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Cross-Country Experience with Restructuring of Sovereign Debt and Restoring Debt Sustainability

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Cross-Country Experience with Restructuring of Sovereign Debt and Restoring Debt Sustainability

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I. INTRODUCTION

1. **In the extreme circumstances where a restructuring of sovereign debt becomes unavoidable, an overarching objective is to restore the country's debt to a sustainable path.** Assessing whether debt sustainability—a situation in which a borrower is expected to be able to continue servicing its debt without an unrealistically large correction to the balance of income and expenditure—has been restored involves an evaluation of the nature of the crisis—including whether it is one of solvency or liquidity—and requires complex judgments, particularly regarding whether a debt restructuring would be sufficient to contribute to a credible and durable exit from the crisis that would enable the country to regain access to international capital markets.[2]

2. **Analysis to date has focused on developing tools to improve debt sustainability assessments and the process for an orderly restructuring of sovereign debt.** Less attention has been given to actual experience with debt-restructuring operations, notably on assessing whether debt sustainability was restored. This paper aims to fill this gap, with an emphasis on debt owed to private creditors.[3] It reviews the experience of the past several years, where a number of countries—including Argentina (2001 and 2005),[4] Dominican Republic (2005), Ecuador (1999), Moldova (2002 and 2004),[5] Pakistan (1999), Russia (1998–2000), Ukraine (1998–2000), and Uruguay (2003)—have restructured their sovereign debt in the context of efforts to resolve a crisis. These debt restructurings have either followed a sovereign default or been undertaken pre-emptively in an effort to avoid default.

3. **Against this background, the paper examines the initial conditions that gave rise to the debt operations, discusses the impact that the restructurings had in each of these cases, and attempts an assessment of whether sustainability has been restored**. The assessment of debt sustainability focuses on three aspects—the current level of debt and related vulnerabilities, as estimated by an early warning system (EWS); vulnerabilities stemming from the liquidity position; and medium-term debt-related vulnerabilities as assessed by debt sustainability analyses (DSAs), including stress testing to determine the effects of shocks to key variables. The

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[2] See: IMF (2002a).

[3] The focus of this note is on non-HIPC countries undergoing restructuring with private creditors in near crisis circumstances since 1998.

[4] While the January/February 2005 global debt exchange offer was launched post-default, Argentina had executed two rounds of restructuring prior to its default in late December 2001 (the June 2001 megaswap and the November/December 2001 Phase I restructuring).

[5] Although the 2002 bond exchange was executed while the original claims were not in default, Moldova incurred arrears on several other claims, including the Gazprom promissory notes that were exchanged in 2004. However, because the Eurobond restructuring took place in a pre-emptive setting aimed at avoiding default, for the analysis of debt sustainability, Moldova is treated as a pre-emptive case. Nonetheless, for completeness, information on both the 2002 and 2004 restructurings are included in the paper.

assessment is based on data from staff reports that were issued through October 2005, most of which have been published. We recognize at the outset that the sample is too small to allow for firm generalizations.

4. **The paper is organized as follows**: Section II provides a cross-country overview of the economic conditions, including the composition of sovereign debt and its dynamics prevailing prior to the debt operations, and a discussion of the scope and outcomes—in terms of the debt relief provided by creditors—of the debt restructurings. Section III analyzes the debt profile, liquidity position, DSAs and accompanying stress tests, and an EWS to assess whether debt sustainability has been restored in each country case. Conclusions are set out in Section IV.

II. Cross-Country Experience with Recent Sovereign Debt Restructurings

5. **To provide the context, the initial conditions that led to a restructuring of sovereign debt are examined; then the scope and salient features of the debt restructurings are reviewed; and finally the outcome of the debt restructurings and debt dynamics around the time of restructuring are presented.**

A. Initial Conditions

6. **An overview of key debt indicators prior to the restructurings reveals substantial differences in the level and composition of public debt across the eight countries.** In particular, two years prior to the restructuring of sovereign debt, total public debt as a share of GDP ranged from 30 percent in the case of Ukraine to 99 percent in the case of Moldova, and the average debt-GDP ratio was 62 percent (see Table 1).[6] In countries that eventually restructured pre-emptively to avoid default, debt ratios were between 30 percent and 99 percent, whereas in Ecuador and Russia, which restructured after a sovereign default, debt ratios stood at 66 percent.[7] In terms of the composition of debt, several countries had a very large share of foreign-currency denominated debt (Argentina, Ecuador, and Russia had shares of above 95 percent in their respective central years of restructuring, labeled "*t*" in Table 1; Uruguay's ratio was 91 percent), whereas in the Dominican Republic, Moldova, Ukraine, and Pakistan, the shares were somewhat lower (below 85 percent).

[6] A part of Moldovan and Pakistani debt was on concessional terms.

[7] Past experience shows that approximately 40 (60) percent of entries into sovereign debt crises occurred when debt levels in the last year before crisis had been above 59 (39) percent of GDP (see Section III).

Table 1. Public Debt in Recent Cases of Sovereign Debt Restructuring

(in percent of GDP)

	Central year 1/	Public Debt							
		t-2 2/	t-1 2/	t			2004		
				Pre-Proj. /3	Post-Proj./Est 2/	Est. /4	Pre-Proj. /3	Post-Proj. 2/	Est. /4
Pre-emptive cases 5/									
Ukraine	1999	***29.9***	***41.8***	***39.2***	***55.5***	66.7	***31.3***	***40.5***	27.1
Pakistan	1999/2000 6/	89.4	91.9	94.4	91.6	83.8	***72.8***	86.4	67.9
Argentina 7/									
Megaswap and *Phase I*	2001	47.7	50.8	53.5	62.0	62.2	52.4	119.0	133.9
Moldova	2002	***98.7***	***84.4***	...	***81.7***	74.4	...	***73.9***	48.3
Uruguay	2003	45.0	89.0	111.0	105.0	104.4	93.0	97.0	92.5
Dominican Republic	2005	55.7	53.9	49.1	46.3	46.3	52.1	53.9	54.1
Post-default cases									
Ecuador	2000	***65.9***	***120.4***	172.4	***123.6***	91.4	***102.0***	***59.7***	47.2
Russia	2000	66.0	93.3	107.2	73.4	57.6	78.5	45.3	21.7
Moldova	2004	74.4	60.6	56.9	48.3	48.3	56.9	48.3	48.3
Argentina /8									
Global Debt Exchange	2005	139.8	129.4	...	78.2	78.2	134.5	129.4	129.4

Sources: IMF staff reports; WEO database; and own calculations.

1/ Central year of debt restructuring episode.
2/ As reported in first staff report after restructuring; or inferred (bold Italics).
3/ As reported in last staff report before restructuring; or inferred (bold Italics).
4/ Actual or latest estimate.
5/ Including Ukraine, which was in technical default for a short period; Moldova, which incurred arrears towards Gazprom but remained current on its Eurobond obligations; and the Dominican Republic, which was in arrears to its London Club creditors but remained current on its international bonds.
6/ Pakistani fiscal year, July to June; 2004 column refers to 2003/04. Latest estimates are lower than previous estimates partly due to an upward revision in the GDP series.
7/ Combined public sector.
8/ 2005 projections are based on the assumption of full creditor participation in the debt exchange; data cover the federal government only.

7. **Notwithstanding considerable divergence in pre-restructuring levels and composition of debt, the majority of countries experienced a surge in debt ratios in the run-up to the restructurings.** Total debt grew rapidly in the Dominican Republic, Ecuador, Russia, Ukraine, and Uruguay.[8] A combination of factors was responsible, including high and increasing public interest obligations (Ecuador and Uruguay), rapid currency depreciation (Dominican Republic, Ecuador, Russia, Ukraine, and Uruguay), declining economic activity (Ecuador, Russia, Ukraine, and Uruguay), and the fiscal cost of supporting a troubled financial sector (Dominican Republic, Ecuador, and Uruguay). By contrast, Argentina's and Pakistan's debt levels did not increase much before the crisis and Moldova's debt ratio was in decline.[9] In

[8] In the Dominican Republic, the debt ratio more than doubled between 2002 and 2003.

[9] In Argentina, the debt ratio only surged in 2002, after the abandonment of the convertibility regime. In Pakistan, the depreciation of the rupee was relatively small (in the two years before the restructuring, the *rupee* depreciated by 12.6 percent against the *U.S. dollar*) and the economy continued to grow despite the fiscal tightening. The Moldovan

(continued)

the case of Argentina, prior to the abandonment of the convertibility regime, overvaluation of the exchange rate may have contributed to mask debt-related vulnerabilities. Moreover, the subsequent overshooting of the exchange rate may have overstated near-term debt ratios and hence vulnerabilities.

8. **High and/or increasing debt levels gave rise to debt-servicing difficulties in all cases, despite differing economic circumstances and backgrounds.**

- Market confidence in *Russia* declined in 1998, when the oil-producing economy suffered from low petroleum prices, and a weakening ability to implement domestic policies that would address the fiscal imbalances exacerbated investor concerns in the wake of the Asian crisis. This led to a capital account crisis culminating in the devaluation of the ruble, considerable problems rolling over the large stock of treasury bills held by foreign investors, and ultimately to default.[10] Gross reserves fell to 15 percent of short-term debt in 1998, as compared to 39 percent in 1996.[11]

- Neighboring *Ukraine* was pulled into crisis partly by the problems in Russia, which worsened Ukraine's market access at a time when high debt-service payments were falling due. While attracting liquidity was the immediate concern, at a debt level of 42 percent of GDP in 1998, there were few solvency concerns. The authorities adjusted the exchange rate band several times in 1998, and finally floated the currency in March 1999. In the event, liquidity became tight, with gross reserves fallen to 14 percent of short-term debt at end-1998 as compared with 148 percent in 1996. While Ukraine remained current on its debt-service obligations to private creditors,[12] it incurred arrears to official bilateral creditors from 2000.

- In 1998, *Ecuador*, like Russia, was adversely affected by low oil prices and impaired investor confidence in the emerging market asset class. In addition, the country was hit by a banking crisis. These factors combined led to a devaluation of the *sucre* in early 1999

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debt situation was helped mainly by negative real interest rates and by primary surpluses. However, Moldova faced increasing debt-servicing difficulties, partly due to increasing amortization payments falling due.

[10] Russia defaulted on its t-bill obligations in August 1998, on restructured loans (PRINs) in December 1998, on the MinFin-3 bond in May 1999, and on interest arrears notes (IANs) in June 1999. Russia had been in arrears to Paris Club creditors since 1998 (regularized in July 1999), and to some non-Paris Club bilaterals since 1996, in pursuit of comparable treatment to the 1996 Paris Club agreement.

[11] For the case descriptions in this paragraph, short-term debt is defined on a remaining maturity basis and includes external arrears.

[12] Except for a short period during the time of the exchange offer in 2000, see Table 3, footnote 1.

and the subsequent default on debt to private creditors, as the public sector debt service burden had increased rapidly (from 8.3 percent of GDP in 1998 to 18.1 percent of GDP in the first quarter of 2000).[13] Ecuador had already been in arrears to Paris Club creditors since 1996. In the run up to the crisis, gross reserves declined from 50 percent of short-term debt (1996) to 30 percent in 2000.

- In the 1990s, *Pakistan's* external debt-service payments increased faster than export earnings (debt service as a share of export receipts rose from 26 percent in 1992 to 34 percent in 1998). Pakistan entered a liquidity crisis when following its nuclear tests in 1998 it was subject to international sanctions, affecting both its current and capital accounts. In the event, debt-service payments to official bilateral creditors were suspended in 1998, but Pakistan remained current with respect to its obligations to private creditors. By June 1998, gross reserves dropped to below 10 percent of short-term debt, as compared with 27 percent in June 1996.

- In *Argentina*, three years of recession and difficulties in containing the fiscal deficit led to a confidence crisis, leading to soaring sovereign spreads and doubts about the sustainability of the convertibility regime in 2001. At end–2001, the ratio of gross reserves to short-term debt had declined to 31 percent as compared with 48 percent in 1999. Public sector debt service increased from 38 percent of exports in 1998 to 66 percent in 2001. In December 2001, after having undergone two debt operations, Argentina defaulted on government debt owed to private and official bilateral creditors.

- In *Moldova*, public debt had built up in the late 1990s due to a combination of sustained fiscal deficits, negative GDP growth, and a sharp depreciation of the *leu* following the Russian crisis in 1998. The debt ratio improved somewhat after 1998, but debt-servicing difficulties intensified, partly as a result of increasing amortization payments falling due. In the event, public external debt-service obligations increased from 17 percent of exports in 1998 to 23 percent in 2002. Gross reserves as share of short-term debt were 39 percent in 2002. Moldova had been in external arrears on debt-service obligations and energy payments to official bilateral creditors as well as to Gazprom, some of which since 1994, but remained current on its Eurobond obligations.

[13] Ecuador defaulted in August/September 1999 on all Brady and Eurobond debt, on all domestic public debt maturing until end-2000, and on external credit lines in closed banks.

- Vulnerabilities in *Uruguay* had been building up long before the crisis, owing to a long recession the country had been enduring since 1999, persistent fiscal deficits, and an inability to deal with banking system weaknesses. Debt and debt-service problems surfaced after the 2002 banking crisis (triggered by massive withdrawals of Argentine and subsequently domestic foreign currency deposits) and the ensuing change in the exchange rate regime. External debt-service obligations increased from 36 percent of exports in 2000 to 56 percent in 2002. Gross reserves coverage of short-term debt fell from 34 percent in 2000 to 16 percent in 2002. Given the high level of public debt, there were some concerns about solvency. Uruguay did not default on its commercial or official debt service obligations.

- In the *Dominican Republic*, the discovery of fraud and losses in the banking system triggered a banking crisis in 2002/03. Private deposits were withdrawn, prompting large official injections of liquidity. Inadequate fiscal management practices undermined the intended fiscal restraint, setting off a vicious cycle of high inflation, peso depreciation, growth of public debt, and capital flight. Gross reserves fell from 151 percent of short-term debt to 31 percent in 2003. Debt service obligations increased from 11.6 percent of goods exports in 2001 to 21.5 percent in 2005 (before restructuring). External arrears started to accrue to the Paris Club (since 2003) and commercial banks (2004). However, the Dominican Republic remained current on its external bond obligations. In the run of the crisis, public debt peaked at 56 percent of GDP in 2003. The debt restructuring has largely addressed liquidity rather than solvency concerns, resolving the bunching of debt service payments falling due.

