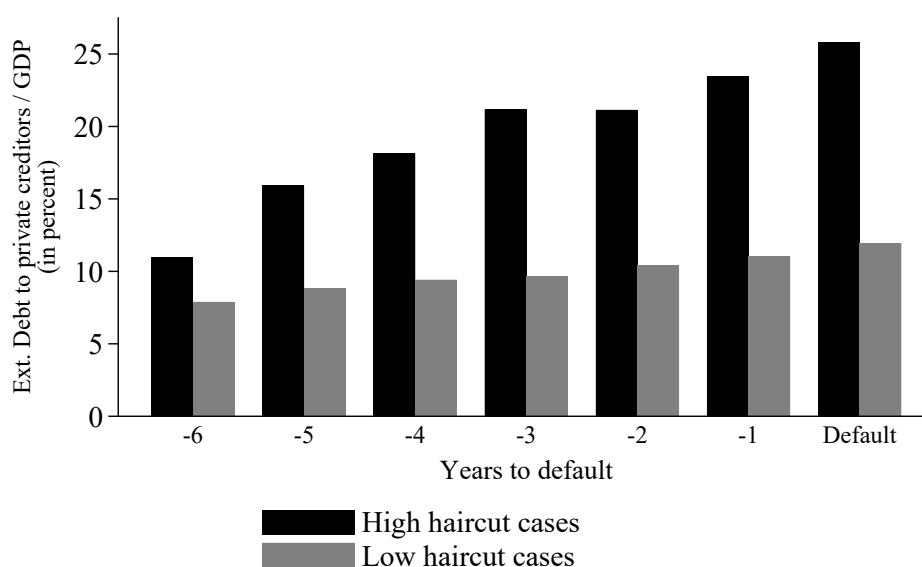

Note: The y-axis plots external debt owed to private creditors relative to GDP. High (low) haircuts are defined as such with an NPV haircut above (below) the median. Sources: The debt (and GDP) data are combined from a variety of sources: World Bank International Debt Statistics; World Bank WDI; Maddison Project ((Van Zanden and Bolt, 2013); (Horn et al., 2023); Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); Farah-Yacoub et al. (2023); Moody's Investor's Manual, Corporation of Foreign Bondholders, Stock Exchange Yearbooks and authors' Calculations.

In principle, the level of public and publicly guaranteed external debt is an observable variable

prior to the debt crisis, thus being a useful warning sign. In practice, the reliability of the data varies considerably across countries and time. There are a variety of "hidden debt" problems that can mask the full extent of the debt build-up and the size of debt outstanding. [11]

With these limitations in mind, Figure 9 focuses on the level of debt, more precisely on total (private plus official) external debts, in percent to debtor country GDP. As can be seen, debt stocks map into haircut size. Countries in the upper two quartiles of the debt distribution record higher average NPV haircuts. The difference is largest for face value haircuts, which is more than twice as large in the 4th quartile than in the 1st quartile.

Figure 9: Higher pre-default external debt usually means higher haircuts, 1815 - 2020.
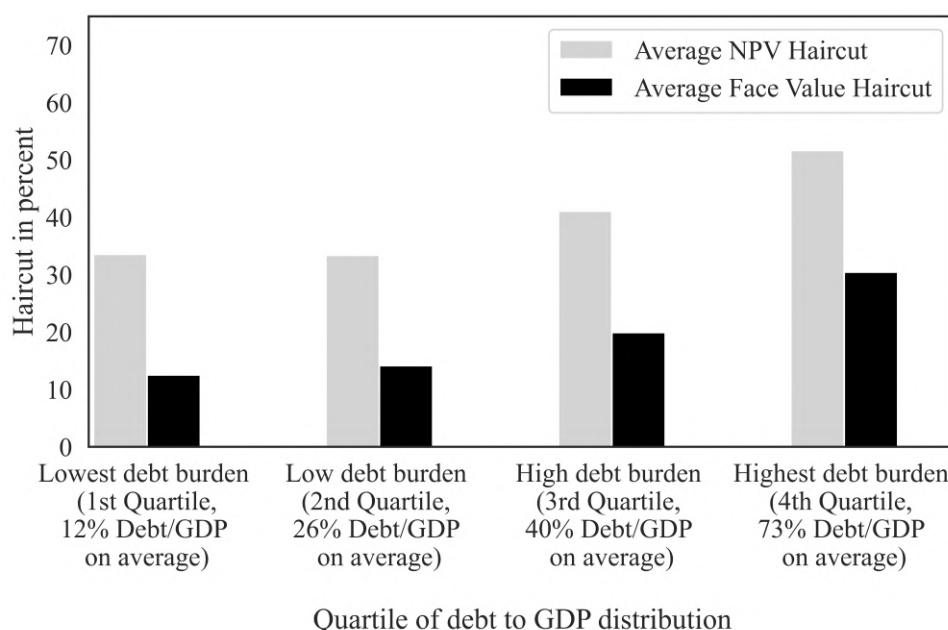
Note: Note: To avoid bias due to outliers, debt/GDP (external debt owed to private and official creditors) is winsorized at 200%. Sources: The debt (and GDP) data is combined from a variety of sources: World Bank International Debt Statistics; World Bank WDI; Maddison Project (Van Zanden and Bolt, 2013); Horn et al. (2023);Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); Farah-Yacoub et al. (2023); Moody's Investor's Manual, Corporation of Foreign Bondholders, Stock Exchange Yearbooks and authors' Calculations.

---

[11]Horn et al. (2021a), document acute under reporting of debts owed to China by many emerging and developing countries. In numerous cases of debt distress in recent years (Mozambique, the Democratic Republic of Congo and Pakistan, among other) the full extent of external indebtedness was not known until the crisis erupted or the country approached the IMF for assistance. Furthermore, Reinhart and Rogoff (2009) argued that to predict external default it was not enough to look at external debt buildups but also the accumulation of domestic debt, as its debt servicing is also a drain on fiscal revenues. They highlight that, for example, it would have been difficult to predict the Philippines' 1983 default on the basis of external debt alone.

Stylized fact 6: Haircuts are higher for low-income sovereigns

Another indicator readily known at the time of default, at least in the modern era, is a country's real income per capita. The challenges to gather reliable income data are markedly greater in the 19th century and prior to WWII in the 20th.[12]

As a proxy for debtor capacity to pay, we use the debtor's per capita income relative to the global average income - both measured in the same year. Using this relative measure allows us to compare income levels across a long, historical sample (in dollar terms, even the richest countries of the mid-19th century would be considered low-or middle income by today's standards). Because economic downturns prior to a default are the norm (see Yeyati and Panizza (2011) and Reinhart and Rogoff (2009)), we use income levels three years prior to the default. Figure 10 shows a binned scatter plot on the size of individual NPV haircuts against the debtors' percentile rank in the global real per capita income distribution. Haircuts are highest for countries with the lowest income. Figure 11 conveys the same message using the World Bank's income classification, which is available since 1987. Median haircuts are twice as large for low-income debtors when compared to the middle-high-income counterparts. These results do not imply that low-income countries benefit from more generous debt relief. As explained in later in this section, haircuts (from a creditor perspective) and debt relief (from a debtor country perspective) are two very different concepts. Poorer countries tend to borrow only sporadically from private creditors in international capital markets, and often in relatively small amounts (Meyer et al., 2022). For these countries, official (bilateral and multilateral) debt plays the dominant role, especially in recent decades (Horn et al., 2021b). The deep haircuts in low-income countries often apply to a small "base" only and will thus result in only limited relief in the total debt burden.

Stylized fact 7: Haircuts are higher for first time debt issuers

As with debt and per capita income, a country's debt issuance history is quantifiable at the time of default, although issuance data is not readily available from most existing databases. We provide such a database, albeit with the benefit of hindsight. Our novel data captures the year in which sovereigns placed a bond in international capital markets or arranged an international syndicated loan for the first time. Our focus on sovereigns implies first issuance after independence, meaning that we do not include debts issued by colonies (those usually carried an explicit or implicit

---

[12]It is particularly problematic for smaller Latin American countries, where independence is gained in the early 1800s but time series for per capita real GDP are only available much later. This issue is less pressing for Asia and Africa where independence follows after WWII or even much later.

