Creditors Losses Versus Debt Relief:
Results from a Decade of Sovereign Debt Crises

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Abstract

This paper computes NPV debt relief and investor losses associated with the major emerging market defaults and debt restructurings of the 1998-2005 period. Investor losses ranged from 13% to 75%, based on the market value of the new debt, and the value of the old debt evaluated at the sovereign yield immediately following the debt exchange. However, debt relief from a country perspective, evaluated at country borrowing rates in *normal* times, was typically lower. In many cases, countries could have lowered their remaining debt burdens, for given investor losses, by offering more front-loaded packages.

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1. Introduction

A sovereign debt restructuring has redistributive implications: compared with the original payment streams promised, it involves losses for investors and gains to the debtor government. This paper compares these gains and losses for the last generation of sovereign debt crises: the debt restructurings that took place between the 1998 Russian default and the 2005 Argentine external bond exchange.

Complementing earlier work on the losses that investors suffered in these exchanges (Sturzenegger and Zettelmeyer, 2005), we propose an approach to computing the post-exchange debt burden and the debt relief received from the debtor perspective. If governments expect to regain access to capital markets after a successful debt restructuring—in line with experience since the 1980s debt crisis—then they ought to discount their liabilities after a restructuring at the interest rate that they expect to prevail in normal (non-crisis) times. We estimate this discount rate based on a standard model of borrowing spreads, using data on borrowing spreads and economic fundamentals prior to each debt crisis.

The main finding of the paper is that this estimated borrowing rate is typically lower than the market yield prevailing immediately after a debt exchange. As a result, the debt burden faced by a country, evaluated at this rate, is larger than the value of the debt from an investor perspective; and the debt relief received is typically smaller than

the losses suffered by investors.[2] This in itself is not a puzzle: in the immediate aftermath of a debt exchange, governments are liquidity constrained, and the secondary market yield at which new debt issues trade is often still a "near crisis" yield. What is more puzzling is that the discrepancy between the market value and debt burden from the country perspective is often large, and in many cases could have been reduced by offering a less backloaded payments stream to investors.

In the sections that follow, we estimate expected borrowing rates in normal times from the perspective of each debt restructuring, and use them to compute the remaining debt burden and the debt relief achieved. A concluding section interprets the results, and draws some policy implications.

2. Estimating Borrowing Rates "in Normal Times"

Suppose that you are a debtor government and would like to evaluate the net present value of debt remaining after a restructuring. As in any discounting problem involving cash flows, the relevant discount rate is the interest rate at which you expect to be able to transfer cash over time in the future—that is, the interest rates which you expect to

[2] Results of a similar flavor have been found by Finger and others (2006), who evaluate the debt relief implicit in recent restructurings using a uniform 10% discount rate, and analyze whether the exchanges reduced debt to sustainable levels.

face after the crisis is overcome and you reaccess financial markets.[3] Hence, evaluating the debt burden requires forming expectations about your likely borrowing cost in "normal times".

One way of approaching this problem is to estimate the empirical relationship between fundamentals and borrowing spreads in noncrisis periods, based on data available to governments at the time of each restructuring, and use this to forecast borrowing costs conditional on fundamentals as they are expected to evolve, taking account possible reputational effects resulting from the restructuring. We opt for a widely used variant of such a model, in which spreads are regressed on emerging market credit ratings—as proxies for country fundamentals—and variables reflecting liquidity in international financial markets (Kamin and Kleist, 1999; González Rozada and Levy Yeyati, 2005, Kashiwagi and Kodres, 2005). This type of model—unlike models in which credit spreads are regressed on fundamentals directly, such as debt, liquidity, growth, current account, etc.—makes our conditional forecasting exercise comparatively easy, since it is simple to formulate assumptions on where a country's credit rating might be expected to return following a default.

[3] Any discount rate above future expected borrowing rates or below future deposit or lending rates leads to a contradiction, as it makes it possible to find an alternative debt service profile with both lower (or higher) debt payments in every period and higher (or lower) net present value. See Sturzenegger and Zettelmeyer (2006a) for a formal statement.