B. The Scope and Outcome of Sovereign Debt Restructuring with the Private Sector

9. **The scope and outcome of sovereign debt restructurings with the private sector varied quite considerably across the eight country cases, with outcomes differing according to whether the restructuring took place pre-emptively or following a default.**[14] Countries that restructured pre-emptively generally received less debt reduction than those that restructured post-default, but also experienced smaller output declines on average.[15]

[14] The role of the Fund during the restructuring process in the different cases is summarized in Annex III.

[15] For an evaluation of differences between individual restructured instruments within recent country cases, see Sturzenegger and Zettelmeyer (2005).

- The scope of debt restructuring depended on the share of debt owed to private creditors (see Tables 2 and 3). Argentina (2001 and 2005), Ecuador, and Uruguay each restructured approximately half of their public debt. By contrast, in countries where debt was largely owed to official creditors, the scope for debt restructuring with the private sector was more limited (parallel debt operations with the Paris Club are summarized in Table 4).

Table 2. Summary: Scope of the Debt Restructuring

	Period	Debt Affected	
		(percent of GDP)	(percent of public debt)
Pre-emptive cases			
Ukraine	1998-2000	12.8	20.9
Pakistan	1999	1.0	1.0
Argentina	2001	30.0	48.1
Megaswap	May-Jun 2001	11.0	17.6
Phase I	Nov-Dec 2001	19.0	30.5
Moldova	2002	2.4	3.0
Uruguay	2003	48.3	49.3
Dominican Republic	2005	7.0	14.3
Post-default cases			
Ecuador	1999-2000	49.4	45.0
Russia	1998-2000	23.7	39.3
Moldova	2004	4.3	8.9
Argentina			
Global Debt Exchange 1/	2005	59.7	53.1

Source: IMF staff reports.

1/ Calculations are based on inclusion of all past due interest.

- In pre-emptive restructuring cases, debt relief was largely provided by extension of maturity with limited reduction in coupon payments. Debt reduction measured in terms of the decline in the **net present value** of the restructured debt was relatively small (see Table 5). With the exception of Argentina (2001), the pre-emptive cases received NPV reductions of no more than 8 percent, when evaluated at a common discount rate of 10 percent.[16] In the case of the Argentine megaswap, the NPV value increased by 28 percent, while the subsequent Phase I restructuring had a NPV reduction of 32 percent. Jointly, the two restructurings resulted in an NPV reduction of 10 percent. The four post-default cases received NPV reductions of 25 percent (Ecuador), 44 percent (Russia), 58 percent (Moldova), and 75 percent (Argentina's 2005 global debt exchange).[17]

[16] Reported values depend critically on the discount rate applied. As restructurings generally extend the maturity profile and/or reduce coupon rates, a higher discount rate will normally be associated with a higher NPV reduction. In the paper, a common rate of 10 percent is used for ensuring comparability across countries. By contrast, for general country work, it is recommended to use a range of discount rates, from the country's medium-term nominal GDP or export growth to its projected borrowing costs under noncrisis conditions. For a fuller discussion on the choice of discount rates, see Kozack (2005).

[17] Measures of debt reduction in Argentina are calculated on the basis of total claims (principal and past due interest), and assuming full creditor participation.

Table 3. The Scope of Debt Restructuring

Ukraine	Following three rounds of selective restructuring of private claims in 1998 and 1999 (together covering around US$800 million) but faced with substantial maturities of bonds falling due in the immediate future, Ukraine launched in February 2000 a comprehensive exchange offer. This offer involved four different Eurobonds and Gazprom bonds maturing in 2000 and 2001 covering principal outstanding of US$3.3 billion.[1] In sum, private sector restructuring covered 21 percent of Ukraine's public debt. Regarding Paris Club debt, an agreement for rescheduling was reached in July 2001 (see Table 4).
Pakistan	The restructuring of sovereign debt to private creditors took place as a requirement under the comparability of treatment clause for the January 1999 Paris Club rescheduling. Only a small share of external debt was owed to private creditors. Consequently, the scope of private sector restructuring was too small to have a sizeable impact on debt sustainability. In addition to the rescheduling of commercial loans (see Annex II), Eurobonds falling due between December 1999 and February 2002 with a face value of US$608 million, equivalent to about 1 percent of GDP, were restructured. Subsequently, in 2001 Pakistan benefited from two additional Paris Club reschedulings, providing it with substantial debt service relief.
Argentina	Prior to the default in late 2001, two rounds of debt treatment were undertaken: a debt swap (*megaswap*) involving debt equivalent to 11 percent of GDP, followed by a restructuring of debt held mainly by domestic investors (*Phase I*), covering debt equivalent to 19 percent of GDP. More than three years after the default, in 2005, Argentina offered to exchange 152 different defaulted securities held by investors both inside and outside of Argentina, with a face value equivalent to 60 percent of GDP (g*lobal debt exchange*). The rescheduling of official bilateral debt is yet to take place.
Moldova	In a piecemeal strategy, notable steps included the restructuring in 2002 of a single Eurobond with outstanding principal of US$39.7 million or 3 percent of total debt, and the 2004 agreement with Gazprom on a settlement of defaulted promissory notes with a face value of US$111.1 million (9 percent of total debt).[2] As in Pakistan, Moldova's external debt was largely owed to official creditors, limiting the scope for debt restructuring to the private sector and its possible impact on debt sustainability. No Paris Club rescheduling was agreed, but Moldova concluded bilateral agreements with Russia, China, Romania, and Germany.
Uruguay	In a single exchange in 2003, all foreign-currency denominated sovereign bonds were restructured, including US$3.6 billion in Eurobonds, US$250 million Samurai bonds, and US$1.6 billion domestic bonds, totaling nearly 50 percent of GDP.
Dominican Republic	The restructuring of debt held by private creditors was in part motivated by the comparability of treatment provision of the April 2004 Paris Club treatment (see Table 4). The restructuring covered the majority of privately-held external debt: US$1.4 billion (12 percent of total debt) in two external bonds and US$175 million in obligations to commercial banks.
Ecuador	Following the default in 1999, Ecuador launched a comprehensive debt restructuring that included debt amounting to almost 50 percent of GDP. In addition to Brady and Eurobond debt with a face value of US$6.5 billion, the debt operation included domestic public debt maturing between September 1999 and end–2000 amounting to US$346 million, and external credit lines in closed domestic banks of about US$80 million. Ecuador reached agreement for a Paris Club rescheduling in September 2000.
Russia	Following the August 1998 sovereign default, the successive rounds of rescheduling until February 2000 covered 24 percent of GDP. This included ruble-denominated debt, arrears relating to principal payments on the MinFin–3 bond, and the entire stock of Soviet-era debt owed to London Club creditors. An agreement for a Paris Club rescheduling was reached in August 1999, providing additional relief to Russia (see Table 4).

[1] In the run-up of this exchange offer, Ukraine deferred selected principal payments to respect inter-creditor equity, and, as a consequence, was briefly in technical default during the period of the exchange offer.

[2] Other elements of Moldova's strategy are described in Annex II.

Table 4. Recent Paris Club Reschedulings

	Date of treatment	Terms	Amount treated (US$ million)	Amount treated (percent of debt owed to Paris Club)	Consolidation Period (in months)	Grace Period (in years) ODA/non-ODA	Maturity (in years) ODA/non-ODA
Pre-emptive cases							
Ukraine	Jul-01	Classic	580	52.7	21	3	12
Pakistan	Dec-01	Ad-hoc	12500	93.8	36	15/3–5	38/18–23
	Jan-01	Houston	1752	14.4	12	10	20
	Jan-99	Houston	3254	26.7	12	10/3	20/18
Moldova	(no reschedulings, but bilateral agreements were reached with China, Germany, Romania, and Russia)						
Uruguay	(no reschedulings)						
Dominican Republic	Oct-05	Classic	137	6.7	12	5	12
	Apr-04	Classic	193	12.4	12	5	12
Post-default cases							
Ecuador	Jun-03	Houston	81	3.0	12	10/3	20/18
	Sep-00	Houston	880	35.0	12	10/3	20/18
Russia	Aug-99	Ad-hoc	8113	15.9	6	2	19
Argentina	(no reschedulings in 2001-now)						

Source: Paris Club.

Table 5. Debt Reduction in Net Present Value of Recent Debt Restructurings

(in percent)

	Operation	NPV reduction 1/	Discount rate	Source
Pre-emptive cases				
Ukraine	Sep 1998 t-bill restructuring	...	...	
	Oct 1998 Chase Manhattan restructuring	...	...	
	Aug 1999 ING and Merrill Lynch restructuring	...	...	
	Apr 2000 Eurobond and Gazprom bond restructuring	5	10	2/
Pakistan	Nov 1999 exchange offer	27	21	3/
		8	10	Estimate
Argentina	Jun 2001 Megaswap	-2	approx. 15	4/
		-28	10	Estimate
	Nov 2001 Phase I restructuring	35	15	4/
		32	10	4/
Moldova	June 2002 exchange offer	6	10	Estimate
		0	8	Estimate
Uruguay	May 2003 debt exchange	20	16	5/
		13	12	5/
		8	10	2/
Dominican Republic	April/May 2005 debt exchange	1	10	Estimate
	Oct 2005 commercial bank agreements	2	10	Estimate
Post-default cases				
Ecuador	Oct 1999 domestic debt restructuring	9	...	4/
		0	10	Estimate
	Aug 2000 Brady and Eurobond restructuring	25	10	Estimate
Russia	May 1999 t-bill restructuring	40–75	... 6/	7/
	Nov 1999 MinFin-3 restructuring	41–63	... 6/	7/
	Aug 2000 London Club agreement	40	...	8/
		44	10	Estimate
Moldova	Apr 2004 Gazprom agreement	58	10	Estimate
Argentina	2005 Global Debt Exchange	75	10	9/

1/ Negative numbers indicate an increase in the net present value of debt.
2/ Kozack (2005).
3/ *IMF (2001).*
4/ Various unpublished IMF studies.
5/ *"Uruguay: 2003 Article IV Consultation and Third Review Under the Stand-By Arrangement and Request for Modification and Waiver of Applicability of Performance Criteria,"* available on the IMF public website at:
http://www.imf.org/external/pubs/ft/scr/2003/cr03247.pdf.
6/ Based on exit yields.
7/ Sturzenegger and Zettelmeyer (2005).
8/ *"Russian Federation: Staff Report for the 2000 Article IV Consultation,"* available on the IMF public website at:
http://www.imf.org/external/pubs/ft/scr/2000/cr00145.pdf.
9/ *"Argentina—Staff Report for the 2005 Article IV Consultation,"* available on the IMF public website at:
http://www.imf.org/external/pubs/ft/scr/2005/cr05236.pdf.

- The distinction between pre-emptive and post-default cases becomes more pronounced when looking at debt reduction measured in terms of reduction in **principal** outstanding (see Tables 6 and 7). Among the pre-emptive cases, no country received more than 6 percent reduction in nominal principal (some countries even saw a small increase), while post-default debt operations yielded substantial reductions.

- While post-default cases have tended to receive more debt reduction, they also experienced on average deeper economic contractions than the pre-emptive cases.[18] On average, real GDP in the pre-emptive restructuring cases contracted by 3.6 percent in the year of lowest growth during the crises (year *t* in Figure 1). This compares to an average contraction of 7.5 percent in the post-default cases.[19] [20]

- In cases that could be characterized as exhibiting solvency problems, the amount of debt relief was greater when the restructuring took place following a default. In this context, the decision to restructure pre-emptively may have had some impact on the incentives of the debtors to reach an agreement. In particular, failure to reach an agreement with creditors could subject the debtor to significant reputational, political, and economic costs in the event that default could not be avoided. Under these circumstances, sovereign debtors may acquiesce to debt restructuring terms that satisfy their creditors, but are not sufficient to restore sustainability. The factors that affect the negotiation strategies of creditors and debtors are, however, broad and complex. It is not possible to adequately disentangle the impact of the decision to default from the broader economic circumstances surrounding that decision, including the more severe recessions that were endured in post-default countries.

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[18] While countries may find it harder to avoid a default in a situation of severe economic contraction, they generally make every effort to remain current on their sovereign obligations. The economic, social, and political costs of sovereign default can be high, as a default is likely to disrupt market access, which may lead to disorderly fiscal and balance of payments adjustments. Against this background, countries that are faced with debt-servicing difficulties and emerging pressures in their external accounts have an incentive to reach agreement with creditors on pre-emptive debt restructurings to avoid default. In addition to alleviating liquidity pressures, a pre-emptive restructuring could forestall or help reduce possible solvency problems by providing the time and scope for adopting corrective measures that, inter alia, foster economic growth and provide for greater upside potential, more generally.

[19] By contrast, the countries that restructured post-default generally showed a quicker rebound following the contraction. On average, in the year following the trough, real GDP grew by 6 percent in the post-default cases but only by 1 percent in the pre-emptive restructuring cases.

[20] Countries defaulted on official bilateral obligations more frequently or earlier than on private sector claims**.** Ecuador and Russia defaulted on bilateral official debt before defaulting on private sector claims, while the Dominican Republic, Moldova, Pakistan, and Ukraine defaulted on bilateral official obligations, but remained current on their Eurobonds through their financial crisis. Argentina defaulted on both types of creditors at the same time, while Uruguay remained current on both.

Table 6. Nominal Principal Reduction in Recent Debt Restructuring Cases

	Period	Nominal Principal Reduction 1/		Upfront cash (percent of restructured debt)	Inclusion of PDI 2/
		(percent of GDP)	(percent of restructured debt)		
Pre-emptive cases					
Ukraine	1998–2000	0.0	0.0	4.9	yes
Pakistan	1999	0.0	-1.0	0.0	... 3/
Argentina	2001	-0.9	-2.9	0.0	... 3/
Megaswap	May-Jun 2001	-0.9	-7.8	0.0	... 3/
Phase I	Nov-Dec 2001	0.0	0.0	0.0	... 3/
Moldova	2002	0.2	6.4	10.0	... 3/
Uruguay	2003	0.5	1.0	0.0	... 3/
Dominican Republic	2005	0.0	0.0	1.9	yes 4/
Post-default cases					
Ecuador	1999–2000	18.4	37.3	3.8	yes
Russia	1998–2000	4.1	17.2	0.4	yes
Moldova	2004	2.5	57.9	42.1	yes
Argentina					
Global Debt Exchange	2005	37.0	56.0	0.9	partly 5/

Source: IMF staff reports.