Figure 10: Lower per capita GDP usually means higher haircuts; 1815 - 2020
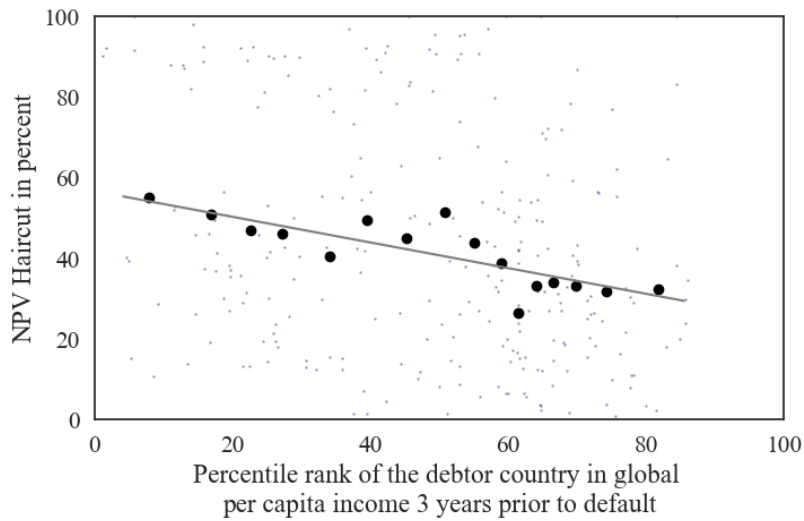
Note:: Small blue dots represent individual observations, large black dots represent binned observations. Number of bins is set equal to $\sqrt{N}$, with N = 260. The percentile rank in global per capita income is calculated per year to reflect the defaulter's relative economic development three years prior to the default (in order to reflect income levels prior to a possible economic downturn around the default). Sources: World Bank Worldbank WDI; Maddison Project (Van Zanden and Bolt, 2013); Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

**Figure 11:** World Bank Income "group" as a predictor of haircut size: 1987-2020
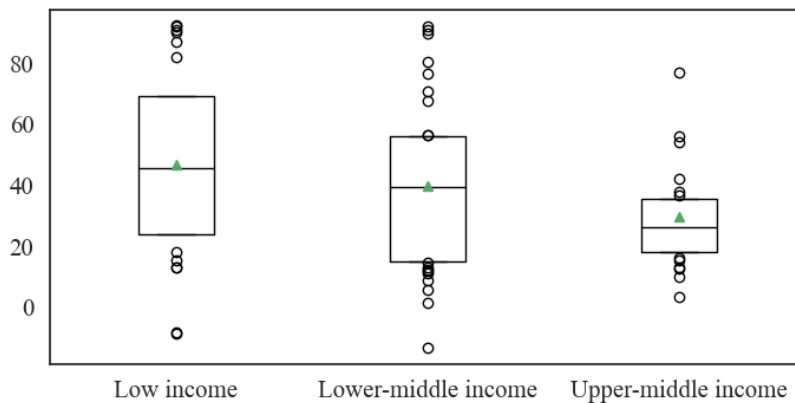
Note: This income classification was introduced by the World Bank in 1987. Boxes represent interquartile ranges, observations above (below) the 75th (25th) percentile are shown as dots. Horizontal lines and green triangles are at the median and mean of the respective sub-sample. Sources: World Bank WDI; Maddison Project (Van Zanden and Bolt, 2013); Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

guarantee from the colonial power). The independence dates are from Reinhart and Rogoff (2009). Prior to 1970, we determine whether a sovereign defaulted on its first sovereign bond(s) on a case by case basis using the granular data based on archival sources by Meyer et al. (2022). For the post-1970 period, we rely on the World Bank 's International Debt Statistics (IDS), which contains data on outstanding debt and new borrowing from foreign financial institutions or through bond issuance (excluding trade credit banks and official development banks). The

creditor breakdown is available on a country-by-country basis. For newly-issued debt, IDS also publishes average maturity. These data allow us to identify when sovereigns first tapped international capital markets, and infer whether the original debts were still outstanding at the time of default. Figure 12 presents a violin chart that compares the individual NPV Haircuts of defaults for first-time sovereign issuers/borrowers (there are 28 cases in the full sample) with all other haircuts. The median (mean) haircut is around 54% (55%) for new entrants to the international capital market, well above the 36% (40%) for all other cases.

Figure 12: Interim vs. final debt restructurings and haircut size: 1815-2020
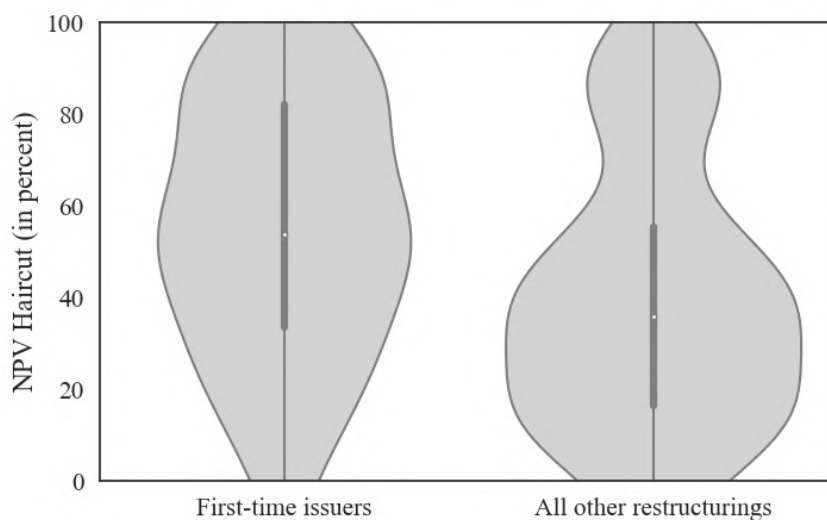
Note: 287 cases with data on whether default included first market issuance. To identify defaults on first market issuance of debt instruments, we rely on bond issuance for the period before 1970 and data from the World Bank's IDS thereafter. For the post 1970 period, where bank loans took the place of bonds, we consider non-trade-credit loans from private financial institutions as market issuance. Sources: World Bank IDS (2022), Meyer et al. (2022); Farah Yacoub et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); and authors' calculations.

## 4.2 Geopolitical and economic shocks during default

This section moves beyond indicators of haircut size that are readily observable at the time default to those that may only become known as the default unfolds over time. We show that geopolitical disasters, delays in crisis resolution (crisis duration), and deep GDP contractions each go hand in hand with larger haircuts.

Stylized fact 8: Haircuts are especially high in case of geopolitical disasters (wars, revolutions, country-break ups)

The geopolitical shocks considered here (wars, revolution, country break-ups), may or may not be known or anticipated by private creditors at the time of lending or at the time of default, but if these unsettling events come to pass, they tend to consistently deliver deep creditor losses. Wars, revolutions (often under foreign influence), or the dissolution of empires have resulted in some of the worst creditor outcomes in the history of sovereign default, including several cases of full debt repudiation (100% haircuts) and many other cases with haircuts in the top 10% of the distribution.

This is shown in Table 2, which reports all defaults with creditor losses of 95 percent or higher. As the last two columns highlight, geopolitical turmoil leaves creditors with major losses. In Figure 13, we move beyond the most extreme cases shown in Table 3, and consider all cases of geopolitical turmoil in the sample (shown in red) alongside the remaining restructurings. In Figure 14, the turmoil cases are further grouped into three buckets (war, revolution, and country break-ups) and compared to the debt restructuring that did not involve these extreme forms of geopolitical turmoil. Haircuts are about 20 percent higher (from 40 to 60 percent) when a geopolitical disturbance is unfolding; and the differences are statistically significant.