Following González Rozada and Levy Yeyati (2005), we regress log spreads on (i) log credit ratings, defined over a 20 point scale (with higher ratings denoting better credit fundamentals), (ii) log U.S. interest rates, (iii) log high yield bond spreads in the United States (as a proxy for liquidity in high risk debt markets), and (iv) dummy variables capturing contagion effects during the Russian and Mexican crisis period. Countries in default, and Russia and Mexico during their respective financial crises, are excluded from the regression (since the purpose is to estimate the relationship between spreads and fundamentals in *non-crisis* times). Given the objective of predicting borrowing spreads based on the information available to policy makers at the time of a restructuring, we run this regression several times, over sample periods that begin in December 1993 and end at the time of the debt restructuring. For example, to predict Russian borrowing spreads following the August 2000 "Prin/IAN" restructuring, we use a sample from December 1993 to July 2000; to predict Argentine borrowing spreads following the Argentine external debt restructuring in early 2005, we use a regression estimated from December 1993 to March 2005; and so on. We run the model on a panel of 21-31 countries, depending on the sample period, using either fixed effects (FE) or pooled OLS (Table 1). The former has the advantage that it picks up systematic deviations between country spreads and the average spread associated with the credit rating of that country; the latter, that it allows estimating the effect of a country's default/restructuring history on borrowing spreads in the future (this is not possible in the FE specification because dummy variables capturing default

history are generally time invariant in our sample, going back to the 1980s debt crisis).

Table 1. Regression Coefficients
(Dependent Variable: Log spread; *p* -values in italics)

Sample period	No. of countries	Variable 1/ *lrating*	*lt10y*	*lhy*	*mex*	*rus*	*default*	*constant*
		Regressions Using Fixed Country Effects						
12/1993 - 9/1998	21	-2.96	-0.25	2.12	-0.08	0.18	…	0.64
		0.00	*0.09*	*0.00*	*0.21*	*0.01*	...	*0.43*
12/1993 - 11/2001	27	-1.78	0.05	0.42	0.39	0.38	…	7.30
		0.00	*0.66*	*0.00*	*0.00*	*0.00*	...	*0.00*
12/1993 - 4/2005	31	-1.87	1.06	0.67	0.58	0.25	…	4.12
		0.00	*0.00*	*0.00*	*0.00*	*0.00*		*0.00*
		Regressions Using Pooled Ordinary Least Squares						
12/1993 - 9/1998	21	-2.78	-0.27	2.12	-0.08	0.19	0.21	0.17
		0.00	*0.06*	*0.00*	*0.20*	*0.01*	*0.19*	*0.83*
12/1993 - 11/2001	27	-1.86	0.04	0.41	0.39	0.38	-0.02	7.54
		0.00	*0.71*	*0.00*	*0.00*	*0.00*	*0.87*	*0.00*
12/1993 - 4/2005	31	-1.90	1.06	0.67	0.58	0.25	-0.08	4.20
		0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.36*	*0.00*

1/ *lrating* is the natural logarithm of the average Moody's and S&P credit rating (expressed on a scale from 1 to 20, where 1 is a default rating and 20 is a AAA rating); *lt10y* is the log of the 10 year U.S. treasury; *lhy* is the log high yield bond spread in the U.S., *mex* and *rus* are dummy variables for the Mexican and Russian crisis periods, and *default* is a dummy variable that takes the value 1 if the country defaulted in the 1980s and/or after it defaults in the sample period.

Table 1 presents our results for three of the relevant samples (see Sturzenegger and Zettelmeyer, 2006a, for the full set). There is a highly significant negative correlation between credit ratings and spreads, such that a halving of the credit rating leads to a 2 to 3 - fold increase in spreads. Furthermore, there is a significant positive correlation

between the high yield bond spread and sovereign credit spreads in all regressions. The other coefficients appear unstable. The relationship between U.S. treasury yields and spreads is negative in the shorter samples, and becomes positive and significant only once the sample grows to about 10 years. Default history seems to matter in the expected direction in the shorter samples, when it appears to increase the borrowing spread by 20-35%, but the effect disappears in the longer samples. This could reflect the fact that memories of defaults in the 1980s became less relevant over time—particularly as the new defaults of the late 1990s materialized.