1/ Negative numbers indicate an increase in principal.
2/ Past due interest.
3/ Not applicable; case did not involve arrears.
4/ London Club agreement included upfront clearance of US$30 million in arrears.
5/ In the offer, only PDI through end-2001 was recognized.

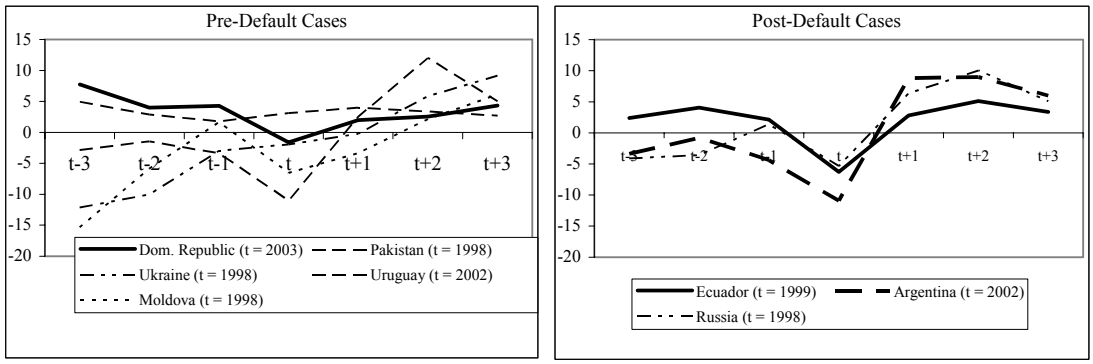
Table 7. Results of the Debt Restructurings[1]

Pre-emptive restructurings to avoid default	
Ukraine	The restructurings of sovereign debt did not lead to a reduction in nominal principal obligations. In net present value terms, estimates are available only for the 2000 restructuring, for which the NPV reduction was rather limited (5 percent of restructured debt).
Pakistan	Eurobond obligations were exchanged for a U.S. dollar-denominated six-year Eurobond with three years grace and a 10 percent coupon. The restructuring led to a nominal increase in principal obligations. In net present value terms, there was a 8 percent debt reduction.[2]
Argentina (2001)	The *megaswap* of June 2001 resulted in a small increase in the debt stock. Moreover, while providing debt-service relief in the short term, it was costly: the net present value of exchanged debt increased by about 28 percent. The November/December 2001 *Phase I* restructuring, completed under the imminent threat of default, did not involve any reduction in principal, but yielded a 32 percent NPV reduction on restructured principal. Given that the Phase I operation covered a larger portion of debt (US$51 billion) than the megaswap (US$29.5 billion), together the two debt exchanges resulted in a net NPV reduction of approximately 10 percent.
Moldova (2002)	The 2002 debt exchange resulted in a principal reduction of US$2.6 million (6.4 percent of restructured debt) and featured an upfront cash payment of US$3.97 million (10 percent of restructured debt). In NPV terms, the restructuring resulted in a haircut of 6 percent.
Uruguay	The voluntary bond exchange of April/May 2003, involving US$5 billion in outstanding debt, resulted in a nominal reduction of principal of US$49 million, equivalent to 1.0 percent of the exchanged bonds. In net present value terms, there was a debt reduction of about 8 percent.[3]
Dominican Republic	In line with the fact that the Dominican Republic was largely faced with a liquidity rather than a solvency problem, the debt restructuring operations did not feature a reduction in principal and yielded a negligible NPV reduction (bond exchange: 1 percent; commercial banks: 2 percent).
Post-default restructurings	
Ecuador	The restructuring of external public debt to private creditors led to a principal reduction of nearly 40 percent (equivalent to 18 percent of GDP), while domestic public debt was rolled over without a reduction of principal. For the external debt operation, there was a NPV reduction of 25 percent, while there was no NPV reduction on domestic debt. Past due interest was fully recognized in the offer.
Russia	The restructuring operations of Soviet-era debt held by the London Club involved a principal reduction of approximately 17 percent of total restructured debt (equivalent to 4.1 percent of GDP), with the haircut in net present value terms estimated at 44 percent (applying a 10 percent discount factor).[4] As in the case of Ecuador, past due interest was fully recognized. Russia's earlier debt operations had not involved haircuts on principal.
Moldova (2004)	Moldova's 2004 Gazprom agreement led to a substantial reduction in principal outstanding as well as in the net present value of outstanding claims (close to 60 percent). Past due interest was fully taken into account.
Argentina (2005)	The 2005 global debt exchange yielded a principal reduction of 56 percent (equivalent to 37 percent of GDP) and a NPV reduction of 75 percent. The high amounts of debt reduction were reached, in part, by not explicitly recognizing past due interest accumulated since 2002. The participation rate in the global debt exchange was 76 percent, below levels reached in other debt exchanges, and almost US$20 billion remain in arrears.[5]

Sources: IMF staff reports; and other documents.

[1] Further details are presented in Annex II.
[2] Evaluating the reduction at a higher discount rate, as done in IMF (2001), leads to a much higher debt reduction.
[3] While, in Uruguay, the debt stock remained high after the restructuring (see Section III), the authorities nonetheless chose not to propose a deeper haircut given that their primary consideration was to improve the debt profile by lengthening maturities, avoid default, and minimize contractual interference, thus aiming at a collaborative process and a voluntary exchange in an effort to support market confidence.
[4] A factor facilitating the high debt relief was the change in the obligor of many original claims (Vneshekonombank).
[5] Principal arrears and PDI recognized through end-2001.

Figure 1. Evolution of GDP Growth Around the Crisis Episodes
(in percent)



Source: WEO.

C. Debt Dynamics Around the Time of Restructuring

10. **Debt dynamics around the time of restructuring were characterized by increases in debt in the run-up to the crisis, followed by a reduction in the aftermath, but the extent of variability has differed markedly among the cases.** Figures 2 and 3 show the debt dynamics around the restructuring period for pre-emptive and post-default cases, respectively, comparing actual debt ratios to pre-restructuring, post-restructuring, and most recent projections. The figures show the build-up of public debt-GDP ratios through the crisis in each case. In most countries (Argentina, Ecuador, Moldova, Pakistan, Russia, Ukraine, and Uruguay), public debt ratios fell considerably following the crisis. The Dominican Republic's debt ratio has also started to decline following its recent crisis.

11. **The debt dynamics since the restructuring can be attributed to a number of key factors, including fiscal performance, economic growth, real interest, and exchange rates.**[21] In cases, where sufficient time has passed since the restructuring episodes, actual debt dynamics in the post-restructuring periods can be compared to staff's projections elaborated in staff reports following the restructurings.[22] Figure 4 shows a comparison of changes in debt to GDP ratios in the respective post-restructuring periods (evolution from the respective central year of restructuring until 2004) for Ecuador, Pakistan, Russia, Ukraine, and Uruguay. In a majority of cases (Pakistan, Russia, Ukraine, and Uruguay), debt dynamics were better than anticipated at the time of restructuring.[23]

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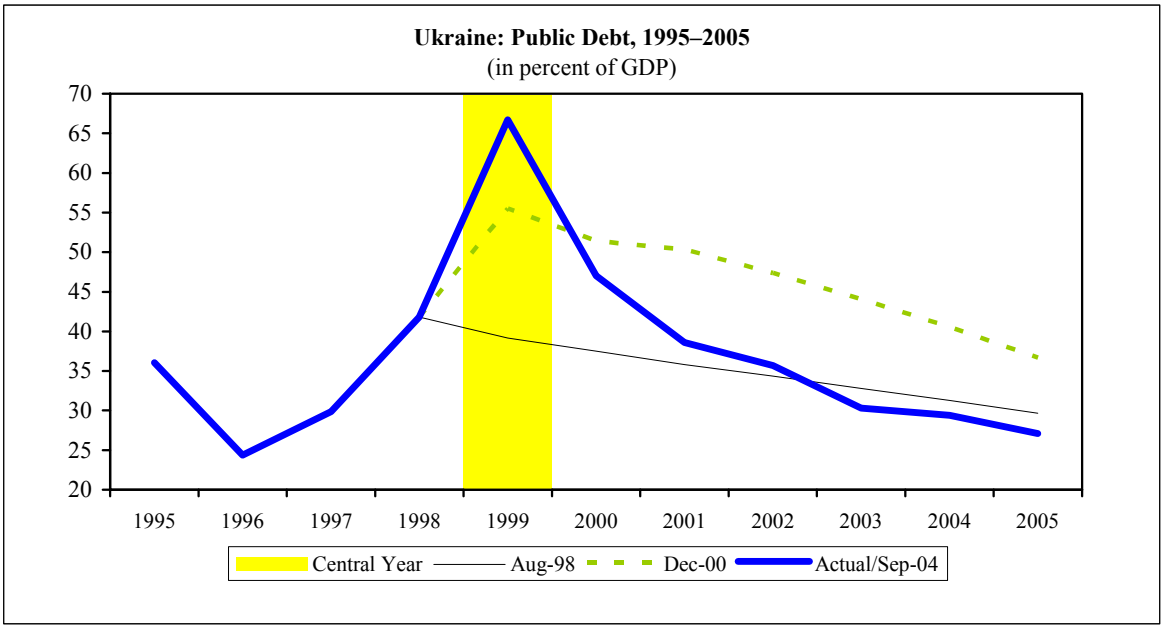
[21] Comparing the evolution of these factors with staff projections made at the time of restructuring can shed light on the reasons for relatively favorable or unfavorable debt dynamics since the restructuring (see Annex III).

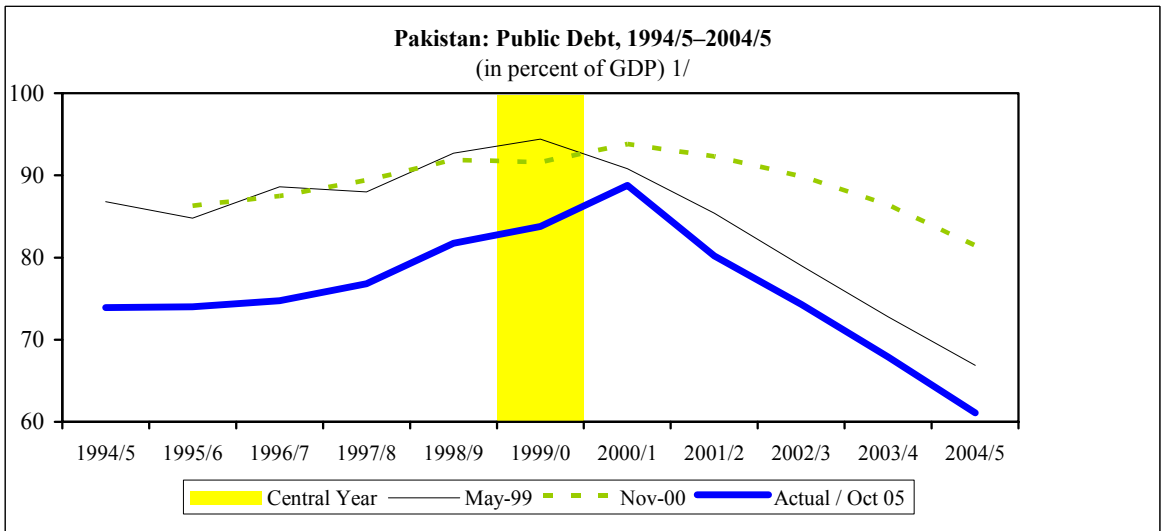
[22] This analysis is confined to comparing outcomes to Fund staff projections made after the restructurings. The staff's analysis may have differed from private sector market participants' views.

[23] Detailed specifications on the respective periods and projections are given in Annex III.

Figure 2. Evolution of Public Debt in Pre-Emptive Cases[24]



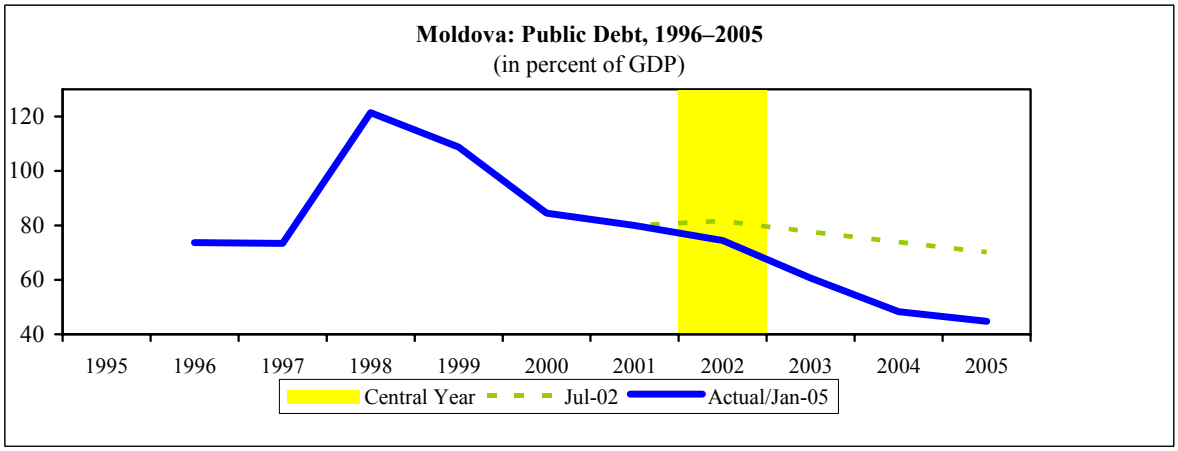
Source: IMF staff reports.