Figure 13: 200 years of Sovereign haircuts (all restructurings with foreign private creditors)
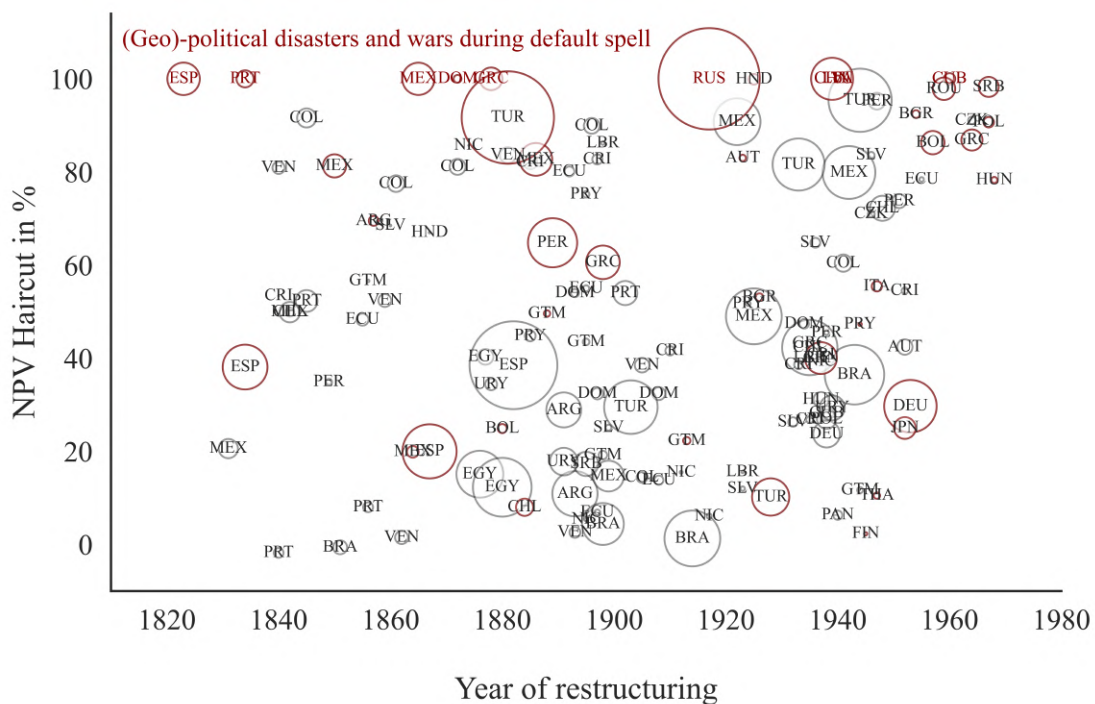

Note: Country-Markers represent the time of the debt restructuring.

Table 2: Geopolitical disasters (wars, revolutions, country break ups) and haircuts: The largest creditor losses, 1815-2020

Debtor country	Default start	Default end	Haircut size in %	Volume m USD	Type of shock	Context
Spain	1823	1833	100	2,440	Foreign intervention	Debt raised during "liberal Triennium" repudiated after absolute monarchy was reinstalled under Ferdinand VII
Portugal	1834	1834	100	na	Foreign intervention	Debt raised by Dom Miguel declared void after he is toppled with the help of foreign powers
Mexico	1865	1865	100	na	Foreign intervention	Debt raised by French-installed king Maximilian I declared void after the Republic is reinstated
Dom. Republic	1872	1872	100	137	Domestic only	Parliament rejects debt restructuring agreement and declares debts as illegitimate.
Russia	1917	partly rest.*	100	23,892	Revolution	Lenin cancels all foreign debts plus seizure of foreign assets
China	1938	partly rest.*	100	4,109	Revolution	Mao fully repudiates foreign debts after 1949
Lithuania	1940	1940	100	180	Foreign annexation	Foreign debts never repaid after Soviet annexation
Latvia	1940	1940	100	109	Foreign annexation	Foreign debts never repaid after Soviet annexation
Cuba	1960	1960	100	299	Revolution	Castro repudiates all foreign debts
Ottoman Empire	1915	1928	100	6,304	Break-up	Debts of the dissolved Ottoman empire are fully repudiated
Romania	1933	1959	98	1,170	Foreign intervention	Debts repudiated in the wake of WW2 and Soviet control
Yugoslavia	1932	1967	98	924	Foreign intervention	Debts repudiated in the wake of WW2 and Soviet control
Liberia	1980	2009	97	1,278	Multiple	Civil wars, instability, natural disasters
Yemen	1983	2001	97	725	Multiple	Civil wars, instability, natural disasters
Nicaragua	1979	2007	96	1,438	Revolution	Sandinista Revolution, 1978/79 plus natural disasters
Peru	1931	1947	95	645	War	Long-delayed default after the Great Depression and WW2
Turkey	1944	1944	95	9,293	Break-up & war	Former restructured Ottoman Empire debt

Note: *A small part of Russia's repudiated debts of 1917 were restructured, namely in 1986 with the UK creditors (USD 304m) and in 1997 with French creditors (USD 1,256m). The big remainder, however, remains unpaid (USD 20,765m). Also a minor part of China's repudiated debts were settled, namely in 1987 with UK creditors (USD 154m), while the rest remains unpaid (USD 3,969m).

Figure 14: Geopolitical disasters usually mean higher haircuts: 1815-2020
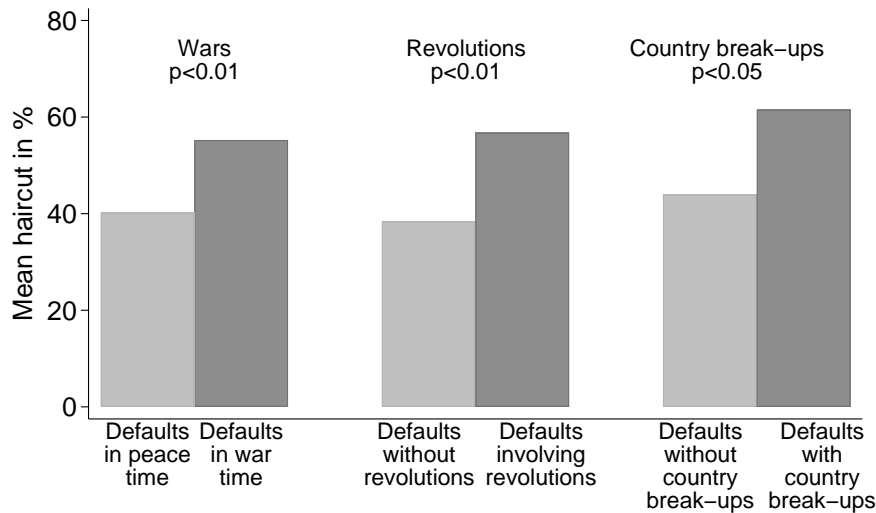
Note: Source: Meyer et al. (2022); Farah-Yacoub et al. (2023) We use interstate-war data from Horn et al. (2021b), Sarkees and Wayman (2010), Nils Petter Gleditsch and Strand (2002) and Davies et al. (2023). Revolutions dates come from Arthur Banks database.

Stylized fact 9: Haircuts are higher for longer debt crises

Once a default occurs, it is very difficult, if not outright impossible, to predict how long it will take for its resolution. As shown earlier in Figure 3b, the average duration of a default spell by era has shortened from an average of well over 20 years, prior to 1870 to about 8 years since 1970 (for all default spells). Figure 15 uses the same breakdown by eras but adds information on haircut size. To define high and low haircuts we use the Bulow-Rogoff cumulative measure and make the cut at the median, 44 percent (see Table 1). In all sub-periods, longer default spells were associated with significantly higher haircuts (in line with the theory by Benjamin and Wright (2009)). This finding is reinforced in Figure 16, which plots the cumulative BR haircuts against the duration of the default spell in a binned scatter plot. Thus, as a rule of thumb in the modern era, creditors can expect a high (above median) haircut once a certain number of years have passed and debt crisis remains unresolved. As analyzed in Reinhart and Rogoff (2009), and Farah-Yacoub et al. (2023), long defaults often deliver protracted output losses and worsening social fundamentals which can markedly further undermine the repayment capacity of the debtor in default. These outcomes may require higher haircuts to cure the default. The link between default duration and high haircuts may also reflect the geopolitical disruptions previously discussed, which certainly added to the length of many pre-WWII defaults (see also Trebesch (2019) on the link between political risk and default duration).

*Stylized Fact 10: Haircuts are higher for deeper output contractions*

The disruptions from a sovereign default are manifold, and it is not uncommon to record output collapses. We measure an output contraction as the decline in GDP either from two years prior before default or the closest local maximum thereafter (if there was economic growth in the two years preceding default); to the closest local minimum, the trough before economic growth returns (even if the return is modest and transitory). If the default does not coincide with any economic contraction, the measure is set to zero. In default, the average real GDP decline for the upper two quartiles, as shown in Figure 17 ranges from 8 to 31 percent. Such severe economic contractions may require time to fully reverse, impacting further the countries debt servicing capacity and resulting in higher haircuts. As Figure 17 illustrates, average haircuts rise from around 35 percent for the milder cases to an average haircut of nearly 60 percent for cases with deep output contraction.

