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Haircuts: Estimating Investor Losses in Sovereign Debt Restructurings, 1998–2005

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IMF Working Paper

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Abstract

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This paper estimates bond-by-bond “haircuts”—realized investor losses—in recent debt restructurings in Russia, Ukraine, Pakistan, Ecuador, Argentina, and Uruguay. We consider both external and domestic restructurings. Haircuts are computed as the percentage difference between the present values of old and new instruments, discounted at the yield prevailing immediately after the exchange. We find average haircuts ranging from 13 percent (Uruguay external exchange) to 73 percent (2005 Argentina exchange). We also find within-exchange variations in haircuts, depending on the instrument tendered. With exceptions, domestic residents do not appear to have been treated systematically better (or worse) than foreign residents.

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I. INTRODUCTION

This paper estimates investor losses—or “haircuts,” in market parlance—associated with the new generation of sovereign debt restructurings that started with Russia’s 1998 default and has since extended to a number of emerging market countries in Eastern Europe, the Middle East, and Latin America. Specifically, we examine the 1999 Russian domestic debt (GKO) restructuring; a string of restructurings in Ukraine during 1998 and 1999; the December 1999 exchange of Pakistan’s Eurobonds; the 2000 external debt exchanges in Russia, Ukraine, and Ecuador; the November 2001 “Phase 1” exchange of Argentine bonds; the 2002 “Pesification” of Argentine debt; the May 2003 Uruguayan bond exchange; and the 2005 Argentina exchange.

One motivation for the empirical exercise conducted in this paper is simply to better understand emerging market debt as an asset class. A key question is how much investors typically recover in a default situation, and whether there are substantial variations from one debt restructuring to another. It is also interesting to find out whether investors were treated equally within each debt restructuring, or whether some holders came out better than others, and if so, whether there is a systematic relationship with the characteristics of the initial instrument or the residence of the bondholder.

A second motivation is related to economic policy. The extent to which private creditors suffered losses in recent debt restructurings is an important input in the policy debate on how debt crises should be resolved, and whether the current framework for doing so is appropriate or not. For example, some of the debt restructurings that we consider in this paper, such as Pakistan’s 1999 Eurobond restructuring, involved a deliberate decision by official creditors to force private creditors to take some losses in order to reduce the “investor moral hazard” associated with official debt forgiveness. This raises the question whether they succeeded, and how big those losses turned out to be *ex post*. However, market participants and policy makers are also interested in the continued existence of a sovereign debt market, and concerned about debtor moral hazard. Some observers, such as Rieffel (2003), have argued that compared with the negotiated “Brady deal” of the early 1990s, the debt exchanges since 1998 have constituted a more confrontational—a unilateral—approach to resolving distressed debt situations, with potentially damaging consequences. But to compare various debt restructurings in terms of their “investor friendliness,” one needs to begin with an assessment of the losses that investors were actually forced to take. This paper provides such an assessment for all major debt restructurings between 1998 and 2005.

This paper is related to several literatures (see Sturzenegger and Zettelmeyer, 2005, for a survey). A small group of papers—including Eichengreen and Portes (1986, 1989), Lindert and Morton (1989), and Klingen, Weder and Zettelmeyer (2004)—have examined how private emerging market creditors have fared over the long run, that is, over time periods that included both debt restructurings and returns in good times. They find that investors in these markets have typically earned a premium over comparable instrument in more stable markets, but that these premia have been relatively small. More similar to this paper, there is a literature summarizing the outcomes of specific debt restructurings. Suter (1992) examines

debt restructurings from 1820 through 1975 and documents the extent to which arrears were repaid, and whether interest payments and face value were reduced. Jorgensen and Sachs (1989) compute investor losses in four Latin American defaults in the 1930s, comparing the present value of the principal outstanding at default to the present value of actual repayment after default, both discounted back to the default year using a risk-free international interest rate. Several papers, including Eichengreen and Rühl (2001), Lipworth and Nystedt (2001), IMF (2001), World Bank (2002), and Cline (2004) have discussed the terms of more recent debt restructurings in the 1980s and 1990s, and sometimes the market performance of bonds before and after restructuring events. Unlike this study, however, these papers do not estimate net present value losses suffered by investors. Finally, while investment banks and creditor organizations, as well as the IMF, have in some cases estimated a measure of “haircuts” associated with specific crises, these estimates are generally not published, the computations underlying them are not always transparent, and the methodologies used may vary across episodes.

The contribution of this paper is twofold. First, we present and justify a particular approach for computing investor losses, namely, as the difference between the net present value of the original and the new (restructured) instruments, using the immediate post-exchange (“exit”) yield of the new instrument to discount both payments streams. Hence, we focus on realized, ex post losses of investors in the immediate aftermath of a restructuring. We then implement this approach in a way that deals, in a consistent way, with a number of practical difficulties, described in detail in the following section. This yields a set of loss estimates at the level of individual instruments tendered, which are comparable both within and across exchanges.

Our main results are as follows. There are substantial differences between average investor losses across debt restructurings, ranging from 13 percent (Uruguay, 2003) to 73 percent (Argentina, 2005), with most restructurings clustered in the 25-35 percent range. Moreover, some (but not all) exchanges exhibit substantial variations in the haircut even within the same exchange, depending on the instrument tendered. Thus, in most cases, “intercreditor equity” was violated ex post, at least in a present value sense. We explore some regularities in within-exchange variations in investor losses, and conjecture what might be driving them. An interesting related finding is that although some exchanges offered different terms to resident and non-resident investors, or designed a restructuring with a particular group of creditors in mind, there generally does not appear to have been harsher treatment of residents relative to nonresident investors (or vice versa).

The paper is organized as follows. Section II explains the methodology. Section III provides a brief description of the restructurings considered and presents the results. Section IV compares the results across exchanges and provides some summary statistics. Section V concludes.

II. MEASURING INVESTOR LOSSES

The approach taken in this paper is to compare the market value of the new instruments, plus any cash payment received, to the net present value (NPV) of the remaining contractual

payments on the old instruments (inclusive of any principal or interest arrears), discounted using the yield of the new instruments (r_{new}) immediately after the results of the exchange became public information. Hence:

$$H \equiv 1 - \frac{NPV(new, r_{new})}{NPV(old, r_{new})}. \quad (1)$$

Two aspects of this definition require elaboration.

First, our concept of “haircuts” differs slightly from a simpler concept that is often used to evaluate “haircuts” by financial market participants, namely, to compare the market value of the new debt and cash received to the sum of *outstanding face value* of the old debt and past due interest. The justification for using the face value—apart from the fact that it makes haircuts much easier to compute, since it is based only on the total volume of outstanding debt, not the payments terms of the old bonds—is that in a default situation, payments due under the old bonds are usually accelerated, so that the contractual right of the creditor shifts from being entitled to a future payment stream to the right to immediate repayment of the principal.

We do not follow this approach for two reasons. First, our objective is to compare the value of the new instruments to the value of the old debt in a situation in which the sovereign would not have defaulted. Hence, it seems unattractive to compute the value of the old instruments conditional on a contractual change that is triggered by the decision to default. Instead, we prefer to base our definition of losses on the original contractual terms. Second, most debt exchanges that are studied in this paper (the exceptions being Argentina, Russia, and Ecuador) took place ahead of formal defaults, so that the debt was not, in fact, accelerated in most cases. So even if we were to accept the argument that the face value is the right “numerator” for computing haircuts when the debt is accelerated, it makes more sense to use the definition proposed in equation (1) if we are to use a consistent methodology across all exchanges.

In practical terms, basing haircuts on NPVs rather than face values of the old instruments will have two effects. If the interest rate used to evaluate the NPV is higher than the coupon rate under the old bonds—which is typically, though not always, the case—computed haircuts will be lower than under the more conventional methodology. Moreover, the discrepancy will be greater the longer the bonds are. We return to this point when we interpret our results below.

The second aspect of our definition that requires justification is the use of the same, post-exchange yield to discount both old and new promised payments flows. The consequence of this is that haircuts in our definition may be very different from the actual, mark-to-market loss experienced by investors at the time of the exchange. To measure the mark-to-market loss, the NPV of the old instruments would have to be discounted at the (generally higher) interest rate prevailing before a debt exchange, resulting in smaller haircut than under

definition (1). However, the mark-to-market loss is not a meaningful concept for our purposes. In a world of perfect foresight, the value of the old instrument just before a debt exchange would be identical to the value of the new instruments just after the exchange. Hence, the measured gain or loss will reflect the extent to which the result of the exchange was incorrectly anticipated, rather than the terms of the exchange: there should not be any systematic connection between the terms of the exchange offer and this loss. Larger reductions in coupon payments and face value, or more drawn out amortization payments need not imply a higher mark-to-market loss at the time of the exchange since the anticipation of these tougher terms will depress the pre-exchange value of the old instruments.

Hence, haircuts in our definition do not reflect the actual loss that investors experienced as a consequence of trading their instruments. For successful bond exchanges, that loss cannot, in general, have been positive—if it had been, investors would not have participated in the exchange. Rather, our “haircuts” describe the loss that was incurred by participating investors—at the margin, i.e. conditioning on the actions of others—compared to a hypothetical situation in which debtor government would not in any way have discriminated against investors that chose not to participate (this is implicit in the fact that both old and new instruments are discounted with the same rate r_{new}). In other words, our haircuts measure what each participating investor’s *temptation to free ride* would have been in the absence of discrimination. In actual fact, of course, these exchanges were mostly a success, indicating that this temptation to free ride must have been overcome somehow, for example, by threatening not to repay holdouts, or by changes the non-payment terms of the old bond contracts. Hence, for successful exchanges, positive haircuts in the definition of equation (1) measure the pressure that must have been exerted on investors in order to solve the free rider problem associated with the exchange. This is a key property of our concept of haircuts: it allows the ranking of exchanges according to their “toughness” on creditors.

To see this more formally, let $u_i(accept | \{a_j\}_{j \neq i})$ denote the expected payoff from accepting the exchange offer, conditioning on the actions of other investors (i.e. accept or reject), and $u_i(reject | \{a_j\}_{j \neq i})$ the expected payoff from holding on to the old debt instrument. For investors that accepted the exchange offer, it must have been true that

$$u_i(accept | \{a_j\}_{j \neq i}) - u_i(reject | \{a_j\}_{j \neq i}) \geq 0, \quad (2)$$

$u_i(accept | \{a_j\}_{j \neq i})$ is just the market value of the new instrument, that is, the price that can be observed in the secondary market after the exchange. By definition this is equal to the net present value of the cash flow promised by the new instrument, discounted by the secondary market yield of these new instruments. Thus, $u_i(accept | \{a_j\}_{j \neq i}) = NPV(new, r_{new})$. Using (1) and (2), one obtains:

$$H \leq 1 - \frac{u_i(\text{reject} | \{a_j\}_{j \neq i})}{NPV(\text{old}, r_{\text{new}})} . \quad (3)$$

$u_i(\text{reject} | \{a_j\}_{j \neq i})$ is the (unobservable) utility, or value, of holding on to the old instrument, conditioning on the outcome of the exchange, given expectations about what would happen to old instruments that were not traded in. $NPV(\text{old}, r_{\text{new}})$ is the net present value of the cash flow associated with the old instrument discounted at the yield of the *new* instrument—that is, assuming “equal treatment”, or no discrimination. In actual fact, of course, there may well have been discrimination—for example, an implicit threat that the old instruments would not be serviced in the same way as the new ones. Hence, the NPV of the old instruments derived under the “equal treatment” assumption, $NPV(\text{old}, r_{\text{new}})$, will generally exceed the actual utility $u_i(\text{reject} | \{a_j\}_{j \neq i})$ that investors expected to derive from retaining the old instruments. The observed “haircut” H tells us how big the difference between the theoretical value of the old instrument, $NPV(\text{old}, r)$, and its value *as it was actually perceived* must have been, at a minimum, to make investors accept the exchange offer. Hence, H is a measure for the perceived “toughness” of a successful exchange offer.

While conceptually simple, measuring H as defined in (1) involves a number of practical complications. The hardest problem was that in a few instances—including the 1999 Russian domestic debt restructuring, the Ukraine treasury bill restructuring of 1998, and the November 2001 Argentine exchange—the new instrument was not traded; hence, there is no market value and no “exit yield.” In these situations, our approach was to estimate what r_{new} might have been using the available interest rate information. In the case of Russia, we used information contained in current and future 90 day interbank rates. In Ukraine we estimated exit yields based on the market returns on similar instruments issued immediately after the exchange. In the case of Argentina, old bonds continued to be traded after the exchange, and the new instruments were eventually traded, albeit after a substantial time lag. As explained in more detail below, the implicit yields of these two groups of bonds are used to compute upper and lower bound estimates for the true haircut. Fortunately, they are sufficiently close to be informative.

A second and more routine problem is that the maturities of the new and old instruments were typically not the same. Suppose, as will generally be the case, that the maturity of the new instrument is longer than that of the old instrument, and that the term structure is upward sloping (as one might expect if the debt exchange has put an end to the perceived crisis; otherwise it could be downward sloping, at least at the short end). Then the yield of the actual new instrument will be higher than that of a new instrument with the length of the old instrument. By discounting the old instrument with this higher yield, we will tend to underestimate the $NPV(\text{old})$ that we would have obtained by discounting with a yield corresponding to the maturity of the old instruments, and hence the extent of the haircut.

To deal with this problem, we attempted to estimate the “new” yield corresponding to the average length of the old instrument by interpolating the yields on all performing instruments trading in the market after the exchange (there are usually more than one). When this was not possible—for example, because all new instruments were longer than the old one in terms of remaining maturity—we used the yield on the new instrument that was closest to the old bond in terms of average length, and made an adjustment using the yield curve on US treasury bills. As a robustness check, we also used the yield of the instrument actually obtained in exchange for the old one, i.e. ignoring any maturity adjustment, bearing in mind that this could introduce a bias as described above. With few exceptions, discussed below, the results were fairly robust to the approach used to adjust the discount factors.

A third complication arises when the exchange involves a change in the currency of denomination of the two instruments. In this case old and new instruments cannot be discounted at the same rate. Fortunately, in most cases both foreign and domestic currency exit yields were available to us, so it was just a matter of applying the discount factor of the relevant currency in each case, adjusted by maturity when necessary. Once the present value of the two instruments was obtained, the exchange rate at the time of the exchange was used to express both in a single currency and compute the haircut.

A fourth complication is that by applying the new instrument yields to the old instrument we are also assuming that both instruments were of the same seniority. However, in some cases—for example, the Russian exchange in which new instruments were upgraded to debt of the Russian Federation as opposed to debt owed by a state-owned bank—the sovereign resorted to security enhancements to make new instruments more attractive. By discounting the old instrument’s cash flow with the yield of the new instruments we would be incorrectly applying this enhancement to the old instrument. In this case, we may be overestimating the haircut with respect to the true old instruments.

Fifth, in a few cases we had to deal with incomplete information about the terms and outcomes of the exchange. In several instances, the package received by the bondholders contained a complex combination of new bonds and there is little precision as to how much of each of the new bonds was exchanged for each particular instrument. In general, when facing such lack of information we computed two bounds. In one, it was assumed that the bondholder received the best possible set of instruments. In the other, she received the worst. In general (but not always), these alternatives do not generate substantially different results.

Finally, some instruments (old and new) envisaged coupon payments tied to future market interest rates such as the US LIBOR. When computing the net present values of these instruments, one must hence assume an expected path of these market interest rate based on information available at the time of the exchange. For an interest rate such as LIBOR, for which there are well developed swap and futures markets, this is easy to do; in fact, forward LIBOR rates based on interest swap rates can be downloaded directly from Bloomberg. In a few cases, however, bonds were indexed to local interest rates for which forward rates cannot be computed; in this case we generally projected that last available rate forward.

III. RESULTS

A. Russia²

The GKO-OFZ Restructuring

On August 18, 1998, the Russian Federation devalued the ruble and defaulted on its domestically issued debt (short-term Treasury Bills known as GKOs, as well as longer-dated Ruble denominated bonds named OFZs), while attempting to stay current on its external obligations. A first restructuring offer on Ruble denominated “GKO” treasury bills was made on August 25; this was rejected by market participants. Following a lengthy negotiation process with a steering committee composed of Western creditor banks, a restructuring agreement, known as the “novation scheme”, was finalized in March 1999. According to Santos (2003), about Rub 190 billion in Russian domestic debt were affected by the restructuring, of which about Rub 80 were held by foreigners. The latter corresponds to about \$12.8 bn when evaluated at pre-crisis exchange rates, and about \$3.5 bn when evaluated at the exchange rate prevailing in early March 1999.

Under the agreement, holders of GKO or OFZs accepted to have their scheduled payments discounted to August 19, 1998, at a rate of 50 percent per annum. Based on the resulting adjusted nominal claims, they then received a package including a combination of cash and very short term instruments in addition to longer term OFZs. The short term component included a cash payment equivalent to 3.33 percent of the adjusted nominal value; 3.33 percent in 3-month GKOs (these bonds had an issue date of December 15 so that they would expire shortly after the exchange on March 24); 3.33 percent in 6-month GKOs (also with an issue date on December 15); and 20 percent in “cash value” OFZs that could be used to pay tax obligations that were in arrears as of July 1st, 1998 at par, or to purchase newly issued shares of Russian banks. The remaining 70 percent was exchanged for new OFZs with maturities ranging from 3 to 5 years with coupons of 30, 25, 20, 15 and 10 each year, respectively. Importantly, all cash proceeds obtained under this scheme—including any receipt from selling the new GKOs or OFZs—had to be deposited in restricted ruble accounts (“S-accounts”) that could be used to purchase selected Russian corporate bonds and equities, but allowed the withdrawal and repatriation of funds at market exchange rates only after they had been placed in a non-interest bearing “transit account” for one year.³ Thus, the novation scheme in effect combined a standard debt restructuring with the imposition of a capital control. In our baseline computations, we disregard the losses associated with the imposition of this control, but return to the issue later.

² This section draws on Santos (2003), Kharas et al. (2001), publicly available IMF reports, investor newsletters, and information gathered by NUPI, Center for Russian Studies.

³ Alternatively, investors could skip the transit account, but only if they agreed to exchange their rubles through a special auction involving a more depreciated rate.

From the perspective of applying our methodology for computing haircuts, the main difficulty of the GKO exchange is that the Russian domestic debt market was wiped out after the default, and was not reestablished even long after the exchange. In other words, there are no secondary market prices at which the new instruments could be valued, and no “exit yields” at which to discount the old instrument. Hence, we need construct a discount rate to value both old and new cash flows at the time of the exchange, using the same information that would have been reflected in domestic bond rates had they existed at the time—in particular, inflation expectations and default risk. One approach is to take the 90 day interbank rate—initially an administered interest rate, but one that reflected inflation expectations, as the authorities were attempting to maintain positive real interest rates—and add to that a sovereign default risk premium, obtained as the difference between the (performing) March 2004, 9 percent Eurobond yield and the yield of US treasuries of equivalent maturity. Since inflation was coming down from high levels at the end of 1998, and a fraction of Russia’s external was still in default, both numbers are very large: in March 1999, the interbank rate stood at 45 percent, and the risk premium at about 35 percent, which implies a ruble discount rate of 80 percent. While appropriate for discounting GKO’s coming due in the near term, this is almost surely too high for discounting the medium term OFZs, as inflation was expected to decline in the medium term. An alternative approach is to apply a declining path of discount rates in line with the actual declines in 90 day interest rates; this yields an average OFZ discount rate of only about 60 percent. However, actual disinflation was faster than expected, and it is inflation *expectations* that we are interested in, so this could be on the low side. Hence, we take the approach of using a flat 80 percent rate discount rate as an upper bound, and a declining path (beginning at 80 percent, declining to about 50 percent by January of 2004, the maturity date of the long OFZ) as a lower bound, and compute haircuts for both sets of discount factors.

Table 1 shows the results. For brevity we only show the haircut computation for the first GKO maturing in each of the months for which there were GKO instruments restructured.⁴ The upper half of the table shows the present value at the time of the exchange of GKO’s with a face value of 100 rubles. In the first four columns, we show GKO’s that would have matured before the exchange date. In these cases, we compute their hypothetical value at the time of the exchange date (March 1, 1999) assuming that after maturing, they would have been invested in Russia at the monthly average ruble deposit rate of about 25 percent prevailing in the Russian financial sector at the time.⁵ The last four columns show GKO’s maturing after the exchange date; in these cases, we apply the 80 percent discount rate short term discount rate implicit in both of the discounting approaches described above.

⁴ The complete table for all GKO’s identified by Bloomberg as defaulted can be obtained from the authors upon request.

⁵ Because the compounding period is short, the results are not very sensitive to the choice of compounding rate. For example, using a compounding rate of 40 percent rather than 25 percent would raise the haircut by a 1-3 percentage points (depending on the GKO’s maturity date).

The lower half of the table shows what investors received in return, both in “cash items” and in longer term OFZs. All values are computed taking into account that the original flow had been discounted at a 50 percent nominal interest rate back to August (line “recognized value of old instrument”). Thus, if an instrument had a face value recognition of 90 percent (see first column) the 3.33 percent of cash implies a payment of $3.33 \times 0.9 = 3$ per 100 of face value, and so on with the other instruments. As there is little information as to the exact number of OFZs given to each GKO holder, we also compute two bounds depending on the instruments obtained. One (lower) bound considers that the holder received only the shorter of the OFZs, thus providing the most convenient alternative to bond holders. The other (upper) bound considers that the bond holders only obtained the longest version.

The “haircuts” shown at the bottom of the table are computed as the percentage difference between the present values of the old instruments and the sum of the present values of new instruments. They indicate that in net present value terms, investors lost *at least* 41-55 percent of the pre-existing claim (depending on the discount rate that is applied, and the GKO tendered). This lower bound applies for investors with access to the shortest OFZ—investors who received the longest OFZ lost about 9 percentage points more. These estimates ignore the effect of withdrawal restrictions (see below).

Russian institutional holders, who were required to hold GKO/OFZs by law, received slightly different terms (10 percent cash, 10 percent in 3 month GKOs, 10 percent in 6 month GKOs, 20 percent in cash value OFZs and 50 percent in OFZs with maturities ranging from 4 to 5 years). The larger share of cash payments implied a slightly improved deal, by about 2-4 percent for investors receiving the shortest OFZ, and about 5-7 percent for investors receiving the longest OFZ, depending again on the discount rate that is applied.

Table 1. Russian GKO Exchange, March 1999
(Haircuts suffered by non-residents, ignoring the effect of repatriation restrictions after the exchange)

	GKOs maturing on ...							
	11/04/98	12/02/98	01/13/99	02/10/99	03/10/99	04/07/99	05/05/99	06/09/99
Old Instruments								
Issue date	02/11/98	06/10/98	01/14/98	03/11/98	03/25/98	04/08/98	05/06/98	06/10/98
Amount issued (US\$ mn) <u>1/</u>	379	155	149	274	349	181	351	101
Average remaining life (years)	-0.32	-0.24	-0.13	-0.06	0.02	0.10	0.18	0.27
Present value on March 1, 1999 <u>2/</u>	106.8	105.8	102.9	101.2	98.5	94.3	90.1	85.2
Compound/discount rate used (percent) <u>3/</u>	22.3	25.7	24.2	22.8	79.9	79.9	79.9	79.9
Recognized Value (RV) of old instrument <u>2/ 4/</u>	90.1	87.3	83.3	80.8	78.1	75.8	73.4	70.7
Value of New Instruments (1) (downward sloping discount rate path) <u>2/ 5/</u>								
Cash (3.33% of RV)	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.4
GKO 3/24/1999 (3.33% of RV)	2.9	2.8	2.7	2.6	2.5	2.4	2.4	2.3
GKO 6/16/1999 (3.33% of RV)	2.5	2.5	2.3	2.3	2.2	2.1	2.1	2.0
"Cash Value" OFZ (20% of RV)	5.1	4.9	4.7	4.5	4.4	4.3	4.1	4.0
Longer Dated OFZ (70% of RV)								
Shortest: OFZ 2/6/2002	49.2	47.7	45.5	44.1	42.7	41.4	40.1	38.6
Longest: OFZ 1/21/2004	39.4	38.2	36.5	35.4	34.2	33.2	32.1	30.9
Value of New Instruments (2) (discount rate fixed at 79.9) <u>2/</u>								
Cash (3.33% of RV)	3.0	2.9	2.8	2.7	2.6	2.5	2.4	2.4
GKO 3/24/1999 (3.33% of RV)	2.9	2.8	2.7	2.6	2.5	2.4	2.4	2.3
GKO 6/16/1999 (3.33% of RV)	2.5	2.5	2.3	2.3	2.2	2.1	2.1	2.0
"Cash Value" OFZ (20% of RV)	1.5	1.5	1.4	1.4	1.3	1.3	1.2	1.2
Longer Dated OFZ (70% of RV)								
Shortest: OFZ 2/6/2002	41.7	40.4	38.5	37.4	36.1	35.1	34.0	32.7
Longest: OFZ 1/21/2004	31.6	30.6	29.2	28.3	27.4	26.6	25.7	24.8
Haircuts based on choosing shortest OFZ (in percent)								
using downward sloping discount path	41.3	42.6	43.7	44.4	44.8	44.1	43.3	42.3
using constant discount rate of 79.9	51.7	52.8	53.6	54.2	54.6	53.9	53.3	52.5
Haircuts based on choosing longest OFZ (in percent)								
using downward sloping discount path	50.5	51.6	52.5	53.1	53.4	52.8	52.1	51.3
using constant discount rate of 79.9	61.1	62.0	62.7	63.2	63.5	63.0	62.4	61.8

1/ Using March 1, 1999 exchange rate. Equals amount outstanding at the exchange, as there were no prior amortizations.

2/ Per 100 units of principal.

3/ For GKOs maturing prior to March 1, average Ruble deposit rates were used for compounding. For those maturing after this date, the estimated post-restructuring GKO's yield is used (see text).

4/ Payments due under old instruments discounted at a 50 percent rate to 8/1/1998.

5/ GKOs discounted at 79.9 percent; shortest OFZ at about 60 percent, longest and "cash OFZ" at about 57 percent.

So far, we have ignored the fact that all cash proceeds had to be placed in restricted "S-accounts". This is like assuming that investors were in no hurry to exit Russia, and happy to spend their cash on the options open to them under the rules governing the "S-accounts." To see how much this (implausible) assumption affects the results, one can make the opposite

assumption, namely, that non-residents attached zero value to the investment or tax payment options offered under the S-accounts. In this case, the requirement that all payments had to be transferred to a non-interest bearing “transit account” for at least one year before they could be repatriated is equivalent to postponing each payment by one year. Hence, the actual new values received, taking into account the withdrawal restriction, need to be multiplied by an additional discount factor reflecting, at a minimum, default risk free ruble interest rates at the time when the payment was received (this assumes that once cash was deposited in “S-accounts,” investors were no longer subject to default risk). In Table 2, we show the haircuts that result from applying these additional discounts—which begin at about 35 percent for the 12 month period following March 1999, and decline to less than 10 percent by late 2002—to the payment promised under the novation scheme, in a manner that is consistent with the two approaches to discounting used in Table 1. The effect is to raise haircuts by 8-15 percentage points relative to Table 1.