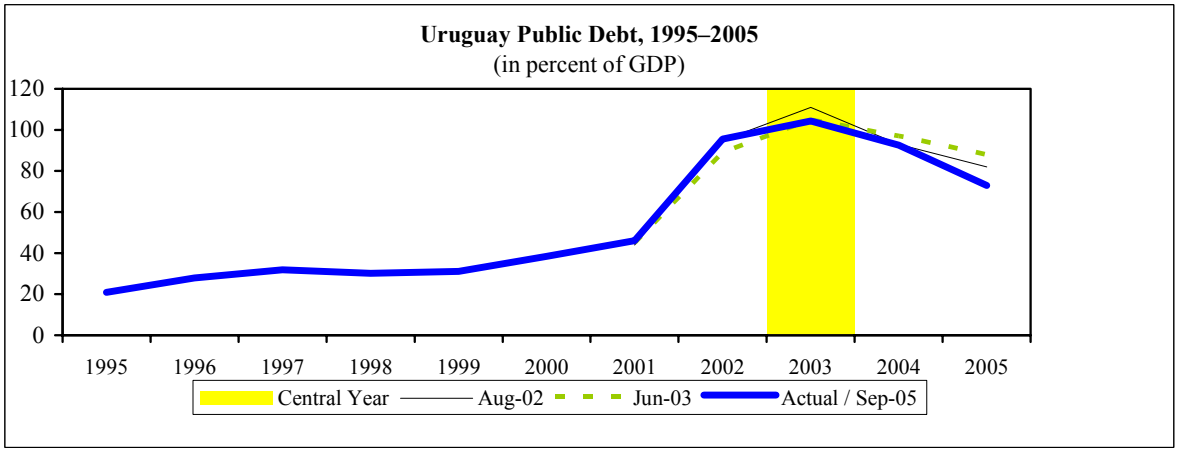
Source: IMF staff reports.
1/ October 2005 data contains a substantial upward revision of historical GDP data, leading to reduced debt/GDP ratios.

[24] Scales vary across countries reflecting differences in the range of debt levels.

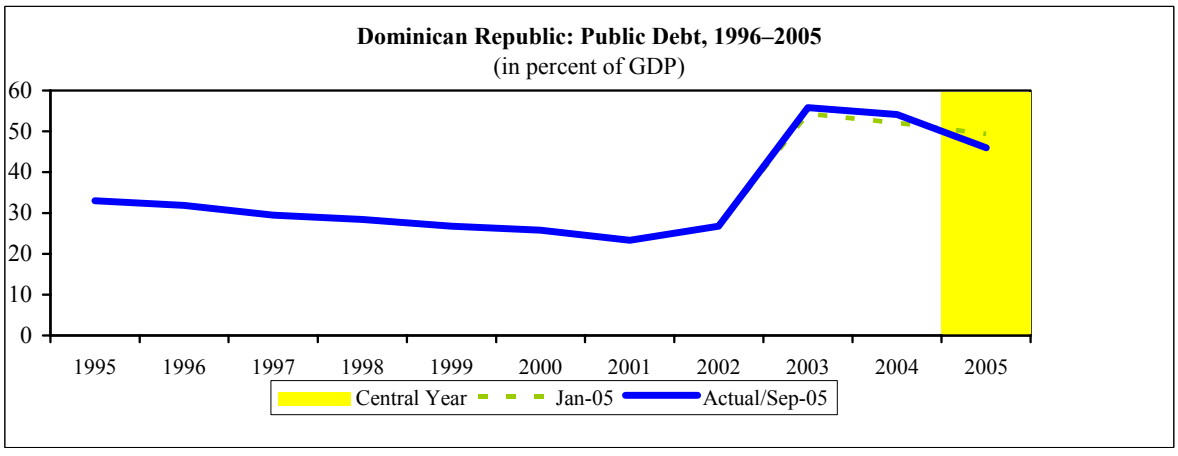
Figure 2. Evolution of Public Debt in Pre-Emptive Cases (concluded)



Source: IMF staff reports.

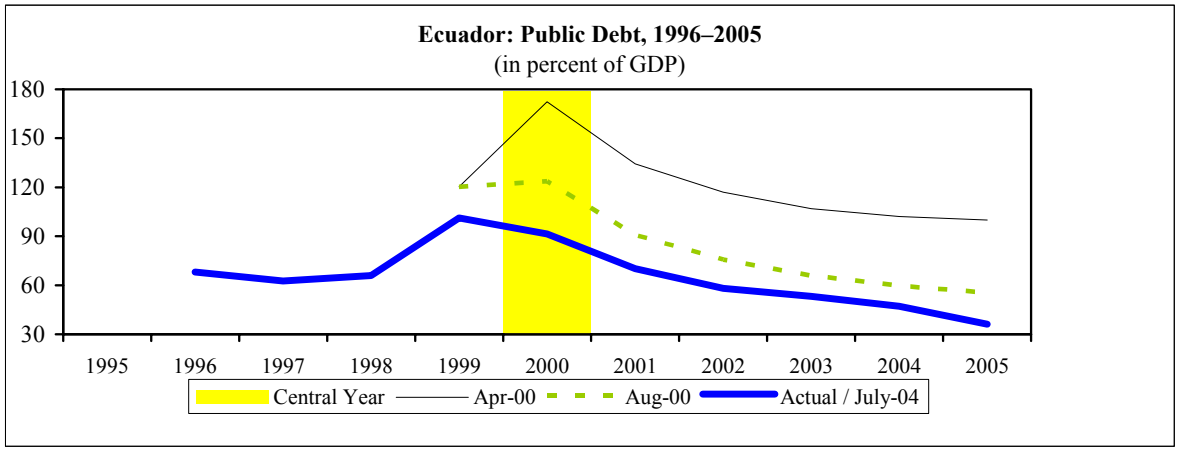


Source: IMF staff reports.

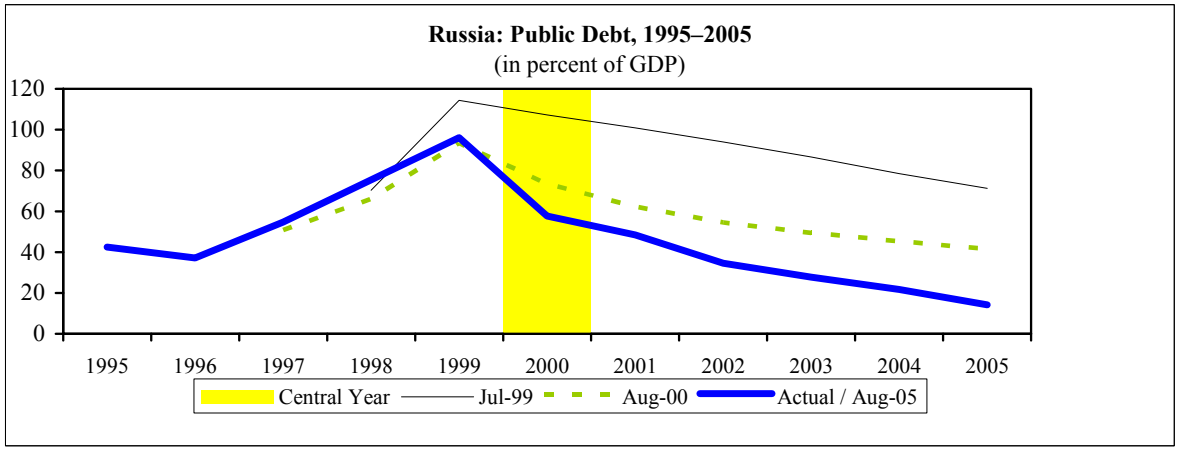


Source: IMF staff reports.

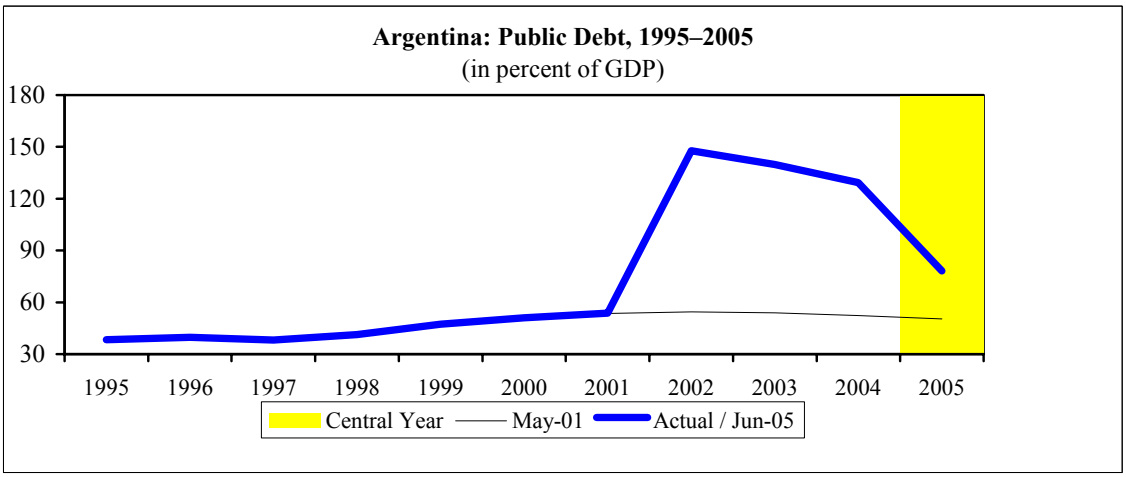
Figure 3. Evolution of Public Debt in Post-Default Cases



Source: IMF staff reports.

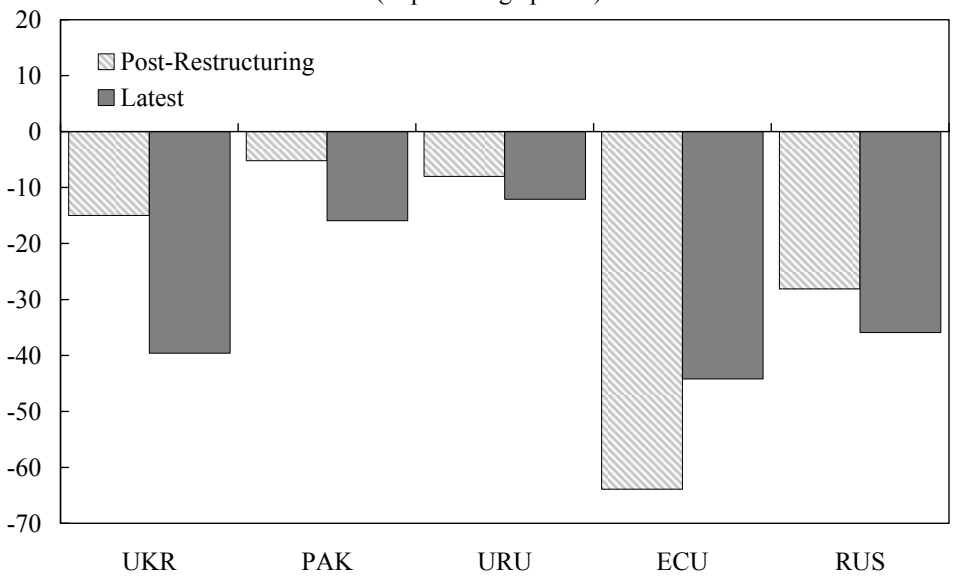


Source: IMF staff reports.



Source: IMF staff reports.

Figure 4. Change in Debt/GDP Ratios, Post-Restructuring Period
(in percentage points)



Source: IMF staff reports.

12. **A decomposition of debt dynamics sheds light on the reasons for this overperformance.** Debt dynamics as projected after the restructurings are decomposed and compared with an ex post decomposition from most recent debt sustainability assessments. Analytically, the decomposition—based on the public sector debt sustainability template for middle-income countries—helps explain the impact on the debt dynamics attributable to changes in the primary balance, the exchange rates, and the interest-growth differential (see Annex III for a detailed analysis).

13. **The analysis shows that in their post-restructuring periods, two countries (Russia and Uruguay) outperformed the primary fiscal path projected by staff following the restructurings**.[25] Three countries had firmer exchange rates than implicit in Fund projections, helping to contain the debt-GDP ratio more quickly than anticipated (Pakistan, Ukraine, and Uruguay). Moreover, in three cases (Pakistan, Russia, and Ukraine) the real interest-growth differential turned out more favorable than expected. Overall, these factors contributed to better debt dynamics than anticipated in four out of the five cases.

[25] The post-restructuring periods are defined as the periods spanning the respective year after the restructuring until and including 2004 (see Annex III).

III. Sovereign Debt Restructuring and Debt Sustainability

14. **Given the different initial conditions, scopes, and outcomes of each of the debt operations, this section attempts to examine the extent to which debt sustainability has been restored**. One needs to recognize, however, that assessing the impact of a debt operation per se on debt sustainability is difficult, as these operations took place in the context of changes in the external environment and shifts in economic policies that inter alia underpin the degree of market confidence. Against this background, this section asks whether the debt operations combined with the supporting economic policies were successful in contributing to a return to sustainability.

A. Criteria for Assessing Debt Sustainability

15. **As noted above, debt sustainability is defined as a situation in which a borrower is expected to be able to continue servicing its debt without an unrealistically large correction to the balance of income and expenditure.** Sustainability thereby encompasses the concepts of solvency and liquidity, without making a sharp distinction between them.[26] Which of these two aspects of sustainability is more relevant in making the sustainability assessment depends on the individual country circumstances. From a solvency angle, debt sustainability implies that a debtor must be able to generate sufficient funds in future periods to cover its debt-service obligations without indefinitely accumulating debt.[27] In other words, the sovereign must be able to produce a level of primary surpluses that over the medium term would maintain or lower the ratio of debt to GDP. From a liquidity angle, debt sustainability implies that the debtor must be able to find sufficient amounts of financing in each period to close any financing gaps without having to resort to disorderly adjustment.

16. **Assessing debt sustainability is highly sensitive to the assumptions concerning the projections of growth, inflation, interest, and exchange rates.** Moreover, difficulties in estimating contingent liabilities arising, for example, from the resolution of financial sector problems, add to the challenge. While some problems can be addressed by sensitivity analysis, including in the context of standardized alternative scenarios and stress tests, the *results are necessarily subject to judgments*.[28] In addition, it needs to be recognized that the analysis of debt

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[26] See: IMF (2002a).

[27] A sovereign is perceived to be solvent if its net worth is nonnegative—if assets are equal to or exceed its liabilities. Assets and liabilities can be valued in a forward-looking context on the basis of discounted values and anticipated future flows. On this basis, solvency would imply that the sovereign must honor its intertemporal budget constraints.

[28] Recent attempts to minimize the judgmental element have focused on applying the value-at-risk approach to debt sustainability analysis (see, for example, Barnhill and Kopits, 2003). Under this approach, the maximum expected increase in the debt-to-GDP ratio over a certain period is estimated, given a predetermined probability level and a covariance matrix of historical macroeconomic data. However, given that in crisis circumstances historical relationships are often unlikely to persist, this approach again involves some element of judgment.

sustainability focuses on countries' underlying economic vulnerabilities, but does not attempt to comprehensively evaluate near-term crisis risks.