Figure 15: A longer default spell (debt crisis) usually means a higher BR haircut: 1815-2020
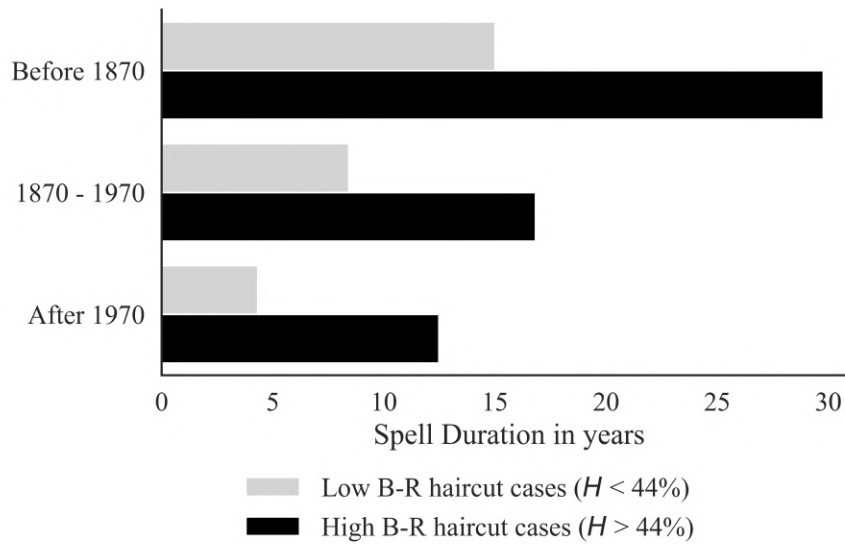

Note: The sample includes 194 spells, excluding full repudiation cases (where duration could be seen as zero, or infinity). Spell Duration is measured as the timed lapsed between the first default and the final, spell-ending restructuring. A restructuring is considered to be spell-ending, when it is not followed by a default within the two years thereafter. High (low) haircuts are defined as such with a haircut above(below) the sample median. Sources: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); Farah-Yacoub et al. (2023); and authors' calculations. We use interstate-war data from Horn et al. (2021b), Sarkees and Wayman (2010) Nils Petter Gleditsch and Strand (2002) and Davies et al. (2023). Revolutions dates come from Arthur Banks database.

Figure 16: Bulow-Rogoff Haircut, by default duration
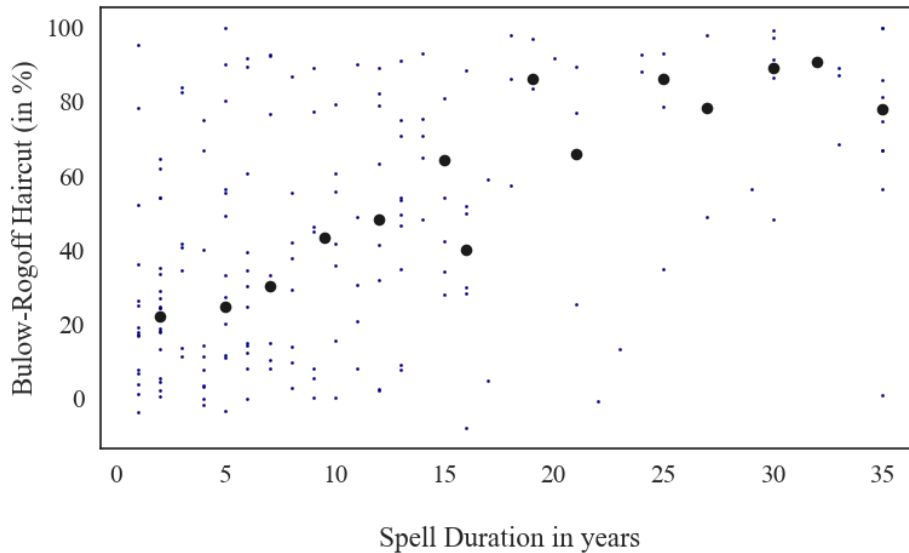
Note: Binned Scatter Plot using the method introduced by Cattaneo et al. (2019). The sample includes 194 spells, excluding full repudiation cases (where duration could be seen as zero, or infinity). Spell duration is winsorized at 35 years. Sources: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); Farah-Yacoub et al. (2023); and authors' calculations.

Figure 17: GDP contractions and Bulow-Rogoff haircuts
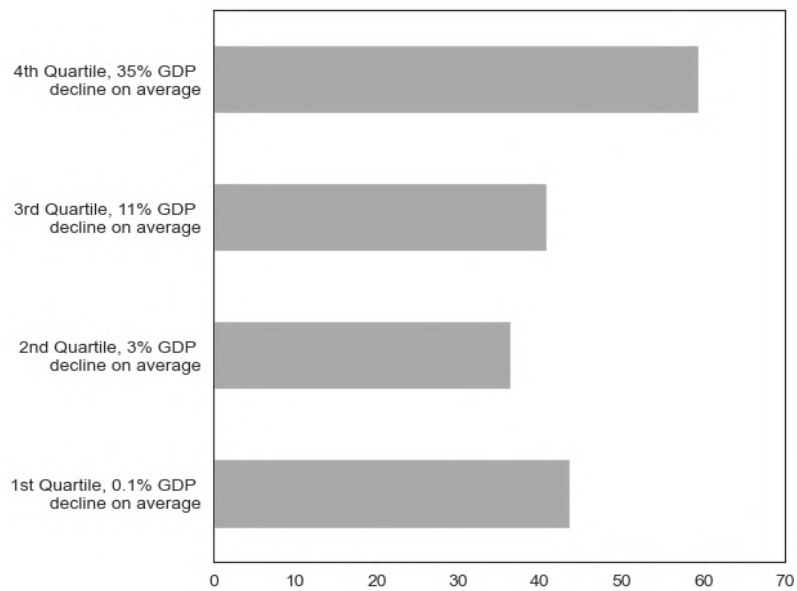
Note: The decline in GDP is measured from two years prior to default to the "first" trough following the default. Due to data gaps, the sample consists of 164 default spells. Sources: Sources: World Bank Worldbank WDI; Maddison Project Van Zanden and Bolt (2013); Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations

Table 3: Correlates of Haircuts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Income level (%-tile of world income distribution)	-0.3*** (-3.8)								-0.1 (-1.0)	-0.1 (-1.6)
Debt/GDP pre-default (ext. debt, in %)		0.4*** (4.2)							0.3*** (3.5)	0.4*** (5.4)
First time issuer (dummy)			15.1*** (2.6)						8.4 (1.0)	-0.8 (-0.1)
WWI/WWII defaults (dummy)				21.1*** (4.2)						5.3 (0.7)
Revolution (dummy)					18.9*** (5.2)					7.0* (1.9)
GDP contraction (in percent)						0.7*** (5.6)				0.2 (1.0)
Default duration (in years)							1.6*** (9.7)			2.5*** (6.4)
Country breakup (dummy)								22.4** (2.3)		
constant	56.6*** (12.9)	26.5*** (7.0)	39.8*** (22.3)	40.2*** (22.9)	37.7*** (19.9)	35.9*** (18.0)	30.9*** (16.1)	42.1*** (24.8)	32.1*** (4.4)	14.3*** (2.7)
No. Observations	271	172	287	321	321	277	321	321	165	165
R-squared	0.05	0.09	0.02	0.05	0.08	0.10	0.23	0.02	0.11	0.56

Note: OLS regression with NPV haircut as dependent variable. All right-hand-side variables other than income level, debt/GDP and default duration are dummy variables. T-stats are reported in parentheses.

4.3 Summary Regression

In this section, we combine the stylized facts discussed above in a systematic way. To do so, we run simple OLS regressions using individual haircuts as the dependent variable. The results in Table 3 confirm our findings thus far. All of the above-mentioned variables are highly correlated with haircut size, including the pre-crisis warning indicators (income level of debtor countries, pre-default debt/GDP ratio and the dummay variable for dirst time issuers). Also the dummies for geopolitical shocks show large and highly significant coefficients, and the same is true for default duration and the size of GDP contractions.

When combining all variables into one regression, we find that the debt level, revolutions and default duration show significant coefficients (Column 10). The estimated coefficients are economically large. Specifically, a 10 percentage point higher debt to GDP level pre-default is associated with a 4 percentage points higher haircut, while a 5 years longer default process is associated with a 12 percentage point higher haircut.