Table 2. Russian GKO Exchange: Haircuts Suffered by Non-Residents
(including the effect of repatriation restrictions after the exchange)
March 1999

	GKOs maturing on ...							
	11/04/98	12/02/98	01/13/99	02/10/99	03/10/99	04/07/99	05/05/99	06/09/99
Haircuts based on choosing shortest OFZ (in percent)								
using downward sloping discount path	52.8	53.8	54.7	55.3	55.6	55.0	54.3	53.5
using constant discount rate of 79.9	66.7	67.4	68.0	68.4	68.7	68.2	67.8	67.2
Haircuts based on choosing longest OFZ (in percent)								
using downward sloping discount path	59.3	60.2	60.9	61.4	61.7	61.2	60.6	59.9
using constant discount rate of 79.9	73.2	73.8	74.3	74.6	74.8	74.5	74.1	73.6

According to the IMF, by the end of May, 1999, about 95 percent of residents and 88.5 percent of nonresidents had agreed to the terms of the GKO-OFZ exchange.⁶ Non-residents who decided not to participate in the “novation scheme,” were repaid in full, but had to place their proceeds in “S-accounts” in combination with a 5-year repatriation restriction. Assuming (1) that investors did not attach any value to the options available to them under the S-account rules, and (2) that cash deposited in “S-account” was no longer subject to sovereign default risk, this was equivalent to receiving a default risk-free zero-coupon “par bond” promising a payment after 5 years. Using 45 percent as an upper bound for the applicable discount factor and 17 percent as a lower bound (this is the average realized 90 day interbank rate between March 1999 and March 2004) implies a haircut between 55 percent and 84 percent—at least as high as the haircuts shown in Table 2.

⁶ “Russian Federation—Staff Report for the 1999 Article IV Consultation and Request for Stand-By Arrangement,” July 13, 1999 (EBS/99//124; unpublished but available on request under IMF archives policy).

In short, the GKO exchange subjected investors—particularly nonresidents, which received smaller cash payments and faced withdrawal restrictions—to very large haircuts: depending on the discount factor and the OFZ obtained, between about 50 and 75 percent, if one takes into account the effect of the withdrawal restrictions. Interestingly, this is still no-where near estimates of non-resident GKO investor losses cited in market commentary at the time of the exchange, which were as high as 95 percent (Santos, 2003). The likely explanation for the discrepancy is that these very high loss estimates reflected not only the effect of the debt restructuring but also the effect of the preceding currency crisis and devaluation.

External debt restructurings

The banking crisis that followed the devaluation-default decision eventually also led to servicing difficulties for Russian external debt payments. On December 2 of 1998, the state-owned Vneshekonombank missed a 362 million payment on its “PRINs”, and on June 2, 1999, it missed a payment on its “IANs”. “PRINs” and “IANs” were dollar denominated, floating interest, long term bonds with total face value of US\$ 29 billion that had been issued in 1997 following an agreement with the London Club to restructure Soviet era debt owed to Western commercial banks. Though widely considered as part of Russia’s external public debt, they were technically obligations of Vneshekonombank rather than obligations of the Russian Federation. In addition, Russia had issued several Eurobonds between 1996 and 1998, on which it did not default.

In May 1999, the Russian government also defaulted on a Soviet era, domestically issued but dollar denominated bond, the “MinFin III.” An open-ended bond exchange offer was announced in November 1999 and modified in January 2000. Bondholders were offered either a new eight-year bond similar to the original instrument, i.e. denominated in US dollars and with a coupon of 3 percent, or a four year OFZ (ruble denominated bond) paying an interest rate of 15 percent in the first year and 10 percent thereafter, with interest paid semiannually and bullet principal payment. For investors that elected the OFZ, dollar face values were converted to Ruble face value at the exchange rate of 26.2 Rubles per dollar (equal to the market rate prevailing in November of 1999). According to the IMF (IMF Staff Country Report No. 00/145, Box 3), about 75 percent of the defaulted amount was exchanged by mid August of 2000 (since the offer remained open, this understates the final participation rate).

As in the case of the GKO exchange, the difficulty in evaluating this exchange is that there are no secondary market debt prices for the newly issued debt. However, the new eight-year MinFin bond can be valued using the yield of Russian performing external bonds—specifically, the March 2004 Eurobond—in early February of 2000 (20.8 percent). In evaluating the new OFZ, we follow the same approach as in the GKO exchange calculations above, constructing two sets of discount rates: one, using the sum of the external default risk premium and the 90 day interbank rate in February of 2000 as a fixed discount rate, and the other, using a downward sloping path of discount rates in line with the decline in the 90 day interbank rate. The former results in a discount rate of 41.4 percent, the latter in a path that starts at 41.4 and falls to 28 percent by November 2003, when the principal of the new OFZ

was to come due. The average discount rate, following this approach, is about 29 percent. Table 3 shows the haircuts involved.

Table 3. Russian MinFin Exchange, February 2000

	MinFin III
Old Instrument	
Issue date	05/14/93
Amount issued and outstanding (US\$ mn)	1,307
Maturity date	05/29/99
Coupon (percent)	3
Average remaining life (years)	matured
Compound rate used (yield, in percent) <u>1/</u>	4.75
Present value on February 1, 2000 (per 100 principal)	106.2
New Instruments	
<i>Option 1: New 3 percent \$-denominated MinFin</i>	
Maturity date	11/14/2007
Present value on Nov. 7	39.0
Discount rate used (yield, in percent)	20.8
<i>Option 2: 15-10 percent coupon ruble denominated OFZ</i>	
Maturity date	11/19/2003
Exchange Coefficient (RUBs per dollar)	26.2
Present value on Nov. 7	
using downward sloping discount path <u>2/</u>	62.5
using fixed discount rate of 41.4 percent	48.5
Haircut based on Option 1 (\$ MinFin)	63.2
Haircut based on Option 2 (OFZ)	
using downward sloping discount path <u>2/</u>	41.1
using fixed discount rate of 41.4 percent	54.4

1/ 3-month US T-Bill yield

2/ Starts at 41.4 percent, falling to 28 percent by late 2003.

Using the US Treasury bill rate to compound the missed principal payment,⁷ the outstanding claim amounted to 106.2 cents on the dollar on February 2, 2000. The new eight-year bond, discounted at a 20.8 percent yield, delivers a present value of 39 cents on the dollar, implying a haircut of 63 percent. For the OFZ option, we obtain a somewhat lower range, between 41 and 54 percent. Given that it was reported (and is confirmed by the amounts issued) that most investors opted for the first alternative, this is puzzling. One possibility is that the OFZ bond was associated with higher currency risk, in the eyes of investors, than is reflected in the 90-day ruble interbank rate that we have used for discounting. Another possibility relates to the open-ended nature of the exchange. The calculations above assume a bond exchange on February 1, 2000. In fact, most bonds were exchanged later, at a time during which both

⁷ This is equivalent to assuming that the bondholders had taken their money out of Russia and into a safe option after the MinFin3 had come due.

inflation expectations and Russian default risk premia were rapidly declining, with the latter declining faster than the former (spreads reached single digits by the middle of the year). Hence, the haircut differential between Option 1 and Option 2 was shrinking, and disappeared in the second half of the year. For example, assuming an exchange date of August 2000 would result in haircut of around 40 percent under *both* options.

Shortly after the MinFin3 restructuring proposal, on February 11, 2000 Russia offered to exchange Vnesh's PRINs and IANs for two new Eurobonds of the Russian Federation. The deal was closed in August 2000, restructuring all PRINs and IANs with a total of 21 billion of new instruments issued in exchange for an original nominal value of 31.8 billion (the original face value of \$29 billion, plus past due interest amounting to US\$ 2.8 billion). By the time the offer closed officially on August 17, participation was close to 99 percent.

In exchange for IANs, PRINs, bondholders were offered a 2030 Eurobond with a step up (2.25 to 7.5 percent) coupon, after a face value reduction of 37.5 percent for the longer maturity PRINs and 33 percent for the shorter maturity IANs. Past due interest was compensated (without face value reduction) by a 2010 Eurobond with a fixed 8.25 percent coupon, and a small cash "sweetener". Unlike the new instruments issued in the GKO and MinFin exchanges, secondary market prices are available for the new Eurobonds issued immediately after the exchange. Hence, in this case, the methodology outlined in section II can be applied without having to resort to constructed discount rates.

Table 4 summarizes the Russian PRIN and IAN exchange. The upper half of the table shows the terms and present values of 100 units of PRINs and IANs, respectively, at the time of the exchange,⁸ as well as the associated past due interest accumulated between December of 1998 and February of 2000. The present values are computed using the yield curve of Russian debt immediately after the closing of the exchange, adjusted for the shorter maturities of the PRINs and IANs. The adjustment is easy in this case since a range of undefaulted Russian Eurobonds were trading in the secondary markets at the time, whose yields can be used to interpolate. As a robustness check, we also computed the present values using only the yield of the instrument actually obtained in the exchange. Since the Russian Eurobond yield curve was quite flat, this makes very little difference to the results.

⁸ For most instruments that are examined in this paper, if an investor had bought and held 100 units of principal since the time of issue, the face value of his or her claim at the time of the debt exchange would also be 100 units. However, there are two exceptions: first, amortizing bonds, that were in part repaid before the debt exchange, and bonds with capitalized interest payments, whose face value increased before the debt exchange. In these cases, the computations in the tables (PVs of the old instruments values obtained in the form of new instruments) generally refer to 100 units of principal *at the time of the exchange*, rather than at the time of issue. For example, the interest paid on Russian PRINs prior to the December 1998 default was in part capitalized into IANs, so that an investor owning 100 PRINs at the time of issue would have owned a basket of 100 PRINs and about 3.6 IANs at the time of the debt exchange. However, the computations in the left column of table 1 refer to 100 units of PRINs only, not to the PRIN/IAN basket associated with 100 units of PRINs *at issue*.

Table 4. Russian PRINs and IANs Exchange
(February 11-August 23, 2000)

	PRINs	IANs
Characteristics of Old Instruments		
Amount outstanding (US\$ mn)	22,231	6,847
Maturity date	12/15/2020	12/15/2015
Average life (years) <u>1/</u>	10.92	9.05
Coupon (percent)	libor + 13/16	libor + 13/16
Present value of cash flow on August 23 (per 100 of principal)	61.2	65.8
Discount rate used (in percent) <u>2/</u>	16.4	16.2
Past due interest on August 23 (PDI, per 100 of principal, face value)	10.3	8.4
Present value of PDI as of August 23 (per 100 of principal)	9.3	8.6
Compound rate used (in percent) <u>3/</u>	4.5	5.0
Present value of cash flow plus PDI	70.4	74.4
New Instruments and Cash obtained		
Cash payment		
Per \$100 of PDI	9.5	9.5
Value obtained (per 100 of principal)	1.0	0.8
2010 percent Eurobond with 8.25 percent coupon (for PDI)		
Amount issued (US\$ mn)	2073.7	517.7
Price on issue date (per unit of new principal)	0.71	0.71
Value obtained (per 100 of principal)	6.6	5.4
Total Compensation for PDI (per 100 of principal)	7.6	6.2
2030 Eurobond with 2.25 - 7.5 percent step-up coupon (for principal)		
Amount issued (US\$ mn)	13,894	4,587
Price on issue date (per unit of new principal)	0.42	0.42
Face value reduction (per 100 of principal)	37.5	33.0
Value obtained (per 100 of principal)	26.1	28.0
Total value obtained	33.7	34.1
Haircut (in percent)	52.1	54.1

1/ Weighted average of time of amortization, using percent amortization in each time period as weights.

2/ Yield corresponding to mean repayment period, using linear interpolation of outstanding Eurobond yields.

3/ 1-year U.S. Treasury yields in December 1998 and June 1999, respectively.

4/ For PRINs, PV of PDI is smaller than nominal PDI because some of the PDI took the form of capitalized interest, i.e. a claim on a future payment stream rather than a past cash payment.

The lower half of the table shows what investors received in return: a small cash payment for PDI, some amount of the 2010 Eurobond for PDI, and the 2030 Eurobond in exchange for the original instrument, after a face value reduction. The lines “value obtained (per 100 units of principal)” are computed by subtracting the corresponding face value reduction (if any) from 100 units of the old bond and then multiplying with the price of one new bond. For

example, in the “PRINs” column, $(100 - 37.5) * 0.418 = 26.1$. Finally, the haircuts are computed, in percentage terms, by subtracting the total value obtained from the present value of the old claim (including PDI) and dividing by the latter. The main result is that investors a little over 50 percent of the pre-exchange claim. Percentage losses on the shorter IANs were very slightly higher than on the longer PRINs.

One caveat applies, namely that the new instruments had two features that were designed to upgrade their seniority relative to the old instruments. First, there was an *upgrade in the obligor*, which became the Russian Federation rather than Vneshekonombank. Second, it included *expanded cross-acceleration clauses* linking default on the 2010 and 2030 bonds to any other issues of Russian Federation Eurobonds (including new issues), and vice versa. MinFins as domestic debt remained subordinated, in the sense that—though dollar denominated—they were not legally linked to existing Russian Federation Eurobonds. Since we are ignoring this upgrade in our haircut calculations, the extent of the haircut could be somewhat overestimated.

B. Ukraine⁹

Debt Restructurings during 1998–99

Ukraine started having problems rolling over its debt shortly after the Russian crisis dried up the market for new Ukrainian issues. In late August of 1998, the Ukrainian government began to negotiate debt exchanges with three groups of creditors: domestic commercial banks who were holders of treasury bills (OVDs), non-resident holders of treasury bills, and holders of a loan placed through Chase Manhattan in October of 1997.

A conversion scheme for treasury bills owned by domestic banks was announced on August 26. It offered to exchange T-bills into longer term hryvnia denominated bonds of 3 to 6 years maturity. A range of exchange coefficients was determined in line with the present value of the T-bills at the time of the exchange, discounted at the prevailing T-bill rate of about 60 percent. Hence, T-bills that had just matured at the time of the exchange received new principal one-for-one, while T-bills that had been issued before the exchange and were coming due in July or August of 1999 received a face value haircut of 65.57 percent. The interest rate on the new bonds was set at 40 percent for the first year, and a floating coupon equal to the future 6-month T-bill yield plus 1 percentage point for the remainder of the period. According to the IMF (Country Report 99/42, p. 43), commercial banks eventually agreed to exchange about Hrv 800 million, or about one third of their portfolio.

⁹ For a description of this case see also Eichengreen and Rühl (2000) and Lipworth and Nystedt (2001). This material has in part been reconstructed with information from the Ukrainian-European Policy and Legal Advice Centre (UEPLAC), publicly available IMF country reports, reports in the *International Financing Review*, and main weekly events reported by *Ukraine Today* (Infobank News Agency).

Table 5 shows haircut computations for both a just issued and a just matured OVDP at the time of the exchange; because of the application of exchange coefficients in line with present value, the haircuts of all other outstanding treasury bills would have been very close. For illustrative purposes, the values of the old and new instrument are computed and compared at a rate of 60 percent (the end-August one year T-Bill rate). However, because of the special structure of the new instrument—a floating rate bond after the first year—the discount and coupon rates approximately cancel after the first year, and the haircut is very insensitive to the discount rate assumed (in particular, for restructured T-Bills with maturity close to one year).¹⁰ The main result is that the haircut was very mild, in the order of 5-10 percent for a domestic bondholder at the time of the exchange. The low value of the haircut derives from the fact that the government forced an interest rate reduction during the first year, but promised the market rate thereafter. This is consistent with the notion, advanced in market commentary at the time, that the Ukraine government was trying to avoid a harsh Russia-style default and restructuring, and instead was seeking to resolve a liquidity crisis mainly by extending maturities.

Foreign bondholders faced a similar conversion but on different terms. All holders were given the chance to exchange their holdings for a hryvnia denominated bond with a 22 percent hedged annual yield, but the market largely ignored this option. The second option was to receive a 2 year zero-coupon dollar-denominated Eurobond with a yield of 20 percent. Some holders that had purchased currency hedges—specifically, holders of 9 and 12 month T-bills issued to nonresidents in December 1997 through Merrill Lynch—additionally received 20 percent of the present value of their principal in cash Hryvnia, exchanged into dollars at market exchange rate of 2.94 on September 22, 1998. In Table 4, we compute haircuts for four T-Bills held by non-residents: the two bills studied previously, assuming that non-resident investors opted for the Eurobond; and the two T-Bills featuring guaranteed minimum dollar returns marketed through Merrill Lynch.

¹⁰ Let i_1 denote the T-Bill yield prevailing just after the exchange. The NPV a T-Bill of m months prevailing maturity issued before the exchange, evaluated at post-exchange yields, was $NPV_{old} = 100 / (1 + i_1)^{m/12}$. The new OVDP paid an interest rate of 40 percent in the first year and after that a one percent markup over the T-Bill rate. Hence, for a 3-year OVDP:

$$NPV_{new} \approx \frac{0.4}{1 + i_1} + \frac{i_2 * 1.01}{(1 + i_1)(1 + i_2)} + \frac{(1 + i_3) * 1.01}{(1 + i_1)(1 + i_2)(1 + i_3)} = \frac{1.41}{1 + i_1},$$

where we used the approximation $i * 1.01 \approx i + 0.01$ for i close to 1. Thus, for an exchange factor f between new and old instruments (e.g. $f = 0.65$) we have:

$$H = 1 - f * NPV_{new} / NPV_{old} = 1 - f * 1.41 / (1 + i_1)^{(12-m)/12}. \text{ For a 1 year T-Bill } (m = 12), \text{ this does not depend on } i_1.$$

Table 5. Ukraine Debt Exchanges, 1998-99

	OVDPs-residents		OVDPs-nonresidents				Chase loan		ING loan
	26-Aug-98		22-Sep-98				20-Oct-98		
	maturing	just issued	unhedged		with \$-hedge				
			(1)	(2)	(3)	(4)				(5)	(6)
Old Instruments									
Issue date	various	08/19/98	various	08/19/98	12/19/97	12/19/97	10/20/97	10/20/97	08/09/98
Amount issued and outstanding (US\$ mn)	...	34.95	...	34.95	197.78	197.78	109	109	163
Maturity date	08/27/98	08/18/99	08/27/98	08/18/99	09/18/98	12/18/98	10/20/98	10/20/98	07/09/99
Coupon (percent)	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.0	17.5
Present value at exchange (per 100 of principal)	100.0	63.1	100.0	50.6	136.9	114.4	100.0	100.0	100.0
Discount rate used (in percent)	matured	60.0	matured	112.6 1/	matured	74.1 2/	matured	matured	matured
New Instruments and Cash obtained									
Long OVDP (3-6 year Hryvnia bond, 40 percent followed by floating coupon)									
Value (per unit of principal of new bond)	0.91	0.91							
Discount rate used (in percent)	60.0	60.0							
Units obtained (per 100 of old principal)	100.00	65.57							
Merrill Lynch Eurobond (2 year, zero coupon, 20 percent \$-bond)									
Value (per unit of principal of new bond)			0.47	0.47	0.47	0.47	0.59		
Discount rate used (in percent)			74.1	74.1 2/	74.1	74.1 2/	76.3		
Units obtained (per 100 of old principal)			100.0	65.6	80.0	71.1 3/	75.0		
Restructured Chase Manhattan Loan (2 year, 16.75 percent)									
Value (per unit of principal of new bond)									
Discount rate used (in percent)									
Units obtained (per 100 of old principal)									
February 2001 DM Eurobond (16 percent)									
Value (per unit of principal of new bond, in US dollars)									0.56
Discount rate used (in percent)									81.6
Units obtained (per 100 of old principal)									75.4
Cash obtained (per 100 of old principal)	0.0	0.0	0.0	0.0	20.0	17.8 3/	25.0	20.0	20.0
Total value obtained (per 100 units of principal) 1/	91.46	59.97	47.49	31.14	57.99	51.56	69.34	61.98	61.98
Haircuts	8.5	5.0	52.5	38.4	57.6	54.9	30.7	38.0	38.0

1/ Yield of 2001 DM Eurobond (adjusted for forward US\$/DM exchange rate) plus 12 month consensus forecast change in UAH/US\$ exchange rate.

2/ Yield of 2001 DM Eurobond (adjusted for forward US\$/DM exchange rate).

3/ Based on recognized present value of T-Bills maturing in December using 60 percent discount rate.

Turning first to the non-hedged instruments in columns (3) and (4), the main result is the much larger haircuts compared to the residents' exchange. What drives this haircut is the low value of the new Eurobond, whose 20 percent coupon was much below the market yield—around 75 percent—of Ukraine's only foreign currency bond trading in secondary markets at the time (namely, a DM-denominated bond maturing in early 2001). The longer the restructured T-Bill, the lower the haircut, because the haircut computation assumes that the same default risk that drives up the yield of the foreign currency bond would also have applied to the T-Bill, depressing the true present value of the old instrument. In column (4), we have assumed a discount rate of over 112 percent, derived as the sum of the foreign currency yield (74 percent) and the 12-month-ahead exchange rate expectations, which according to Consensus Forecasts anticipated a depreciation of the Hryvnia by about 38 percent. This implies a present value of the old instrument of about 50 per 100 units of principal, implying a haircut of just under 40 percent.

Given the high haircut suffered by non-residents compared to residents, it is worth asking why almost all non-resident that agreed to the exchange offer—holding Hrv 1034.4 million worth of principal out of a total restructured amount of Hrv 1070 million, according to *Ukrainian Economic Trends*—chose the Eurobond option rather than the higher yielding local currency alternative. To this, two things can be said. First, the floating rate OVDPs offered to residents—which were attractive to the extent that they insured holders of restructured bonds against future increases in default risk—were in fact not offered to non-residents. Second, non-residents were worried about capital controls, which were being discussed at the time (*International Financing Review* No. 1251). The benefit of avoiding potential capital controls is not reflected in our haircut calculations. The very low haircuts for residents shown in columns (1) and (2) reflect the assumption that future T-bill rates to which coupon payments are being indexed are market rates, i.e. rates that properly reflect default risk. This assumption is hidden in the fact that we use the same rates to compute future interest streams *and to discount them* (see footnote 10). In an environment with capital controls, however, domestic T-bill yields might well be too low. If future T-bill rate were expected to understate default risk, the discount rates applied would need to be higher than expected T-bill rates, leading to a higher haircut. Indeed, Ukraine had attempted to maintain yields artificially low even prior to the August debt restructuring, in part, by directing the National Bank of Ukraine (NBU) to undertake heavy purchases. According to the IMF, about two-thirds of the T-Bill stock of about Hrv. 9 billion issued in 1998 was owned by the NBU. This may be one of the reasons why reported T-bill issue rates at the time were significantly lower, at about 60 percent, than the secondary market yield of Ukraine's external, 2001 DM bond.

Did the holders of hedged OVDPs do better than other non-resident OVDP holders? In terms of total value received per 100 Hryvnia of outstanding principal, they did much better, as is clear from comparing the line “total value obtained” in columns (5) and (6) to that in columns (3) and (4). This is the consequence of receiving 20 percent of the outstanding principal (or its present value in the case of the OVDP maturing in December) in cash rather than in the form of a new risky bond. However, investors that had purchased hedged OVDP bills were also *entitled* to a much larger payment in September of 1998 than investors that

had not. Under the terms of the hedge, investors were to receive a minimum 22 percent dollar return. When this is applied to the dollar amount they paid when purchasing 100 Hryvnia worth of OVDP bills in December of 1997, and converted back into Hryvnias using the September 22, 1998 exchange rate of 2.94, one finds that investors should have received about 137 Hryvnias, as opposed to only 100 for a non-hedged instrument. This much higher contractual entitlement was partly, but not fully offset by the higher value received, resulting in a higher haircut (of around 55 percent) for the hedged instruments.

In addition to the OVDP restructurings, Ukraine also restructured two dollar denominated loans. Holders of a \$109 million fiduciary loan issued through Chase Manhattan coming due on October 20, 1998 received a 25 percent (\$27.25 million) cash payment, while the remainder of their claim was restructured into a new amortizing loan with a dollar interest rate of 16.75 percent, payable in quarterly installments starting in 1999. Principal payment would be limited to \$2 million per quarter during the first year; the balance would be paid in four equal installments in 2000. Table 5 shows the haircut on this restructuring. As the new loan did not trade, we again use the yield on Ukraine's DM Eurobond (adjusted to a dollar rate using the DM-US forward interest rate differential) for discounting. At around 30 percent, the haircut was lower than for the hedged OVDPs held by non-residents, driven by the higher cash payment and somewhat faster amortization of the new Chase loan compared to the Merrill Lynch Eurobond.

Together with a new loan from the IMF, the three Fall 1998 restructurings resolved Ukraine's payments difficulties in the immediate aftermath of the Russian crisis. In mid 1999, however, in the face of a bunching of debt service in the second quarter—in particular, repayment of the 10-month bond placed through ING Barings in August of 1998 (\$163 million including interest) maturing on June 9—the government was again forced to seek a restructuring. On May 18, the Ministry of Finance submitted to ING a debt conversion offer, according to which 20 percent would be repaid on time, with the remainder swapped for a new international bond with a three year maturity. The ING bond was mostly held by one investor—Regent Pacific Group—who initially insisted on full repayment. Ukraine's first offer was rejected, and the original repayment date passed.

On July 15, the Ministry of Finance and ING Barings finally reached an agreement by which 20 percent of the bond would be repaid in cash, with the remainder exchanged for DM bonds, at a rate of 94.3 cents of new debt for each dollar of old debt. The DM bonds would be an additional issue of the *existing* DM 1 billion international bond issued in 1998 and due on February 2001, with a coupon of 16 percent. In addition, holders of the restructured \$500 million zero coupon Eurobond issued through Merrill Lynch in September 1998 were invited to enter the exchange; their holdings would be valued at either at 55 cents, or 75 cents to the dollar if investors put in new money equal to at least 15 percent of their holdings. In the event, the offer received almost 50 percent acceptance among the Merrill Lynch bondholders.

On August 2, 1999, Ukraine made the 20 percent cash payment to ING Barings, and on August 20, it tagged the original 2001 DM Eurobond for the remainder. Table 5 shows that this exchange entailed a haircut of about 38 percent.

The 2000 Bond Exchange

While the piecemeal restructurings of 1998-99 provided some immediate cash flow relief, they also created large payments obligations for 2000 and 2001. For 2000, Ukraine's debt-service obligations were about \$3 billion, including about \$1.1 on bonds (principal and interest) \$900 million to the IMF, and \$250 to Russia. Gross international reserves stood at only around \$1 billion at the end of 1999, and there was no hope for any significant amount of new borrowing. Consequently, in early 2000, Ukraine had no alternative but to seek a new restructuring.