17. **Recognizing that elements of judgment and uncertainty are unavoidable, the stock of debt following a restructuring can in principle be judged as being sustainable if the probability of a recurrence of debt crisis is judged as fairly low.** At the other extreme, the debt level would be judged as unsustainable if the probability of a recurrent crisis was rather high. Between these extremes, there could be a "gray zone," a range of debt levels that would be consistent with a medium range probability of a recurrence of debt problems.

18. **To help to classify the cases into the three categories, we apply three sets of criteria, which are discussed further in the following subsections:**

- **The current debt level and vulnerabilities as estimated by an EWS.** The current level of debt measures the accumulated debt burden that needs to be serviced (see Box 1). With the help of EWS estimates, it is possible to gauge debt-related vulnerabilities based on the historical experience in a wide sample of countries. It has to be recognized, however, that EWS estimates, while useful as part of a broader analysis, should not be relied on as an exclusive metric for assessing the likelihood of debt distress (see Box 2). These estimates can shed some light on near-term vulnerabilities, but not on persistent ones that could materialize in the longer term.

- **Vulnerabilities stemming from the liquidity position.** From a liquidity perspective, a sovereign that is faced with large financing needs (including for rollovers of maturing obligations) and/or a small pool of available resources to satisfy its obligations stands an increased risk of incurring a debt service crisis.

- **Medium-term debt-related vulnerabilities.** Medium-term debt dynamics and related vulnerabilities can be gauged based on debt sustainability analysis. This analysis calculates medium-term debt projections based on estimates for key macroeconomic variables. Stress tests and alternative scenarios bring to light related vulnerabilities.[29]

B. The Current Debt Level and Related Vulnerabilities

19. **There are no clear-cut threshold levels regarding debt-to-GDP ratios that would allow classifying countries into groups of low, medium-range or high probability of crisis recurrence.** However, cross-country experience can shed some light on the relationship between debt levels and sustainability. From a sample of 55 low- and middle-income countries over the

[29] In addition to these three sets of criteria, practical key considerations for debt sustainability are the political implementation capacity and risks to sound economic policies.

Box 1. Debt Crises and the Level of Debt

In order to analyze the relationship between debt levels and the probability of debt crises, we estimate probabilities for debt crises, using lagged values of the debt-to-GDP ratio, GDP growth and the ratio of short-term external debt to GDP as explanatory variables (see Annex IV). The sample consists of 55 low- and middle-income countries, during the period 1971–2002. The pooled probit model allows for an in-sample forecast of crisis probabilities (graphically shown as the dots in Figure 1.1). We fit a polynomial through the in-sample forecasts (thick line in Figure 1.1) and show a +/- two standard-deviation band around it. From this sample, a 50 percent probability of being in debt crisis is associated with a debt-to-GDP ratio of 80 percent in the previous year. However, the standard deviation is rather substantial (18 percentage points). There is also no obvious cut-off point for the debt ratio that would allow deciding between sustainable and unsustainable debt levels, although a clear correlation is evident.

From the same dataset, we isolate the episodes of entry into debt crisis and order them by their observed debt-to-GDP ratios in the last year before entry (see Figure 1.2). Again, there do not appear to be obvious cut-off points. However, 40 (60) percent of entries into crisis in the sample occurred when debt levels in the last year before the crisis had been above 59 (39) percent of GDP. The average debt-GDP ratio in a year before crisis entry was 57 percent (compared to 47 percent in tranquil times).

Figure 1.1. Crisis Probabilities and Debt Levels

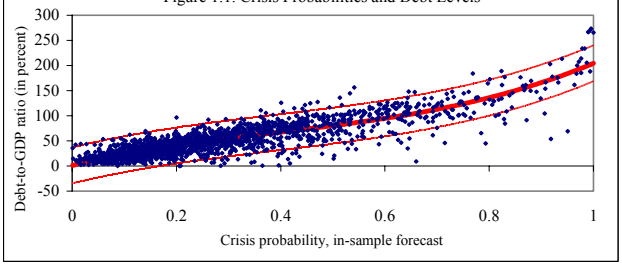
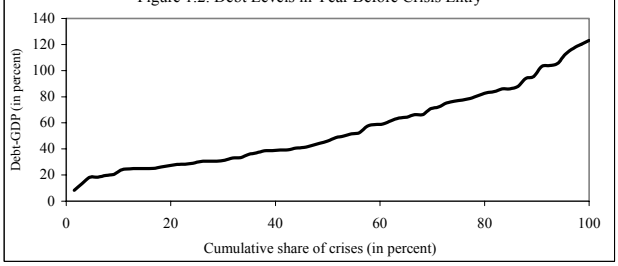


Figure 1.2. Debt Levels in Year Before Crisis Entry



Sources: WEO; and IMF staff calculations.

In addition to the debt-to-GDP ratios, other factors regarding the current indebtedness play a role in the assessment of sustainability. For countries holding substantial amounts of concessional debt, a NPV-based ratio arguably reflects more accurately the incidence of debt. Moreover, the composition of debt matters. A higher share of domestic debt tends to indicate a lower vulnerability to real exchange rate movements. Similarly, a high share of official loans in the debt portfolio is associated with lower vulnerability, as this creditor group may be more likely than others to roll over maturing claims. However, as these variables are not available for a large sample of countries and over a longer period of time, the effects on sustainability cannot easily be assessed quantitatively.

Box 2. An Early-Warning System Approach

Building on Manasse, Roubini, and Schimmelpfennig (2003), Schimmelpfennig (2003) specifies an EWS model based exclusively on data available in the WEO database. The estimation method is a binary regression (logit) with robust variance estimates for pooled data. The sample comprises of 37 low- and middle-income countries over the period 1990–2002. A country is defined to be in a debt distress if it is classified to be in default by Standard & Poor's or if it receives nonconcessional financing from the IMF in excess of 100 percent of quota. Countries can be in crisis for protracted periods.

Independent variables in the model are total external debt in percent of GDP, short-term external debt by remaining maturity as a share of official reserves, the current account balance in percent of GDP, growth of foreign exchange reserves, GDP growth, inflation volatility, as well as a dummy for hyperinflation episodes (by contrast, public debt as share of GDP is not included).[1] All coefficients show the expected sign and are statistically significant.

The EWS model fits the data well, correctly predicting 62 percent of in-sample crisis entries while sending false alarms of looming distress (Type II errors) in 12 percent of the cases. The EWS model signals heightened debt vulnerabilities when the predicted vulnerability score is greater than the in-sample frequency of crisis episodes (24.8 percent).

The model results should be interpreted with care. As noted in IMF (2003c), "identifying 'danger zones' is still more an art than a science, with a large element of judgment required." In a recent survey of a variety of EWS models developed by Fund staff and by private institutions, Berg, Borensztein, and Pattillo (2005) explained that "the advantage of EWS models lies in their objective, systematic nature. The models process data in a mechanical way and are not clouded by conventional misperceptions or biases based on past experiences." The survey found that EWS model forecasts can be statistically significant predictors of distress, with some models outperforming bond spreads, agency ratings, and analysts' risk scores. This said, the authors also concluded that the results of their survey "are mixed ... and reinforce the view that EWS models are not accurate enough to be used as the sole method to anticipate crises. However, they can contribute to the analysis of vulnerability in conjunction with more traditional surveillance methods and other indicators."

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[1] Since the ratio of public debt to GDP does not enter as an independent variable, it is not possible to use this specification to relate public debt levels with crisis probabilities.

period 1971–2002, a debt-to-GDP ratio equal to 80 percent is estimated to be associated with a 50 percent probability of a being in debt crisis the following year (see Box 1). Similarly, a debt level of 100 percent is associated with a probability of 63 percent, while a debt level of 40 percent corresponds to a rather low probability of 20 percent in the sample. Moreover, 40 percent of entries into crisis occurred when debt levels had been above 59 percent of GDP in the last year before crisis, while 60 percent of crisis episodes occurred at debt levels above 39 percent of GDP.[30] However, there do not appear to be obvious cut-off points for the range of sustainable debt, as crises have occurred at a very large range of debt ratios.

Table 8. Public Debt Ratios, 2004 1/
(in percent of GDP)

Pre-emptive cases	
Ukraine	27.1
Pakistan 2/	67.9
(NPV)	59.0
Moldova	48.3
(NPV)	53.6
Uruguay	92.5
Dominican Republic	54.1
Post-default cases	
Ecuador	47.2
Russia	21.7
Argentina	129.4

Source: IMF staff reports.

1/ 2004 is the most recent year with actual data for all countries.
2/ End of FY 2003/04.

20. **In 2004, two of the eight country cases had debt ratios in excess of 90 percent (see Table 8).** However, Uruguay's debt ratio (93 percent) has since declined (to 69 percent in 2005, somewhat faster than projected). Argentina's debt ratio (129 percent at end-2004) has been reduced substantially (to 87 percent at end-2005) following the global debt exchange. The early repurchase of all its outstanding Fund obligations (SDR6.7 billion) in January 2006 has also helped to improve the debt structure. Debt ratios in four other countries ranged between 40 percent and 70 percent (Dominican Republic, Ecuador, Moldova, and Pakistan), respectively.[31] The remaining two countries (Ukraine and Russia) had ratios at or below 30 percent.

[30] A number of recent studies look at the relation of debt levels to crisis occurrence. According to IMF (2003b), between 1970 and 2001, from a sample of 72 countries, more than half of sovereign debt crises occurred at public debt levels of below 40 percent of GDP, while about two-thirds happened at levels below 60 percent of GDP. Similarly, the World Economic Outlook (WEO, September 2003) reported that over the past 30 years, in 35 percent of sovereign debt default cases, defaults occurred at debt to GDP ratios at below 40 percent, while in 55 percent of cases the defaults occurred at levels below 60 percent. Looking at countries' external debt, Reinhart, Rogoff, and Savastano (2003) find that half of all defaults or restructurings since 1970 took place in countries with ratios of external debt to GNP below 60 percent, and that safe debt levels for individual countries can be as low as 15 percent to 20 percent, depending on the country's history of default and inflation. Similarly, Manasse, Roubini, and Schimmelpfennig (2003) find that countries with external debt greater than 50 percent of GDP are more likely to experience default episodes.

[31] Pakistan holds some of its debt on concessional terms, and in terms of net present value, its debt ratio is estimated 9 percentage points below face value. In Moldova, where debt used to be concessional on average, the net present value in 2004 exceeded its face value, indicating that the terms of its debt contracts have deteriorated for Moldova.

21. **EWS can be used to supplement the analysis of debt-related vulnerabilities.** Table 9 shows estimated vulnerability scores based on a model applied by Manasse, Roubini, and Schimmelpfennig (2003) and Schimmelpfennig (2003) (see Box 2 for a description of the methodology).[32] The model correctly predicts 62 percent of in-sample crisis entries but also sends false alarms of looming distress in 12 percent of the cases (Type II errors), underscoring that results should be interpreted carefully, and in conjunction with a menu of other indicators. The results would assign significant vulnerability scores to Argentina and Uruguay. However, Argentina's score drops considerably in 2006, as the post-exchange debt ratio enters into the projection.[33] Vulnerability scores for the remaining countries are much lower.

Table 9. EWS Vulnerability Scores
(in percent)

	2005	2006
Pre-emptive cases		
Ukraine	0.1	1.6
Pakistan /1	3.2	1.9
Moldova	4.6	4.3
Uruguay	54.6	55.4
Dominican Republic	3.0	8.3
Post-default cases		
Ecuador	16.9	13.4
Russia	1.1	1.5
Argentina	55.4	26.6
Memorandum Item		
EWS signal threshold	24.8	24.8

Source: IMF staff calculations.

1/ 2005 and 2006 columns refer to FY 2004/05 and 2005/06 respectively.

C. Vulnerabilities Stemming From Liquidity Needs

22. **Liquidity risks can stem from a country's external situation as well as from its fiscal position.** Projections for the ratio of foreign exchange reserves to short-term external debt can be used to show potential balance of payments vulnerabilities that could arise should market access deteriorate. A ratio below one implies that complete lack of market access for one year would put pressures on the balance of payments. From a fiscal perspective, gross financing needs projections show the amount of resources a sovereign needs to secure in addition to projected revenues, in order to be able to execute its planned expenditures.

[32] Vulnerability scores were estimated in October 2005 based on actual data for 2004 and projections for 2005 from the WEO database and latest staff reports. Projections were made on the basis of the model as calibrated in 2003. The model's original sample did not include Ukraine and Moldova.

[33] Argentina's 2006 vulnerability score was calculated using external debt projections at face value, based on the assumption of full creditor participation in the global debt exchange.

23. **Within the country sample, the degrees of vulnerability are widely dispersed (see Table 10).** Ecuador, Uruguay, and to a smaller extent Argentina, show substantial degrees of vulnerability in their external liquidity positions, while risks are somewhat smaller in the Dominican Republic and Moldova. By contrast, Pakistan, Russia, and Ukraine maintain rather comfortable levels of reserves. Regarding the magnitude of financing needs, risks are highest among the group in Uruguay, although with significant bond issuance in early 2006, Uruguay's near-term risks have decreased. Financing needs are in a medium range in the Dominican Republic, Ecuador, Moldova, Pakistan, Ukraine, as well as in Argentina, although in the latter case they have been reduced considerably with the full prepayment of Fund resources in early 2006. Financing needs are relatively low in Russia.

Table 10. Liquidity Indicators, 2005–06

	Reserves/ST debt 1/ (ratio)		Financing need 2/ (percent of GDP)	
	2005	2006	2005	2006
Pre-emptive cases				
Ukraine	8.3	12.0	4.4	4.1
Pakistan 3/	2.0	3.1	3.9	4.8
Moldova	1.1	1.2	5.5	4.8
Uruguay	0.6	0.6	11.9	12.3
Dominican Republic	1.5	1.7	5.3	4.2
Post-default cases				
Ecuador 4/	0.2	0.2	7.1	6.2
Russia	5.3	7.2	-4.0	-3.5
Argentina 5/	0.8	0.7	4.3	3.4

Sources: WEO; IMF staff reports; and staff calculations.