5 A Brief Detour on Haircuts vs. Debt Relief

A common misconception is to equate haircuts (from a creditor perspective) and debt relief (from a debtor country perspective). Indeed, most restructurings of private external debt do not reduce total external debt to GDP significantly in the year of the restructuring. This seeming paradox arises for a variety of reasons. First, currency crashes often accompany default and debt restructuring. With external debt denominated in a hard currency (usually US dollars), the valuation effect can produce a sudden and significant surge in the external debt-to GDP ratio. Second, output collapses, as discussed previously, can drastically reduce the denominator, further increasing the ratio of total external debt relative to GDP. Third, if the country avails itself to IMF financing during the debt exchange (a common practice), it incurs more official debt in the process, which is sometimes supplanted by additional loans from the World Bank or other multilaterals and official lenders. Last, but certainly not least, the amount of debt treated in the restructuring (especially initial or interim restructurings) may be quite small as a share of the total debt stock. The coverage of the restructuring is critical in determining the extent of debt reduction achieved.

This last important point can be illustrated with our new dataset. For 182 individual restructurings for which we have detailed data on total external debt stocks, the median share of debt covered by the renegotiation with private creditors only accounts for 16 percent of total external debt (the average is 35 percent). When the restructured share of debt is low, even a high haircut will not deliver much debt relief (debt reduction). There is a natural analogy with taxes. Even very high taxes when applied to a small tax base can end up yielding very little revenue. The tax "rate" on private creditors is the haircut size (in percent); the tax base is the debt stock amount covered by the restructuring. This helps explain, as discussed earlier in this section, why in most low-income countries, where debt to private creditors is only a small share of external debt, high haircuts may not deliver much debt relief. Final restructurings, usually not only involve higher haircuts but also cover a much larger share of total debts outstanding, as was case for the Brady deals of the early to mid-1990s (Cline et al., 1995).
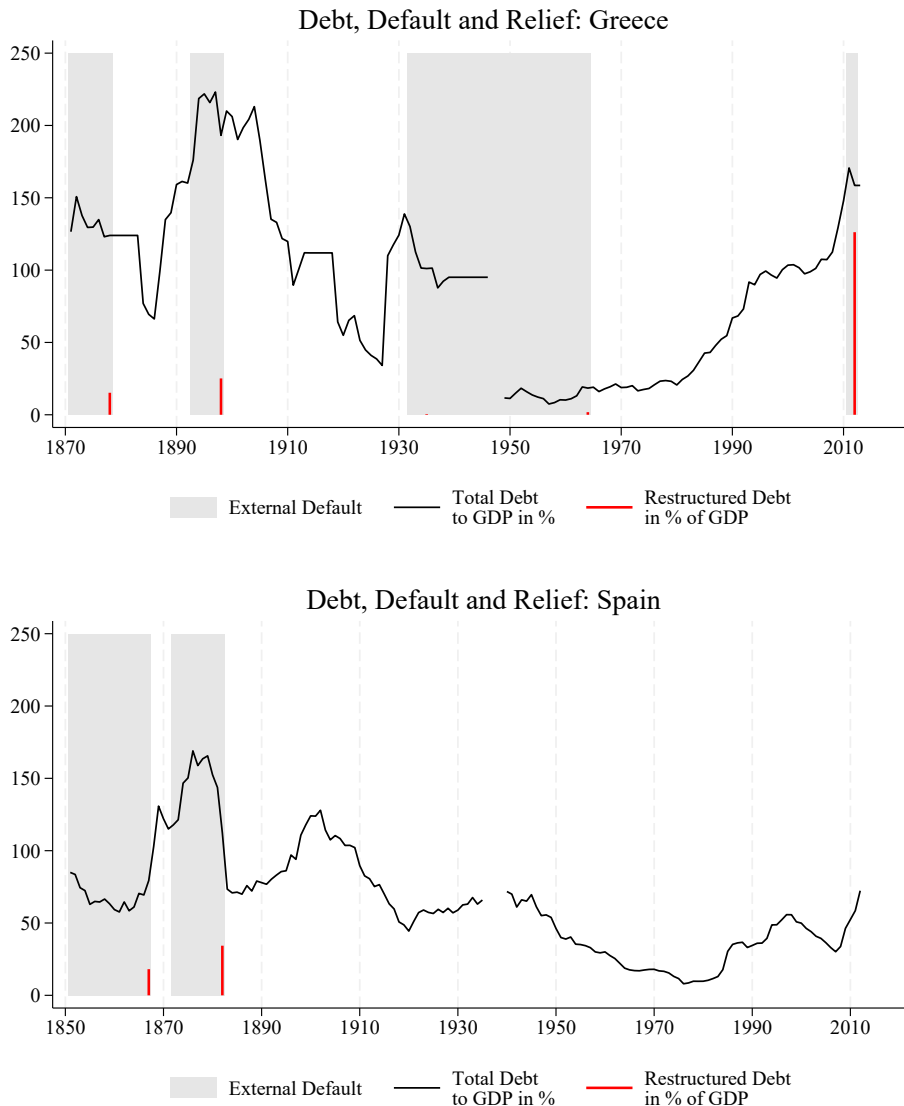
The four country histories shown in Figure 18 provide a visual illustration that the total debt stock of a country can indeed remain largely unaffected by a restructuring.
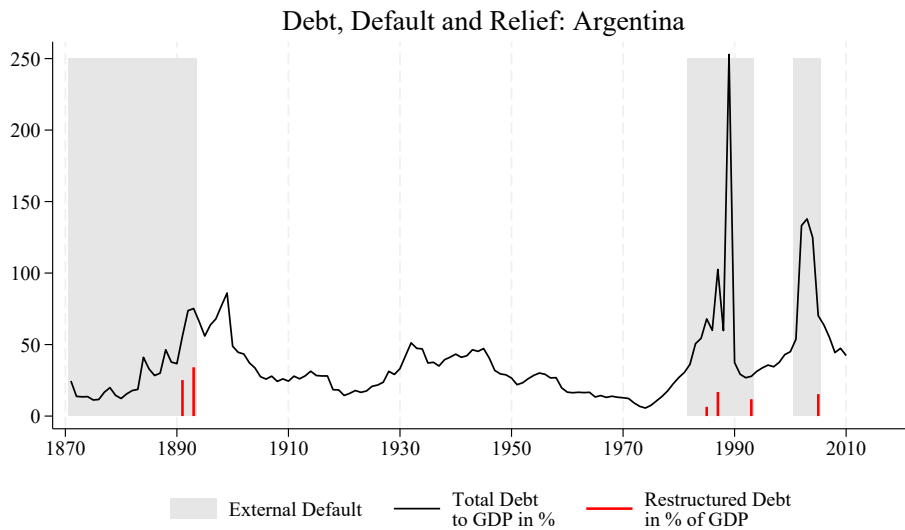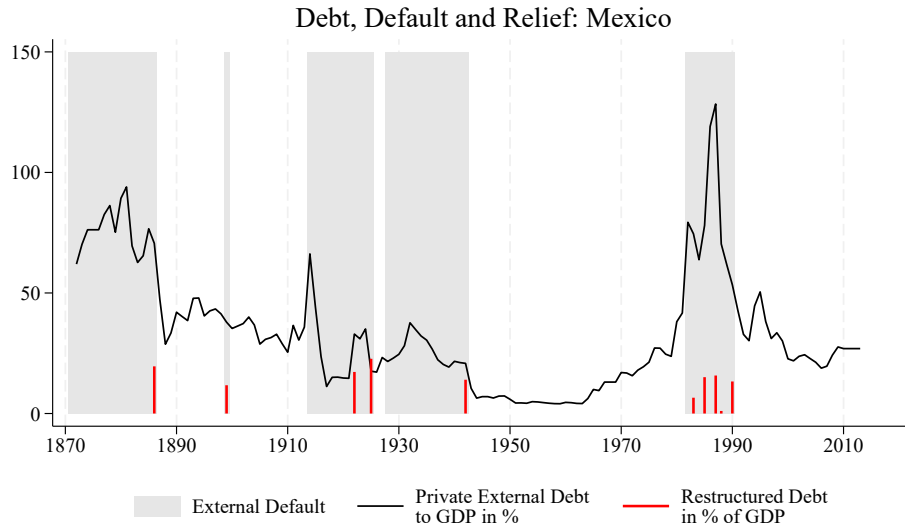
Table 4: Share of total debt treated in restructuring

	(1) Debt Restructured / Total Ext. Debt
Mean	35%
Median	16%
N	182

Note: Data covers 182 cases for which we have data on debt and GDP around the time of the restructuring. This includes cases from 19th, 20th and 21st century. Sources: World Bank International Debt Statistics; Worldbank WDI; Maddison Project, Van Zanden and Bolt (2013), Horn et al. (2023), Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021), Moody's Investor's Manual, Corporation of Foreign Bondholders, Stock Exchange Yearbooks and authors' Calculations.

Figure 18: Debt Stocks around the time of debt restructurings. Four examples.