On February 4, 2000, with ING Barings as lead manager, Ukraine launched a comprehensive exchange offer involving all outstanding commercial bonds. These included two Eurobonds issued prior to the August crisis—a Euro 500 million, 14.75 percent Eurobond issued in March 1998 and coming due in March 2000 and the DM 1.5 billion, 16 percent Eurobond due in February 2001—as well as the two bonds that resulted from the 1998-99 restructurings—the \$74 million 16.75 percent Chase Manhattan bond maturing in October 2000, and what remained of the Merrill Lynch Eurobond (US\$258.4 million) falling due in October of 2000. In addition, about \$1 billion of 8.5 percent bonds owed to the Russian energy exporter Gazprom were falling due between March of 2000 and March of 2007.

Creditors could choose between two 7-year coupon amortization bonds denominated either in Euros or U.S. dollars, to be issued under English law. For the euro-denominated bond, the coupon was set at 10 percent, while for the U.S. dollar-denominated bond it was set at 11 percent. There was no face value reduction except for the zero coupon Merrill Lynch Eurobond, where it was about 5 percent and for the “Gazprom bonds,” where it ranged between 0 and 33 percent depending on the maturity date of the bonds. Coupon payments for the new bonds were set on a quarterly basis, with no grace period for interest payments. Amortization was to occur twice a year, with 3 percent at each amortization date in 2001, 5 percent in 2002, and 9.33 percent at each date between 2003 and 2007. Past due interest and accrued interest (i.e. interest accrued since the last scheduled coupon payment which was not yet payable) was paid in full and in cash. The exchange offer established a minimum participation threshold of 85 percent among the holders of bonds maturing in 2000–01. In the event, there was almost full participation.

In Table 6, all claims (present values of old instruments, past due interest and principal, cash payments, and the number of units of new instruments received) are computed for 100 units of principal outstanding at the time of the exchange.¹¹ Because the haircuts arising from the U.S. dollar bond option and the euro-denominated bond option differ only by decimals of a

¹¹ Thus, for the amortizing Chase Manhattan loan shown in the second column, present values, PDP, etc. are expressed as percentages of the principal that had not been repaid by February of 2000 (89 percent of the original principal).

percent, we only show the former. Note that in addition to one case of past-due interest (on the DM Eurobond, whose annual 16 percent coupon payment was missed in February 2000), there is a case of past due principal from a missed amortization payment due in January 2000; according to the IMF (2001), these payments were missed for “intercreditor equity” reasons, i.e. to avoid paying some investors in full during or immediately before a debt restructuring offer.

Table 6. Ukraine External Debt Exchange, February-April 2000.

	2000 US\$ Eurobond	Chase Manhattan	Merrill - Lynch	2001 DM Eurobond	Gazprom bonds <u>1/</u>
Old Instruments					
Issue date	3/1/1998	10/20/1998	10/1/1998	26/02/1998	21/03/1995
Amount issued (in US\$ mn) <u>2/</u> <u>3/</u>	493	82	500	756	1,015
Amount outstanding (in US\$ mn) <u>3/</u>	493	74	258	756	1,015
Currency of denomination	Euro	US\$	US\$	DM	US\$
Maturity date	3/1/2000	10/20/2000	10/1/2000	2/26/2001	3/21/2007
Average remaining life (years) <u>4/</u>	0.07	0.42	0.66	1.06	3.58
Coupon (percent)	14.75	16.75	0	16	8.5
Present value of cash flow on 2/4/2000 (per 100 principal)	112.4	73.6	84.8	90.4	63.8
Discount rate used (in percent) <u>5/</u>	27.6	27.9	28.1	28.3	29.5
Past due principal (per 100 outstanding) by February 4, 2000	0.0	25.0	0.0	0.0	0.0
Past due interest (per 100) up to 3/15/2000	0.0	0.0	0.0	16.0	
Present value including PDP and PDI	112.4	98.6	84.8	106.4	63.8
New Instruments and Cash obtained					
Cash payments (for PDI and accrued interest)	14.7	6.7	0.0	16.8	1.7
2007 11 percent US\$-denominated Eurobond					
Price on issue date (April 15, 2000, per unit of new principal)	0.59	0.59	0.59	0.59	0.59
Units obtained (per 100 of principal)	100	100	94.6	100	81.9
Value obtained (per 100 of principal)	58.9	58.9	55.7	58.9	48.2
Total value obtained (per 100 of principal)	73.54	65.62	55.69	75.71	49.97
Haircut based on choice of US\$ bond (in percent)	34.6	33.4	34.3	28.9	21.7

1/ Simple average, i.e. synthetic instrument consisting of all 29 outstanding Gazprom bonds in equal parts.

2/ For Chase Manhattan loan, the difference between amounts issued and outstanding is due to amortization during 1999. For Merrill Lynch bond, it is due to the retiring of principal after July 1999 exchange offer.

3/ Evaluated using February 4, 2000 market exchange rates

4/ Weighted average of time of amortization, using percent amortization in each time period as weights.

5/ Yield to maturity of new bond of corresponding currency, with minor maturity adjustment based on US yield curve.

One difficulty compared with the case of Russia is that only the two newly issued Eurobonds were trading in the market after the exchange; thus, it is not possible to interpolate yields based on a full Eurobond yield curve for the purpose of discounting, as was the case for Russia. Instead, the yields used for discounting are those of the actual new instruments

obtained when exchanging each of the old bonds, with a small maturity adjustment based on the U.S. yield curve.

The main result is that while in this case there were no significant nominal haircuts except on some of the “Gazprom bonds”, the present value losses ranged from about 22 to 35 percent, making this a fairly mild restructuring compared to both the haircuts suffered by non-resident OVDP holders in the Fall of 1998, and to the Russian external debt restructuring that was being negotiated at about the same time. Moreover, in the week following the exchange, prices of new bonds rallied from about 59 to about 67 cents on the dollar, and yields fell from the immediate exit yield of about 28 percent to about 23 percent. If haircuts are recomputed using these prices and yields, they would be 5-8 percentage points lower, in the 18 to 27 percent range. Note that this is the only case covered in this paper where the results are sensitive to changes in prices and yields immediately following the exchange, which could arguably be attributed to a delayed reaction to the success of the exchange (rather than new information about fundamentals, which we would *not* want to be reflected in the haircut).

Another result is that in this exchange, bonds with a shorter life appear to have suffered larger haircuts than bonds with longer life. This can be observed both for the bonds shown and within the class of Gazprom bonds. Thus, the larger nominal haircuts applied to longer dated Gazprom bonds did not completely offset the smaller present values of the longer bonds, at least not at the discount rates applied in our calculations. We return to this point in the last section of the paper.

C. Pakistan¹²

Pakistan’s 1999 bond restructuring—famous for being the first Eurobond restructuring in history—had its origins in high public debt (about 90 percent of GDP since the early 1990s) and a major balance of payments crisis in May of 1998 triggered by international sanctions imposed in reaction to Pakistan’s nuclear tests. After the lifting of most sanctions in late 1998, Pakistan negotiated a Paris Club restructuring in January of 1999 which required the country to seek comparable debt relief from private creditors, and in particular, to restructure its international bonds. By July, the government had signed a rescheduling with commercial banks covering about \$900 million in commercial loans, but it held off on restructuring its Eurobonds, as no principal repayments were coming due until the end of the year. Finally, on November 15, Pakistan launched a bond exchange, ahead of a Paris club deadline that required it to show “progress” in negotiations with bondholders by the end of 1999. No interest or principal payments were missed prior to the exchange.

¹² This section relies on Helbling (2001), Burki (2000), IMF Country Reports No. 97/120, 01/11, 01/24, 01/222 and 03/338, the IMF Staff Report for the 1998 Article IV consultation (unpublished but publicly available under the IMF’s policy of releasing most Executive Board documents that are more than five years old), financial sector newsletters, and news reports.

The exchange involved swapping three bonds: a \$150 million, 11.5 percent Eurobond due in December 1999; a \$160 million, 6 percent exchangeable note due in February 2002 with a put option in February 2000; and a \$300 million Libor-plus-3.95 percent floating rate note due in May of 2000. All three were to be exchanged for a new amortizing bond with an overall maturity of six years and a three-year grace period, paying a 10 percent coupon. There was no nominal haircut; in fact, holders of the two bonds with the shorter average life received slightly more in nominal terms than under the original instruments (Table 7).

Table 7. Pakistan Eurobond Exchange (November-December 1999)

	12/1999 Eurobond	2/2002 Eurobond with 2000 Put	5/2000 Eurobond
Old Instruments			
Issue date	12/22/1994	2/26/1997	5/30/1997
Amount issued and outstanding (US\$ mn)	150	160	300
Maturity date ^{1/}	12/22/1999	2/26/2002	5/30/2000
Average remaining life (years)	0.025	0.205	0.463
Coupon (percent)	11.5	6	libor + 3.95
Present value of cash flow on 12/13/1999 (per 100 principal) ^{2/}	105.3	104.3	97.0
Discount rate used (in percent) ^{3/}	21.4	21.4	21.4
New Instrument			
2005 percent amortizing Eurobond with 10 percent coupon			
Price on issue date	0.68	0.68	0.68
Units obtained (per 100 of principal)	103.2	105.7	100.0
Value obtained (per 100 of principal)	70.3	72.0	68.1
Haircut (in percent)	33.3	31.0	29.8

^{1/} 2002 Bond had put option in February 2000.

^{2/} Includes accrued interest. For puttable 2002 bond, we assume that the option to put would have been used for entire outstanding amount in February of 2000

^{3/} Yield to maturity on new 2005 Eurobond, with a minor maturity correction based on the US yield curve.

Table 7 is similar in structure but simpler than most of the previous tables, as there was only one exchange option and no need to reimburse past due interest or principal. Haircuts were of about the same order as the average haircut in the case of Ukraine, i.e., about 30 percent. Like for Ukraine, haircuts were larger for the shorter-dated instruments, though the variation (in both remaining life and the haircuts) was very small.

D. Ecuador¹³

Ecuador's debt crisis occurred less than five years after a Brady deal with commercial banks had reduced the country's external debt to sustainable, though still high, debt levels. It originated in a banking crisis that erupted in April of 1998 and became progressively worse due to a lack of crisis resolution instruments and political obstacles. Central Bank liquidity support to failing banks led to a currency crisis in early 1999, and by mid-1999, net international reserves had fallen to levels that made it very difficult to meet upcoming debt service payments—about \$550 million on Brady and Eurobonds during the remainder of 1999 and 2000, and maturing domestic debt in the order of US\$500 million—without agreement on an IMF program. But the IMF in turn required some degree of “private sector bail-in” to help close the financing gap and return debt to sustainable levels.

Against this background, on August 25, 1999, Ecuador announced that it would suspend coupon payments on Discount and PDI Brady bonds. After a failed attempt to persuade the Brady bondholders to accept a debt exchange limited to Brady bonds, Ecuador also defaulted on its remaining Brady bonds and, by the end of October, on its Eurobonds. It was the first default on international sovereign bonds since the 1930s. In addition, about US\$ 500 million of short-term domestic dollar-denominated debt was restructured to longer maturities at a reduced rate of interest.¹⁴

With IMF support, on July 27, 2000, Ecuador launched an offer to exchange its defaulted Brady Bonds and Eurobonds for new uncollateralized bonds maturing in 2030 with a step-up coupon starting at 4 percent and rising to 10 percent, in 1 percent steps, by 2006 (Table 8). For each type of defaulted bond, an exchange ratio was set in line with “stripped” secondary market prices; thus, the idea was to treat each bond equally based on their pre-default prices. The shortest instruments, namely Eurobonds and Brady Interest Equalization bonds were exchanged at par, while the longer dated Brady bonds were exchanged at 1:0.78 (PDI bonds), 1:0.58 (Discount bonds) and 1:0.40 (Pars). Holders of Par and Discount bonds also received a cash payment equal to the present value of their U.S. collateral. Past due interest and principal were repaid in cash, while accrued interest (interest owed since the last scheduled coupon payment) was exchanged, at par, for a new Republic bond with a fixed coupon of 12 percent, maturing in 2012. Bondholders could also elect to exchange their principal for this shorter bond rather than the 2030 bonds at the cost of a further 35 percent discount relative to the face value of the 2030 bonds. The aggregate amount of 2012 bonds was limited to 1.25 billion, and holders of Eurobonds and shorter dated Brady bonds were given priority in the allocation of the 2012 bonds. By the time the exchange was finalized on August 23, over 97 percent of the eligible bonds had agreed to tender.

¹³ This section is based on Jacomé (2004), Fischer (2001), Beckerman and Solimano (2002), Bucheit (2000), published or publicly available IMF Country Reports, and news reports.

¹⁴ IMF (2002, p. 7) suggests that the present value loss in the domestic restructuring was 9 percent. We have not been able to independently confirm this.

Table 8. Ecuador Exchange, July-August 2000

	Pars	Discounts	PDI	IEs	2004 Euro	2002 Euro
Old Instruments						
Issue date	2/28/1995	2/28/1995	2/28/1995	12/21/1994	4/25/1997	4/25/1997
Amount issued (US\$ mn)	1,655	1,435	2,308	191	150	350
Amount outstanding (US\$ mn) ^{1/}	1,655	1,435	2,781	143	150	350
Maturity date	2/28/25	2/28/25	2/27/15	12/21/2004	4/25/04	4/25/02
Average remaining life (years) ^{2/}	24.5	24.5	10.59	2.56	3.67	1.67
Coupon (percent)	3-5 step up	libor+13/16	libor+13/16	libor+13/16	libor +4.75	11.25
Present value of cash flow on 8/23/00 ^{3/}	48.5	65.7	44.9	75.2	78.3	89.0
Discount rate used (in percent) ^{4/}	21.6	22.0	22.4	23.4	23.3	23.5
Past due principal (PDP) ^{3/}	0.00	0.00	0.00	10.00	0.00	0.00
Past due interest (PDI) ^{3/ 5/}	4.10	4.68	1.96	7.29	11.25	12.05
Present value including PDI and PDP	52.6	70.4	46.9	92.5	89.5	101.1
New Instruments and Cash obtained						
Cash payments						
Release of principal collateral ^{3/}	23.50	23.50	0.00	0.00	0.00	0.00
Payment for PDI and PDP ^{3/}	4.10	4.68	1.96	17.29	11.25	12.05
2030 Eurobond with 4/5/6/7/8/9/10 percent step-up coupon						
Amounts issued (US\$ mn) ^{6/}	662	832	1175	0	0	0
Price on issue date (per unit of new principal)	0.36	0.36	0.36	0.36	0.36	0.36
Units obtained for principal ^{3/}	40	58	78	100	100	100
Value obtained for principal ^{3/}	14.5	21.0	28.2	36.2	36.2	36.2
2012 Eurobond with 12 percent coupon						
Amounts issued (US\$ mn) ^{6/}	16	51	745	95	103	240
Price on issue date (per unit of new principal)	0.60	0.60	0.60	0.60	0.60	0.60
Units obtained for accrued interest ^{3/}	0.94	3.53	3.53	1.36	3.77	3.69
Value obtained for accrued interest ^{3/}	0.57	2.13	2.13	0.82	2.27	2.22
<i>if elected instead of 2030 bonds:</i>						
Units obtained for principal ^{3/}	26	37.7	50.7	65	65	65
Value obtained for principal ^{3/}	15.7	22.7	30.5	39.1	39.1	39.1
Total value obtained	42.6	51.3	33.4	57.3	52.7	53.4
Haircut (in percent)	18.9	27.1	28.9	38.1	41.2	47.2

^{1/} For PDIs, difference between amount issued and outstanding is due to capitalization of interest payments prior to the exchange; for IEs, difference is due to amortization payments made between June 1995 and June 1999.

^{2/} Weighted average of time of amortization, using percent of remaining amortization in each time period as weights.

^{3/} Refers to 100 units of outstanding principal at time of exchange, excluding any PDP. For capitalizing PDI bonds, this was about 118 percent of the original principal; for IE bonds, about 65 percent of original principal.

^{4/} Yield corresponding to average life, using linear interpolation of outstanding Eurobond yields. For Pars and Discounts, principal and last 12 months of interest were discounted using a US long rate (5.81 percent).

^{5/} Including interest on principal and interest arrears.

^{6/} Assuming that all bondholders opted for the 2012 bond and were rationed as announced in the exchange offer (i.e. shorter instruments had priority; the 2012 would be prorated within the marginal class, i.e. PDI bonds).

The main results are as follows. As expected, the 2012 option delivered a slightly higher value (compare lines “value obtained for principal” for the 2030 and 2012 bonds), and thus was rationed. As in the case of Ukraine, there were substantial differences in the haircuts across instruments, ranging from 19 to 47 percent. Again, the bonds with the longest

remaining average life tended to suffer the smallest NPV haircuts, while the largest haircuts were associated with the shortest instruments, notwithstanding the fact that the longer instruments were subject to larger reductions in face value. Ex post, these reductions were apparently insufficient to equalize the NPV haircuts; consequently, there is a negative correlation between NPV haircuts and nominal haircuts.

The Ecuador exchange was the first to restructure collateralized Brady bonds, leading to the release of the present value of the collateral in cash, as shown in the table. Note that while the collateralization increased the total value received relative to what it would have been without collateralization, this may not have had a large effect on the haircut, since it is also reflected in a comparatively high value of the *old* bonds. Although our general principle is to compute the present value of the old instruments using a discount rate that comes from the yield of the new instruments or other performing trading sovereign bonds, principal repayments of Brady Par and Discount bonds need to be discounted using the same US long treasury bond rate that was used to compute the cash value of the collateral released at the exchange, since these repayments were collateralized and hence not subject to country risk.¹⁵

Ecuador's exchange also broke new ground in several other respects. The new bonds contained two novel features meant to minimize the chances of a new debt restructuring in the foreseeable future and protect the interests of bondholders. A "mandatory debt management" provision committed Ecuador to retiring a minimum proportion of the face value of each of the new bonds every year. A "principal reinstatement" provision meant that a payment default occurring in the first 10 years would automatically result in the issuance of additional 2030 bonds to the holders. The effect of this was to offer a (limited) protection of bondholders against the dilution of their claims by new debt holders in the event of default. Finally, for the first time in sovereign debt, the Ecuador exchange used "exit amendments" to put pressure on potential holdouts. As part of the exchange, Ecuador solicited the consent of existing bondholders to change various *non*-payment terms of the old instruments, which (unlike the payment terms) could be changed with simple majority, with the effect of reducing the liquidity of non-tendered bonds and stripping them from various creditor protections.

E. Argentina

"Phase 1"

In November 2001, after several attempts at balancing the budget and avoiding a restructuring of debt obligations, a substantial reduction in tax collection together with the lack of additional access to either market or multilateral funds forced the government to seek

¹⁵ The Brady Par and Discount bonds also collateralized a rolling 12 month window of interest payments. In computing their present value, we reflect this by discounting the last two coupon payment in the cash flow of the bond using the same long US bond rate used to discount the principal collateral.

debt relief through a “voluntary” debt exchange. It was planned in two stages, the first of which (“Phase 1”) would be targeted at domestic residents, and the second (“Phase 2”) at nonresidents. The idea was to segment local and foreign bondholders in order to protect domestic financial institutions and pension funds. In the event, Phase 1 was carried out, but shortly thereafter the government was ousted, and a broader default followed at the end of December. Thus, Phase 2 never materialized as planned.

The strategy of the “Phase 1” exchange was to offer local holders “guaranteed” loans governed by Argentine law in exchange for their bonds. The “guarantee” of the loans would be revenues collected through the financial transaction tax. Moreover, bondholders were given the option of recovering the original bonds if any terms or conditions of the guaranteed loans were changed in the future. In exchange for the granting of the guarantee, interest payments would be reduced and maturities extended. Creditors were given 1-3 options, depending on the instrument tendered. One option was a fixed rate loan in which interest rates would be reduced by 30 percent relative to the original rate, with a cap at 7 percent per annum. In addition, maturities would be extended, by three years, on shorter term instruments. Interest payments were to be made monthly, to match interest payments with the collection of the financial transaction tax. For floating rate bonds similar conditions were imposed, with the cap set at Libor plus 300 basis points. Finally, a third option was to convert into a capitalizing loan with maturity in 2011. Only a few bonds were offered this alternative.

Several incentives for participation were offered, including favorable accounting rules for banks and pension funds, which were allowed to value the new instrument at par rather than mark it to market. However, the main incentive was the threat of an involuntary restructuring at worse terms if the exchange was not accepted. The restructuring was considered a technical default by rating agencies and Standard and Poor’s moved Argentina to the selective default (SD) category. The bond exchange was successful in the sense that almost all debt in the hands of banks, local pension funds and local residents was tendered. In all, 41.7 billion of debt instruments were exchanged, implying a reduction of 2.35 billion in interest and 2.5 billion in amortizations in 2002 alone. Financing needs were reduced by US\$26.2 billion in the first five years.

From the perspective of computing haircuts, Argentina’s Phase 1 exchange poses unique challenges. To begin with, the number of old and new instruments involved was much larger than in any previous exchange. Most importantly, there was no secondary market for the new domestic instruments immediately after the exchange. As a result, the methodology used in most previous computations—to discount both new and old payment streams with the maturity-adjusted “exit yield”—cannot be applied. Instead, our approach is to compare the old and new payments streams using two alternative discount rates that arguably constitute upper and lower bounds, respectively, for the true, unobservable, exit yield, as follows.

First, while the new instruments were not initially traded, the old instruments—which continued to be held by nonresident and some resident bondholders—were, and post-exchange yields for these instruments are available. However, because the government had announced that the new instruments would in effect be treated as senior—the declared

intention was to restructure the old instruments in a second phase while attempting to service the new ones—one must assume that the yield of the old instrument would have exceeded the yield of the new instruments. This is also clear from the fact that most of the local bondholders that were given a choice did in fact agree to exchange. Hence, we used the yields of the old instruments to estimate an upper bound for the haircut resulting from the Phase 1 exchange. Differences in maturity between new and old instruments are handled by discounting the new guaranteed loans by the yields on the old bond with the closest average life, adjusted by the US T-bill yield curve when the two did not match perfectly.

Second, the new instruments were eventually traded, in mid-2003, but at that time the instruments had suffered a new restructuring involving a currency conversion (*pesification*, more on this below), so that the prices and yields on these instruments at the time are useless for the purposes of evaluating the Phase 1 instruments that were denominated in US dollars. However, by then the government had issued post-default debt both in dollars and in indexed pesos. We use the yields of this post-default debt to construct an estimate of the Phase 1 instruments yield as follows. First, by comparing the yields on the Boden 07 (a post default, fairly liquid paper denominated in indexed pesos) and a guaranteed loan of similar average life, we compute a liquidity premium associated with the guaranteed loans. This is estimated at 2.7 percent. We then add this liquidity premium to the yield of post default dollar-denominated instruments, in particular the Boden 2012 which started trading in September 2002, making small yield curve adjustments using the US T-bill yield curve when appropriate. However, by September 2002, much legal and political uncertainty had been resolved, a new arrangement with the IMF was in place, and the economy was rapidly recovering. Thus, the observed yields at that time will almost certainly understate what the yields would have been in November of 2001.

A further complication is that the payment stream for some floating rate bonds is difficult to project. While forward rates are readily available for the LIBOR, some Argentine bonds were indexed to local rates that do not have a forward curve. In those cases, we took the actual payments these bonds would have made as long as we have the information (May 2005) and keep this value frozen thereafter. A sole exception is the “FRAN,” which was indexed to the yield of Argentine debt; thus, we valued this bond at par at the time of the exchange.

Table 9 contains haircut calculations for most of the exchanged instruments, using maturity adjusted yields derived from either the November 2001 yields on the old, mostly externally issued instruments (“upper bound”, or UB, estimates) or yields on the post default debt adjusted by a liquidity premium (“lower bound”, LB, estimates). Argentina had remained current on its payments until the exchange, so there was no PDI or past due principal, and there were no cash payments associated with the exchange.

Table 9. Argentina "Phase 1" Exchange, November 2001

	Bonte 02	Bonte 03F	Bonte 03	Bonte 04	Bonte 05	Bonte 06	Bonte 27	FRAN	FRB	FRN 04
Old Instruments										
Issue date	5/9/1997	7/21/1998	2/21/2000	5/24/1999	2/21/2000	2/21/2001	9/19/1998	4/13/1998	3/31/1993	4/6/1999
Amount outstanding (US\$ mn)	2,201	260	1,695	1,358	1,727	856	98	456	2,310	231
Remaining capital (per 100 units issued)	100	100	100	100	100	100	100	100	56	100
Maturity date	5/9/2002	7/21/2003	5/21/2003	5/24/2004	5/21/2005	5/15/2006	9/19/2005	4/10/2005	3/29/2005	4/6/2004
Coupon (percent)	8.75	floating	11.75	11.25	12.13	11.75	9.94	6 mo n/a	L + 13/16	L + 5/75
Average remaining life (years)	0.49	1.69	1.52	2.53	3.52	4.51	25.87	3.41	1.83	2.40
Present value (1) on 11/7 (UB) (per 100 principal) 1/	79.9	57.7	60.4	60.1	63.2	51.6	46.1	100.0	96.1	59.2
Implicit discount rate (yield, in percent)	96.1	72.4	73.9	47.4	37.1	41.5	23.7	48.1	-14.1	39.9
Present value (2) on 11/7 (LB) (per 100 principal) 2/	102.0	102.7	102.5	98.4	98.0	94.0	84.1	100.0	82.9	89.3
Discount rate used (in percent) 3/	14.2	14.9	14.8	15.3	15.7	16.1	12.5	13.0	15.0	15.3
Total amount exchanged	479.7	115.0	1,052.7	930.3	936.3	721.4	44.2	149.7	1,380.9	5.0
New Instruments (Guaranteed Loans) 4/										
Option 1: Shorter Maturity, Fixed Rate										
Maturity	5/9/2005	7/21/2006	5/21/2006	5/24/2007	5/21/2008	5/15/2009	9/19/2007	4/10/2008	3/31/2008	4/6/2007
Present value (1) on Nov. 7 (UB)	46.3	34.3	35.3	32.6	33.8	31.4	31.1	33.9	27.6	22.6
Discount rate used (yield, in percent) 5/	37.1	41.5	41.5	38.9	33.9	33.2	23.7	33.8	36.5	52.2
Present value (2) on Nov. 7 (LB)	78.2	72.6	73.4	68.8	71.5	68.3	48.9	71.6	67.8	69.2
Discount rate used (yield, in percent) 6/	15.7	16.2	16.1	16.4	14.4	14.5	15.3	14.3	14.3	16.4
Option 2: Shorter Maturity, Floating Rate										
Maturity	5/9/2005	7/21/2006	5/21/2006	5/24/2007	5/21/2008	5/15/2009	9/19/2007	4/10/2008	...	...
Present value (1) on Nov. 7 (UB)	44.6	28.2	29.2	21.3	31.0	28.2	17.0	31.2	...	...
Discount rate used (yield, in percent) 5/	38.1	48.6	48.5	52.3	36.5	36.7	44.8	36.5	...	...
Present value (2) on Nov. 7 (LB)	77.5	72.3	73.0	66.7	72.7	70.2	55.3	72.8	...	...
Discount rate used (yield, in percent) 6/	15.7	16.2	16.1	16.4	14.4	14.5	15.3	14.3	...	...
Option 3: Longer Maturity, Capitalizing										
Maturity	...	...	11/6/2011	11/6/2011	11/6/2011	11/6/2011	...	11/6/2011	...	...
Present value (1) on Nov. 7 (UB)	...	...	13.5	13.5	13.5	13.5	...	13.5	...	...
Discount rate used (yield, in percent) 5/	...	...	31.8	31.8	31.8	31.8	...	31.8	...	...
Present value (2) on Nov. 7 (LB)	...	...	51.5	51.5	51.5	51.5	...	51.5	...	...
Discount rate used (yield, in percent) 6/	...	...	14.7	14.7	14.7	14.7	...	14.7	...	...
Haircuts based on PV1 (upper bound)										
if chose option 1	42.1	40.5	41.4	45.7	46.6	39.1	32.5	66.1	71.3	61.9
if chose option 2	44.2	51.0	51.7	64.5	50.9	45.4	63.2	68.8	...	...
if chose option 3	...	...	77.7	77.6	78.7	73.9	...	86.5	...	...
Haircut based on PV2 (lower bound)										
if chose option 1	23.4	29.3	28.4	30.1	27.0	27.3	41.8	28.4	18.1	22.5
if chose option 2	24.1	29.6	28.7	32.2	25.8	25.4	34.2	27.2	...	...
if chose option 3	...	...	49.8	47.7	47.5	45.2	...	48.5	...	...