1/ Ratio of gross international reserves to short-term external debt at remaining maturity.
2/ Defined as the overall fiscal deficit, plus amorization of medium- and long-term debt, plus short-term debt at end of previous period.
3/ 2005 and 2006 columns refer to FY 2004/05 and 2005/06, respectivel
4/ Financing need projections exclude debt buybacks.
5/ Gross fiscal financing need is defined as federal overall cash balance plus federal amortization due.

D. Medium-Term Debt-Related Vulnerabilities

24. **Debt-related vulnerabilities can be analyzed based on projections of the ratio of debt to GDP over the medium term and associated stress tests.** Under the Fund's standard debt sustainability analysis, a central projection, based on a medium-term macroeconomic framework, is supplemented by a series of alternative scenarios and bound tests, showing the dispersion of debt paths under alternative sets of assumptions (see Box 3 for a description of the methodology).

Box 3. The Fund's Methodology for Debt Sustainability Analysis in Middle-Income Countries

The Fund has started to apply a standard methodology to debt sustainability analyses in middle-income countries. Based on medium-term projections for a country's macroeconomic framework, a baseline for debt dynamics is projected. In addition, a set of standardized alternative scenarios and stress tests are calculated, in an attempt to provide sensitivity analysis which is broadly comparable across countries.

The Fund's standard sensitivity tests comprise of the following: an alternative scenario uses historical averages of key variables (real GDP growth, real interest rate, primary balance), normally over a period of 10 years. The stress tests apply a two-standard deviation shock to each of these variables in turn, leaving the remaining variables as under the baseline scenario.[1]

Additional stress tests include a combined shock to all three variables of one standard deviation; a one-time 30 percent depreciation of the real exchange rate; and a 10 percent of GDP increase in debt on account of events such as realization of contingent liabilities from a financial sector restructuring. Other alternative scenarios have more recently been added, including one using a primary balance forecast assuming unchanged policies; a scenario based on forecasts for key variables obtained from the financial markets; and a country-specific shock.

Regardless of the standardization, the debt sustainability analysis still requires a considerable degree of judgment. The central projections and alternative scenarios are necessarily functions of projections for key variables, including GDP growth, real interest rates, exchange rates, and the primary fiscal balance, which cannot be made without involving a significant measure of judgment.

It should also be underscored that stress tests are normally based on 10–year historical averages and standard deviations, implying rather harsh shocks for those countries emerging from transition or having undergone large crises during that time. Against that background, judgment is necessary in evaluating the comparability of the stress tests across countries. Moreover, given the relatively small number of stress tests and their degree of dispersion (see Table 9), the empirical value of such stress tests in determining whether a case is sustainable is limited.

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[1] Based on the framework adapted in 2003 (See IMF (2003b)). In July 2005, certain changes were made to the framework, including the application of less severe shocks in the bound tests (see IMF (2005)).

25. **In all eight country cases, medium-term baseline projections tend to be somewhat below 2004 levels (see Table 11).** However, the mean of the projected debt levels of different scenarios and stress tests for each country at the end of the projection horizon is lower than the current level only in seven cases. By contrast, for Ecuador, the mean of the projections is considerably above the 2004 level. The dispersion of projected debt levels is also substantial (see last column of Table 11).

Table 11. Debt Sustainability Analysis Projections
(percent of GDP)

	Public Debt	Medium-Term Projection 1/		
	2004	Baseline	Mean 2/	STD 2/
Pre-emptive cases				
Ukraine	27.1	16.4	26.0	15.4
Pakistan 3/	67.9	45.6	49.8	5.2
Moldova 4/	53.6	26.0	24.3	8.7
Uruguay	92.5	53.6	70.7	14.3
Dominican Republic	54.1	37.6	44.7	6.1
Post-default cases				
Ecuador	47.2	41.7	57.4	13.8
Russia	21.7	7.3	19.5	9.8
Argentina	129.4	56.9	80.9	18.9

Sources: IMF staff reports; and staff calculations.

1/ For 2010, except Ukraine (2009) and Pakistan (2009/10). Data is based on 2003 DSA framework, except for Pakistan, Russia, and Uruguay, which use the 2005 framework (see Box 3).
2/ Mean and standard deviation (STD) of scenarios and bound tests.
3/ Public debt in 2004 refers to 2003/04.
4/ Moldova's DSA is expressed in terms of net present value.

26. **A closer look at the cases sheds further light on medium-term debt-related vulnerabilities**:

- *Ukraine*. Under the baseline scenario in the most recent debt sustainability analysis, debt is projected to decline from 27 percent of GDP in 2004 to 16 percent by 2009.[34] The alternative scenarios and bound tests show that some vulnerabilities remain, but only one scenario (combining a shock to GDP growth with a relaxation of the primary balance) would imply a steadily increasing debt ratio, while all others see the debt ratio temporarily increasing to at most 39 percent (see Figure 5).

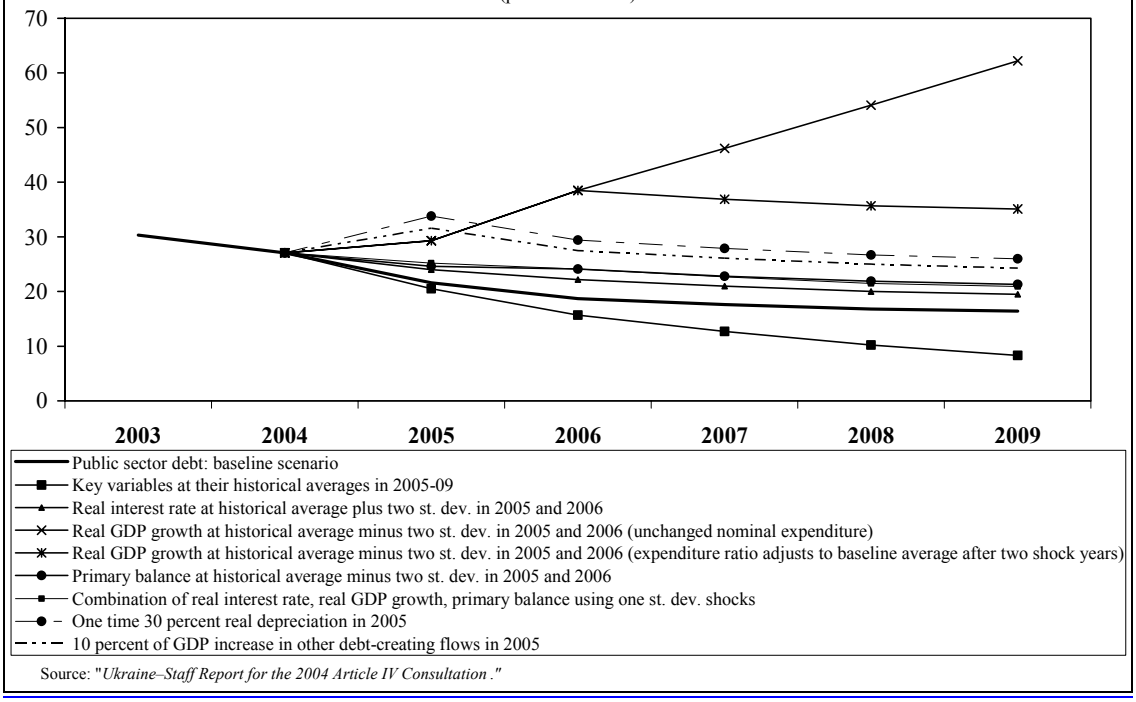
- *Pakistan*. Figure 6 shows that under the baseline scenario, debt is projected to decline from 68 percent in 2003/04 (equivalent to 59 percent in terms of net present value) to 46 percent.[35] [36] This projection is based on the assumption that on average, primary deficits of 0.4 percent of GDP will be maintained over the projection horizon (2009/10), substantially below the average primary surplus achieved over the preceding four years (1.7 percent). The stress tests show that the applied shocks would not lead to explosive debt paths, with even the most adverse scenario (a one-time 30 percent real depreciation

[34] See *"Ukraine—Staff Report for the 2004 Article IV Consultation."* Available on the IMF public website at http://www.imf.org/external/pubs/ft/scr/2005/cr0515.pdf.

[35] Debt projections are based on revised GDP statistics.

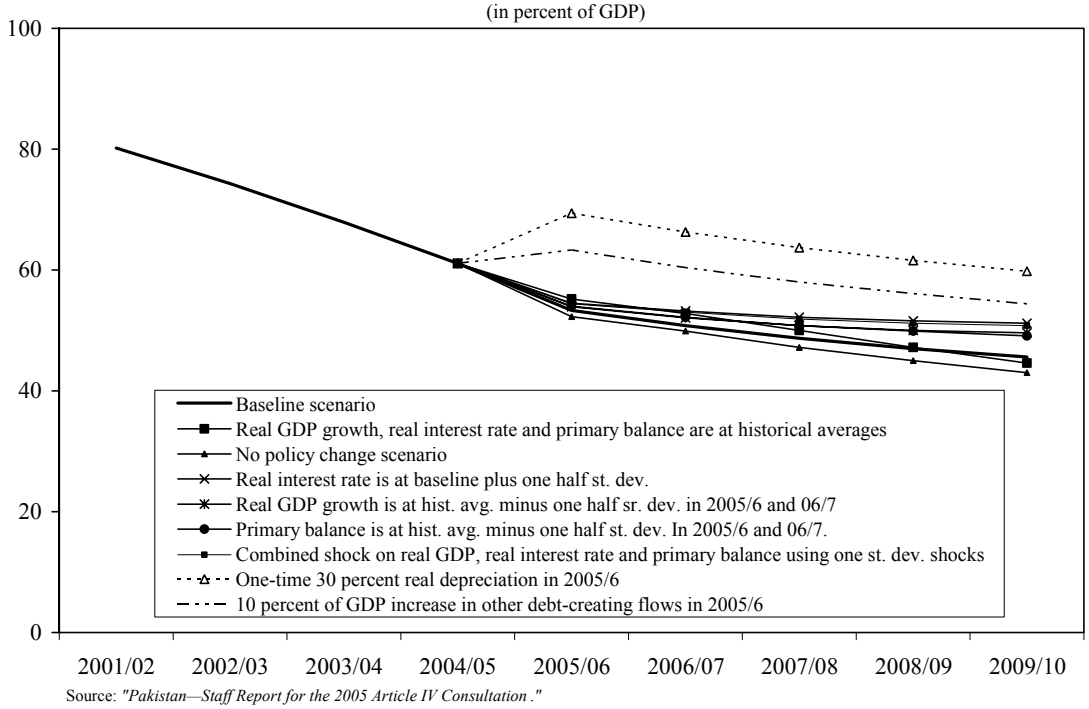
[36] See *"Pakistan—Staff Report for the 2005 Article IV Consultation."* Available on the IMF public website at http://www.imf.org/external/pubs/ft/scr/2005/cr05409.pdf.

Figure 5. Ukraine: Debt Sustainability Analysis, 2003–09
(percent of GDP)



Source: "*Ukraine–Staff Report for the 2004 Article IV Consultation .*"

Figure 6. Pakistan: Debt Sustainability Analysis, 2001/02–09/10
(in percent of GDP)



Source: *"Pakistan—Staff Report for the 2005 Article IV Consultation ."*

in 2005/06) leading, after a temporary increase to 69 percent, to a steady decline in the ratio to 60 percent by 2009/10.

- *Moldova.* Under the baseline scenario, debt is projected to decline from 54 percent in 2004 to 26 percent by 2010.[37] The projection is based on assumed primary deficits in the order of ½ percent of GDP, implying a loosening compared to a 2001–04 average surplus of 2.2 percent (see Figure 7).[38] The alternative scenarios and bound tests point to limited risks, with 2010 projected debt substantially below 2004 levels in all simulations. Only one bound test, a one-time 30 percent real depreciation in 2005, would lead to a temporary increase in the debt ratio to above 60 percent.

- *Uruguay.* The baseline scenario projects a steady decrease in the debt ratio from 93 percent in 2004 to 54 percent by 2010, contingent on sustained primary surpluses of 3.5–4 percent of GDP. While this would not imply substantial tightening relative to the 2004 outcome (3.8 percent), it would nonetheless require sustained fiscal discipline, against a background of substantially lower surpluses in recent years (0.1 percent during 2000–03).[39] The scenario also does not factor in the projected fiscal contingent liabilities associated with restructuring of the public banks, which could add up to 5 percentage points to the debt ratio by 2010.[40] The stress tests confirm that significant vulnerabilities remain. A one time 30 percent real depreciation would raise the debt ratio to 104 percent by end–2006, from where it is projected to recover slowly, while a scenario based on 10–year historical averages would set the debt ratio on a steadily increasing path (see Figure 8).[41] However, vulnerabilities are mitigated by the reduced rollover risk brought by the lengthening of maturities in connection with the debt restructuring.[42]

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[37] The Moldovan DSA is expressed in terms of net present values. The face value debt to GDP ratio is projected to decline from 48 percent in 2004 to 39 percent in 2010. The bound tests are based on one standard deviation shocks rather than the standard two-standard deviation shocks.

[38] See *"Republic of Moldova—Staff Report for the 2004 Article IV Consultation."* Available on the IMF public website at http://www.imf.org/external/pubs/ft/scr/2005/cr0548.pdf.