We then use sample-specific regression coefficients to calculate fitted spreads for each debt restructuring based on: (1) the high yield bond spread and U.S. interest rates at the time of the debt restructuring; (2) the default history dummy set to 1 (in the OLS specifications) or the country fixed effect set to 1 (in the fixed effect specifications); (3) the assumption that *credit ratings will return to their pre-crisis level*, defined as the highest credit rating earned by the country in the 12 months before the default (or devaluation, when devaluations preceded the default).[4] We then add fitted spreads to U.S. treasury yields of similar maturity to that of the new instruments issued at each debt restructuring to give expected yields over the relevant time horizon. As shown in

[4] The results are not sensitive to the precise time window that is applied in selecting the pre-default rating. For example, in the case of Russia, 9.5 is the average of the Moody's and S&P rating (for long term debt in foreign currency) that Russia received between November 1996 and February 1998, before ratings started to decline ahead of the August 1998 default; prior to that, the average rating was lower. Hence, any window of at least 7 months length would have returned the same result.

Table 2, these range from as low as 6% (Uruguay, 2003) and as high as 19% (Russia, March 1999, FE estimates). These differences are accounted for in part by differences in the assumed medium term ratings and in part by differences in the financial environment (high yield bond spreads and US treasury rates). OLS estimates tend to give lower predicted yields than the fixed effects estimates, as the fixed effects associated with the countries in the table tend to be positive (when the cross-sectional average is zero by construction) and fairly large.

Most important, there are substantial differences between estimated borrowing rates in "normal times" based on information available at the time of restructuring and *actual* bond yields observed for country debt trading in secondary markets at the same time. Except for some outliers, the differences are 2 – 8 percentage points based on the FE estimates, and 4 – 14 percentage points based on the OLS estimates.[5] Hence, post-restructuring yields tend to be higher than the yields that the country can reasonably expect to pay in non crisis times—even though the former already reflect the country's improved solvency situation following a debt restructuring.

[5] In four cases—the March 1999 GKO restructuring in Russia, the 1998-99 Ukraine restructurings, and the November 2001 "Phase 1" restructuring in Argentina—the differences between fitted and actual yields were much larger. These were generally cases in which the instruments issued in the debt exchange did not trade in the aftermath of the exchange and the "actual yields" quoted in the table reflect the yields on bonds issued *before* the crisis. While these bonds were being serviced, they were believed to be candidates for default, and in three of the four cases—Russia was the only exception—were indeed defaulted (within 2 months in the case of Argentina, and within 9-18 months in the cases involving Ukraine).

Table 2. Discount Rate Estimates

Restructuring Episode	Date	Rating		Fitted Using FE 1/		Fitted Using OLS		Actual
		Assumed	2005	Spread	Yield	Spread	Yield	$ Yield
Russia - GKO	Mar-99	9.5	12	13.9	19.0	7.5	12.6	40.0
Russia - MinFin	Feb-00	9.5	12	9.4	16.1	4.4	11.1	20.8
Russia - PRINs/IANs	Aug-00	9.5	12	10.3	16.2	4.9	10.8	16.4
Ukraine - OVDP	Sep-98	7	9	...	...	35.9	40.6	75.0
Ukraine - ING Loan	Aug-99	7	9	...	...	11.5	17.2	81.6
Ukraine - External	Apr-00	7	9	...	...	8.9	14.9	28.6
Pakistan - Eurobond	Dec-99	7.5	8	...	...	7.7	13.8	21.4
Ecuador - External	Aug-00	8	5	11.0	17.0	7.0	12.9	22.2
Argentina - Phase 1	Nov-01	9	6	7.6	12.5	5.6	10.5	37.8
Argentina - External	Apr-05	9	6	3.6	8.6	2.7	7.7	8.2
Uruguay - External	May-03	12	7	2.7	6.6	2.2	6.1	12.0
Uruguay - Domestic	May-03	12	7	2.7	6.3	2.2	5.8	14.1

1/ For Ukraine and Pakistan, no fixed effects results are available because these countries only entered the regression sample after the time of their debt restructurings.