1/ Actual secondary market price of old bonds trading on November 7, 2001.

2/ Includes accrued interest.

3/ Based on the yield of post-default bonds trading in September 2002 (see text).

4/ There were no face value reduction under any option, i.e. principal units were exchanged 1:1.

5/ Yield to maturity of old instruments after exchange on November 7, 2001, adjusted for maturity difference

6/ Based on the yield of post-default bonds trading in September 2002, with maturity adjustment (see text).

Table 9. Argentina "Phase 1" Exchange, November 2001 (continued)

	Global 03	Global 05	Global 06	Global 08	Global 09	Global 10	Global 12	Global 15	Global 17	Global 18
Old Instruments										
Issue date	12/20/1993	12/4/1998	10/9/1996	6/19/2001	4/7/1999	3/15/2000	2/21/2001	6/15/2000	1/30/1997	6/19/2001
Amount outstanding (US\$ mn)	1,843	862	1,213	11,096	1,413	860	923	903	2,503	7,060
Remaining capital (per 100 units issued)	100	100	100	100	100	100	100	100	100	100
Maturity date	12/20/2003	12/4/2005	10/9/2006	12/19/2008	4/7/2009	3/15/2010	2/21/2012	6/15/2015	1/30/2017	6/19/2018
Coupon (percent)	8.38	11.00	11.00	7-15.5	11.75	11.38	12.38	11.75	11.38	12.25
Average remaining life (years)	2.10	4.06	4.91	7.11	7.41	8.34	10.28	13.60	15.23	16.61
Present value (1) on 11/7 (UB) (per 100 principal) ^{1/}	55.7	57.8	45.9	47.9	46.7	46.3	48.3	47.6	47.4	40.4
Implicit discount rate (yield, in percent)	52.6	35.3	38.7	33.7	33.1	32.0	31.9	30.7	28.8	23.7
Present value (2) on 11/7 (LB) (per 100 principal) ^{2/}	92.6	91.7	85.4	91.8	90.7	88.8	93.3	89.1	84.6	83.4
Discount rate used (in percent) ^{3/}	15.1	15.9	16.3	14.2	14.5	14.6	14.7	14.9	15.1	15.1
Total amount exchanged	58.7	83.8	70.4	8,997.0	277.1	130.7	492.5	318.7	884.8	5,876.6
New Instruments (Guaranteed Loans) ^{4/}										
Option 1: Shorter Maturity, Fixed Rate										
Maturity	12/20/2006	12/4/2008	10/9/2009	12/19/2011	5/7/2012	3/15/2013	2/21/2012	6/15/2015	1/30/2017	7/19/2018
Present value (1) on Nov. 7 (UB)	25.9	31.5	31.5	29.9	27.3	26.4	27.8	25.6	27.5	13.8
Discount rate used (yield, in percent) ^{5/}	48.7	34.0	32.0	32.1	31.9	32.0	31.9	30.7	28.8	28.8
Present value (2) on Nov. 7 (LB)	69.4	69.3	67.1	65.1	61.4	59.9	62.0	55.5	54.9	43.6
Discount rate used (yield, in percent) ^{6/}	16.3	14.5	14.5	14.6	14.7	14.8	14.7	14.9	15.1	15.1
Option 2: Shorter Maturity, Floating Rate										
Maturity	12/20/2006	12/4/2008	10/9/2009	12/19/2011	5/7/2012	3/15/2013	2/21/2012	6/15/2015	1/30/2017	7/19/2018
Present value (1) on Nov. 7 (UB)	25.2	29.1	29.1	17.1	18.8	18.4	16.3	17.9	17.5	6.7
Discount rate used (yield, in percent) ^{5/}	48.7	36.6	36.7	44.2	44.3	44.3	44.3	44.5	44.6	44.6
Present value (2) on Nov. 7 (LB)	69.2	71.0	70.8	44.1	64.9	63.7	77.7	73.8	59.9	68.9
Discount rate used (yield, in percent) ^{6/}	16.3	14.5	14.5	14.6	14.7	14.8	14.7	14.9	15.1	15.1
Option 3: Longer Maturity, Capitalizing										
Maturity	...	11/6/2011	11/6/2011	11/6/2011	11/6/2011	11/6/2011	...	...	...	...
Present value (1) on Nov. 7 (UB)	...	13.5	13.5	13.5	13.5	13.5	...	...	...	...
Discount rate used (yield, in percent) ^{5/}	...	31.8	31.8	31.8	31.8	31.8	...	...	...	...
Present value (2) on Nov. 7 (LB)	...	51.5	51.5	51.5	51.5	51.5	...	...	...	...
Discount rate used (yield, in percent) ^{6/}	...	14.7	14.7	14.7	14.7	14.7	...	...	...	...
Haircuts based on PV1 (upper bound)										
if chose option 1	53.4	45.5	31.2	37.6	41.5	42.9	42.4	46.3	41.9	66.0
if chose option 2	54.7	49.7	36.6	64.4	59.8	60.3	66.2	62.3	63.0	83.5
if chose option 3	...	76.7	70.6	71.8	71.1	70.9	...	...	...	...
Haircuts based on PV2 (lower bound)										
if chose option 1	25.0	24.5	21.4	29.1	32.3	32.6	33.5	37.7	35.2	47.7
if chose option 2	25.3	22.6	17.1	52.0	28.5	28.3	16.7	17.2	29.3	17.3
if chose option 3	...	43.9	39.7	43.9	43.3	42.0	...	...	...	...

^{1/} Actual secondary market price of old bonds trading on November 7, 2001.

^{2/} Includes accrued interest.

^{4/} There were no face value reduction under any option, i.e. principal units were exchanged 1:1.

^{5/} Yield to maturity of old instruments after exchange on November 7, 2001, adjusted for maturity difference

^{6/} Based on the yield of post-default bonds trading in September 2002, with maturity adjustment (see text).

Table 9. Argentina "Phase 1" Exchange, November 2001 (continued)

	Global 19	Global 20	Global 27	Global 29	Global 30	Global 31	Global 31 meg	PRE 3	PRE 4	PRE 5
Old Instruments										
Issue date	2/25/1999	2/3/2000	9/19/1997	3/1/1999	7/21/2000	1/31/2001	6/19/2001	9/1/1992	9/1/1992	1/1/2000
Amount outstanding (US\$ mn)	176	158	995	125	241	15	9,219	73	648	0.2
Remaining capital (per 100 units issued)	100	100	100	100	100	100	100	21	21	100
Maturity date	2/25/2019	2/1/2020	9/19/2027	3/1/2029	7/21/2030	1/31/2031	6/19/2031	9/1/2002	9/1/2002	1/1/2010
Coupon (percent)	12.13	12.00	9.75	8.88	10.25	12.00	12.00	1 mo CD	1 mo L	1 mo n/a
Average remaining life (years)	17.30	18.23	25.87	27.32	28.71	29.24	29.62	0.46	0.46	8.14
Present value (1) on 11/7 (UB) (per 100 principal) ^{1/}	44.4	47.7	45.4	39.4	44.5	47.2	39.5	99.7	93.4	17.2
Implicit discount rate (yield, in percent)	31.9	29.1	23.7	28.7	26.7	29.8	22.5	81.9	144.4	52.4
Present value (2) on 11/7 (LB) (per 100 principal) ^{2/}	87.2	85.9	68.7	81.2	74.1	86.2	74.4	121.3	127.4	53.7
Discount rate used (in percent) ^{3/}	15.2	15.3	15.3	12.3	15.2	15.2	15.2	13.4	14.2	13.0
Total amount exchanged	74.0	48.1	467.9		113.2	47.1	8,148.1	27.2	320.7	
New Instruments (Guaranteed Loans) ^{4/}										
Option 1: Shorter Maturity, Fixed Rate										
Maturity	2/25/2019	2/1/2020	9/19/2027	3/1/2032	7/21/2030	1/31/2031	6/19/2031	9/1/2005	9/1/2005	1/1/2013
Present value (1) on Nov. 7 (UB)	24.0	26.5	30.5	22.8	27.8	25.1	18.8	43.0	32.9	15.5
Discount rate used (yield, in percent) ^{5/}	31.9	29.1	23.7	31.9	26.7	29.8	22.5	39.8	52.2	33.3
Present value (2) on Nov. 7 (LB)	52.7	52.6	47.9	49.0	49.0	49.1	36.5	78.6	78.2	41.0
Discount rate used (yield, in percent) ^{6/}	15.2	15.3	15.3	15.2	15.2	15.2	15.2	14.9	14.9	16.1
Option 2: Shorter Maturity, Floating Rate										
Maturity	2/25/2019	2/1/2020	9/19/2027	3/1/2032	7/21/2030	1/31/2031	6/19/2031			
Present value (1) on Nov. 7 (UB)	17.4	17.3	16.7	15.6	17.1	17.2	5.9			
Discount rate used (yield, in percent) ^{5/}	44.7	44.8	44.8	44.8	44.7	44.7	44.7			
Present value (2) on Nov. 7 (LB)	58.6	58.0	54.7	49.8	55.5	55.6	45.7			
Discount rate used (yield, in percent) ^{6/}	15.2	15.3	15.3	15.2	15.2	15.2	15.2			
Option 3: Longer Maturity, Capitalizing										
Maturity										
Present value (1) on Nov. 7 (UB)										
Discount rate used (yield, in percent) ^{5/}										
Present value (2) on Nov. 7 (LB)										
Discount rate used (yield, in percent) ^{6/}										
Haircuts based on PV1 (upper bound)										
if chose option 1	46.0	44.3	32.8	42.1	37.6	46.9	52.5	56.9	64.7	10.1
if chose option 2	60.9	63.7	63.2	60.3	61.6	63.6	85.2			
if chose option 3										
Haircut based on PV2 (lower bound)										
if chose option 1	39.6	38.8	30.3	39.6	33.9	43.0	50.9	35.2	38.6	23.6
if chose option 2	32.9	32.4	20.4	38.6	25.2	35.5	38.5			
if chose option 3										

^{1/} Actual secondary market price of old bonds trading on November 7, 2001.

^{2/} Includes accrued interest.

^{3/} Based on the yield of post-default bonds trading in September 2002 (see text).

^{4/} There were no face value reduction under any option, i.e. principal units were exchanged 1:1.

^{5/} Yield to maturity of old instruments after exchange on November 7, 2001, adjusted for maturity difference

^{6/} Based on the yield of post-default bonds trading in September 2002, with maturity adjustment (see text).

Table 9. Argentina "Phase 1" Exchange, November 2001 (continued)

	Pre 6	PRO1	PRO2	PRO3	PRO4	PRO5	PRO6	PRO8	PRO9	Hidro
Old Instruments										
Issue date	1/1/2000	4/1/1991	4/1/1991	12/28/1994	12/28/1994	1/15/1999	1/15/1999	1/1/2000	4/15/2001	12/2/1992
Amount outstanding (US\$ mn)	76	658	520	6	1,144	289	1,033	10	101	20
Remaining capital (per 100 units issued)	100	54	54	91	91	88	88	100	100	71
Maturity date	1/1/2010	4/1/2007	4/1/2007	12/28/2010	12/28/2010	4/15/2007	4/15/2007	1/1/2016	4/15/2007	12/2/2008
Coupon (percent)	1 mo L/O eff CD rate	2.71	2.71	1 mo L/O eff CD rate	1 mo L	ARCR	3 mo L	1 mo L	3 mo L	1 mo L
Average remaining life (years)	8.14	2.71	2.71	4.54	4.54	5.42	2.71	14.15	5.42	3.54
Present value (1) on 11/7 (UB) (per 100 principal) ^{1/}	18.5	49.2	58.6	34.5	46.8	44.0	42.3	10.4	31.8	61.2
Implicit discount rate (yield, in percent)	36.4	51.9	52.3	51.9	50.8	51.9	54.3	36.8	52.2	38.4
Present value (2) on 11/7 (LB) (per 100 principal) ^{2/}	60.9	83.6	102.5	67.8	101.8	82.0	76.7	46.5	76.4	99.9
Discount rate used (in percent) ^{3/}	11.6	14.6	15.4	15.3	13.8	11.8	15.4	11.9	12.1	14.5
Total amount exchanged	3.1	317.3	189.5	0.2	278.6	128.5	343.7	0.1	9.8	19.7
New Instruments (Guaranteed Loans) ^{4/}										
Option 1: Shorter Maturity, Fixed Rate										
Maturity	1/1/2013	4/1/2010	4/1/2010	12/28/2013	12/28/2013	4/15/2010	4/15/2010	1/1/2019	4/15/2010	12/2/2011
Present value (1) on Nov. 7 (UB)	8.3	24.3	18.1	17.7	13.2	24.3	17.8	6.7	19.5	15.2
Discount rate used (yield, in percent) ^{5/}	52.7	40.5	52.3	40.9	52.6	40.5	52.3	52.9	40.7	52.5
Present value (2) on Nov. 7 (LB)	45.8	60.2	62.6	50.0	53.5	60.3	62.2	37.5	55.1	57.8
Discount rate used (yield, in percent) ^{6/}	16.1	15.6	15.6	15.9	15.9	15.6	15.6	16.3	15.8	15.8
Option 2: Shorter Maturity, Floating Rate										
Maturity	...	...	...	...	...	...	...	...	...	...
Present value (1) on Nov. 7 (UB)	...	...	...	...	...	...	...	...	...	...
Discount rate used (yield, in percent) ^{5/}	...	...	...	...	...	...	...	...	...	...
Present value (2) on Nov. 7 (LB)	...	...	...	...	...	...	...	...	...	...
Discount rate used (yield, in percent) ^{6/}	...	...	...	...	...	...	...	...	...	...
Option 3: Longer Maturity, Capitalizing										
Maturity	...	...	...	...	...	...	...	...	...	...
Present value (1) on Nov. 7 (UB)	...	...	...	...	...	...	...	...	...	...
Discount rate used (yield, in percent) ^{5/}	...	...	...	...	...	...	...	...	...	...
Present value (2) on Nov. 7 (LB)	...	...	...	...	...	...	...	...	...	...
Discount rate used (yield, in percent) ^{6/}	...	...	...	...	...	...	...	...	...	...
Haircuts based on PV1 (upper bound)										
if chose option 1	55.2	50.5	69.1	48.7	71.8	44.7	57.9	35.1	38.6	75.1
if chose option 2	...	...	...	...	...	...	...	...	...	...
if chose option 3	...	...	...	...	...	...	...	...	...	...
Haircuts based on PV2 (lower bound)										
if chose option 1	24.9	27.9	38.9	26.2	47.5	26.5	18.8	19.3	27.9	42.1
if chose option 2	...	...	...	...	...	...	...	...	...	...
if chose option 3	...	...	...	...	...	...	...	...	...	...

^{1/} Actual secondary market price of old bonds trading on November 7, 2001.

^{2/} Includes accrued interest.

^{3/} Based on the yield of post-default bonds trading in September 2002 (see text).

^{4/} There were no face value reduction under any option, i.e. principal units were exchanged 1:1.

^{5/} Yield to maturity of old instruments after exchange on November 7, 2001, adjusted for maturity difference

^{6/} Based on the yield of post-default bonds trading in September 2002, with maturity adjustment (see text).

Table 9. Argentina "Phase 1" Exchange, November 2001 (concluded)

	Bonex 92	Span 02	RA \$02	RA \$07	RA \$08	Radar 1	Radar 2	Radar 3	Radar 4	Celtic 2
Old Instruments										
Issue date	9/15/1992	12/16/1997	7/10/1997	2/12/1997	6/19/2001	4/24/2001	5/28/2001	7/24/2001	8/8/2001	9/4/2001
Amount outstanding (US\$ mn)	177	135	113	80	931	380	380	400	250	300
Remaining capital (per 100 units issued)	13	100	100	100	100	100	100	100	100	100
Maturity date	9/15/2002	11/30/2002	7/10/2002	2/12/2007	9/19/2008	4/24/2003	5/28/2003	7/24/2006	8/8/2006	9/4/2007
Coupon (percent)	6 mo L	0.00	8.75	11.75	10.00	BdL+405	BdL+405	BdL+405	BdL+405	BdL+405
Average remaining life (years)	0.84	1.05	0.66	5.25	6.86	1.45	1.54	4.70	4.74	5.81
Present value (1) on 11/7 (UB) (per 100 principal) ^{1/}	96.1	83.4	83.1	47.8	45.6	54.3	55.4	34.2	23.9	33.7
Implicit discount rate (yield, in percent)	1372.5	52.0	51.9	38.8	33.1	72.2	72.3	43.5	43.5	36.3
Present value (2) on 11/7 (LB) (per 100 principal) ^{2/}	736.4	109.7	101.2	97.5	93.7	96.5	97.8	83.3	67.2	77.8
Discount rate used (in percent) ^{3/}	14.4	11.8	11.7	13.6	13.1	12.1	12.1	11.2	11.2	11.5
Total amount exchanged	131.5	25.4	32.2	65.6	329.7	375.7	380.3	467.9	250.0	300.0
New Instruments (Guaranteed Loans) ^{4/}										
Option 1: Shorter Maturity, Fixed Rate										
Maturity	9/15/2005	11/30/2005	7/10/2005	2/12/2010	9/19/2011	4/24/2006	5/28/2006	7/24/2009	8/8/2009	9/4/2010
Present value (1) on Nov. 7 (UB)	40.2	44.9	41.9	26.1	27.0	29.7	29.4	28.1	20.0	20.2
Discount rate used (yield, in percent) ^{5/}	38.2	35.3	39.9	33.3	33.4	48.5	48.6	36.7	36.7	44.2
Present value (2) on Nov. 7 (LB)	73.6	76.2	78.9	57.3	58.2	73.4	73.4	70.2	54.6	67.4
Discount rate used (yield, in percent) ^{6/}	15.9	15.9	14.9	16.0	16.1	16.1	16.1	14.5	14.5	14.6
Option 2: Shorter Maturity, Floating Rate										
Maturity	...	11/30/2005	...	...	...	...	...	...	...	...
Present value (1) on Nov. 7 (UB)	...	32.4	...	...	...	...	...	...	...	...
Discount rate used (yield, in percent) ^{5/}	...	48.4	...	...	...	...	...	...	...	...
Present value (2) on Nov. 7 (LB)	...	75.4	...	...	...	...	...	...	...	...
Discount rate used (yield, in percent) ^{6/}	...	15.9	...	...	...	...	...	...	...	...
Option 3: Longer Maturity, Capitalizing										
Maturity	...	11/6/2011	...	...	11/6/2011	11/6/2011	11/6/2011	11/6/2011	11/6/2011	11/6/2011
Present value (1) on Nov. 7 (UB)	...	13.5	...	...	13.5	13.5	13.5	13.5	13.5	13.5
Discount rate used (yield, in percent) ^{5/}	...	31.8	...	...	31.8	31.8	31.8	31.8	31.8	31.8
Present value (2) on Nov. 7 (LB)	...	51.5	...	...	51.5	51.5	51.5	51.5	51.5	51.5
Discount rate used (yield, in percent) ^{6/}	...	14.7	...	...	14.7	14.7	14.7	14.7	14.7	14.7
Haircuts based on PV1 (upper bound)										
if chose option 1	58.2	46.1	49.5	45.4	40.7	45.3	46.9	17.7	16.3	40.1
if chose option 2	...	61.2	...	...	...	...	...	...	...	...
if chose option 3	...	83.8	...	...	70.4	75.2	75.7	60.5	43.6	59.9
Haircuts based on PV2 (lower bound)										
if chose option 1	90.0	30.5	22.1	41.2	37.8	23.9	25.0	15.7	18.8	13.4
if chose option 2	...	31.3	...	...	...	...	...	...	...	...
if chose option 3	...	53.0	...	...	45.0	46.6	47.4	38.2	23.4	33.8

^{1/} Actual secondary market price of old bonds trading on November 7, 2001.

^{2/} Includes accrued interest.

^{3/} Based on the yield of post-default bonds trading in September 2002 (see text).

^{4/} There were no face value reduction under any option, i.e. principal units were exchanged 1:1.

^{5/} Yield to maturity of old instruments after exchange on November 7, 2001, adjusted for maturity difference

^{6/} Based on the yield of post-default bonds trading in September 2002, with maturity adjustment (see text).

Fortunately, in spite of our inability to estimate the exit yield with any precision, the upper and lower bound haircut estimates corresponding to each old bond in Table 9 are not so far apart as to be meaningless. Based on Option 1, which was given to all old instruments and which was generally the most favorable, almost all lower bound estimates exceed 25 percent while most upper bound estimates are below 60 percent. The average haircut is about 40 percent, somewhat higher than for the Ecuador, Ukraine, and Pakistan exchanges, but below those suffered by Russia's creditors in 1999 and 2000.

Pesification

Shortly after the Phase 1 exchange, the government faced a bank run to which it reacted by imposing a deposit freeze. In turn, this led to political turmoil and the fall of the government. The new administration defaulted on all public debt, and shortly afterwards devalued the currency. Since most debt was denominated in U.S. dollars, the debt burden increased sharply. As a result, in February 2002, the government decided to “pesify” the guaranteed loans that had been issued in November 2001, as well as any other dollar-denominated domestic law instruments (about US\$58 bn in total). Dollar instruments would be converted at 1.40 pesos per dollar, with a promise to index capital and interest payments by inflation. As the peso/dollar exchange rate was close to 1.90 at the time, this entailed a substantial loss. In addition, interest rates were further reduced for most of the instruments, with all, except for those with the longest maturity, set at 2 percent. Maturities were left unchanged. While there was no exchange—the terms of domestic law instruments were simply changed by fiat—investors were given the choice to return to the defaulted foreign currency bond they had exchanged during “Phase 1.” It is estimated that holders of about US\$3.65 bn “pesified loans” made use of this option. In addition, creditors holding about \$16.3 bn pesified loans—mostly pension funds—rejected both alternatives, and took legal action against the government.¹⁶ Their loans were eventually “redollarized” by decree in August of 2003.

Table 10 shows the results (transposed from the usual format, as we have over 100 instruments, while the modalities of the restructuring were fairly simple). We discount the original dollar-denominated instruments using the yield of dollar denominated instruments at the time, while the cash flow of the new local currency instruments are discounted by the yield on the indexed peso bonds. As discussed previously, guaranteed loans commanded a slightly higher yield relative to bonds with the same characteristics, reflecting their lack of the liquidity; hence, they are discounted at a slightly higher rate. The final step is to convert the peso net present values into dollars using the current exchange rate of 1.9 pesos/US\$, so they can be compared to the present value of the old instruments. The unweighted average haircut was about 45 percent.¹⁷ Most haircuts were in the range of 30 to 65 percent.

¹⁶ We are grateful to Luciano Laspina for supplying us with these estimates.

¹⁷ Unfortunately a weighted average haircut cannot be computed because we have no information on the relative volumes of various outstanding instruments. While we know the amount or principal exchanged for each old instrument in “Phase 1”, there is no information as to how it was exchanged (i.e. for which new instrument, of the several existing alternatives) and hence on the outstanding volumes of various “guaranteed loans.”