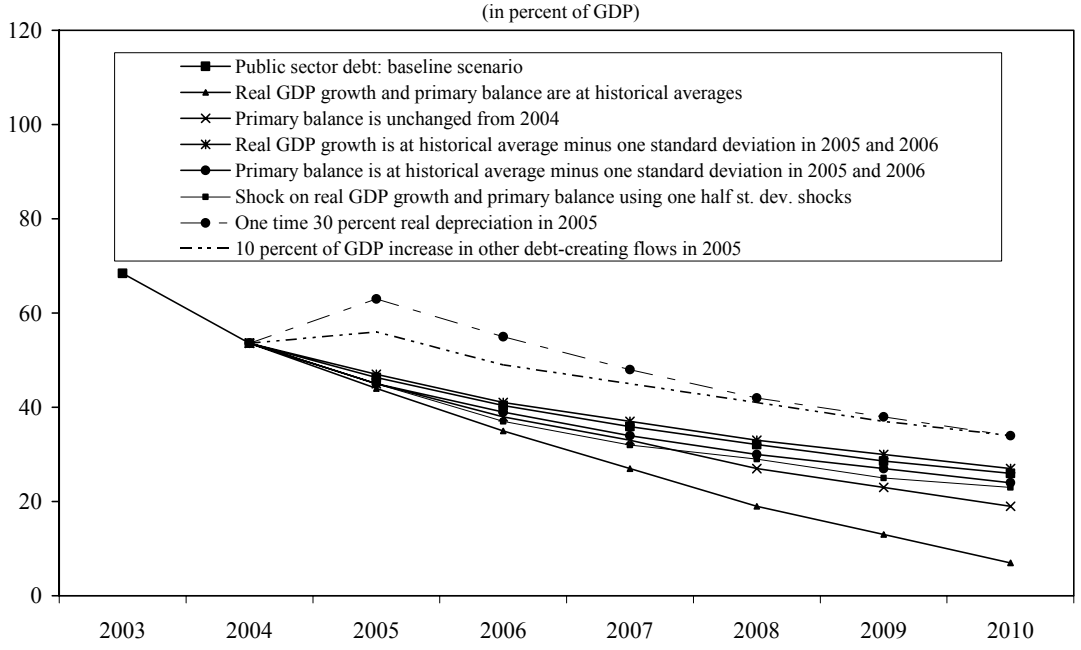
[39] See *"Uruguay—First Review Under the Stand-By Arrangement, and Request for Modification of Performance Criteria."* Available on the IMF public website at http://www.imf.org/external/pubs/ft/scr/2005/cr05431.pdf .

[40] Depending on various factors, including the amount of recovery of nonperforming loans, the actual amount may be smaller.

[41] In addition to standard stress tests, staff also present less severe shocks, which are projected to keep the debt-to-GDP ratio on a declining path (*"Uruguay—First Review Under the Stand-By Arrangement, and Request for Modification of Performance Criteria"*, op cit).

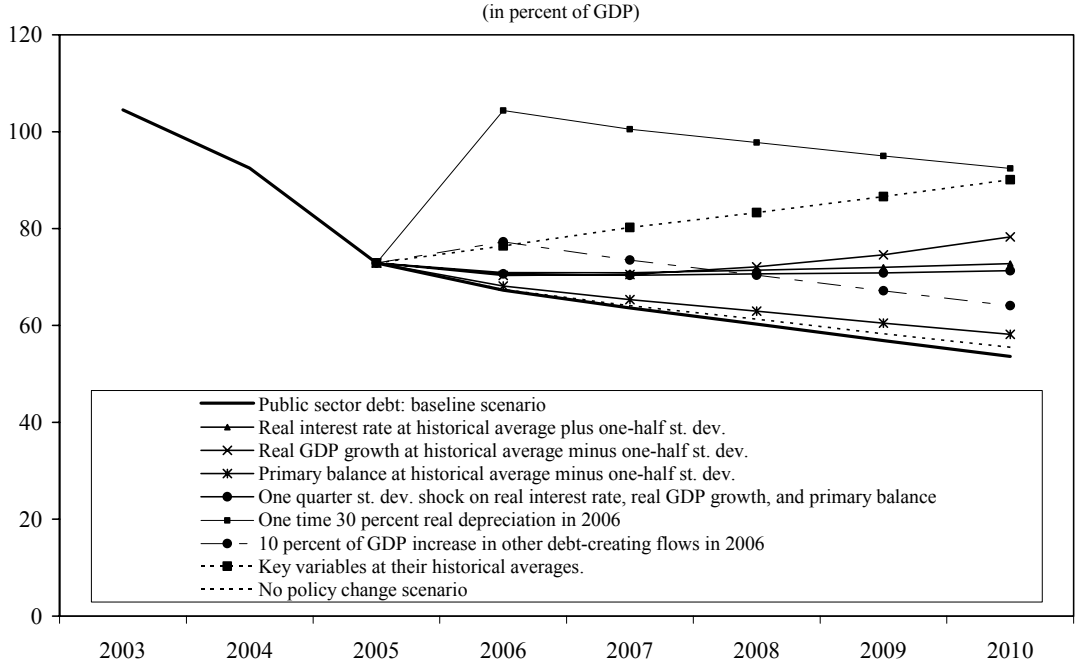
[42] Uruguay also restored access to private financial markets soon after the restructuring.

Figure 7. Moldova: Debt Sustainability Analysis, 2003–10
(in percent of GDP)



Source: *"Republic of Moldova--Staff Report for the 2004 Article IV Consultation ."*

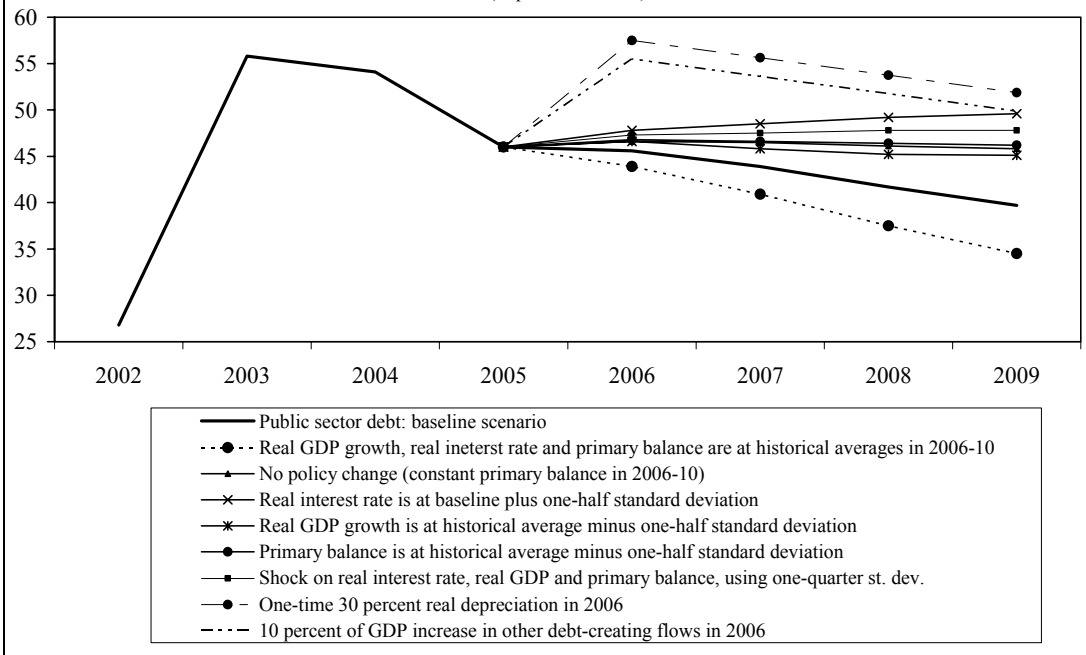
Figure 8. Uruguay: Debt Sustainability Analysis, 2003–10
(in percent of GDP)



Source: *"Uruguay--First Review under the Stand-By Arrangement, and Request for Modification of Performance Criteria."*

- *Dominican Republic*. Under the baseline scenario, public debt is projected to fall from 54 percent in 2004 to 38 percent in 2010 (see Figure 9). The scenario is conditional on achievement of primary surpluses of between 0.8 percent and 2.5 percent of GDP, implying a substantial fiscal consolidation from recent years: during 2001–04, the Dominican Republic posted an average primary deficit of 1.8 percent of GDP. The sensitivity tests show that some vulnerabilities remain: two scenarios, featuring a one-time real depreciation of 30 percent and a 10 percent increase in other debt-creating flows would push the debt ratio again temporarily to above 55 percent. However, most other scenarios project roughly steady or slightly falling debt ratios.

Figure 9. Dominican Republic: Debt Sustainability Analysis, 2002–09
(in percent of GDP)



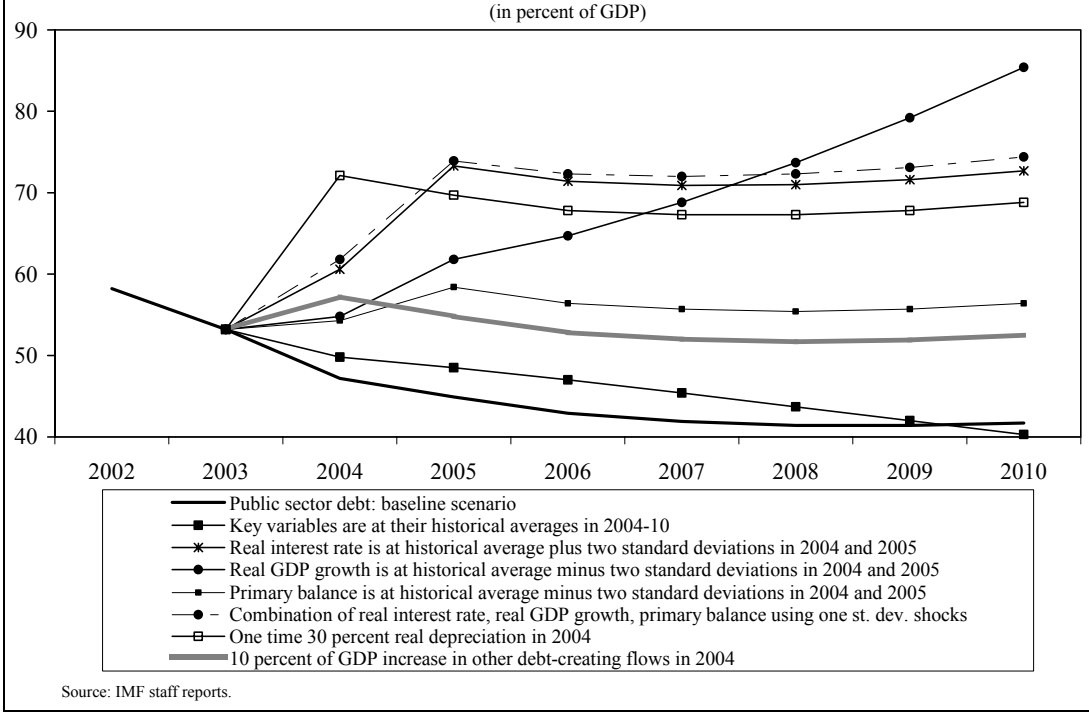
Source: IMF staff reports.

- *Ecuador*. Figure 10 shows that under a baseline scenario the debt ratio would decline from 53 percent in 2003 to 42 percent by 2010. The scenario is based on the continuation of sizeable primary surpluses (2–5 percent range), which would be consistent with recent experience (from 2000–03, the primary surplus averaged 5.3 percent), although recent political developments have increased uncertainty to the outlook.[43] The sensitivity tests show that vulnerabilities are pronounced. Under a number of the standardized stress tests,

[43] The debt sustainability analysis is based on a passive scenario that assumes limited success in pushing through substantial policy initiatives.

debt would stabilize only at a substantially higher ratio of around 70 percent. Moreover, a shock to GDP growth would lead to a sharply rising debt path.

Figure 10. Ecuador: Debt Sustainability Analysis, 2002–10
(in percent of GDP)



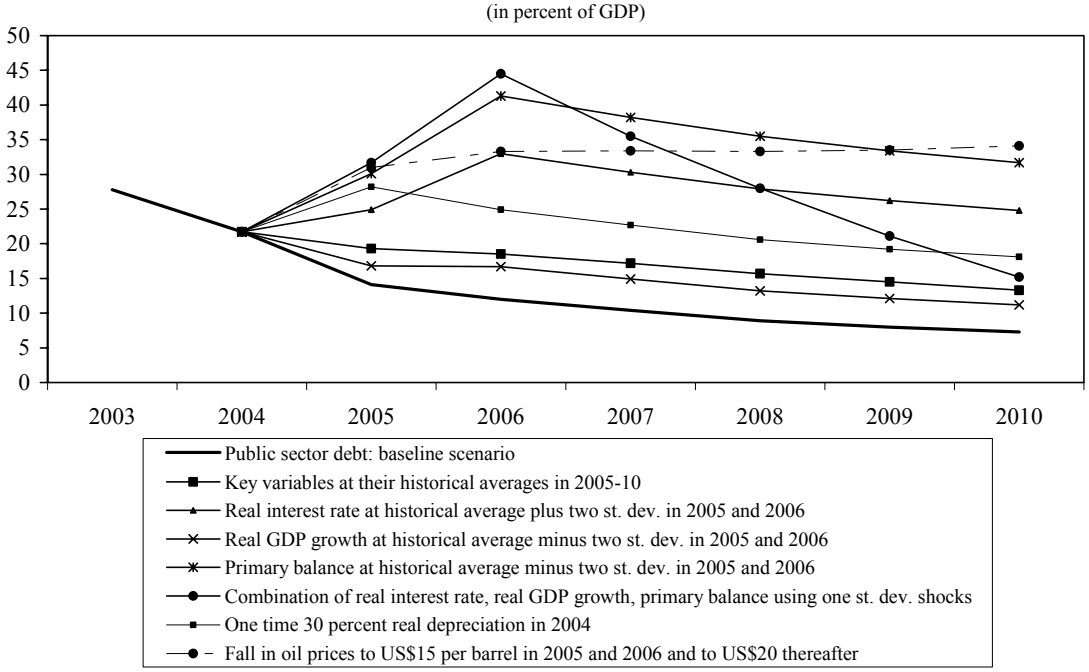
Source: IMF staff reports.

- *Russia*. Russia's debt as a share of GDP is projected to fall from 22 percent in 2004 to 7 percent in 2010 under a baseline scenario, conditional upon primary surpluses in the 5–9 percent range, facilitated by favorable petroleum prices (during 2001–04, the primary surplus averaged 4.3 percent).[44] Limited vulnerabilities remain, as evidenced by the stress tests (see Figure 11). A marked fall in oil prices as assumed under one of the stress tests would lead to steadily increasing debt ratios, reaching 34 percent by 2010. Two other applied shocks would each lead to a debt to GDP ratio of above 40 percent by end–2006, from where it would start falling gradually. However, as the stress tests are based on 10–year historical averages and standard deviations, they are based on a historical period which comprises the difficult transition years. This results in unusually harsh shocks: for instance, a shock to GDP growth using the historical average less two standard deviations implies considering an annual decline in real GDP of 8.1 percent for two consecutive years (compared to, for example, a fall of 4.2 percent in Ecuador). Despite such harsh

[44]See *"Russian Federation—Staff Report for the 2005 Article IV Consultation."* Available on the IMF public website at http://www.imf.org/external/pubs/ft/scr/2005/cr05377.pdf.

shocks, Russia's debt would nevertheless only exceed 30 percent in 2010 under two scenarios.