Debt, Default and Relief: Greece

Debt, Default and Relief: Spain

Debt, Default and Relief: Mexico

External Default | Private External Debt to GDP in % | Restructured Debt in % of GDP

Debt, Default and Relief: Argentina

External Default | Total Debt to GDP in % | Restructured Debt in % of GDP

Note: Total Debt includes debt to private and official foreign creditors, but also local-currency debt. Restructured Debt considers only private external debt treated in the respective debt restructuring. Sources: World Bank International Debt Statistics; Worldbank WDI; Maddison Project (Van Zanden and Bolt, 2013); Horn et al. (2023); Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021); Reinhart and Rogoff (2009); Moody's Investor's Manual, Corporation of Foreign Bondholders, Stock Exchange Yearbooks and authors' Calculations.

6 Conclusion

In this paper, we have attempted to fill in some existing gaps in the literature on external sovereign debt crises. One such gap involves adapting key insights from Bulow and Rogoff (1989) empirically. They emphasize, in particular, that debt restructuring is a repeated game, so that a priori there is no reason to expect that a default can be brought to an end with a single debt restructuring. Research thus far focused on haircuts in each restructuring deal separately, rather than considering the full crisis spell. Here, we measure creditor losses over the course of repeated restructurings a la Bulow-Rogoff. For example, in the case of Brazil's 1980s debt crisis, the deal-by-deal approach yields 6 different haircut estimates (ranging from -9 in 1983 to 29 percent in the Brady deal of 1994). Here, we compute the cumulative B-R haircut for Brazil during its 13-year long default spell, namely as 46.6 percent.

We distinguish between milder and more severe crisis spells, thus filling another gap in the empirical crisis literature and facilitating a comparison across episodes. While the focus is on the size of creditor losses, our analysis is not silent on other dimensions of the severity of the debt crisis that particularly impact the debtor country. For instance, we have shown that there is a strong link between haircut size and the duration of the default spell as well as the magnitude of output losses. In other words, low Bulow-Rogoff haircuts usually coincide with shorter default spells and milder recessions.

On the drivers of haircuts, the rules of thumb presented here are far from exhaustive. The list of possibilities includes idiosyncratic factors of the debtor country, global circumstances, the bargaining strengths of the debtors and creditors, legal considerations, and so on. More work is understand the determinants of creditor losses in this market, and also on the legacy of high or low haircuts. Another promising field of study are haircuts and debt relief vis-a-vis official creditors (bilateral and multilateral debt), which have received too little attention, especially given the relevance for lower income countries (see Schlegl et al. (2019) or Horn et al. (2021b)). The same is true for domestic debt restructurings. As Reinhart and Rogoff (2009) observe, even with all its limitations, external debt crises and their resolution are far better documented and understood than domestic debt crises. Filling this knowledge gap will be particularly important, as more and more countries have turned to domestic sources of funding (see Erce et al. (2022)).

As to the policy implications of our analysis, there is little new to add. The evidence presented here further reinforces the view that even multiple restructurings, if these are shallow, rarely cure a default. Multilateral institutions or debtor governments are seldom in the driver's seat during

a debt restructuring between a sovereign and its private creditors. Yet, these institutions may play a role in reducing the odds of minimalist restructurings with low haircuts by providing more realistic assessments in their debt sustainability analyses (DSAs), which have historically suffered from chronic over-optimism (see Boughton (2004) and IMF (2017)). Disguising insolvency as illiquidity and delaying the correct diagnosis has often lead debtors and creditors to jointly gamble for resurrection. The debtors end up with more debt and creditors with a worse portfolio.

References

Ams, J., Baqir, R., Gelpern, A., and Trebesch, C. (2018). Sovereign default. *Sovereign Debt: A Guide for Economists and Practitioners.*

Arellano, C. (2008). Default risk and income fluctuations in emerging economies. *American economic review*, 98(3):690–712.

Arellano, C., Mateos-Planas, X., and Ríos-Rull, J.-V. (2023). Partial default. *Journal of Political Economy*, 131(6):000–000.

Asonuma, T. and Trebesch, C. (2016). Sovereign debt restructurings: preemptive or post-default. *Journal of the European Economic Association*, 14(1):175–214.

Baron, M., Verner, E., and Xiong, W. (2021). Banking crises without panics. *The Quarterly Journal of Economics*, 136(1):51–113.

Benjamin, D. and Wright, M. (2009). Recovery before redemption: A theory of delays in sovereign debt renegotiations. April.

Borensztein, E. and Panizza, U. (2009). The costs of sovereign default. *IMF Staff Papers*, 56(4):683–741.

Boughton, J. M. (2004). The imf and the force of history: Ten events and ten ideas that have shaped the institution.

Bulow, J. and Rogoff, K. (1989). A constant recontracting model of sovereign debt. *Journal of political Economy*, 97(1):155–178.

Bulow, J. and Rogoff, K. (1990). Cleaning up third world debt without getting taken to the cleaners. *Journal of Economic Perspectives*, 4(1):31–42.

Bulow, J. and Rogoff, K. (2005). Grants versus loans for development banks. *American Economic Review*, 95(2):393–397.

Bulow, J. I. and Rogoff, K. S. (1988). Sovereign debt: Is to forgive to forget?

Cattaneo, M. D., Crump, R. K., Farrell, M. H., and Feng, Y. (2019). On binscatter. *arXiv preprint arXiv:1902.09608.*

Centeno, M. A. (2002). *Blood and debt: War and the nation-state in Latin America.* Penn State Press.

Cheng, G., Díaz-Cassou, J., and Erce, A. (2016). From debt collection to relief provision: 60 years of official debt restructurings through the paris club.

Cheng, G., Diaz-Cassou, J., and Erce, A. (2019). The macroeconomic effects of official debt restructuring: evidence from the paris club. *Oxford Economic Papers*, 71(2):344–363.

Cline, W. R. et al. (1995). International debt reexamined. *Peterson Institute Press: All Books*.

Cruces, J. and Trebesch, C. (2013). Sovereign defaults: The price of haircuts. *American Economic Journal: Macroeconomics*, 5(3):85–117.

Davies, S., Pettersson, T., and Öberg, M. (2023). Haircuts: Estimating investor losses in sovereign debt restructurings, 1998-2005. *Journal of Peace Research*, 60(4).

Dimson, E., Marsh, P., and Staunton, M. (2002). *Triumph of the optimists: 101 years of global investment returns.* Princeton University Press.

Eaton, J. and Gersovitz, M. (1981). Debt with potential repudiation: Theoretical and empirical analysis. *The Review of Economic Studies*, 48(2):289–309.

Erce, A., Mallucci, E., and Picarelli, M. O. (2022). A journey in the history of sovereign defaults on domestic-law public debt.

Fang, C., Schumacher, J., and Trebesch, C. (2021). Restructuring sovereign bonds: holdouts, haircuts and the effectiveness of cacs. *IMF Economic Review*, 69:155–196.

Farah Yacoub, J., Graf von Luckner, C., and Reinhart, C. (2022). Eternal external debt crises: A long view.

Farah-Yacoub, J. P., Graf von Luckner, C., Ramalho, R., and Reinhart, C. (2023). The social costs of sovereign default.

Giesecke, K., Longstaff, F. A., Schaefer, S., and Strebulaev, I. A. (2014). Macroeconomic effects of corporate default crisis: A long-term perspective. *Journal of Financial Economics*, 111(2):297–310.

Graf von Luckner, C., Meyer, J., Reinhart, C., and Trebesch, C. (2021). External sovereign debt restructurings: Delay and replay.

Horn, S., Mihalyi, D., Nickol, P., and Sosa-Padilla, C. (2023). Hidden debt revelations. Mimeo.

Horn, S., Reinhart, C. M., and Trebesch, C. (2021a). China's overseas lending. *Journal of International Economics*, 133:103539.

Horn, S., Reinhart, C. M., and Trebesch, C. (2021b). Coping with disasters: two centuries of international official lending. Technical Report w27343, National Bureau of Economic Research.

IMF (2017). *Review of the debt sustainability framework in loc-income countries: proposed reforms.*

Jayachandran, S. and Kremer, M. (2006). Odious debt. *American Economic Review*, 96(1):82–92.

Jorda, , Knoll, K., Kuvshinov, D., Schularick, M., and Taylor, A. M. (2019). The Rate of Return on Everything, 1870–2015*. *The Quarterly Journal of Economics*, 134(3):1225–1298.