Table 10. Argentina Pesification (February 2002)

Name ^{1/}	Old Instruments (US\$ denominated)						New Instruments (AR\$ denominated) ^{1/}				Haircut
	Issue	Maturity ^{1/}	Coupon	Remaining	Present	Discount	Coupon	Present	Present	Discount	
			(percent)	life (years) ^{2/}	value on Feb. 3	rate used (percent)	^{3/} (percent)	value in AR\$ ^{1/}	value in US\$ ^{1/}	rate used (percent)	
Bonte 02	5/9/97	5/9/02	8.75	0.26	101.27	12.82	2.00	99.61	52.4	12.45	48.2
Bonte 03F	7/21/98	7/21/03	floating	1.46	105.11	12.72	2.00	87.42	46.0	12.45	56.2
Bonte 03	2/21/00	5/21/03	11.75	1.29	102.22	12.73	2.00	89.11	46.9	12.45	54.1
Bonte 04	5/24/99	5/24/04	11.25	2.30	100.82	12.64	2.00	81.13	42.7	12.45	57.7
Bonte 05	2/21/00	5/21/05	12.13	3.30	102.83	12.56	2.00	74.03	39.0	12.45	62.1
Bonte 06	2/21/01	5/15/06	11.75	4.28	101.74	12.47	2.00	67.72	35.6	12.45	65.0
Bonte 27	9/19/98	9/19/27	9.94	25.64	100.57	10.60	2.00	21.52	11.3	12.45	88.7
PRE 4	9/1/92	9/1/02	1 mo L	0.34	21.91	12.82	2.00	19.11	10.1	12.45	54.1
Pre 6	1/1/00	1/1/10	1 mo L	5.96	69.26	12.32	2.00	45.84	24.1	12.45	65.2
PRO2	4/1/91	4/1/07	1 mo L	2.59	58.10	12.62	2.00	54.20	28.5	12.45	50.9
PRO4	12/28/94	12/28/10	1 mo L	4.42	96.83	12.46	2.00	86.53	45.5	12.45	53.0
PRO6	1/15/99	4/15/07	3 mo L	2.67	69.53	12.61	2.00	66.16	34.8	12.45	49.9
PRO8	1/1/00	1/1/16	1mo L	8.92	65.22	12.06	2.00	37.48	19.7	12.45	69.8
Hidro	12/2/92	12/2/08	monthly L	3.42	70.80	12.55	2.00	68.07	35.8	12.45	49.4
Bonex 92	9/15/92	9/15/02	S/A L	0.61	12.08	12.79	2.00	12.19	6.4	12.45	46.9
Radar 1	4/24/01	4/24/03	Bdl+405	1.22	93.32	12.74	2.00	89.62	47.2	12.45	49.5
Radar 2	5/28/01	5/28/03	Bdl+405	1.31	93.58	12.73	2.00	89.35	47.0	12.45	49.7
Radar 3	7/24/01	7/24/06	Bdl+405	4.47	76.40	12.45	2.00	66.63	35.1	12.45	54.1
PG 2011 GL 08	11/6/01	11/6/11	7.00	9.38	53.02	14.73	5.50	45.39	23.9	15.16	54.9
PG TF BP E+400/02	11/6/01	7/21/06	7.00	4.46	77.87	15.16	7.00	66.71	35.1	15.16	54.9
PG 2009 7%	11/6/01	6/19/09	7.00	7.38	69.23	14.90	4.00	54.14	28.5	15.16	58.8
PG TF GL 03	11/6/01	12/20/06	5.863 - 7	4.88	75.15	15.12	4.00	94.69	49.8	15.16	33.7
PG TV GL 03	11/6/01	12/20/06	L+300	4.88	77.15	15.12	4.00	94.37	49.7	15.16	35.6
PG TF GL 05	11/6/01	12/4/08	7.00	6.84	70.13	14.95	4.00	81.47	42.9	15.16	38.9
PG TV GL 05	11/6/01	12/4/08	L + 300	6.84	74.09	14.95	4.00	81.14	42.7	15.16	42.4
PG TF GL 06	11/6/01	10/9/09	7.00	7.68	68.28	14.88	4.00	77.16	40.6	15.16	40.5
PG TV GL 06	11/6/01	10/9/09	L + 300	7.68	74.40	14.88	4.00	81.20	42.7	15.16	42.6
PG TF GL 08	11/6/01	12/19/11	7.00	8.58	66.74	14.80	4.00	73.07	38.5	15.16	42.4
PG TV GL 08	11/6/01	12/19/11	L+300	8.58	72.16	14.80	4.00	72.77	38.3	15.16	46.9
PG TF GL 09	11/6/01	5/7/12	7.00	10.26	63.87	14.65	5.00	74.13	39.0	15.16	38.9
PG TV GL 09	11/6/01	5/7/12	L + 300	10.26	70.62	14.65	5.00	73.83	38.9	15.16	45.0
PGTF GL10	11/6/01	3/15/13	7.00	11.12	62.81	14.58	5.00	71.50	37.6	15.16	40.1
PGTV GL10	11/6/01	3/15/13	L + 300bp	11.12	70.11	14.58	5.00	71.20	37.5	15.16	46.6
PGTF GL12	11/6/01	2/21/12	7.00	10.05	64.36	14.67	5.00	74.95	39.4	15.16	38.7
PGTV GL12	11/6/01	2/21/12	L + 300bp	10.05	57.09	14.67	5.00	62.83	33.1	15.16	42.1
PGTF GL15	11/6/01	6/15/15	7.00	13.37	59.59	14.38	5.00	64.09	33.7	15.16	43.4
PGTV GL15	11/6/01	6/15/15	L + 300bp	13.37	68.66	14.38	5.00	63.83	33.6	15.16	51.1
PGTF GL17	11/6/01	1/30/17	7.00	15.00	59.91	14.24	5.00	63.40	33.4	15.16	44.3
PGTV GL17	11/6/01	1/30/17	L + 300bp	15.00	69.20	14.24	5.00	63.14	33.2	15.16	52.0
PGTF GL18	11/6/01	7/19/18	7.00	15.33	49.05	14.21	5.00	46.76	24.6	15.16	49.8
PGTV GL18	11/6/01	7/19/18	L + 300bp	15.33	61.90	14.21	5.00	46.57	24.5	15.16	60.4
PGTF GL19	11/6/01	2/25/19	7.00	17.07	58.90	14.06	5.00	60.31	31.7	15.16	46.1
PGTV GL19	11/6/01	2/25/19	L + 300bp	17.07	69.44	14.06	5.00	60.06	31.6	15.16	54.5
PGTF GL20	11/6/01	2/1/20	7.00	18.01	59.34	13.97	5.00	60.42	31.8	15.16	46.4
PGTV GL20	11/6/01	2/1/20	L + 300bp	18.01	69.49	13.97	5.00	60.17	31.7	15.16	54.4
PGTF GL27	11/6/01	9/19/27	6.83	25.64	56.86	13.31	5.00	54.04	28.4	15.16	50.0
PGTV GL27	11/6/01	9/19/27	+ 287.1bp	25.64	69.53	13.31	5.00	53.82	28.3	15.16	59.3
PGTF GL29	11/6/01	3/1/32	6.21	17.58	54.93	14.01	5.00	62.36	32.8	15.16	40.2
PGTV GL29	11/6/01	3/1/32	L + 242bp	17.58	65.85	14.01	5.00	62.12	32.7	15.16	50.3
PG TF GL 30	11/6/01	7/21/30	7.00	28.48	58.93	13.06	5.00	53.25	28.0	15.16	52.4
PG TV GL 30	11/6/01	7/21/30	L+300	28.48	71.64	13.06	5.00	53.03	27.9	15.16	61.0
PG TF GL 31	11/6/01	1/31/31	7.00	29.01	59.24	13.01	5.00	53.31	28.1	15.16	52.6
PG TV GL 31	11/6/01	1/31/31	L+300	29.01	71.97	13.01	5.00	53.09	27.9	15.16	61.2
PG TF GL 31 mega	11/6/01	6/19/31	7.00	29.39	47.94	12.98	5.00	35.70	18.8	15.16	60.8
PG TV GL 31 mega	11/6/01	6/19/31	L+300	29.39	65.23	12.98	5.00	35.56	18.7	15.16	71.3

Table 10. Argentina Pesification (February 2002) (concluded)

Name 1/	Old Instruments (US\$ denominated)						New Instruments (AR\$ denominated) 1/				Haircut	
	Issue	Maturity 1/	Coupon	Remaining life	Present value on Feb. 3	Discount rate used	Coupon	Present value in	Present value in	Discount rate used	3/	(percent)
			(percent)	(years) 2/		(percent)	3/ (percent)	AR\$ 1/	US\$ 1/	(percent)		
PG TF Bonte 02	11/6/01	5/9/05	25 - 7 onw	3.26	82.04	15.26	3.00	104.23	54.9	15.16		33.1
PG TV Bonte 02	11/6/01	5/9/05	L+300	3.26	81.91	15.26	3.00	103.85	54.7	15.16		33.3
PG TF Bonte 03	11/6/01	5/21/06	7.00	4.30	78.50	15.17	3.00	94.88	49.9	15.16		36.4
PG TV Bonte 03	11/6/01	5/21/06	L+300	4.30	79.47	15.17	3.00	94.49	49.7	15.16		37.4
PG TV Bonte 03 F	11/6/01	7/21/06	L+300	4.46	79.04	15.16	3.00	93.01	49.0	15.16		38.1
PG TF Bonte 04	11/6/01	5/24/07	7.00	5.30	75.03	15.09	4.00	91.94	48.4	15.16		35.5
PG TV Bonte 04	11/6/01	5/24/07	L+300	5.30	77.18	15.09	4.00	91.56	48.2	15.16		37.6
PG TF Bonte 05	11/6/01	5/21/08	7.00	6.30	71.99	15.00	4.00	85.21	44.8	15.16		37.7
PG TV Bonte 05	11/6/01	5/21/08	L+300	6.30	75.23	15.00	4.00	84.86	44.7	15.16		40.6
PG TF Bonte 06	11/6/01	5/15/09	7.00	7.28	69.33	14.91	4.00	79.31	41.7	15.16		39.8
PG TV Bonte 06	11/6/01	5/15/09	L+300	7.28	73.64	14.91	4.00	78.99	41.6	15.16		43.5
PG TF Bonte 27	11/6/01	9/19/27	6.96	25.64	58.02	13.31	5.00	54.06	28.5	15.16		51.0
PG TV Bonte 27	11/6/01	9/19/27	L+296.8	25.64	70.31	13.31	5.00	53.84	28.3	15.16		59.7
PG TV BP E+400/02	11/6/01	4/24/05	L+300	3.22	82.68	15.27	3.00	105.07	55.3	15.16		33.1
PG TV BP E+330/02	11/6/01	8/22/05	L+300	3.55	82.71	15.24	3.00	105.04	55.3	15.16		33.2
PG TV BP E+580/02	11/6/01	7/21/06	L+300	4.46	79.04	15.16	3.00	93.01	49.0	15.16		38.1
PG TV BP E+435/02	11/6/01	2/16/07	L+300	5.04	77.62	15.11	4.00	93.10	49.0	15.16		36.9
PG TV BP E+300/02	11/6/01	8/7/05	L+300	3.51	81.37	15.24	3.00	101.45	53.4	15.16		34.4
PG TV BP E+580/02	11/6/01	8/7/05	L+300	3.51	81.37	15.24	3.00	101.45	53.4	15.16		34.4
PG TV BP Act./02	11/6/01	8/7/05	L+300	3.51	81.37	15.24	3.00	101.45	53.4	15.16		34.4
PG TV BP E+580 mega/	11/6/01	6/19/09	L+300	7.38	73.58	14.90	4.00	78.61	41.4	15.16		43.8
PG TV Hexagon 2	11/6/01	11/30/05	L+300	3.82	80.96	15.21	3.00	99.26	52.2	15.16		35.5
PG TV Hexagon 3	11/6/01	12/23/05	L+300	3.89	80.63	15.21	3.00	98.38	51.8	15.16		35.8
PG TV Hexagon 4	11/6/01	9/27/08	L+300	6.65	74.79	14.97	4.00	82.94	43.7	15.16		41.6
PG TV Radar 1	11/6/01	4/24/06	L+300	4.22	79.74	15.18	3.00	95.28	50.1	15.16		37.1
PG TV Radar 2	11/6/01	5/28/06	L+300	4.32	79.57	15.17	3.00	94.58	49.8	15.16		37.4
PG TV Radar 3	11/6/01	7/24/09	L+300	7.47	73.54	14.90	4.00	78.25	41.2	15.16		44.0
PG TV Radar 4	11/6/01	8/8/09	L+300	7.52	73.20	14.89	4.00	77.55	40.8	15.16		44.2
PG TV Celtic I	11/6/01	9/23/10	L+300	8.64	72.15	14.79	4.00	72.58	38.2	15.16		47.1
PG TV Celtic II	11/6/01	9/4/10	L+300	8.59	71.87	14.80	4.00	72.27	38.0	15.16		47.1
PG TV FRB	11/6/01	3/31/08	L+300	6.16	71.51	15.01	3.00	74.21	39.1	15.16		45.4
PG TF SPAN	11/6/01	11/30/05	7.00	3.82	80.68	15.21	3.00	99.67	52.5	15.16		35.0
PG TV SPAN	11/6/01	11/30/05	L+300	3.82	80.96	15.21	3.00	99.26	52.2	15.16		35.5
PG TF FRAN	11/6/01	4/10/08	7.00	6.19	71.99	15.01	4.00	85.55	45.0	15.16		37.5
PG TV FRAN	11/6/01	4/10/08	L+300	6.19	75.22	15.01	4.00	85.20	44.8	15.16		40.4
PG TV FRN 04	11/6/01	4/6/07	L+300	5.17	77.10	15.10	4.00	91.87	48.4	15.16		37.3
PG TV BONEX 92	11/6/01	9/15/05	L+300	3.62	78.18	15.23	3.00	99.82	52.5	15.16		32.8
PG TF API	11/6/01	3/15/16	2.8-7	8.58	65.59	14.80	4.00	75.55	39.8	15.16		39.4
PG TV API	11/6/01	3/15/16	L+300	8.58	71.20	14.80	4.00	75.43	39.7	15.16		44.2
PG TV Bono YPF	11/6/01	2/3/09	L+300	5.13	77.41	15.10	4.00	92.81	48.8	15.16		36.9
PG TF Capitalizable 202	11/6/01	6/29/20	7.00	18.41	33.59	13.94	5.50	29.29	15.4	15.16		54.1
PG TF Cert. Cap BNA 2	11/6/01	12/30/18	7.00	16.92	36.09	14.07	5.50	33.33	17.5	15.16		51.4
PGTV Hidro\$	11/6/01	12/2/11	L+300	6.29	63.84	15.00	4.00	85.29	44.9	15.16		29.7
PGTV Pre4	11/6/01	9/1/05	L+300	3.21	80.74	15.27	3.00	103.44	54.4	15.16		32.6
PGTV Pre4	11/6/01	1/1/13	L+300	8.96	53.74	14.77	4.00	54.32	28.6	15.16		46.8
PGTV Pro2	11/6/01	4/1/10	L+300	5.46	75.75	15.07	4.00	90.06	47.4	15.16		37.4
PGTV Pro4	11/6/01	12/28/13	L+300	7.25	65.22	14.91	4.00	80.68	42.5	15.16		34.9
PGTV Pro6	11/6/01	4/15/10	L+300	5.54	52.55	15.06	4.00	71.92	37.9	15.16		28.0
PGTV Pro8	11/6/01	1/1/19	L+300	11.92	46.56	14.51	5.00	47.69	25.1	15.16		46.1
PGTV Pro10	11/6/01	4/15/10	L+300	6.29	63.34	15.00	4.00	84.09	44.3	15.16		30.1
PGTF RAS08	11/6/01	9/19/11	7.00	9.63	65.17	14.71	4.00	68.82	36.2	15.16		44.4

1/ Names and maturities of the old instruments also refer to the new instruments, i.e. restructuring did not affect maturity.

2/ Weighted average of time of amortization, using percent amortization in each time period as weights.

3/ Based on linear interpolation of Boden 2005 and Boden 2012 yields, plus liquidity premium of 2.7 percentage points for guaranteed loans.

4/ Boden 2007 yield, plus liquidity premium of 2.7 percentage points for guaranteed loans.

The 2005 External Debt Exchange

Following “Phase 1” and pesification, there remained a large stock—about \$80 billion—of unstructured international debt issued prior to the default, held mostly by non-residents and some residents which had not tendered in the Phase 1 exchange. In September 2003, the government presented an initial debt restructuring strategy known as the “Dubai guidelines” focused on the objective of attaining a haircut of 75 percent in nominal terms. After fierce creditor resistance and a wave of litigation, on June 1, 2004 the government presented a modification of the Dubai guidelines that became known as the “Buenos Aires proposal,” focused on a “menu” of three securities—a par bond with no face value reduction, a discount bond with a high reduction, and a “quasi par” bond in between—to be issued in a range of currencies, including CPI-indexed domestic currency. Another novelty of the exchange was that all instruments would include a detachable “GDP warrant” with payments tied to GDP growth.

A government filing with the U.S. Securities and Exchange Commission in late September 2004 laid out the details. The *par bond* could be denominated in CPI-indexed pesos, dollars, euros or yens; with a maturity of 35 years. Coupons would be increasing from 1.33 percent in the first five years to 2.5 in the next ten, 3.75 in the following ten and 5.25 thereafter for the dollar bond (0.63, 1.18, 1.77 and 2.48 percent for the indexed peso bond). Amortization would take place in 19 half-year installments starting in September 2029. The *discount bond* was exchanged at 33.7 percent of the original face value. It had a maturity of 30 years, and paid a constant interest rate of 8.28 percent in dollars (5.83 percent in indexed pesos) though part of this capitalized during the first 10 years. It was offered in the same currencies as the par bond, and amortized in 20 equal payments beginning in June 2024. Finally, the “quasi par” bond had a maturity of 42 years, was exchanged at 69.6 percent of face value, had an interest rate of 3.31 that capitalized during the first 10 years, and amortized in 20 semiannual payments starting in 2036. This bond was issued in indexed pesos only, and targeted specifically to local pension funds, which were coaxed into an agreement under which they received the quasi par bond along with regulatory benefits. A minimum of 350,000 dollars was required to bid for this bond, imposing a constraint on retail investors. In contrast, a *maximum* of 50,000 dollars per holder of each issue was set for the Par bond, as a way of forcing larger holders to the discount bond, which with a haircut of 66.3 percent provided the largest debt relief in terms of face value. No restrictions were placed on the discount bond.

In order to de-dollarize the debt, owners of any instrument could change their holding for indexed pesos bonds. The currency conversion was done at the exchange rate prevailing on December 31, 2003, the formal issue date of the bond. The new bonds would pay interest beginning at this date, which would be paid out in cash at settlement. Unpaid and accrued interest through December 31, 2001 (the default date) would also be included. There was no recognition, however, for unpaid interest due between December 2001 and December 2003—the only instance, among the debt restructurings covered in this paper, when PDI was not recognized in some form.

The offer opened on January 12, 2005, and closed on February 25. Participation was 76.15 percent of all holdings, leading to US\$35.3 billion of restructured debt: US\$15 billion in par bonds, \$US11.9 billion in discount bonds, and Arg\$ 24.3 billion (about US\$8.3) in quasi-par bonds. 44 percent of the new debt was denominated in indexed pesos. Although settlement did not begin until early June—reflecting litigation by holdouts that delayed the originally envisaged April 1, 2005 settlement date—a gray “when and if” market trading promises to deliver the new bonds after settlement sprung into existence immediately after preliminary exchange results were announced on March 3, 2005. Using the prices and yields in this market as well as the yields of other performing post-default debt, it is possible to calculate the haircuts in the usual way. In Table 11, we show the results for 66 US\$ and Arg\$ denominated instruments (we do not show haircuts for instruments denominated in other currencies because of the symmetric treatment offered to Euro and US Dollar bonds).¹⁸

The main finding is that average haircuts (weighted by the face value of original instruments tendered) were 71-75 percent: around 71 percent for the Par, 75 percent for the discount, and 73 percent for the Quasi-Par. The higher haircut for the discount bond appears to be a result of a relatively low secondary market price of this bond compared to the par bond, as indicated by higher yields of the discount bonds relative to their par counterparts.

Except for two outliers above and below, haircuts across instruments varied between 64 and 82 percent. The high end of this range is constituted by bonds issued during the June 2001 “megaswap”, such as the Global 18 or Global 31 “mega.” Because they were long term and carried high coupon rates (having been issued in near-crisis circumstances), the present value of these bonds is high, and hence the haircut is high as well. The lower end corresponds to bonds that derived from previous debt consolidations and carried a low interest rate and high degree of capitalization; hence, these bonds had low market value.

The two outliers are the “FRAN”, with a haircut of close to 90 percent, and the (collateralized) Discount Brady bond, at around 38 percent. The high haircut on the FRAN is driven by extraordinarily high past due interest on this bond, resulting from the fact that its coupon payments were linked to the yield on other outstanding Argentine sovereign bonds, which were extremely high during the default period. In turn, the low haircut on the Brady bond reflects the absence of past due interest, as investors continued to receive interest payment financed by interest collateral, as well as the release of principal collateral upon exchange. This implied a cash payment of over 45 percent of principal outstanding, and a “total value received” of over 60 percent—compared to 30-40 percent for a typical uncollateralized bond. Of course, the fact that the principal was collateralized also pushes up the value of the *old* bond compared to an uncollateralized bond. However, this offsetting effect on the haircut was relatively small because of the low emerging market interest environment after the exchange, which implied that the difference in value between a collateralized bond and an uncollateralized one was fairly minor.

¹⁸ Also missing are a handful of US\$ and Arg\$ issues for which we could not verify the payment terms.

Table 11. Argentina's 2005 Exchange (January-February 2005)

	Bonte 02	Bonte 03	Bonte 03F	Bonte 04	Bonte 05	Bonte 06	Bonte 27	FRAN	FRN 04
Characteristics of Old Instruments									
Amount outstanding (US\$ mn)	1,513.4	732.9	143.1	508.7	759.5	225.2	3.4	383.5	225.9
Maturity date	5/9/02	5/21/03	7/21/03	5/24/04	5/21/05	5/15/06	9/19/27	4/10/05	4/6/04
Remaining Life (years)	Matured	Matured	Matured	Matured	0.21	1.19	22.55	0.09	Matured
Coupon (percent)	8.75	11.75	floating	11.25	12.125	11.75	9.9375	GI-linked	6mL+575
Original Currency	USD	USD	USD	USD	USD	USD	USD	USD	USD
PV of past due principal and interest (in US\$) <u>1/</u>	108.1	120.5	114.0	129.8	37.1	36.0	35.4	211.4	120.0
Compound rate (in percent per annum)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
PV of future cash flow on April 1 2005 (in US\$) <u>1/</u>	0.0	0.0	0.0	0.0	104.9	108.9	114.5	100.0	0.0
Discount rate (in percent)	N/A	N/A	N/A	N/A	7.37	7.42	8.67	7.36	N/A
Present value including PDI and PDP (in US\$)	108.1	120.5	114.0	129.8	142.0	144.9	150.0	311.4	120.0
New Instruments and Cash obtained									
Option 1. PAR in US\$ (35 year bond with step-up coupon, no face value reduction)									
Price on 3/4/05 (per unit of principal of new bond)	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Units obtained <u>1/</u>	101.3	101.3	102.9	101.2	101.3	101.5	102.8	105.7	102.0
Cash payment obtained (in US\$) <u>1/</u>	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.7
Total value obtained (in US\$) <u>1/</u>	39.7	39.7	40.3	39.6	39.7	39.8	40.3	41.4	39.9
Option 2. PAR in AR\$ (35 year bond with step-up coupon, no face value reduction)									
Price on 3/4/05 (per unit of principal of new bond)	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395
Units obtained <u>1/ 2/</u>	295.4	295.6	300.1	295.1	295.7	296.1	300.0	308.4	297.5
Cash payment obtained (in AR\$) <u>1/</u>	2.3	2.3	2.4	2.3	2.3	2.3	2.4	2.4	2.3
Total value obtained (in AR\$)	119.0	119.1	120.9	118.9	119.1	119.3	120.8	124.2	119.9
Total value obtained (in US\$) <u>3/</u>	40.6	40.6	41.3	40.6	40.7	40.7	41.2	42.4	40.9
Option 3. DISCOUNT in US\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)									
Price on 3/4/05 (per unit of principal of new bond)	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
Units obtained <u>1/</u>	34.1	34.1	34.7	34.1	34.2	34.2	34.6	35.6	34.4
Cash payment obtained (in US\$) <u>1/</u>	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total value obtained (in US\$) <u>1/</u>	33.6	33.6	34.1	33.5	33.6	33.7	34.1	35.0	33.8
Option 4. DISCOUNT in AR\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)									
Price on 3/4/05 (per unit of principal of new bond)	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Units obtained <u>1/ 2/</u>	99.6	99.6	101.1	99.5	99.6	99.8	101.1	103.9	100.3
Cash payment obtained (in AR\$) <u>1/</u>	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.9	2.8
Total value obtained (in AR\$)	107.3	107.4	109.0	107.2	107.4	107.6	109.0	112.1	108.1
Total value obtained (in US\$) <u>3/</u>	36.6	36.6	37.2	36.6	36.7	36.7	37.2	38.2	36.9
Option 5. QUASI-PAR (in AR\$, 42 year capitalizing bond, face value reduction of 30.1 percent)									
Value on 3/4/05 (per unit of principal of new bond)	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551
Units obtained <u>1/ 2/</u>	206.5	206.6	209.7	206.3	206.7	207.0	209.7	215.6	208.0
Cash payment obtained	-	-	-	-	-	-	-	-	-
Total value obtained (in AR\$)	113.8	113.9	115.6	113.7	113.9	114.1	115.6	118.8	114.6
Total value obtained (in US\$) <u>3/</u>	38.9	38.9	39.5	38.8	38.9	38.9	39.5	40.6	39.1
Haircut based on Option 1 (in percent)	63.3	67.1	64.7	69.5	72.1	72.6	73.2	86.7	66.7
Haircut based on Option 2 (in percent)	62.4	66.3	63.8	68.7	71.4	71.9	72.5	86.4	65.9
Haircut based on Option 3 (in percent)	69.0	72.1	70.1	74.2	76.3	76.8	77.3	88.7	71.8
Haircut based on Option 4 (in percent)	66.1	69.6	67.4	71.8	74.2	74.7	75.2	87.7	69.3
Haircut based on Option 5 (in percent)	64.1	67.7	65.4	70.1	72.6	73.1	73.7	87.0	67.4
Weighted average <u>4/</u>	64.9	68.5	66.2	70.8	73.2	73.7	74.3	87.3	68.1

1/ Per 100 units of principal at issue.

2/ Using exchange rate of 2.9175 AR\$ per US\$ prevailing on 12/31/03.

3/ Using exchange rate of 2.93 AR\$ per US\$.