Intuitively, the post exchange yield appears to still be a “crisis rate”. One reason why this might be the case in the sovereign debt context relates to asymmetric information. Defaults are events in which rules are broken and reputations are shattered. There is uncertainty about the country preferences and future behavior, which are reflected in the yield prevailing immediately after a default. The government presumably knows its policy intentions and ability to deliver better than investors, but cannot take advantage of this better knowledge and simply buy back its debt because it cannot borrow in the immediate aftermath of a debt exchange (except possibly at the “crisis yield”). As time progresses and policy actions are observed, the information gap will

narrow. Even if country fundamentals (and global liquidity conditions) do not change, secondary market yields will hence fall.

Two cases—Argentina in April of 2005, and the fixed effects estimates for Russia in August of 2000—are exceptions in that the difference between fitted and actual yields was close to zero. In these cases, a substantial amount of time had passed between the initial default and the final debt restructuring: over 3 years in the case of Argentina, and 2 years in the case of Russia. In the meantime, the economic situation of both countries had greatly improved, and it was clear that the worst fears that had prevailed at the time of default—a significant reversal of market reforms, and hyperinflation—would not materialize. This may explain why the premium that we typically observe when comparing actual and fitted yields is missing.

3. Implications of the 1998-2005 Restructurings

Using data on the cash flows of the debt instruments exchanged, we now compare the financial implications of the 1998-2005 debt restructurings for debtor countries and investors. We focus, first, on the (remaining) *debt burden*, which is the sum of net present values of the new debt instrument issues, discounted at the rates estimated in the previous section. This is compared with the secondary market *value* of the new debt immediately after the exchange. Second, we compute the *debt relief* that resulted from each restructuring as the percentage difference between the present value of the

old debt outstanding and the new debt burden, both discounted at estimated borrowing rate in normal times. This is compared with the *haircut*—the losses—experienced by investors, which are defined analogously, except that the discounting takes place at the actual secondary market yield quoted in Table 2.[6]

The first two columns of Table 3 express the debt burden (for each of the two country discount rates estimated) as a percentage of the market value of the new debt immediately after the restructuring. With few exceptions, the debt burden from the debtor government perspective was larger than the value of the same debt from the investor perspective. This is just a reflection of the fact that except for the case of Argentina (2005) and the Russia Prins/IANs exchange based on fixed effects estimates, estimated discount rates were lower than actual secondary market yields. The table shows that the resulting discrepancy between debt burdens and value to investors was quite large, in the range of 20 to 120%.

[6] Hence, debt relief is defined as 1-*NPV(new,r)*/*NPV(old,r)*; where *NPV(new,r)* and *NPV(old,r)* denote the sum of the net present values of the new and old instruments exchanged, discounted at the borrowing rate in normal times. The haircut is defined identically, except that the actual post-exchange yields are used as discount rates instead of *r*. See Sturzenegger and Zettelmeyer (2005, 2006a,b) and Andritzky (2006) for discussion of this and related concepts of investor losses.

Table 3. Implications of debt restructurings for debtors and investors 1/
(in percent)

Restructuring Episode		Debt burden/value		Debt relief estimates		Investor losses 2/	Average duration 3/	
		FE	OLS	FE	OLS			
Russia - GKO, residents	Mar-99	120	129	36.4	31.8	46.7	2.1	
Russia - GKO, nonresidents 4/	Mar-99	122	131	51.6	47.9	60.0	2.1	
Russia - MinFin	Feb-00	125	163	53.9	40.0	63.2	6.5	
Russia - PRINs/IANs	Aug-00	102	223	51.8	33.2	52.6	12.7	
Ukraine - OVDP, nonresidents	Sep-98	…	133	…	43.3	56.4	2.0	
Ukraine - Chase Loan	Oct-98	…	121	…	15.8	30.7	1.4	
Ukraine - ING Loan	Aug-99	…	154	…	4.8	38.0	1.4	
Ukraine - External	Apr-00	…	145	…	10.2	28.9	5.4	
Pakistan - Eurobond	Dec-99	…	131	…	11.2	31.0	3.9	
Ecuador - External	Aug-00	119	145	28.0	24.8	28.6	16.3	
Argentina - Phase 1	Nov-01	154	176	32.2	30.8	40.5	11.0	5/
Argentina - External	Apr-05	104	122	73.9	70.9	75.0	23.7	
Uruguay - External	May-03	152	159	-3.3	-5.3	13.4	11.5	
Uruguay - Domestic	May-03	157	163	2.0	0.0	22.3	8.4	

1/ Weighted by outstanding or exchanged principal of old instruments. When several exchange options were available, took simple average across options, unless otherwise noted.
2/ Source: Sturzenegger and Zettelmeyer, 2005.
3/ Refers to new instruments. Average time of debt service (both interest payments and amortization; in years).
4/ Includes effect of exchange restrictions (see Sturzenegger and Zettelmeyer, 2005, for details).
5/ Estimate; based on average duration of old debt of 8 years and average maturity extension of 3 years.