Lindert, P. H. and Morton, P. J. (1989). How sovereign debt has worked. In *Developing Country Debt and Economic Performance, Volume 1: The International Financial System*, pages 39–106. University of Chicago Press.

Manasse, P. and Roubini, N. (2009). "rules of thumb" for sovereign debt crises. *Journal of International Economics*, 78(2):192–205.

Marichal, C. (2000). *A century of debt crises in Latin America.* Princeton University Press.

Mendoza, E. G. and Terrones, M. E. (2008). An anatomy of credit booms: evidence from macro aggregates and micro data. Technical report, National Bureau of Economic Research.

Meyer, J., Reinhart, C. M., and Trebesch, C. (2022). Sovereign Bonds Since Waterloo*. *The Quarterly Journal of Economics*, 137(3):1615–1680.

Mitchener, K. J. and Trebesch, C. (2023). Sovereign debt in the twenty-first century. *Journal of Economic Literature*, 61(2):565–623.

Nils Petter Gleditsch, Peter Wallensteen, M. E. M. S. and Strand, H. (2002). Armed conflict 1946-2001: A new dataset. *Journal of Peace Research*, 39(5).

Reinhart, C. M., Rogoff, K., and Savastano, M. (2003). Debt intolerance. *Brookings Papers for Economic Activity*, 1:1–74.

Reinhart, C. M. and Rogoff, K. S. (2009). *This time is different: Eight centuries of financial folly.* princeton university press.

Reinhart, C. M. and Rogoff, K. S. (2011). From financial crash to debt crisis. *American Economic Review*, 101(5):1676–1706.

Reinhart, C. M. and Trebesch, C. (2016). Sovereign debt relief and its aftermath. *Journal of the European Economic Association*, 14(1):215–251.

Sarkees, M. R. and Wayman, F. (2010). *Resort to War: 1816 – 2007.* Washington DC: CQ Press.

Schlegl, M., Trebesch, C., and Wright, M. L. (2019). The seniority structure of sovereign debt. Technical report, National Bureau of Economic Research.

Sturzenegger, F. and Zettelmeyer, J. (2006). *Debt Defaults and Lessons from a Decade of Crises.* Cambridge: The MIT press.

Sturzenegger, F. and Zettelmeyer, J. (2007). Creditors 'losses versus debt relief: Results from a decade of sovereign debt crises. *Journal of the European Economic Association*, 5(2-3):343–351.

Sturzenegger, F. and Zettelmeyer, J. (2008). Haircuts: estimating investor losses in sovereign debt restructurings, 1998–2005. *Journal of international Money and Finance*, 27(5):780–805.

Suter, C. (2019). *Debt Cycles in The World-Economy: Foreign Loans, Financial Crises, And Debt Settlement, 1820-1990.* Routledge.

Trebesch, C. (2019). Resolving sovereign debt crises: The role of political risk. *Oxford Economic Papers*, 71(2):421–444.

Van Zanden, J. L. and Bolt, J. (2013). The maddison project. Retrieved June 2023.

Williamson, S. H. (2023). What was the u.s. gdp then?

World Bank (2022). *World Development Indicators.*

Wynne, W. H. (2000). *State Insolvency and Foreign Bondholders: Selected Case Histories of Goveernmental Foreign Bond Defaults and Debt Readjustments*, volume 2. Beard Books.

Yeyati, E. L. and Panizza, U. (2011). The elusive costs of sovereign defaults. *Journal of Development Economics*, 94(1):95–105.

A Appendix

A.1 Data

A.1.1 GDP

For measures on economic output, we rely on real GDP data from the World Bank post 1970 (World Bank, 2022). Prior to 1970, we extrapolate that series backwards using historical data on real GDP growth data from the Maddison project (Van Zanden and Bolt, 2013), as follows:

$$GDP_{t-1} = \frac{GDP_t}{(1 + g_t)} \tag{4}$$

Where g is the the growth rate in year t, sourced from the Maddison project (Van Zanden and Bolt, 2013). The resulting series is then expressed in 2020 USD, de-/inflated using data from Williamson (2023).

A.1.2 Debt

Data on total (private and official) external debt stocks and private external debt stocks originate from (A) the International Debt Statistics post 1970, (supplemented with IDS data from earlier vintages, presented in Horn et al. (2021b); (B) Horn et al. (2023) for the interwar period and (C) historical archival sources, Investors Monthly Manual, including Moody's Investor's Manual, Corporation of Foreign Bondholders, Stock Exchange Yearbooks for the period prior to that. We collected outstanding amounts of bonds outstanding and sum this up to aggregate external debt outstanding. Just like all monetary series, the debt stocks are expressed in 2020 USD, de-/inflated using data from Williamson (2023).

## A.2 Supplementary Figures and Tables

In the following we present alternative versions of Figure 1. Namely Figure A.1 splits the sample into interim and spell-ending restructurings, reiterating that interim restructurings have become more common; and often come with lower haircuts. In FigureA.2 we divide the sample of 321 haircuts into those with and those without any face value reduction. As a complementary graph to that, we show the levels of face value haircuts across the 200 year history in Figure A.3. Finally, Figure A.4 shows Bulow-Rogoff Haircuts by the time a default spell was concluded.

Figure A.1: 200 years of Sovereign haircuts: interim and spell-ending restructurings.
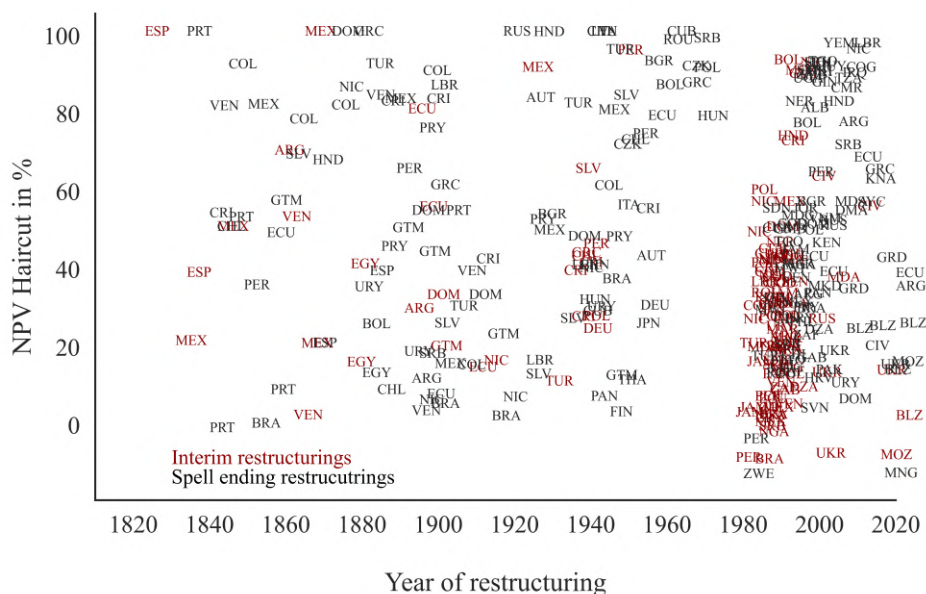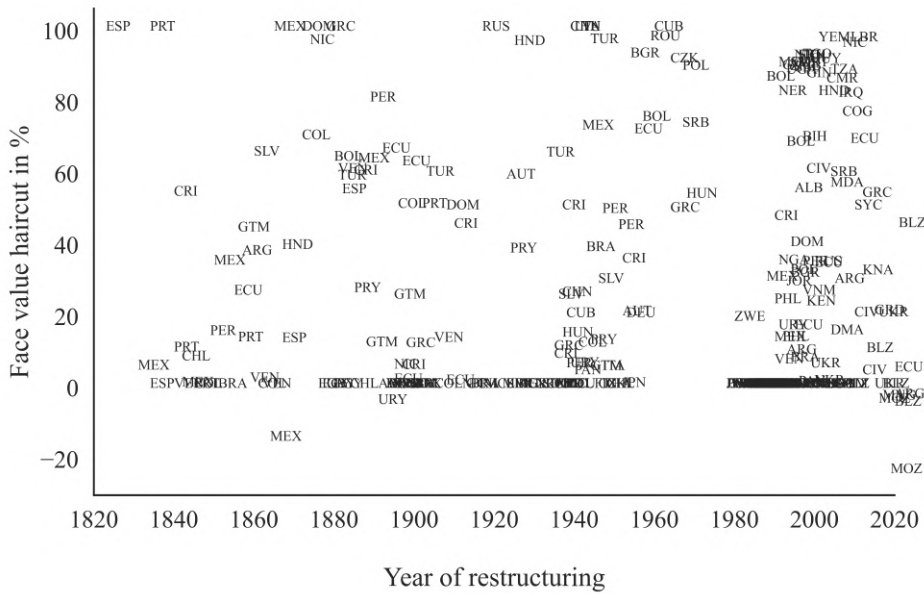