4/ Using aggregate face value of the five options as weights (Option 1 and 2: US\$15 bn; Option 3 and 4: 11.9 bn; Option 5 about 8.3 bn)

Table 11. Argentina's 2005 Exchange (January-February 2005) (continued)

	Global 03	Global 05	Global 06	Global 08	Global 09	Global 10	Global 12	Global 15	Global 17	Global 18
Characteristics of Old Instruments										
Amount outstanding (US\$ mn)	1,794.4	821.6	1,185.4	5,024.7	1,197.0	775.0	465.3	718.2	1,903.7	104.6
Maturity date	12/20/03	12/4/05	10/9/06	12/19/08	4/7/09	3/15/10	2/21/12	6/15/15	1/30/17	6/19/18
Remaining Life (years)	Matured	0.75	1.59	2.42	4.09	5.02	6.96	10.28	11.91	12.17
Coupon (percent)	8.375	11	11	7 - 15.5	11.75	11.375	12.375	11.75	11.375	12.25
Original Currency	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
PV of past due principal and interest (in US\$) 1/	118.8	33.6	33.7	25.7	36.0	40.6	44.2	35.9	40.7	0.0
Compound rate (in percent per annum)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
PV of future cash flow on April 1 2005 (in US\$) 1/	0.0	105.5	110.1	122.1	119.9	116.1	130.3	130.7	128.7	216.8
Discount rate (in percent)	N/A	7.39	7.44	7.49	7.58	7.63	7.74	7.93	8.02	8.04
Present value including PDI and PDP (in US\$)	118.8	139.1	143.8	147.8	155.9	156.7	174.5	166.7	169.3	216.8
New Instruments and Cash obtained										
Option 1. PAR in US\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Units obtained 1/	100.3	100.8	102.5	100.2	102.7	103.3	104.5	100.5	104.7	106.6
Cash payment obtained (in US\$) 1/	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8
Total value obtained (in US\$) 1/	39.3	39.5	40.1	39.3	40.2	40.5	40.9	39.4	41.0	41.7
Option 2. PAR in AR\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395
Units obtained 1/ 2/	292.5	294.2	299.1	292.4	299.7	301.5	304.8	293.3	305.6	310.9
Cash payment obtained (in AR\$) 1/	2.3	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.4	2.4
Total value obtained (in AR\$)	117.8	118.5	120.5	117.8	120.8	121.5	122.8	118.2	123.1	125.2
Total value obtained (in US\$) 3/	40.2	40.4	41.1	40.2	41.2	41.5	41.9	40.3	42.0	42.7
Option 3. DISCOUNT in US\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
Units obtained 1/	33.8	34.0	34.5	33.8	34.6	34.8	35.2	33.9	35.3	35.9
Cash payment obtained (in US\$) 1/	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total value obtained (in US\$) 1/	33.2	33.4	34.0	33.2	34.1	34.3	34.6	33.3	34.7	35.3
Option 4. DISCOUNT in AR\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Units obtained 1/ 2/	98.6	99.1	100.8	98.5	101.0	101.6	102.7	98.8	103.0	104.8
Cash payment obtained (in AR\$) 1/	2.8	2.8	2.8	2.8	2.8	2.9	2.9	2.8	2.9	2.9
Total value obtained (in AR\$)	106.3	106.9	108.7	106.2	108.9	109.5	110.7	106.6	111.0	113.0
Total value obtained (in US\$) 3/	36.3	36.5	37.1	36.3	37.2	37.4	37.8	36.4	37.9	38.5
Option 5. QUASI-PAR (in AR\$, 42 year capitalizing bond, face value reduction of 30.1 percent)										
Value on 3/4/05 (per unit of principal of new bond)	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551
Units obtained 1/ 2/	204.5	205.6	209.0	204.4	209.5	210.8	213.0	205.0	213.6	217.3
Cash payment obtained	-	-	-	-	-	-	-	-	-	-
Total value obtained (in AR\$)	112.7	113.4	115.2	112.7	115.5	116.2	117.4	113.0	117.8	119.8
Total value obtained (in US\$) 3/	38.5	38.7	39.3	38.5	39.4	39.7	40.1	38.6	40.2	40.9
Haircut based on Option 1 (in percent)	66.9	71.6	72.1	73.4	74.2	74.2	76.6	76.4	75.8	80.8
Haircut based on Option 2 (in percent)	66.1	70.9	71.4	72.8	73.6	73.5	76.0	75.8	75.2	80.3
Haircut based on Option 3 (in percent)	72.0	76.0	76.4	77.5	78.2	78.1	80.1	80.0	79.5	83.7
Haircut based on Option 4 (in percent)	69.5	73.8	74.2	75.5	76.2	76.1	78.3	78.2	77.6	82.2
Haircut based on Option 5 (in percent)	67.6	72.2	72.6	74.0	74.7	74.7	77.0	76.9	76.3	81.1
Weighted average 4/	68.3	72.8	73.3	74.5	75.3	75.2	77.5	77.4	76.8	81.6

1/ Per 100 units of principal at issue.

2/ Using exchange rate of 2.9175 AR\$ per US\$ prevailing on 12/31/03.

3/ Using exchange rate of 2.93 AR\$ per US\$.

4/ Using aggregate face value of the five options as weights (Option 1 and 2: US\$15 bn; Option 3 and 4: \$US11.9 bn; Option 5 about US\$8.3 bn)

Table 11. Argentina's 2005 Exchange (January-February 2005) (continued)

	Global 19	Global 20	Global 27	Global 29	Global 30	Global 31	Global 31A	PRE 4	Pre 6	PRO2
Characteristics of Old Instruments										
Amount outstanding (US\$ mn)	146.8	121.7	809.5	125.0	166.0	13.2	8,595.2	259.9	73.5	332.6
Maturity date	2/25/19	2/1/20	9/19/27	3/1/29	7/21/30	1/31/31	6/19/31	9/1/02	1/1/10	4/1/07
Remaining Life (years)	13.98	14.92	22.55	14.16	25.39	25.92	26.30	Matured	2.79	1.00
Coupon (percent)	12.125	12	9.75	8.875	10.25	12	12	1mL flat	1mL flat	1mL flat
Original Currency	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
PV of past due principal and interest (in US\$) 1/	43.3	42.8	34.8	36.3	36.6	42.9	0.0	26.4	0.0	47.2
Compound rate (in percent per annum)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
PV of future cash flow on April 1 2005 (in US\$) 1/	135.5	135.1	112.6	101.7	117.3	135.9	214.5	0.0	107.4	26.1
Discount rate (in percent)	8.14	8.20	8.67	8.15	8.85	8.88	8.91	N/A	7.51	7.41
Present value including PDI and PDP (in US\$)	178.8	178.0	147.4	138.0	154.0	178.7	214.5	26.4	107.4	73.3
New Instruments and Cash obtained										
Option 1. PAR in US\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Units obtained 1/	104.2	105.0	102.8	103.0	104.6	105.0	106.4	17.0	111.1	67.1
Cash payment obtained (in US\$) 1/	1.7	1.7	1.7	1.7	1.7	1.7	1.8	0.3	1.8	1.1
Total value obtained (in US\$) 1/	40.8	41.1	40.2	40.3	40.9	41.1	41.7	6.6	43.5	26.3
Option 2. PAR in AR\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395
Units obtained 1/ 2/	304.1	306.3	299.8	300.4	305.0	306.3	310.5	49.5	324.1	195.8
Cash payment obtained (in AR\$) 1/	2.4	2.4	2.4	2.4	2.4	2.4	2.4	0.4	2.6	1.5
Total value obtained (in AR\$)	122.5	123.4	120.8	121.0	122.9	123.4	125.1	20.0	130.6	78.9
Total value obtained (in US\$) 3/	41.8	42.1	41.2	41.3	41.9	42.1	42.7	6.8	44.6	26.9
Option 3. DISCOUNT in US\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
Units obtained 1/	35.1	35.4	34.6	34.7	35.2	35.4	35.9	5.7	37.4	22.6
Cash payment obtained (in US\$) 1/	1.4	1.4	1.4	1.4	1.4	1.4	1.4	0.2	1.5	0.9
Total value obtained (in US\$) 1/	34.6	34.8	34.1	34.1	34.7	34.8	35.3	5.6	36.8	22.2
Option 4. DISCOUNT in AR\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Units obtained 1/ 2/	102.5	103.2	101.0	101.2	102.8	103.2	104.6	16.7	109.2	66.0
Cash payment obtained (in AR\$) 1/	2.9	2.9	2.8	2.8	2.9	2.9	2.9	0.5	3.1	1.9
Total value obtained (in AR\$)	110.5	111.3	108.9	109.1	110.8	111.3	112.8	18.0	117.7	71.1
Total value obtained (in US\$) 3/	37.7	38.0	37.2	37.2	37.8	38.0	38.5	6.1	40.2	24.3
Option 5. QUASI-PAR (in AR\$, 42 year capitalizing bond, face value reduction of 30.1 percent)										
Value on 3/4/05 (per unit of principal of new bond)	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551
Units obtained 1/ 2/	212.6	214.1	209.6	210.0	213.2	214.1	217.0	34.6	226.5	136.8
Cash payment obtained	-	-	-	-	-	-	-	-	-	-
Total value obtained (in AR\$)	117.2	118.0	115.5	115.8	117.5	118.0	119.6	19.1	124.9	75.4
Total value obtained (in US\$) 3/	40.0	40.3	39.4	39.5	40.1	40.3	40.8	6.5	42.6	25.7
Haircut based on Option 1 (in percent)	77.2	76.9	72.7	70.8	73.4	77.0	80.6	74.8	59.5	64.1
Haircut based on Option 2 (in percent)	76.6	76.3	72.0	70.1	72.8	76.4	80.1	74.2	58.5	63.3
Haircut based on Option 3 (in percent)	80.7	80.4	76.9	75.3	77.5	80.5	83.5	78.7	65.7	69.6
Haircut based on Option 4 (in percent)	78.9	78.7	74.8	73.0	75.4	78.7	82.1	76.8	62.6	66.9
Haircut based on Option 5 (in percent)	77.6	77.4	73.3	71.4	73.9	77.5	81.0	75.4	60.3	64.9
Weighted average 4/	78.1	77.9	73.8	72.0	74.5	78.0	81.4	75.9	61.2	65.6

1/ Per 100 units of principal at issue.

2/ Using exchange rate of 2.9175 AR\$ per US\$ prevailing on 12/31/03.

3/ Using exchange rate of 2.93 AR\$ per US\$.

4/ Using aggregate face value of the five options as weights (Option 1 and 2: US\$15 bn; Option 3 and 4: \$US11.9 bn; Option 5 about US\$8.3 bn)

Table 11. Argentina's 2005 Exchange (January-February 2005) (continued)

	PRO4	PRO6	PRO8	PRO10	Hidro	Bonex 92	Radar 1	Radar 2	Radar 3	Radar 4
Characteristics of Old Instruments										
Amount outstanding (US\$ mn)	452.3	527.6	14.7	51.5	18.2	150.0	349.5	351.7	361.9	232.0
Maturity date	12/28/10	4/15/07	1/1/16	4/15/07	12/2/08	9/15/02	4/24/03	5/28/03	7/24/06	8/8/06
Remaining Life (years)	2.84	1.13	5.75	1.13	1.84	Matured	Matured	Matured	1.38	1.42
Coupon (percent)	1mL flat	1mL flat	1mL flat	3m Lflat	1mL flat	6mL flat	3dlar+405	3dlar+405	3dlar+405	3dlar+405
Original Currency	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
PV of past due principal and interest (in US\$) 1/	52.4	56.6	0.0	49.0	48.9	13.3	112.3	115.9	20.9	19.1
Compound rate (in percent per annum)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
PV of future cash flow on April 1 2005 (in US\$) 1/	74.5	35.0	101.2	54.6	47.4	0.0	0.0	0.0	96.7	96.5
Discount rate (in percent)	7.51	7.41	7.67	7.41	7.45	N/A	N/A	N/A	7.43	7.43
Present value including PDI and PDP (in US\$)	126.9	91.5	101.2	103.6	96.3	13.3	112.3	115.9	117.5	115.5
New Instruments and Cash obtained										
Option 1. PAR in US\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Units obtained 1/	124.3	84.4	111.1	100.5	91.0	12.6	103.0	101.4	102.7	102.9
Cash payment obtained (in US\$) 1/	2.1	1.4	1.8	1.7	1.5	0.2	1.7	1.7	1.7	1.7
Total value obtained (in US\$) 1/	48.7	33.1	43.5	39.4	35.6	4.9	40.3	39.7	40.2	40.3
Option 2. PAR in AR\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395
Units obtained 1/ 2/	362.7	246.2	324.1	293.2	265.4	36.8	300.4	296.0	299.7	300.2
Cash payment obtained (in AR\$) 1/	2.9	1.9	2.6	2.3	2.1	0.3	2.4	2.3	2.4	2.4
Total value obtained (in AR\$)	146.1	99.2	130.6	118.1	106.9	14.8	121.0	119.2	120.8	121.0
Total value obtained (in US\$) 3/	49.9	33.9	44.6	40.3	36.5	5.1	41.3	40.7	41.2	41.3
Option 3. DISCOUNT in US\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
Units obtained 1/	41.9	28.4	37.4	33.9	30.7	4.3	34.7	34.2	34.6	34.7
Cash payment obtained (in US\$) 1/	1.7	1.1	1.5	1.4	1.2	0.2	1.4	1.4	1.4	1.4
Total value obtained (in US\$) 1/	41.2	28.0	36.8	33.3	30.2	4.2	34.1	33.6	34.1	34.1
Option 4. DISCOUNT in AR\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Units obtained 1/ 2/	122.2	83.0	109.2	98.8	89.4	12.4	101.2	99.7	101.0	101.2
Cash payment obtained (in AR\$) 1/	3.4	2.3	3.1	2.8	2.5	0.3	2.8	2.8	2.8	2.8
Total value obtained (in AR\$)	131.8	89.5	117.7	106.5	96.4	13.4	109.1	107.5	108.9	109.1
Total value obtained (in US\$) 3/	45.0	30.5	40.2	36.4	32.9	4.6	37.2	36.7	37.2	37.2
Option 5. QUASI-PAR (in AR\$, 42 year capitalizing bond, face value reduction of 30.1 percent)										
Value on 3/4/05 (per unit of principal of new bond)	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551
Units obtained 1/ 2/	253.5	172.1	226.5	205.0	185.5	25.8	210.0	206.9	209.5	209.9
Cash payment obtained	-	-	-	-	-	-	-	-	-	-
Total value obtained (in AR\$)	139.8	94.9	124.9	113.0	102.3	14.2	115.7	114.1	115.5	115.7
Total value obtained (in US\$) 3/	47.7	32.4	42.6	38.6	34.9	4.8	39.5	38.9	39.4	39.5
Haircut based on Option 1 (in percent)	61.6	63.9	57.0	62.0	63.0	62.7	64.1	65.7	65.8	65.1
Haircut based on Option 2 (in percent)	60.7	63.0	56.0	61.1	62.1	61.8	63.2	64.9	64.9	64.3
Haircut based on Option 3 (in percent)	67.5	69.4	63.6	67.8	68.7	68.5	69.6	71.0	71.0	70.5
Haircut based on Option 4 (in percent)	64.6	66.6	60.3	64.9	65.8	65.6	66.8	68.3	68.4	67.8
Haircut based on Option 5 (in percent)	62.4	64.6	57.9	62.8	63.7	63.5	64.8	66.4	66.5	65.8
Weighted average 4/	63.2	65.4	58.8	63.6	64.6	64.3	65.6	67.2	67.2	66.6

1/ Per 100 units of principal at issue.

2/ Using exchange rate of 2.9175 AR\$ per US\$ prevailing on 12/31/03.

3/ Using exchange rate of 2.93 AR\$ per US\$.

4/ Using aggregate face value of the five options as weights (Option 1 and 2: US\$15 bn; Option 3 and 4: \$US11.9 bn; Option 5 about US\$8.3 bn)

Table 11. Argentina's 2005 Exchange (January-February 2005) (continued)

	Celtic 2	Span 02	Letras T9C	Letras T10	Letras T10	Letras T10	Letras T10	RML	Pagare III
Characteristics of Old Instruments									
Amount outstanding (US\$ mn)	279.1	130.1	448.5	119.7	116.8	25.0	30.8	561.8	4.0
Maturity date	9/4/07	11/30/02	3/15/02	2/15/02	3/8/02	2/22/02	3/22/02	4/16/02	4/24/02
Remaining Life (years)	2.50	Matured	Matured	Matured	Matured	Matured	Matured	Matured	Matured
Coupon (percent)	adlar+405	rs. linked	zero	zero	zero	zero	zero	9.1	adlar+400
Original Currency	USD	USD	USD	USD	USD	USD	USD	USD	USD
PV of past due principal and interest (in US\$) 1/	19.1	117.7	103.8	103.9	103.8	103.9	103.8	108.4	107.6
Compound rate (in percent per annum)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
PV of future cash flow on April 1 2005 (in US\$) 1/	93.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discount rate (in percent)	7.49	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Present value including PDI and PDP (in US\$)	112.9	117.7	103.8	103.9	103.8	103.9	103.8	108.4	107.6
New Instruments and Cash obtained									
Option 1. PAR in US\$ (35 year bond with step-up coupon, no face value reduction)									
Price on 3/4/05 (per unit of principal of new bond)	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Units obtained 1/	103.0	101.2	100.0	100.0	100.0	100.0	100.0	101.9	103.1
Cash payment obtained (in US\$) 1/	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Total value obtained (in US\$) 1/	40.3	39.6	39.2	39.2	39.2	39.2	39.2	39.9	40.4
Option 2. PAR in AR\$ (35 year bond with step-up coupon, no face value reduction)									
Price on 3/4/05 (per unit of principal of new bond)	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395
Units obtained 1/ 2/	300.4	295.2	291.8	291.8	291.8	291.8	291.8	297.2	300.8
Cash payment obtained (in AR\$) 1/	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4
Total value obtained (in AR\$)	121.0	118.9	117.5	117.5	117.5	117.5	117.5	119.7	121.2
Total value obtained (in US\$) 3/	41.3	40.6	40.1	40.1	40.1	40.1	40.1	40.9	41.4
Option 3. DISCOUNT in US\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)									
Price on 3/4/05 (per unit of principal of new bond)	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
Units obtained 1/	34.7	34.1	33.7	33.7	33.7	33.7	33.7	34.3	34.7
Cash payment obtained (in US\$) 1/	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Total value obtained (in US\$) 1/	34.1	33.6	33.2	33.2	33.2	33.2	33.2	33.8	34.2
Option 4. DISCOUNT in AR\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)									
Price on 3/4/05 (per unit of principal of new bond)	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Units obtained 1/ 2/	101.2	99.5	98.3	98.3	98.3	98.3	98.3	100.2	101.4
Cash payment obtained (in AR\$) 1/	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Total value obtained (in AR\$)	109.1	107.3	106.0	106.0	106.0	106.0	106.0	108.0	109.3
Total value obtained (in US\$) 3/	37.3	36.6	36.2	36.2	36.2	36.2	36.2	36.9	37.3
Option 5. QUASI-PAR (in AR\$, 42 year capitalizing bond, face value reduction of 30.1 percent)									
Value on 3/4/05 (per unit of principal of new bond)	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551
Units obtained 1/ 2/	210.0	206.4	203.9	203.9	203.9	203.9	203.9	207.8	210.2
Cash payment obtained	-	-	-	-	-	-	-	-	-
Total value obtained (in AR\$)	115.8	113.8	112.4	112.4	112.4	112.4	112.4	114.5	115.9
Total value obtained (in US\$) 3/	39.5	38.8	38.4	38.4	38.4	38.4	38.4	39.1	39.6
Haircut based on Option 1 (in percent)	64.3	66.3	62.3	62.3	62.3	62.3	62.3	63.2	62.5
Haircut based on Option 2 (in percent)	63.4	65.5	61.4	61.4	61.4	61.4	61.4	62.3	61.6
Haircut based on Option 3 (in percent)	69.7	71.5	68.1	68.1	68.1	68.1	68.1	68.8	68.2
Haircut based on Option 4 (in percent)	67.0	68.9	65.2	65.2	65.2	65.2	65.2	66.0	65.4
Haircut based on Option 5 (in percent)	65.0	67.0	63.0	63.1	63.0	63.1	63.0	63.9	63.3
Weighted average 4/	65.8	67.7	63.9	63.9	63.9	63.9	63.9	64.7	64.1

1/ Per 100 units of principal at issue.

2/ Using exchange rate of 2.9175 AR\$ per US\$ prevailing on 12/31/03.

3/ Using exchange rate of 2.93 AR\$ per US\$.

4/ Using aggregate face value of the five options as weights (Option 1 and 2: US\$15 bn; Option 3 and 4: \$US11.9 bn; Option 5 about US\$8.3 bn)

Table 11. Argentina's 2005 Exchange (January-February 2005) (continued)

	Pagare IV	Pagare V	Pagare VI	Pagare A	Pagare B	Pagare C	Pagare 200	Global F	FRB	Discount
Characteristics of Old Instruments										
Amount outstanding (US\$ mn)	11.3	1.4	20.7	197.8	130.0	75.0	15.0	181.6	1,637.2	800.5
Maturity date	8/22/02	10/30/02	2/16/04	8/7/02	8/7/02	8/7/02	6/19/06	10/15/04	3/29/05	3/31/23
Remaining Life (years)	Matured	Matured	Matured	Matured	Matured	Matured	0.67	Matured	Matured	18.08
Coupon (percent)	aresta+400	aresta+400	aresta+400	aresta+580	adlar+300	3adlar+75	adlar+150	0 nL	+81.25 mL	+81.25
Original Currency	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
PV of past due principal and interest (in US\$) <u>1/</u>	110.3	112.4	126.8	111.9	107.6	106.1	91.2	100.5	59.5	0.0
Compound rate (in percent per annum)	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	-
PV of future cash flow on April 1 2005 (in US\$) <u>1/</u>	0.0	0.0	0.0	0.0	0.0	0.0	53.6	0.0	0.0	99.6
Discount rate (in percent) <u>2/</u>	N/A	N/A	N/A	N/A	N/A	N/A	7.39	N/A	N/A	8.39
Present value including PDI and PDP (in US\$)	110.3	112.4	126.8	111.9	107.6	106.1	144.7	100.5	59.5	99.6
New Instruments and Cash obtained										
Option 1. PAR in US\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	-
Units obtained <u>1/</u>	103.1	101.7	100.9	101.1	101.3	101.4	103.7	74.3	56.5	-
Cash payment obtained (in US\$) <u>1/</u>	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.2	0.9	-
Total value obtained (in US\$) <u>1/</u>	40.4	39.8	39.5	39.6	39.7	39.7	40.6	29.1	22.1	-
Option 2. PAR in AR\$ (35 year bond with step-up coupon, no face value reduction)										
Price on 3/4/05 (per unit of principal of new bond)	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395	-
Units obtained <u>1/ 2/</u>	300.8	296.6	294.3	295.0	295.5	295.9	302.6	216.8	164.8	-
Cash payment obtained (in AR\$) <u>1/</u>	2.4	2.3	2.3	2.3	2.3	2.3	2.4	1.7	1.3	-
Total value obtained (in AR\$)	121.2	119.5	118.6	118.9	119.1	119.2	121.9	87.4	66.4	-
Total value obtained (in US\$) <u>3/</u>	41.4	40.8	40.5	40.6	40.6	40.7	41.6	29.8	22.7	-
Option 3. DISCOUNT in US\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944	0.944
Units obtained <u>1/</u>	34.7	34.3	34.0	34.1	34.1	34.2	35.0	25.0	19.0	15.8
Cash payment obtained (in US\$) <u>1/</u>	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.0	0.8	46.3
Total value obtained (in US\$) <u>1/</u>	34.2	33.7	33.4	33.5	33.6	33.6	34.4	24.6	18.7	61.3
Option 4. DISCOUNT in AR\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)										
Price on 3/4/05 (per unit of principal of new bond)	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Units obtained <u>1/ 2/</u>	101.4	100.0	99.2	99.4	99.6	99.7	102.0	73.1	55.5	46.1
Cash payment obtained (in AR\$) <u>1/</u>	2.8	2.8	2.8	2.8	2.8	2.8	2.9	2.1	1.6	135.2
Total value obtained (in AR\$)	109.3	107.8	106.9	107.2	107.4	107.5	110.0	78.8	59.9	183.6
Total value obtained (in US\$) <u>3/</u>	37.3	36.8	36.5	36.6	36.6	36.7	37.5	26.9	20.4	62.7
Option 5. QUASI-PAR (in AR\$, 42 year capitalizing bond, face value reduction of 30.1 percent)										
Value on 3/4/05 (per unit of principal of new bond)	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551	-
Units obtained <u>1/ 2/</u>	210.2	207.3	205.7	206.2	206.6	206.8	211.5	151.6	115.2	-
Cash payment obtained	-	-	-	-	-	-	-	-	-	-
Total value obtained (in AR\$)	115.9	114.3	113.4	113.7	113.9	114.0	116.6	83.6	63.5	-
Total value obtained (in US\$) <u>3/</u>	39.6	39.0	38.7	38.8	38.9	38.9	39.8	28.5	21.7	-
Haircut based on Option 1 (in percent)	63.4	64.6	68.9	64.6	63.1	62.6	71.9	71.0	62.8	-
Haircut based on Option 2 (in percent)	62.5	63.7	68.1	63.7	62.2	61.6	71.2	70.3	61.9	-
Haircut based on Option 3 (in percent)	69.0	70.0	73.6	70.0	68.8	68.3	76.2	75.5	68.5	38.5
Haircut based on Option 4 (in percent)	66.2	67.3	71.2	67.3	65.9	65.4	74.1	73.3	65.7	37.1
Haircut based on Option 5 (in percent)	64.2	65.3	69.5	65.3	63.9	63.3	72.5	71.6	63.6	-
Weighted average <u>4/</u>	64.9	66.1	70.2	66.1	64.7	64.1	73.1	72.3	64.4	37.8

1/ Per 100 units of principal at issue.

2/ For discount bond, principal and last three coupon payments were discounted using US long bond rate implicit in price of collateral released (4.67)

3/ Using exchange rate of 2.9175 AR\$ per US\$ prevailing on 12/31/03.

4/ Using exchange rate of 2.93 AR\$ per US\$.

5/ Using aggregate face value of the five options as weights (Option 1 and 2: US\$15 bn; Option 3 and 4: \$US11.9 bn; Option 5 about US\$8.3 bn)

Table 11. Argentina's 2005 Exchange (January-February 2005) (concluded)

	RA \$02	RA \$07	RA \$08	PRE 3	PRO1	PRO3	PRO5	PRO9
Characteristics of Old Instruments								
Amount outstanding (US\$ mn)	20.3	5.8	248.6	9.9	39.2	1.0	96.9	30.3
Maturity date	7/10/02	2/12/07	9/19/08	9/1/02	4/1/07	12/28/10	4/15/07	4/15/07
Remaining Life (years)	Matured	1.94	3.54	Matured	1.00	2.84	1.13	1.13
Coupon (percent)	8.75	11.75	10-12	1m CD	1m CD	1m CD	1m CD	savings rt
Original Currency	ARS	ARS	ARS	ARS	ARS	ARS	ARS	ARS
PV of past due principal and interest (in US\$) <u>1/</u>	40.8	14.8	12.9	9.1	14.4	17.4	21.5	19.1
Compound rate (in percent per annum)	3.54	3.54	3.54	3.54	3.54	3.54	3.54	3.54
PV of future cash flow on April 1 2005 (in US\$) <u>1/</u>	0.0	33.3	31.4	0.0	6.4	16.3	11.3	17.7
Discount rate (in percent)	N/A	14.39	15.65	N/A	8.12	14.99	8.91	8.91
Present value including PDI and PDP (in US\$)	40.8	48.1	44.3	9.1	20.7	33.6	32.8	36.7
New Instruments and Cash obtained								
Option 1. PAR in US\$ (35 year bond with step-up coupon, no face value reduction)								
Price on 3/4/05 (per unit of principal of new bond)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Units obtained <u>1/</u>	104.2	104.5	102.8	16.0	70.1	107.4	84.6	100.8
Cash payment obtained (in US\$) <u>1/</u>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total value obtained (in US\$) <u>1/</u>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Option 2. PAR in AR\$ (35 year bond with step-up coupon, no face value reduction)								
Price on 3/4/05 (per unit of principal of new bond)	0.395	0.395	0.395	0.395	0.395	0.395	0.395	0.395
Units obtained <u>1/</u> <u>2/</u>	104.2	104.5	102.8	16.0	70.1	107.4	84.6	100.8
Cash payment obtained (in AR\$) <u>1/</u>	0.8	0.8	0.8	0.1	0.6	0.8	0.7	0.8
Total value obtained (in AR\$)	42.0	42.1	41.4	6.5	28.3	43.3	34.1	40.6
Total value obtained (in US\$) <u>3/</u>	14.3	14.4	14.1	2.2	9.6	14.8	11.6	13.9
Option 3. DISCOUNT in US\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)								
Price on 3/4/05 (per unit of principal of new bond)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Units obtained <u>1/</u>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cash payment obtained (in US\$) <u>1/</u>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total value obtained (in US\$) <u>1/</u>	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Option 4. DISCOUNT in AR\$ (30 year bond with step-up coupon, face value reduction of 66.3 percent)								
Price on 3/4/05 (per unit of principal of new bond)	1.050	1.050	1.050	1.050	1.050	1.050	1.050	1.050
Units obtained <u>1/</u> <u>2/</u>	35.1	35.2	34.7	5.4	23.6	36.2	28.5	34.0
Cash payment obtained (in AR\$) <u>1/</u>	1.0	1.0	1.0	0.2	0.7	1.0	0.8	1.0
Total value obtained (in AR\$)	37.8	38.0	37.4	5.8	25.5	39.0	30.7	36.6
Total value obtained (in US\$) <u>3/</u>	12.9	13.0	12.8	2.0	8.7	13.3	10.5	12.5
Option 5. QUASI-PAR (in AR\$, 42 year capitalizing bond, face value reduction of 30.1 percent)								
Value on 3/4/05 (per unit of principal of new bond)	0.551	0.551	0.551	0.551	0.551	0.551	0.551	0.551
Units obtained <u>1/</u> <u>2/</u>	72.8	73.1	71.9	11.2	49.0	75.1	59.1	70.4
Cash payment obtained	-	-	-	-	-	-	-	-
Total value obtained (in AR\$)	40.1	40.3	39.6	6.2	27.0	41.4	32.6	38.8
Total value obtained (in US\$) <u>3/</u>	13.7	13.7	13.5	2.1	9.2	14.1	11.1	13.3
Haircut based on Option 1 (in percent)	-	-	-	-	-	-	-	-
Haircut based on Option 2 (in percent)	64.9	70.1	68.1	75.9	53.5	56.1	64.6	62.3
Haircut based on Option 3 (in percent)	-	-	-	-	-	-	-	-
Haircut based on Option 4 (in percent)	68.3	73.1	71.2	78.2	58.1	60.4	68.1	66.0
Haircut based on Option 5 (in percent)	66.4	71.4	69.5	76.9	55.5	58.0	66.1	63.9
Weighted average <u>4/</u>	66.4	71.4	69.5	76.9	55.5	58.0	66.1	63.9

1/ Per 100 units of principal at issue.