The table next shows debt relief and investor losses associated with the various restructurings, as percentages of the original debt burden and debt value, respectively. Debt restructurings in the last decade varied greatly with respect to their "harshness" on investors: Argentina's debt 2005 exchange led to investor losses in the order of 75%, while external investors lost only 13% in Uruguay's 2003 exchange. The table also shows that investor losses generally did not translate into debt relief of similar magnitude. In general, debt relief fell short of investor losses by about 10-20

percentage points, reflecting the combined effects of lower discount rates, and the fact that debt restructurings usually went along with an extension of residual maturities. The use of lower discount rates hence raises the net present value of the longer maturity new debt more than that of the shorter maturity old debt.

Could countries have taken advantage of the gap between market yields and borrowing rates in normal times by offering investors shorter instruments? As argued before, countries that engage in a debt restructuring are borrowing constrained; hence, offering investors very short-term debt or cash would not have been an option. However, there is also evidence that the exclusion period from international capital markets following the conclusion of a debt restructuring agreement is typically short (Gelos, Sahay, and Sandleris, 2004): a matter of months; at most, a couple of years. In light of this it is quite puzzling that many debt exchanges offered investors long term instruments—with average durations far outside the typical exclusion periods, see last column of Table 3—even in cases when secondary market rates clearly exceeded borrowing rates in normal times. These governments could have obtained higher debt relief, for *given* investor losses, by opting for more "front-loaded" payment streams.

4. Conclusion

The debt exchanges of the 1998-2005 period differed greatly in terms of the investor losses they inflicted and the debt relief obtained by the countries. However, they also

have one feature in common: with few exceptions, investor losses greatly exceeded debt relief. In itself, this is not puzzling: it reflects the fact that the sovereign yields prevailing immediately after an exchange tend to be higher than borrowing rates in normal times. What is puzzling, however, is that faced with this situation, countries often did not attempt to maximize debt relief, for given investor losses (or conversely maximize the value to investors, for a given debt relief) by offering shorter maturity instruments. On the contrary, new instruments were often long term, significantly extending the maturity of the original debt.

The most plausible interpretation is presumably that governments feared that with some probability, they might be cut off from sovereign borrowing over a long period of time. While this fear is at odds with the observation that capital market exclusion periods following recent defaults have typically been short, it might be justified by the fact that emerging market borrowers—irrespective of their default histories—have had unstable access to international capital markets, suffering periodic "sudden stops" in international capital flows. This would justify discounting the remaining debt burden at higher rates than borrowing rates in normal times. Our debt relief estimates would consequently underestimate the welfare gains of the analyzed debt restructurings for the country.

Alternatively, it could be that borrower countries governments did not maximize welfare. For example, the primary interest of governments might have been to

minimize liquidity problems over a limited time horizon, even if this led to a higher social debt burden. Even in that case, however, extending debt maturities much beyond the expected time of return to capital markets does not make much sense unless governments believed that with some probability, borrowing contraints will remain—or could return—for a long time (since they would otherwise have been better off issuing shorter maturity debt and refinancing it when it came due).

This paper has policy implications at two levels. First, it simply serves as a reminder that in order to maximize debt relief for a given level of investor losses, governments should be front-loading payments under a debt exchange offer as much as possible. Second, to the extent that debt restructuring offers were backloaded because governments expected to remain liquidity constrained in the future, the paper highlights the potential benefit of institutional arrangements that reduce the threat of "sudden stops" in private capital flows, or provide liquidity assistance if sudden stops do occur.[7] The gap between the debt burden and the value of the debt computed in Table 3 could be viewed as a measure of this benefit, that is, of the solvency gains that might have resulted from stable access to capital markets.

[7] For a survey of proposals in this area, see Sturzenegger and Zettelmeyer (2006b), Chapter 12.

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