Note: Country-Markers represent the time of the debt restructuring. *Sources*: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

Figure A.2: 200 years of Sovereign haircuts : with and without face value reduction
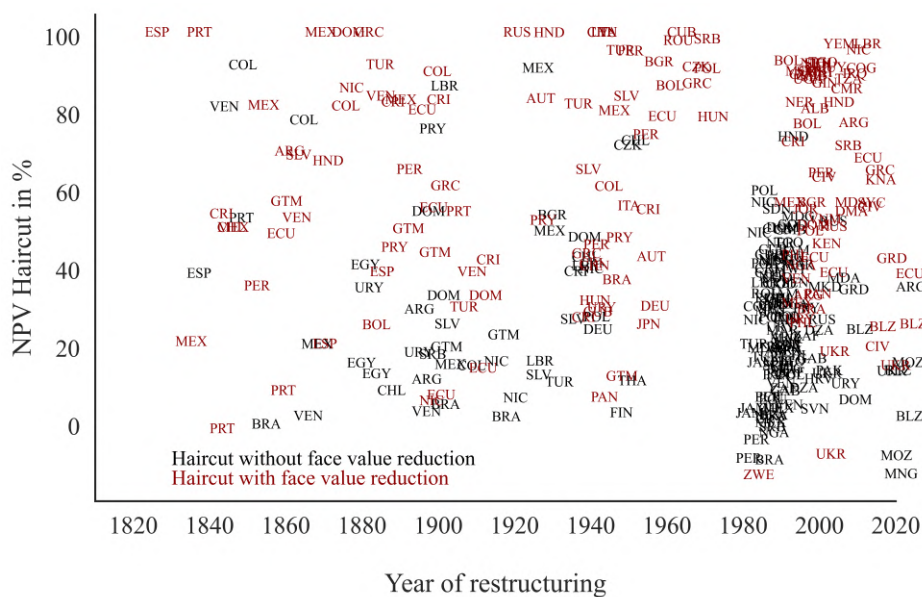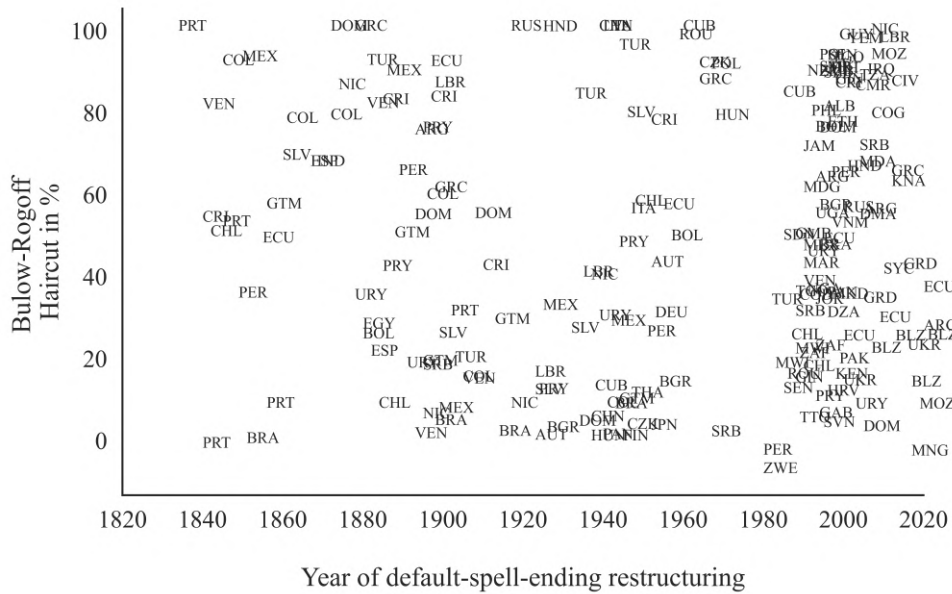

Note: Country-Markers represent the time of the debt restructuring. *Sources*: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

Figure A.3: 200 years of Sovereign haircuts: Face vale haircuts

Note: Country-Markers represent the time of the debt restructuring. *Sources*: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

Figure A.4: 200 years of Sovereign haircuts: Bulow-Rogoff haircuts

Note: Country-Markers represent the time of the end of a spell. *Sources*: Meyer et al. (2022); Cruces and Trebesch (2013); Fang et al. (2021) and authors' calculations.

Figure A.5 shows an illustrative sample of historical precedents of sovereigns that accessed markets for the very first time and defaulted very soon thereafter, to complement the discussion in Section 4.

Figure A.5: Market Access and Default of selected first-time borrowers from international capital markets.
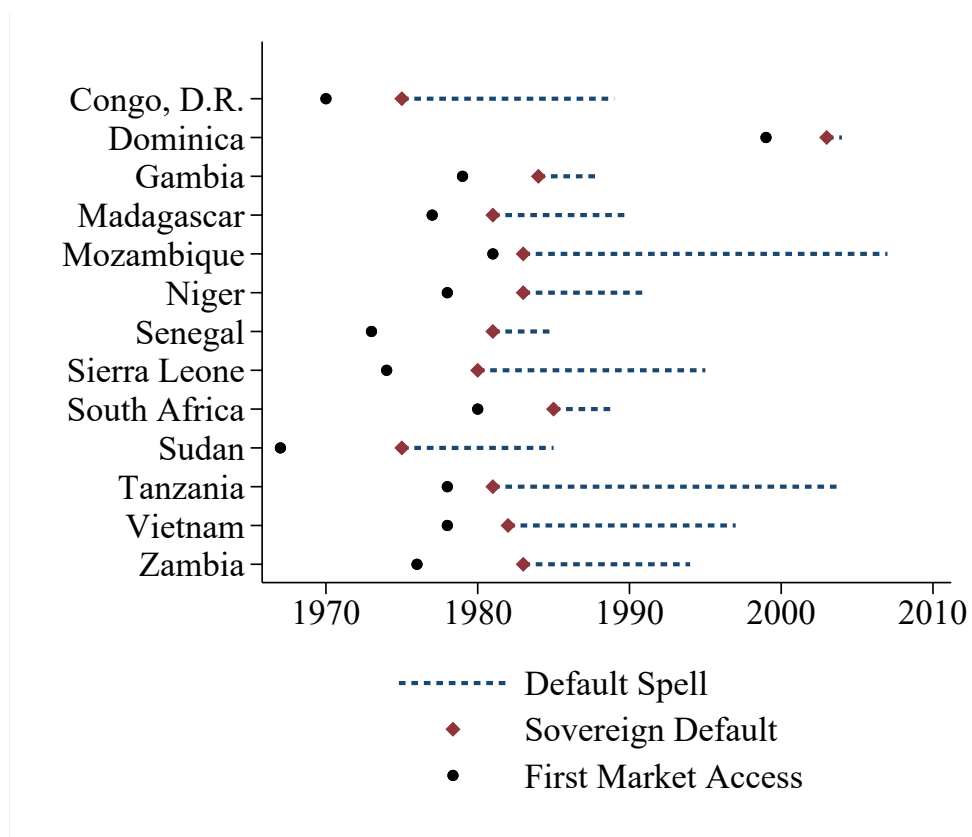
Finally, and as a complement to Figure 14, Table 5 presents how (geo-)political disaster correlate with higher haircuts.

Table 5: Default with and without Disasters: 1815-2020

	Cases	Mean	Median	SD	Min	Max	Difference in mean p-value of t-test
Wars							
Default without wars	274	41	29	37	-14	100	
Default with wars	48	56	34	54	0	100	0002
Revolutions							
Defaults without revolutions	226	38	33	29	-13	100	
Defaults involving revolutions	96	54	52	31	-14	100	0000
Country break-ups							
Defaults without country break-ups	312	42	38	30	-14	100	
Defaults with country break-ups	10	65	68	24	10	92	0022

Note: Country break-ups include the break-up of the Central American Federation, Gran Colombia, Ottoman Empire, and Austria-Hungary. We use interstate-war data from Horn et al. (2021b), Sarkees and Wayman (2010) Nils Petter Gleditsch and Strand (2002) and Davies et al. (2023). Revolutions dates come from the Arthur Banks database.