2/ Using exchange rate of 2.9175 AR\$ per US\$ prevailing on 12/31/03.

3/ Using exchange rate of 2.93 AR\$ per US\$.

4/ Using aggregate face value of the three options used as weights.

Overall, these are the highest haircuts of any single exchange studied in this paper. Remarkably, they are very high in spite of the fact that the secondary market yields that were used for discounting are extraordinarily low—only 7-9 percent—as a result of a favorable financing environment for all emerging market countries and the faster than expected recovery of output and the fiscal accounts in Argentina. This implied that the maturity extensions that were part of the exchange translated into much smaller reductions in value than was typically the case in the other exchanges in the late 1990s. This said, note that domestic investors that tendered their instruments in Argentina’s “Phase 1” exchange did not fare much better on average, as they were restructured twice, in November of 2001 and February 2002 (pesification). The average cumulative haircut resulting from these two restructurings was close to 70 percent; almost as high as the haircuts associated with the 2005 exchange.¹⁹

F. Uruguay²⁰

As a result of negative output shocks and deposits withdrawals related to the crisis in Argentina, Uruguay’s banking system came under pressure in 2002, and the largest domestically owned banks (two public and four private) began to experience difficulties. Rating agencies downgraded Uruguay below investment grade, further fueling the crisis. Liquidity assistance by the Central Bank resources led to a quick decline in reserves and eventually a currency crisis. On June 19, 2002, the government decided to float the currency. A 50 percent exchange rate depreciation followed, leading to a large increase in the debt to GDP ratio, and raising doubts about the ability of the government to service the public debt, even after the banking crisis was brought under control by the end of the year.

In early 2003, the government decided to launch a debt exchange, geared to extending the maturity of the debt and improving the liquidity of existing instruments. The exchange targeted all traded debt (about half of total sovereign debt). Eligible securities comprised (i) forty six domestically issued bonds and treasury bills, accounting for US\$ 1.6 billion in principal; (ii) eighteen international bonds, accounting for US\$3.5 billion; and (iii) one “Samurai” bond issued in Japan, accounting for about 250 US million.

¹⁹ Multiplying the two haircuts gives a “combined average haircut” of $1-(1-0.42)*(1-0.45) = 0.68$. Importantly, this number should not be viewed as an estimate of how domestic investors fared *over the entire December 2001 to April 2005 default period*. When viewed over this entire period, domestic residents are likely to have done significantly better than external creditors, since the improvement in market conditions after 2002 is not reflected in the combined haircut of 68 percent while it is reflected in the 2005 average haircut of 73 percent. However, the two numbers do indicate that the losses inflicted on domestic and external investors *at the time of their respective restructurings* was about the same.

²⁰ The terms of the Uruguayan exchange are comprehensively described in two documents issued by the government of Uruguay, “Prospectus for Debt Securities or Warrants to Purchase Debt Securities” and “Prospectus Supplement, Offer to Exchange.” In addition, this section draws from IMF (2003).

An offer to exchange the international bonds was launched on April 10, 2003, and settlement took place on May 29. Participation was high (about 90 percent for the externally issued and 99 percent for the domestic bonds). A combination of the use of exit consents to change the non-payment terms of the old bonds and regulatory incentives contributed to the high acceptance rate (see Sturzenegger and Zettelmeyer, 2005, for details).

The exchange offered most bondholders a choice between two options. First, a *maturity extension option*, under which each bond could be exchanged by another with similar coupon and extended maturity (in general, 5 years longer than the original), mixed in some cases with a 30 year bond, which capitalized part of the interest earned over the first four years. Second, a *benchmark bond option*, under which investors received one of a smaller number of new bonds that were longer dated but more liquid. Three external and four domestic benchmark bonds were introduced, with maturities ranging from seven to 30 years. Some of the bonds had step-up coupons, and were geared to creditors trading out of floating rate bonds. These bonds were designed to be attractive not only to institutional investors but also to index-tracking funds, based on the premise that the new issues would be large enough to be included in international indices.

In addition, some bondholders were offered small upfront cash payments to compensate for accrued interest on the old bonds (there was no past due interest or principal). Holders of two collateralized Brady bonds (the 2021 Par “Series A” and “Series B bonds”) also received the present value of the principal repayment in cash.

Table 12 shows the precise terms of the exchange and computes haircuts for the 18 international bonds. The computations are complicated by the large number of bonds and options offered, and the fact that secondary market prices are not available for some of the new bonds that were part of the menu (either because they were illiquid or because they were in fact not issued due to lack of interest). However, prices and hence exit yields are available for all fixed coupon US dollar denominated and for the two Euro denominated bonds. Using these, Table 12 computes the haircuts, for each old instrument and each of the two exchange options, under two alternative approaches: First, using the yield of the new instrument actually received to discount the old cash flows, regardless of differences in maturity; second, using a yield corresponding to the remaining life of the old instrument interpolated from the available yields of the new US dollar bonds, with a maturity correction based on the US yield curve at the short end. The latter can be used for all dollar denominated old bonds; while the use of the former depends on whether secondary market prices were available for the new instruments. Since this was always the case under the “benchmark option” but not necessarily under the “extension option,” our haircut estimates for the latter are somewhat less complete.

Table 12. Uruguay Debt Exchange: International Bonds (April-May 2003)

	US\$ 7.875 2003	US\$ New Money	US\$ Conv. 91	US\$ Conv. 02	US\$ 8.375 2006	US\$ 7.0 2008
Characteristics of Old Instruments						
Issue Date	18/11/98	19/02/91	19/02/91	26/04/02	26/09/96	06/04/98
Amount issued (in US\$ mn)	200	90	335	150	100	250
Amount outstanding (in US\$ mn)	191	26	55	150	97	240
Coupon (in percent)	7.875	libor+1.00	libor+0.875	libor+0.559	8.375	7.000
Maturity date	18/11/03	19/02/06	19/02/07	26/04/07	26/09/06	7/4/2008
Average life (years) ^{1/}	0.47	1.43	1.93	3.17	3.33	4.83
Present value (1) (per 100 of principal)	95.4	...	...	...	87.4	82.3
Discount rate used (in percent) ^{2/}	18.7	...	...	...	14.2	12.4
Present value (2) (per 100 of principal)	98.1	89.4	86.0	89.0	92.1	84.0
Discount rate used (in percent) ^{3/}	12.2	12.2	12.2	12.2	12.2	11.8
Present value (3) (per 100 of principal)	97.0	87.0	83.2	84.1	87.0	77.1
Discount rate used (in percent) ^{4/}	14.7	14.4	14.3	14.3	14.4	14.2
New Instruments and Cash obtained						
1. "Extension Option"						
Cash obtained (per 100 or principal)	5.0	5.0	5.0	0.0	0.0	0.0
Extension Bond (coupon/denomination like original bond).						
Amount issued (in US\$ mn)	83.6	1.4	5.4	--	60.8	64.2
Maturity	18/11/08	02/07/09	02/01/10	26/04/12	26/09/11	01/04/13
Price on 5/29/03 (per unit of new principal) ^{5/}	0.65	0.60	0.58	not issued	0.74	0.71
Units obtained (per 100 of principal)	95	95	95	...	100	100
Value obtained (per 100 of principal)	61.8	56.8	54.9	...	73.8	70.7
Long Bond (7.875 maturing in 2033; total issue US\$ 1055.6 million)						
Price on 5/29/03 (per unit of new principal)						
Units obtained (per 100 of principal)						
Value obtained (per 100 of principal)						
Total Value Extension Option	66.8	61.8	59.9	...	73.8	70.7
2. "Benchmark Option"						
Cash obtained (per 100 or principal)	7.0	5.0	5.0	0.0	0.0	0.0
Benchmark Bond (US\$; total issue \$500 mn for 2011 and \$1059.5 mn for 2015 bond)						
Coupon	7.25	7.25	7.25	7.25	7.25	7.5
Maturity	15/02/11	15/02/11	15/02/11	15/02/11	15/02/11	15/03/15
Price on 5/29/03 (per unit of new principal)	0.77	0.77	0.77	0.77	0.77	0.74
Units obtained (per 100 of principal)	109.0	93.9	92.9	110.0	107.0	101.0
Value obtained (per 100 of principal)	83.9	72.3	71.5	84.6	82.3	74.9
Long Bond (7.875 maturing in 2033; total issue US\$ 1055.6 million)						
Price on 5/29/03 (per unit of new principal)						
Units obtained (per 100 of principal)						
Value obtained (per 100 of principal)						
Total Value Benchmark Option	90.9	77.3	76.5	84.6	82.3	74.9
Haircut based on extension option (percent)						
Based on Present Value (1)--no maturity adjustment	30.0	...	...	...	15.6	14.1
Based on Present Value (3)--with maturity adjustment	31.2	29.0	28.0	...	15.2	8.4
Haircut based on benchmark option (percent)						
Based on Present Value (2)--no maturity adjustment	7.4	13.5	11.1	4.9	10.7	10.9
Based on Present Value (3)--with maturity adjustment	6.4	11.2	8.0	-0.6	5.4	2.9

^{1/} Weighted average of time of amortization, using percent amortization in each time period as weights.

^{2/} Average yield to maturity of new instruments actually obtained in extension option.

^{3/} Average yield to maturity of new instruments actually obtained in benchmark option.

^{4/} Yield to maturity corresponding to average life of old bond, using interpolation of yield of new US\$ bonds.

^{5/} For U.S New Money and US\$ libor+0.875 convertible bond, prices are not available because new bonds were illiquid; in this case, we use the present value of the new bond, discounted by the maturity adjusted yield of other new US\$ bonds

Table 12. Uruguay Debt Exchange: International Bonds (April-May 2003, continued)

	US\$ 7.875 2009	US\$ 7.25 2009	US\$ 8.75 2010	US\$ 7.625 2012	US\$ 6.75 Par A	US\$ 6.75 Par B
Characteristics of Old Instruments						
Issue Date	25/03/02	04/05/99	22/06/00	21/11/01	18/02/91	02/12/91
Amount issued (in US\$ mn)	250	250	300	410	331	199
Amount outstanding (in US\$ mn)	248	241	274	410	250	30
Coupon (in percent)	7.875	7.250	8.750	7.625	6.750	6.750
Maturity date	25/03/09	4/5/2009	22/06/10	20/01/12	19/02/21	21/03/21
Average life (years) <u>1/</u>	5.83	5.92	7.08	8.67	17.75	17.83
Present value (1) (per 100 of principal)	83.7	79.8	87.1	78.5	92.7	91.0
Discount rate used (in percent) <u>2/ 5/</u>	12.5	12.4	12.7	12.6	12.2	12.2
Present value (2) (per 100 of principal)	86.0	81.7	90.1	81.0	92.7	91.0
Discount rate used (in percent) <u>3/ 5/</u>	11.9	11.9	11.9	12.0	12.2	12.2
Present value (3) (per 100 of principal)	78.7	74.6	82.6	74.0	91.7	90.1
Discount rate used (in percent) <u>4/ 5/</u>	14.1	14.0	13.9	13.7	12.6	12.5
New Instruments and Cash obtained						
1. "Extension Option"						
Cash obtained (per 100 or principal)	0.0	0.0	0.0	0.0	38.0	38.0
Extension Bond (coupon/denomination like original bond).						
Amount issued (in US\$ mn) <u>2/</u>	20.0	31.5	50.6	41.1	...	...
Maturity	25/03/14	04/05/14	22/06/15	20/01/17	...	...
Price on 5/29/03 (per unit of new principal)	0.74	0.71	0.77	0.69	...	...
Units obtained (per 100 of principal)	80	80	70	60	0.0	0.0
Value obtained (per 100 of principal)	59.2	56.5	53.7	41.1	0.0	0.0
Long Bond (7.875 maturing in 2033; total issue US\$ 1055.6 million)						
Price on 5/29/03 (per unit of new principal)	0.6	0.6	0.6	0.6	0.6	0.6
Units obtained (per 100 of principal)	20	20	30	40	70	70
Value obtained (per 100 of principal)	12.9	12.9	19.3	25.7	45.0	45.0
Total Value Extension Option	72.1	69.4	73.0	66.8	83.0	83.0
2. "Benchmark Option"						
Cash obtained (per 100 or principal)	0.0	0.0	0.0	0.0	38.0	38.0
Benchmark Bond (US\$; total issue \$500 mn for 2011 and \$1059.5 mn for 2015 bond)						
Coupon	7.5	7.5	7.5	7.5	...	...
Maturity	15/03/15	15/03/15	15/03/15	15/03/15	...	...
Price on 5/29/03 (per unit of new principal)	0.74	0.74	0.74	0.74	...	...
Units obtained (per 100 of principal)	85.0	80.0	78.0	60.0	0.0	0.0
Value obtained (per 100 of principal)	63.1	59.3	57.9	44.5	0.0	0.0
Long Bond (7.875 maturing in 2033; total issue US\$ 1055.6 million)						
Price on 5/29/03 (per unit of new principal)	0.64	0.64	0.64	0.64	0.64	0.64
Units obtained (per 100 of principal)	20.0	20.0	30.0	40.0	70.0	70.0
Value obtained (per 100 of principal)	12.9	12.9	19.3	25.7	45.0	45.0
Total Value Benchmark Option	75.9	72.2	77.1	70.2	83.0	83.0
Haircut based on extension option (percent)						
Based on Present Value (1)--no maturity adjustment	13.9	13.1	16.2	14.9	10.5	8.8
Based on Present Value (3)--with maturity adjustment	8.5	7.0	11.6	9.7	9.5	7.9
Haircut based on benchmark option (percent)						
Based on Present Value (2)--no maturity adjustment	11.7	11.6	14.4	13.3	10.5	8.8
Based on Present Value (3)--with maturity adjustment	3.6	3.2	6.6	5.1	9.5	7.9

1/ Weighted average of time of amortization, using percent amortization in each time period as weights.

2/ Average yield to maturity of new instruments actually obtained in extension option.

3/ Average yield to maturity of new instruments actually obtained in benchmark option.

4/ Yield to maturity corresponding to average life of old bond, using interpolation of yield of new US\$ bonds.

5/ For 2021 A and B Par Brady bonds, collateralized principal and the last three coupon payments are discounted using the same long US interest rate that is implicit in the cash value of the released principal collateral (5.30 percent).

Table 12. Uruguay Debt Exchange: International Bonds (April-May 2003, concluded)

	US\$ 7.875 2027	€ 7.00 2005	€ 7.00 2011	£ Conv. 91	CLP 7.0 2007	CLP 6.375 2011
Characteristics of Old Instruments						
Issue Date	15/07/97	26/09/00	28/6/01	19/02/91	29/11/00	15/03/01
Amount issued (in US\$ mn) ^{1/}	510	266	237	93	118	127
Amount outstanding (in US\$ mn) ^{1/}	510	264	237	39	118	127
Coupon (in percent)	7.875	7.000	7.000	libor+0.875	7.000	6.375
Maturity date	15/07/27	26/09/05	28/6/11	19/02/07	29/05/07	15/03/11
Average life (years) ^{2/}	24.17	2.33	8.08	1.93	4.00	7.79
Present value (1) (per 100 of principal)	71.2	95.9	87.2	...	...	...
Discount rate used (in percent) ^{3/}	12.2	11.4	10.7	...	...	...
Present value (2) (per 100 of principal)	71.2	94.6	82.1	89.7	85.9	74.4
Discount rate used (in percent) ^{4/}	12.2	12.2	11.8	12.2	11.8	12.0
Present value (3) (per 100 of principal)	73.7	...	...	...	...	...
Discount rate used (in percent) ^{5/}	11.8	...	...	...	...	...
New Instruments and Cash obtained						
1. "Extension Option"						
Cash obtained (per 100 or principal)	0.0	0.0	0.0	5.0	0.0	0.0
Extension Bond (coupon/denomination like original bond).						
Amount issued (in US\$ mn) ^{1/}	...	111.0	139.3	--	--	2.12415
Maturity	...	26/09/12	28/6/19	02/01/10	29/05/12	15/03/16
Price on 5/29/03 (per unit of new principal)	...	0.79	0.72	not issued	not issued	illiquid
Units obtained (per 100 of principal)	0.0	100	100	...	...	100
Value obtained (per 100 of principal)	0.0	79.3	72.4	...	...	...
Long Bond (7.875 maturing in 2033; total issue US\$ 1055.6 million)						
Price on 5/29/03 (per unit of new principal)	0.6					
Units obtained (per 100 of principal)	100					
Value obtained (per 100 of principal)	64.3					
Total Value Extension Option	64.3	79.3	72.4	...	...	...
2. "Benchmark Option"						
Cash obtained (per 100 or principal)	0.0	0.0	0.0	5.0	0.0	0.0
Benchmark Bond (US\$; total issue \$500 mn for 2011 and \$1059.5 mn for 2015 bond)						
Coupon	...	7.25	7.5	7.25	7.5	...
Maturity	...	15/02/11	15/03/15	15/02/11	15/03/15	...
Price on 5/29/03 (per unit of new principal)	...	0.77	0.74	0.77	0.74	...
Units obtained (per 100 of principal)	0.0	100.0	85.0	92.9	95.0	0.0
Value obtained (per 100 of principal)	0.0	76.9	63.1	71.5	70.5	0.0
Long Bond (7.875 maturing in 2033; total issue US\$ 1055.6 million)						
Price on 5/29/03 (per unit of new principal)	0.64		0.64			0.64
Units obtained (per 100 of principal)	100.0		0.0			95.0
Value obtained (per 100 of principal)	64.3		0.0			61.0
Total Value Benchmark Option	64.3	76.9	63.1	76.5	70.5	61.0
Haircut based on extension option (percent)						
Based on Present Value (1)--no maturity adjustment	9.8	17.4	17.1	...	...	...
Based on Present Value (3)--with maturity adjustment	12.8	...	...	...	...	...
Haircut based on benchmark option (percent)						
Based on Present Value (2)--no maturity adjustment	9.8	18.7	23.2	14.7	18.0	17.9
Based on Present Value (3)--with maturity adjustment	12.8	...	...	...	...	...

^{1/} Bonds not denominated in US\$ are evaluated using May 29, 2003 market exchange rates

^{2/} Weighted average of time of amortization, using percent amortization in each time period as weights.

^{3/} Average yield to maturity of new instruments actually obtained in extension option.

^{4/} Average yield to maturity of new instruments actually obtained in benchmark option.

^{5/} Yield to maturity corresponding to average life of old bond, using interpolation of yield of new US\$ bonds.

The main result is that the haircuts for the Uruguay external exchange were substantially lower than in any of the other exchanges studied in this paper, namely in the range of 5-20 percent, with a few outliers above and below. According to the computations that do not make maturity adjustments (i.e. where old and new cashflows at discounted at the same rate) the weighted average haircut is just under 13 percent. The alternative approach (“present value (3)”) results in even lower haircuts, with a weighted average haircut of about 9 percent for the extension option and 5 percent for the benchmark option. The approach of discounting new and old instruments at rates that take into account the shorter maturity of the old instruments tends to lower the haircut in this case because the Uruguay post-exchange yield curve was downward sloping; this pushes up the value of the new, longer dated instruments. A pattern relating the remaining life of the old instrument to the haircut suffered, as observed for Ukraine and Ecuador, is not discernible for Uruguay.

Table 13 shows the results of a similar restructuring applied to all (dollar denominated) Uruguayan domestic bonds—forty-six in total. They can be divided in three groups: treasury bills coming due within the next 12 months, medium and long term variable rate bonds indexed to LIBOR, and five fixed rate government bonds (including a relatively large, \$300 million issue, and two “previsionales” associated with the social security system) coming due between 2005 and 2012. Floating rate bonds were equipped with a put option which allowed bondholders to ask for early repayment of up to 10 percent of principal on each annual anniversary of the issue date. The present value for these instruments shown in table 13 takes into account the value of these options; that is, it assumes—in view of the discount rate of about 14 percent at the time—that the put options would have been exercised in full.

Treasury bill holders received 15 percent in cash, with the remainder traded either into a 5.25 percent fixed rate bond maturing in 2006, or a step-up coupon bond maturing in 2010 (benchmark option). To keep the table manageable, we only show the first T-bill maturing in any month in which a T-bill was restructured. Floating rate bonds could choose between a floating rate “extension bond” indexed to LIBOR with a maturity extension of generally five years, or a slightly longer dated benchmark bond with step-up coupon. Bonds maturing in 2003 received some cash payments, but those maturing in 2004 or later did not. Finally, fixed rate bond holders generally had a choice between a fixed 7.5 coupon bond and a step-up coupon bond, with maturity extensions of 5-8 years.

The result is that for the floating rate bonds, haircuts appear to have been in the 20-35 percent range, and for the short dated treasury bills, in the 15-30 percent range. Hence, it appears that the short dated and variable rate domestic treasury bonds and bills suffered from a somewhat higher haircut than Uruguay’s international bonds. In contrast, the long dated fixed rate domestic bonds and “previsionales” seem to have been subjected to about the same haircut as the international bonds.

Table 13. Uruguay Debt Exchange: Domestic Law Bonds (April-May 2003)

	Treasury Bills					Floating Rate Treasury Bonds				
	Letras 10121	Letras 10123	Letras 10127	Letras 10132	Letras 10137	Letras 10201	32a. TV	33a. TV	34a. TV	35a. TV
Old Instruments										
Issue date	5/24/2001	6/7/2001	7/5/2001	8/9/2001	9/13/2001	3/14/2002	6/15/1993	9/22/1993	12/27/1993	3/22/1994
Amount outstanding (US\$ mn)	5.3	5.3	5.3	5.3	5.3	5.3	39.2	37.9	40.1	40.4
Amount exchanged (US\$ mn)	5.1	5.1	5.1	5.1	5.1	5.1	37.8	36.6	39.0	37.4
Maturity date	5/22/2003	6/5/2003	7/3/2003	8/7/2003	9/11/2003	3/11/2004	6/15/2003	9/22/2003	12/27/2003	3/22/2004
Coupon (percent)							- 12m libor+175	6m libor+175	6m libor+175	6m libor+175
Average remaining life (years) 1/	0.00	0.02	0.10	0.19	0.29	0.79	0.05	0.32	0.58	0.82
Present value on 29/05/03 (per 100 principal)	100.0	98.9	97.7	96.6	95.5	89.2	100.3	96.9	95.2	91.0
Discount rate used (in percent) 2/	matured	14.8	14.8	14.8	14.8	14.7	14.8	14.7	14.7	14.7
New Instruments and Cash obtained										
1. "Extension Option"										
Cash obtained (per \$100 of Principal)	15	15	15	15	15	15	15	10	5	0
Extension Bond										
Amount issued (US\$ mn)				101.0					41.1	
Coupon		5.25	5.25	5.25	5.25	5.25	5.25	6m libor+175	6m libor+175	6m libor+175
Maturity	9/15/2006	9/15/2006	9/15/2006	9/15/2006	9/15/2006	9/15/2006	9/15/2006	12/27/2008	12/27/2008	12/27/2008
Value in 5/03 (per unit of new principal)	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.66	0.66	0.66
Discount rate used (yield, in percent) 2/	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.1	14.1	14.1
Units obtained (per 100 of principal)	85	85	85	85	85	85	85	90	95	100
Total Value Extension Option	84.5	84.5	84.5	84.5	84.5	84.5	84.5	69.2	67.5	65.8
2. "Benchmark Option" (total issue \$184.6 mn for 2010, \$323.7 mn for 2013, \$322.2 mn for 2018, and \$ 324.2 mn for 2019)										
Cash obtained (per 100 principal)	15	15	15	15	15	15	15	10	5	0
Benchmark Bond										
Coupon		4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)
Maturity	6/15/2010	6/15/2010	6/15/2010	6/15/2010	6/15/2010	6/15/2010	6/15/2010	6/15/2010	6/15/2010	6/15/2010
Value Obtained (per 100 of principal)	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Discount rate used (yield, in percent) 2/	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
Units obtained (per 100 of principal)	85	85	85	85	85	85	85	90	95	100
Total Value of Benchmark Option	69.9	69.9	69.9	69.9	69.9	69.9	69.9	68.2	66.4	64.6
Haircuts (in percent)										
if chose "Extension Option"	15.5	14.5	13.5	12.5	11.5	5.3	15.8	28.5	29.0	27.6
if chose "Benchmark Option"	30.1	29.3	28.4	27.6	26.8	21.6	30.3	29.7	30.2	29.0

1/ Weighted average of time of amortization, using percent amortization in each time period as weights. Note that all floating rate bonds were puttable after the first year.

2/ Discount rate taken from the yield curve for international bonds trading after the exchange.

Table 13. Uruguay Debt Exchange: Domestic Law Bonds (April-May 2003, continued)

	Floating Rate Treasury Bonds													
	36a. TV	37a. TV	38a. TV	39a. TV	40a. TV	41a. TV	42a. TV	43a. TV	44a. TV	45a. TV	46a. TV	47a. TV	48a. TV	49a. TV
Old Instruments														
Issue date	6/27/1994	9/27/1994	11/7/1994	12/20/1994	3/27/1995	6/23/1995	9/29/1995	12/22/1995	4/8/1996	6/12/1996	8/20/1996	12/2/1996		
Amount outstanding (US\$ mn)	25.5	29.6	12.2	29.1	35.0	53.9	31.3	25.6	35.1	50.7	129.1	48.7		
Amount exchanged (US\$ mn)	24.8	28.9	12.0	28.6	34.7	52.6	31.1	25.4	35.0	50.1	128.1	48.1		
Maturity date	6/27/2004	9/27/2004	11/7/2004	12/20/2004	3/27/2005	6/23/2005	9/29/2005	12/22/2005	4/8/2006	6/12/2006	8/20/2006	12/2/2006		
Coupon (percent)	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150	6m libor+150		
Average remaining life (years) 1/	0.82	0.78	0.87	0.82	1.19	1.57	0.92	1.36	1.70	2.00	1.96	1.89		
Present value on 29/05/03 (per 100 principal)	91.5	88.9	87.0	87.8	84.7	85.7	85.6	83.4	79.9	82.6	81.8	81.1		
Discount rate used (in percent) 2/	14.7	14.6	14.6	14.6	14.6	14.5	14.5	14.5	14.4	14.4	14.4	14.3		
New Instruments and Cash obtained														
1. "Extension Option"														
Cash obtained (per \$100 of Principal)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Extension Bond														
Amount issued (US\$ mn)	20.1													
Coupon														
Maturity														
Value in 5/03 (per unit of new principal)	11/27/2009	11/27/2009	11/27/2009	11/27/2009	11/27/2009	9/29/2010	9/29/2010	9/29/2010	9/29/2010	9/29/2010	8/20/2011	8/20/2011		
Discount rate used (yield, in percent) 2/	0.62	0.62	0.62	0.62	0.62	0.60	0.60	0.60	0.60	0.60	0.58	0.58		
Units obtained (per 100 of principal)	14.0	14.0	14.0	14.0	14.0	13.9	13.9	13.9	13.9	13.9	13.8	13.8		
Total Value Extension Option	100	100	100	100	100	100	100	100	100	100	100	100		
2. "Benchmark Option" (total issue \$184.6 mn for 2010, \$323.7 mn for 2013, \$322.2 mn for 2018, and \$ 324.2 mn for 2019)														
Cash obtained (per 100 principal)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benchmark Bond														
Coupon														
Maturity														
Value Obtained (per 100 of principal)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)		
Discount rate used (yield, in percent) 2/	6/15/2010	6/15/2010	6/15/2010	6/15/2010	6/15/2010	5/15/2013	5/15/2013	5/15/2013	5/15/2013	5/15/2013	5/15/2013	5/15/2013		
Units obtained (per 100 of principal)	0.65	0.65	0.65	0.65	0.65	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
Total Value of Benchmark Option	14.0	14.0	14.0	14.0	14.0	13.7	13.7	13.7	13.7	13.7	13.7	13.7		
Haircuts (in percent)	100	100	100	100	100	100	100	100	100	100	100	100		
if chose "Extension Option"	64.6	64.6	64.6	64.6	64.6	60.1	60.1	60.1	60.1	60.1	60.1	60.1		
if chose "Benchmark Option"	31.9	29.9	28.4	29.0	26.4	29.6	29.5	27.7	24.5	29.3	28.6	27.9		
	29.4	27.3	25.7	26.4	23.7	29.9	29.8	27.9	24.8	27.2	26.6	25.9		

1/ Weighted average of time of amortization, using percent amortization in each time period as weights. Note that all floating rate bonds were puttable after the first year.

2/ Discount rate taken from the yield curve for international bonds trading after the exchange.

Table 13. Uruguay Debt Exchange: Domestic Law Bonds (April-May 2003, concluded)

	Floating Rate Treasury Bonds (concluded)							Fixed Rate Treasury Bonds			"Provisional"	
	48a. TV	49a. TV	51a. TV	52a. TV	50a. TV	53a. TV	54a. TV	29a. TF	30a. TF	31a. TF	A.P. 3a.	A.P. 2a.
Old Instruments												
Issue date	5/15/1997	6/30/1997	9/22/1997	2/25/2000	8/15/1997	3/23/2001	11/29/2002	12/16/1998	3/23/2001	2/28/2002	2/25/2000	3/5/1999
Amount outstanding (US\$ mn)	32.3	48.0	34.3	82.8	28.4	10.9	105.5	25.0	299.1	40.0	46.2	108.5
Amount exchanged (US\$ mn)	31.8	47.6	33.9	82.4	28.4	10.6	105.5	25.0	297.9	39.8	46.0	108.2
Maturity date	5/15/2009	6/30/2012	9/22/2012	2/25/2010	8/15/2012	3/23/2011	5/29/2013	12/16/2005	3/23/2011	2/28/2012	2/25/2010	3/5/2007
Coupon (percent)	6m libor+100 6m libor+100 6m libor+100 6m libor+100 6m libor+100 6m libor+175 6m libor+200							7.50	7.50	9.75	8.00	7.63
Average remaining life (years) 1/	2.73	2.87	2.24	4.12	2.34	5.03	5.50	2.55	7.82	8.76	6.75	3.77
Present value on 29/05/03 (per 100 principal)	76.7	88.7	90.5	75.6	90.3	78.3	83.7	89.4	73.3	84.6	78.1	83.2
Discount rate used (in percent) 2/	14.0	13.6	13.6	13.9	13.6	13.8	13.5	14.5	13.8	13.7	13.9	14.3
New Instruments and Cash obtained												
1. "Extension Option"												
Cash obtained (per \$100 of Principal)	0	0	0	0	0	0	0	0	...	0	0	0
Extension Bond												
Amount issued (US\$ mn)			14.4			3.4		25.0		21.9	40.6	98.0
Coupon	6m libor+100 6m libor+100 6m libor+100 6m libor+100 6m libor+100 6m libor+200 6m libor+200							7.5		9.75	8.0	7.63
Maturity	6/30/2017	6/30/2017	6/30/2017	6/30/2017	6/30/2017	4/15/2018	4/15/2018	12/16/2010		2/28/2020	2/25/2018	3/5/2012
Value in 5/03 (per unit of new principal)	0.51	0.51	0.51	0.51	0.51	0.57	0.57	0.72		0.82	0.70	0.71
Discount rate used (yield, in percent) 2/	13.3	13.3	13.3	13.3	13.3	13.3	13.3	13.8		12.7	12.9	13.7
Units obtained (per 100 of principal)	100	100	100	100	100	100	100	100		100	100	100
Total Value Extension Option	51.4	51.4	51.4	51.4	51.4	57.3	57.3	72.2		82.1	69.8	70.8
2. "Benchmark Option" (total issue \$184.6 mn for 2010, \$323.7 mn for 2013, \$322.2 mn for 2018, and \$324.2 mn for 2019)												
Cash obtained (per 100 principal)	0	0	0	0	0	0	0	0	0	0	0	0
Benchmark Bond												
Coupon	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	4 (up to 7)	7.5	7.5	7.5	4 (up to 7)
Maturity	4/15/2018	4/15/2018	4/15/2018	4/15/2018	4/15/2018	4/15/2018	4/15/2018	6/15/2010	3/23/2019	3/23/2019	3/23/2019	5/15/2013
Value Obtained (per 100 of principal)	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.65	0.66	0.66	0.66	0.60
Discount rate used (yield, in percent) 2/	13.3	13.3	13.3	13.3	13.3	13.3	13.3	14.0	12.8	12.8	12.8	13.7
Units obtained (per 100 of principal)	100	100	100	100	100	100	100	105	100	115	105	110
Total Value of Benchmark Option	57.2	57.2	57.2	57.2	57.2	57.2	57.2	67.9	66.2	76.2	69.5	66.1
Haircuts (in percent)												
if chose "Extension Option"	33.0	42.0	43.2	32.0	43.1	26.7	31.5	19.3	...	3.0	10.7	14.9
if chose "Benchmark Option"	25.4	35.5	36.8	24.3	36.7	27.0	31.7	24.1	9.6	10.0	11.0	20.6

1/ Weighted average of time of amortization, using percent amortization in each time period as weights. Note that all floating rate bonds were puttable after the first year.

2/ Discount rate taken from the yield curve for international bonds trading after the exchange.

IV. COMPARISON

Table 14 summarizes the main technical characteristics of the debt restructurings studied in this paper: the size of the exchange, the participation rate, the numbers of instruments tendered and new instruments issued, the options available to investors, etc. Table 15 contains the main results, both in terms of the level and dispersion of NPV haircuts, and contrasts them with the results that result from the application of the more conventional haircuts used by market participants (namely, to compare the NPV of the new instruments obtained with the face value rather than the NPV of the old instruments). In the following, we summarize the main points arising from these tables.

First, as already clear from the preceding sections, there are very large variations in the average level of haircuts across debt restructuring episodes. Among the exchanges targeted to non-residents, Uruguay's 2003 exchange, with an average haircut of about 13 percent, was the mildest, while Argentina's 2005 exchange, with haircuts of about 74 percent, was the harshest. Most other restructurings stayed well below and above these upper and lower bounds, respectively, and are clustered in the range between 25 and 55 percent.

Second, haircuts computed according to the financial market convention generally give the appearance of even larger investor losses. This is not surprising, as the conventional definition sets the value of old instruments equal to their face value, which is generally higher than their net present value when discounted at the same—post-restructuring, but generally still high—interest rates that we use to value the new instruments. There is a single exception: Argentina in 2005, which restructured in an exceptionally favorable external environment, and as a result experienced exit yields that were typically lower than the coupon rates of the old instruments (many of which had been issued in an already distressed situation). Hence, in this case, NPV haircuts in our definition are somewhat higher than haircuts computed according to market convention. In addition, there are of course cases when both definitions imply almost the same result; this occurs when the old instrument had very short remaining maturity or had just matured (as was the case, for example, for all or most instruments exchanged in Pakistan's 1999, Ukraine's 2000, Russia's MinFin3, or Ukraine's Chase and ING loan restructurings).

Third, comparing restructurings targeted to residents and to non-residents does not yield a very clear pattern. In two of the earlier exchanges—Ukraine's OVDP exchange and Russia's GKO exchange—residents, according to our results, obtained significantly better deals. However, in the case of Ukraine, residents avoided high overt losses only at the price of obtaining domestic currency instruments that exposed them to capital controls; non-residents received Eurobonds. For Russia, part of the difference between the resident and non-resident haircuts shown in the Table is due to a repatriation restriction that is reflected only in the non-residents' result (though as we have seen in Section III.A., nonresidents fared somewhat worse even if the repatriation restriction is ignored).

Table 14. Sovereign Debt Restructurings, 1998-2005: Summary of Characteristics

	Exchange Dates	Face value eligible (US\$ bn)	Participation (percent)	Number of eligible instrum.	Number of new instrum.	Number of options offered	Was there past due principal?	Was there past due interest?	Was cash paid?	Was there face value reduction?	Was there currency conversion?
Russia	GKO/OFZs-residents	4.81 <u>1/</u>	95 <u>3/</u>	21	9	1	yes	no	yes	yes	no
	GKO/OFZs-nonres.	3.50 <u>2/</u>	89 <u>3/</u>	21	9	1	yes	no	yes	yes	no
	MinFin3	1.31	75 <u>4/</u>	1	2	2	yes	no	no	no	optional
	PRINs/IANs	29.08	99	2	2	1	no	yes	yes	yes	no
Ukraine	OVDPs-residents	4.47 <u>5/</u>	84 <u>6/</u>	all T-Bills	1	1	no	no	no	no	no
	OVDPs-nonresidents	0.42 <u>7/</u>	82	all T-Bills	1	3	no	no	yes	no	optional
	Chase Loan	0.11	100	1	1	1	no	no	yes	no	no
	ING Loan	0.16	100	1	1	1	yes	no	yes	yes	no
	International Bonds	2.60	97	33	2	2	yes	yes	yes	yes	no
	International Bonds	0.61	99	3	1	1	no	no	no	no	no
Ecuador	International Bonds	6.51	98	6	2	1-2	yes	yes	yes	yes	no
Argentina	"Phase 1" (residents)	64.37	65 <u>9/</u>	79	106	1-3	no	no	no	no	no
	Pesification	57.55	65 <u>10/</u>	107	107	1	no	no	no	no	forced
	2005 International	79.70	76	156	11	1-3	yes	yes	yes	yes	optional
Uruguay	External <u>11/</u>	3.77	90	19	19	2	no	no	yes	yes	no
	Domestic	1.62	99	45	15	2	no	no	yes/no	no	no

1/ Corresponds to 110 bn rubles, converted into US\$ at the exchange rate at the time of the exchange (22.86 Rub/\$).

2/ Corresponds to 80 bn rubles, converted into US\$ at the exchange rate at the time of the exchange (22.86 Rub/\$).

3/ As of May 31, 2000

4/ As of mid-August 2000. Exchange was open-ended, and final participation rate was higher.

5/ Corresponds to 10.05 bn hryvnias, evaluated at the exchange rate at the time of the exchange (2.25 Hrv/US\$)

6/ Average of full exchange of National Bank holdings (about 75 percent of resident holdings of OVDPs) and exchange of about one-third of OVDP holdings of commercial banks.

7/ Corresponds to 1.3 bn hryvnias at the rate at the time of the exchange

8/ Except in the sense that a US\$ denominated loan was converted into a DM denominated bond, at market exchange rates.

9/ Refers to participation with respect to total eligible face value. Participation among domestic residents, to whom exchange was targeted, was much higher.

10/ Debtholders (including the pension funds) that rejected both pesification and the offer to return to original pre-Phase 1 instruments are counted as non-participating.

11/ Numbers cited are inclusive of Yen bond which was restructured in parallel to the external debt exchange, using collective action clauses.

Table 15. Sovereign Debt Restructurings, 1998-2005: Summary of Haircuts

		Haircuts in our definition (H_{npv}) <u>1/</u>				Haircuts in conventional definition (H_{mkt}) <u>2/</u>			
		average <u>3/</u> (percent)	range <u>4/</u> (percent)	standard deviation	correlation between face value cut remaining life	average <u>3/</u> (percent)	standard deviation	correlation between face value cut remaining life	
Russia	GKO/OFZs-residents	<u>5/</u> , <u>6/</u> 45.0	40-55	1.1	n.s.	n.s.	45.7	4.5	1.00
	GKO/OFZs-nonresidents	<u>5/</u> , <u>6/</u> 61.1	50-75	0.8	n.s.	n.s.	61.5	3.2	1.00
	MinFin3	<u>7/</u> 63.2	63	...	...	...	61.0	...	...
	PRINs/IANs	52.6	52-54	2.6	...	...	69.2	0.7	...
Ukraine	OVDPs-residents	<u>8/</u> 6.9	5-9	1.5	-0.82	-0.83	18.2	12.6	1.00
	OVDPs-nonresidents	<u>9/</u> 56.3	54-58	1.9	...	...	59.2	1.9	...
	Chase Loan	30.7	31	...	...	...	30.7	...	...
	ING Loan	38.0	38	...	...	...	38.0	...	...
	International Bonds	<u>10/</u> 27.8	22-35	5.5	-0.82	-0.97	40.1	9.2	0.87
Pakistan	Eurobonds	30.9	29-32	1.8	n.s.	-0.96	30.4	1.9	n.s.
Ecuador	International Bonds	27.4	19-47	10.4	-0.94	-0.90	60.0	7.3	n.s.
Argentina	Phase 1 (residents)	<u>11/</u> 41.7	25-60	10.5	...	n.s.	58.1	9.4	0.58
	Pesification	45.6	30-65	10.4	...	n.s.	61.3	11.0	0.62
	2005 International	<u>12/</u> 72.9	64-82	7.3	...	n.s.	67.0	9.1	n.s.
Uruguay	External	<u>13/</u> 12.9	5-20	4.5	0.81	n.s.	26.2	7.8	0.85
	Domestic	<u>14/</u> 23.3	10-40	6.9	0.47	n.s.	36.2	8.8	n.s.

1/ $H_{npv} = 1 - NPV(new)/NPV(old)$; NPV(old) includes PDI and PDP, compounded at a US short term rate. See methodology section for details.

2/ $H_{mkt} = 1 - NPV(new)/(outstanding principal + PDI)$. Outstanding principal includes any PDP; PDI is uncompounded.

3/ Weighted by outstanding or exchanged principal of old instruments. When several exchange options were available, generally took simple average across options.

4/ Subjective measure; describes the interval in which all instrument-specific haircuts were contained except for clear outliers above and below.

5/ Calculations for residents ignore exchange restriction; calculations for non-resident value effect of exchange restrictions.

6/ Average, standard deviation, and correlations assume choice of shortest OFZ; average between two approaches to discounting used in Tables 1 and 2.

7/ Refers to Option 1 (new \$MinFin) only), assuming February 2000 exchange date.

8/ Based on old OVDPs maturing at end-August, end-September, end-October and end-November 1998 and August 1999.

9/ Refers to exchange of hedged (dollar linked) OVDPs purchased by non-residents through Merrill Lynch in December 1997.

10/ All calculations based on instruments shown in Table 6, i.e. lumping the various Gazprom notes into one synthetic instrument.

11/ Calculations based on Option 1 ("guaranteed loan" with reduced fixed interest rate and, in general, a maturity extension of 3 years).

12/ Calculations based on 30 US\$ denominated international bonds constituting about 54 percent of principal exchanged.

13/ Calculations based on benchmark option, discounted without maturity adjustment.

14/ Calculations use simple average of extension and benchmark options, and are based on haircuts for all 46 domestic bonds, not just bonds shown in Table 11.

No clear difference in treatment is apparent in the two most recent crises. While the Argentina 2005 exchange, targeted mostly at non-residents, was the harshest of the restructurings covered in this paper, residents holders of the same international bonds that restructured earlier appear to have been treated almost as harshly, since they were first restructured in the November 2001 “Phase 1” exchange, and subsequently “pesified” in February 2002, at a combined loss of close to 70 percent. Finally, during Uruguay’s 2003 exchange, long dated fixed rate domestic instruments held by residents were subjected to about the same, relatively mild, haircuts as international bonds. Shorter dated treasury bills and floating rate bonds suffered higher haircuts, but this could be on account of their shorter durations (see below).

Fourth, as indicated by the standard deviation of haircuts presented in Table 15, there was often considerable variation in the haircuts received by investors *within* the same exchange or restructuring. This applies particularly to restructurings—like Argentina, Uruguay, Ecuador, and (if one includes the “Gazprom bonds) Ukraine 2000—in which there was a large degree of heterogeneity in the characteristics of the old instruments that were being tendered. Hence, intercreditor equity was often violated in the sense that the losses suffered could differ widely across creditors within the same exchange. As Table 15 shows, this is not an artifact of the particular definition of haircuts proposed in this paper: a similar result holds if haircuts are evaluated according to the market convention that focuses on the face value of old instruments rather than the net present value of the payments stream that they promise. Indeed, for most exchanges, the within-exchange standard deviation of haircuts according to market convention was slightly higher than that of haircuts in our definition.

Fifth, the correlations shown in Table 15, in conjunction with what we know about the design of the various exchanges, give us an idea of what might be driving some of the within-exchange differences in haircuts across creditors. Almost all exchanges made an attempt to differentiate the package of instruments offered to investors in line with the characteristics of the old instruments traded. In practice, this was done by offering holders of longer old instruments longer new instruments (Argentina; Phase 1, and Pesification), by imposing a larger face value haircut on them (Russia GKO and PRINs/IANs exchange; Ukraine OVDP and 2000 exchanges) or a mixture of both (Ecuador and Uruguay exchanges). Hence, the correlation between haircuts according to market convention—that is, disregarding any differences in maturity and payments terms of the old instruments—and their remaining life is typically positive. Per unit of face value, holders of longer-dated old instruments tended to receive smaller values of new instruments.

However, this seemingly “tougher” treatment of longer instruments almost never translated into less favorable treatment *per unit of NPV* of the old instruments. As Table 15 shows, the correlation between remaining life and NPV haircuts is either not significant (“n.s.”), or significant and *negative*. This means that any “tougher” treatment of longer instruments did not, in fact, go far enough in making up for the fact that longer instruments, when evaluated at the high post-exchange yields, had lower value to begin with. As a result, holders of longer instruments ended up with lower NPV haircuts than those of shorter original instruments in four external exchanges: Russia (PRINs/IANs); Ecuador, Ukraine (OVDP and 2000), and

Pakistan. In all other cases, there is no significant relationship between remaining life and the NPV haircut. Any remaining cross-instrument differences in haircuts in these cases are either random or due to reasons that are beyond the scope of this paper.

Note also that because the debt restructurings we study in this paper reduced the NPV debt burden through a mix of maturity extensions, interest reductions and face value reductions, there is no clear pattern linking face value reductions and NPV haircuts. Within most exchanges, there is no statistically significant correlation between face value cuts and NPV haircuts. Indeed, in a few cases (Ukraine OVDP, Ukraine 2000, and Ecuador) there is a significant and negative relationship, reflecting the relationship between longer dated instruments and higher face value haircuts discussed above.

Sixth, Brady bond holders seem to have fared better than average bondholders not just in terms of value received (as one would expect) but even in terms of haircuts, i.e. taking into account the fact that Brady bonds had higher values to begin with. This is most pronounced for Argentina, where the holders of Discount Brady bonds got away with haircuts of less than 38 percent, compared to average haircuts on non-collateralized bonds of 74 percent. It is also apparent for Uruguay (haircuts of 9-10 percent compared to over 13 on average for holders of non-collateralized bonds) and Ecuador (19-27 percent compared to 32 percent). These differences are driven by the much higher cash received by Brady bond holders as a result of the release of their principal collateral, which outweighed the effect of the collateral in boosting the value of the old bond (in particular, given low exit yields for Uruguay and Argentina). Debtors could have offset these higher cash payments by offering Brady bond holders a correspondingly smaller number of units of the new bonds, but in practice, this was not done. In Uruguay and Argentina, Brady bond holders received the same number of “nominal units” as everyone else. In Ecuador, holders of long dated Brady bonds received a smaller number of units (that is, a higher face value haircut) but this was not enough to offset the higher value, compared to non-collateralized bonds, arising from the release of the principal collateral.

Finally, it is worth noting that most exchanges studied in this paper led to participation rates above or around 90 percent (Table 14). Hence, the free rider or holdout problem seems to have been successfully dealt with in most exchanges. Possible exceptions are the two most recent Argentina restructurings, namely *pesification*, and the 2005 exchange (participation in “Phase 1”, though nominally only 65 percent of all eligible claims, was much higher among the domestic claim-holders that were targeted by the exchange). As far as *pesification* is concerned, the relatively low participation rate reflected mainly resistance from the pension funds, while the 2005 participation rate of 76 percent was attributable to low (63 percent) participation by non-resident creditors (among residents, participation was 98 percent). This said, even the comparatively low 76 percent average participation rate surprised many market observers, who had been predicting participation rates in the 50-60 percent range in view of the tough terms of the exchange offer (see, for example, Economist Intelligence Unit, *Argentina: Finance Outlook*, November 10, 2004).

V. CONCLUSIONS

This paper has two main results. First, NPV haircuts—defined by comparing the present value of new instruments received with that of old instruments tendered, both evaluated at yields prevailing immediately after the debt exchange—varied substantially across the debt restructurings studied. The “toughest” restructuring was Argentina’s 2005 exchange with an average haircut of almost 75 percent, followed by the Russian GKO exchange (50-70 percent), while the mildest was Uruguay’s international bond exchange, with a haircut close to 10 percent. Domestic residents appear to have been treated more favorably in Russia’s and Ukraine’s 1998-99 domestic debt exchanges, but this does not appear to have been the case during the Argentina (2001–05) and Uruguay (2003) restructurings. Second, considerable variation in haircuts existed within some of the exchanges, depending on the instrument tendered. In some debt restructurings, holders of longer-dated instruments appear to suffer smaller losses in NPV terms, while in others, within-exchange variation in NPV losses does not seem to follow an obvious pattern.

The paper also finds that a simpler definition of “haircuts,” which is often used by market participants—namely, to measure investor losses with respect to the face value of the outstanding debt rather than its present value—tends to exaggerate the losses actually suffered by investors. This is because the present value of the claims that investors gave up in a restructuring was typically lower than their face value—even if one evaluates present values under the assumption that the old instrument would have been serviced with the same probability as the new instruments. Hence, “haircuts” according to the conventional definition tend to be higher than in the definition used in this paper, which compares the value received by investors with the present value of the old instruments. The sole exception is the Argentina 2005 exchange. The latter is unusual in that yields prevailing after the exchange were lower than the coupon rates carried by many of the old instruments, so that their present value, when evaluated at the exit yields, exceeded 100 cents on the dollar. Hence, for the Argentina exchange, the NPV haircuts that we find are slightly higher than the haircut (about 70 percent) that has been typically cited by market sources.

The first of these two main results of the paper is not surprising, since variations in haircuts across debt exchanges are to be expected as a result of differences between countries’ ability to pay, willingness to pay, and bargaining power. In contrast, variations in haircuts within exchanges are more surprising, as they appear to conflict with the notion of intercreditor equity and the equal legal status of bondholders. At a minimum, our results suggest that intercreditor equity is a more diffuse concept, and perhaps one that is harder to implement, than might appear at first. One sense in which there could be intercreditor equity is that all bondholders are offered the same units of a new instrument, or the same access to a menu of instruments, per outstanding face value of their old instrument. Most debt exchanges do not seem to have sought intercreditor equity in this sense, as holders of longer dated instruments typically received a higher face value reduction, comparatively longer-dated new instruments, or a combination of both. In the end, however, these attempts to differentiate treatment in accordance with the characteristics of the old instruments did not fully offset

differences in the present value of old instruments, and as a result, substantial differences in NPV haircuts remain.

The facts established in this paper both raise and potentially help answer a range of questions at the center of the study of debt crises and defaults. Why have some debt restructurings led to much higher investor losses than others? Is this mainly a reflection of the depth of a debt problem—a government's ability to pay—or of willingness to pay, perhaps driven by differences in the domestic political economy of defaults? Do the terms of a restructuring depend on other features of the bargaining game between investors and governments, such as the time elapsed since default, as a war of attrition model would suggest? What accounts for differences in investor treatment within the same restructuring? Do the costs of default from a country perspective—in particular, any sanctions and reputational costs—vary with the harshness of the debt restructuring pursued? We hope that the facts presented in this paper will lay the basis for future empirical work investigating these questions.

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