Figure 11. Russia: Debt Sustainability Analysis, 2003–10
(in percent of GDP)



Source: *"Russian Federation—Staff Report for the 2005 Article IV Consultation."*

- *Argentina.* The baseline scenario projects a decline in the debt-to-GDP ratio from 78 percent in 2005 to 57 percent by 2010, and does not yet factor in the favorable effects of the early repurchase of all outstanding Fund obligations in January 2006 on debt service obligations.[45] [46] While Argentina still needs to resolve its arrears to nonparticipating creditors, projections are based on staff's reform scenario, assuming full participation in the 2005 debt exchange, and anchored on federal primary surpluses between 3.3 percent and 3.7 percent in 2005–10.[47] These surpluses are consistent with the 2004 outcome (3.9 percent), but historically Argentina's primary surpluses have been lower (1.6 percent average in 2002–03), pointing to the sustained policy effort that will be necessary to achieve the assumed primary surpluses over the medium term. The stress

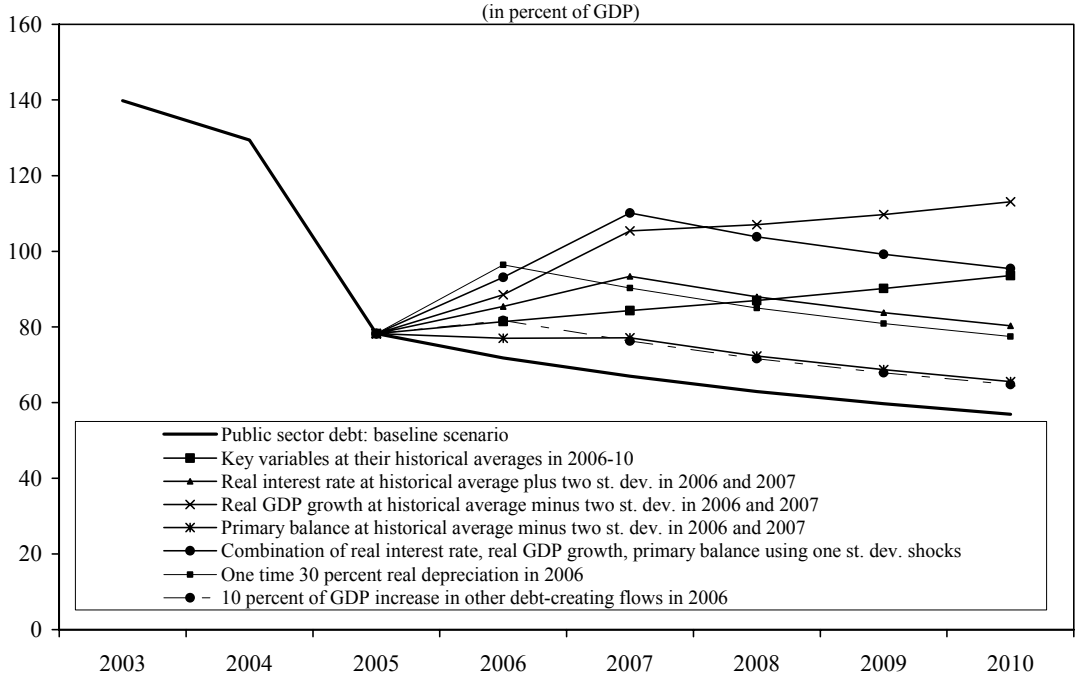
[45] See *"Argentina—Staff Report for the 2005 Article IV Consultation."* Available on the IMF public website at http://www.imf.org/external/pubs/ft/scr/2005/cr05236.pdf.

[46] Last January, the federal government refinanced the prepaid Fund resources, mainly with a 10-year low-interest compensation bond held by the central bank.

[47] Consolidated primary surpluses over this period range from 4 percent to 4.5 percent, respectively.

tests point to remaining risks to debt sustainability (see Figure 12). However, it should be recognized that the standardized calibration method of the DSA stress tests, which is based on 10-year historical averages and standard deviations (see Box 3), may lead to the simulation of very large shocks in the case of Argentina. Given the high volatility of growth during that period and the very severe contraction of output experienced in 2001/02, the calibration, for instance, implies a simulation of a decline in growth by 12.3 percent in 2006 and 2007, compared to robust growth projections in the baseline scenario. This large GDP shock as well as a pronounced joint shock on the interest rate, the GDP and the primary balance would imply an increase in debt to more than 100 percent by 2007.[48] A scenario based on historical averages as well as the GDP shock scenario would imply continuously rising debt ratios through 2010.[49]

Figure 12. Argentina: Debt Sustainability Analysis, 2003–10
(in percent of GDP)



Source: *"Argentina--Staff Report for the 2005 Article IV Consultation."*

[48] The GDP shock scenario assumes real GDP growth in 2006 and 2007, at its ten-year historical average less two standard deviations. The joint shock scenario assumes real interest rates at historical averages plus one standard deviation, and real GDP growth and the primary balance at historical averages minus one standard deviation, in 2006 and 2007.

[49] The scenario based on historical averages assumes real GDP growth, real interest rates and the primary balance at historical averages during 2006–10.

E. Summary for the Eight Countries

27. **Based on the above analysis, medium-term vulnerabilities appear low in Pakistan, Russia, and Ukraine, and in the medium range in Argentina, Dominican Republic, Ecuador, and Moldova. A considerable degree of vulnerability remains in Uruguay (see Table 12)**.

- In *Russia* and *Ukraine*, relatively low debt levels and EWS vulnerability scores, comfortable reserve coverage, manageable financing needs, and favorable DSA projections point to overall low solvency and liquidity crisis vulnerabilities. *Pakistan's* crisis vulnerability can also be characterized as relatively low: while its debt level is substantially higher than Russia's or Ukraine's, its composition of debt—of which only a small fraction is owed to commercial creditors—makes it less vulnerable to swings in market confidence, and the relatively low risk implied in the DSA projections, low EWS vulnerability scores, and relatively favorable liquidity indicators suggest that overall, Pakistan's debt vulnerabilities are limited.

Table 12. Debt Sustainability Indicators

	Debt level in 2004 (percent of GDP)	EWS vulnerability score (in percent)		Reserves / short-term debt (ratio)		Financing need (percent of GDP)		DSA projections 1/ (percent of GDP)			Assessment of debt vulnerability
		2005	2006	2005	2006	2005	2006	Baseline	Mean 2/	STD 2/	
Pre-emptive cases											
Ukraine	27.1	0.1	1.6	8.31	11.98	4.4	4.1	16.4	26.0	15.4	low
Pakistan 3/	67.9	3.2	1.9	1.97	3.07	3.9	4.8	45.6	49.8	5.2	low
Moldova 4/	53.6	4.6	4.3	1.05	1.16	5.5	4.8	26.0	24.3	8.7	medium
Uruguay	92.5	54.6	55.4	0.59	0.59	11.9	12.3	53.6	70.7	14.3	high
Dominican Republic	54.1	3.0	8.3	1.51	1.72	5.3	4.2	37.6	44.7	6.1	medium
Post-default cases											
Ecuador	47.2	16.9	13.4	0.23	0.22	7.1	6.2	41.7	57.4	13.8	medium
Russia	21.7	1.1	1.5	5.28	7.24	-4.0	-3.5	7.3	19.5	9.8	low
Argentina 5/	129.4	55.4	26.6	0.78	0.72	4.3	3.4	56.9	80.9	18.9	medium

Sources: IMF staff reports; and staff calculations.

1/ For 2010, except Ukraine (2009) and Pakistan (2009/10).
2/ Mean and standard deviation (STD) of scenarios and bound tests in final year.
3/ Net present value of debt-to-GDP ratio in 2003/04: 59 percent.
4/ Debt levels and DSA projections are expressed in terms of net present value.
5/ Post restructuring debt level is 78.2 percent (end-2005 projection based on assumption of full creditor participation in the debt exchange).

- Vulnerabilities in *Argentina*, *the Dominican Republic*, *Ecuador,* and *Moldova* can be characterized as in the medium range. In this group, debt levels, EWS vulnerability scores, and financing needs are generally higher than in the low vulnerability group, reserve coverage is lower, and DSA projections tend to indicate higher risks. In Argentina, nonparticipating creditor claims are still in arrears.

- In *Uruguay*, while short-term risks have already been significantly lessened, considerable vulnerabilities remain. While on a declining trajectory, the debt level is still high, and liquidity indicators point to remaining challenges. However, near-term risks have been

reduced as a result of generally favorable external financing conditions and of the Fund arrangement remaining on track.[50]

28. **Developments in sovereign debt markets and credit ratings lend some support to the above analysis.**

Liquidity conditions in international bond markets have been very favorable in recent years—the overall EMBI Global spread fell from 1000 basis points (bps) in late 2001 to below 240 bps in December 2005—making it somewhat difficult to extract inferences from country spread movements. However, spreads on sovereign debt issuance by Russia, Ukraine, and Pakistan indicate that market confidence has returned following the resolution of their respective crises, with spreads having fallen below the EMBI Global in these countries (see Figure 13). Spreads in the Dominican Republic and Uruguay have also fallen considerably since the height of the crises, while improvements in sovereign spreads have been less systematic in Ecuador. The spread on Argentina's sovereign debt remained extraordinarily high until mid-2005, but fell to below 500 bp shortly after the Global Debt Exchange, and has declined further since then.[51]

- Credit ratings have improved considerably in Argentina, Moldova, Pakistan, Russia, and Ukraine, while improvements in Ecuador were less pronounced.[52] Moody's has assigned a B3 rating to Argentina's foreign-currency long-term debt and applied this rating to the newly issued bonds. Moody's ratings for the Dominican Republic and Uruguay have not yet improved since the respective debt restructurings (see Figure 14). Standard and Poor's upgraded Uruguay in 2004 to B, five notches below investment grade, and raised the outlook from stable to positive in early 2006. Moreover, Standard and Poor's downgraded Ecuador in 2005 to CCC+, and assigned a B rating to the Dominican Republic after the recent bond exchange.

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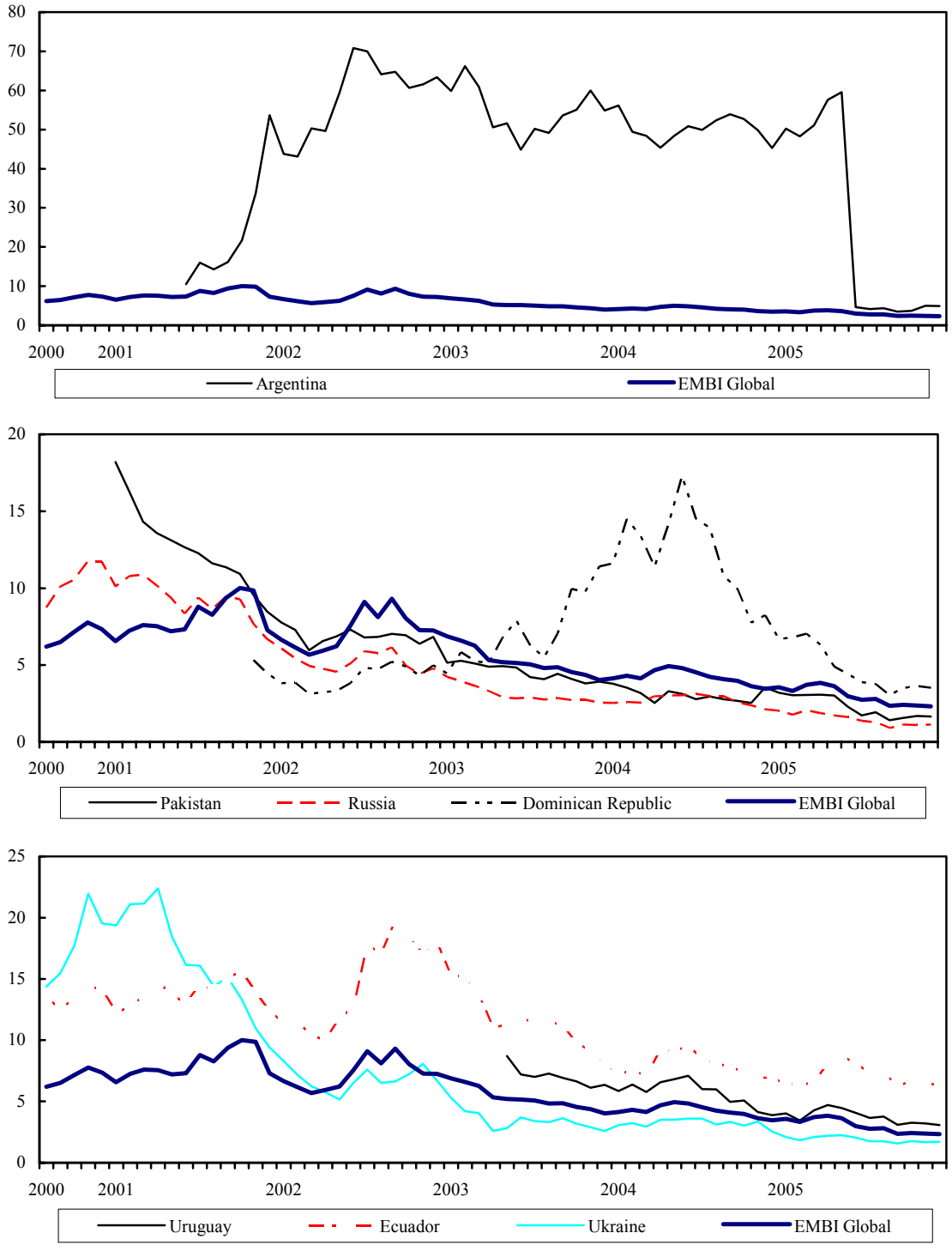
[50] This assessment is mirrored in Uruguay's *Supplementary Memorandum of Economic and Financial Policies* (March 13, 2006): "Near-term vulnerabilities have declined... Medium-term vulnerabilities, however, remain high, with the still high public debt, mainly in foreign currency and at floating rate, and large public financing needs..." (see *"Uruguay: Third Review Under the Stand-By Arrangement and Request for Modification and Waiver of Nonobservance of Performance Criteria."* Available on the IMF public website at http://www.imf.org/external/pubs/ft/scr/2006/cr06197.pdf).

[51] Spread data for Moldova are not available.

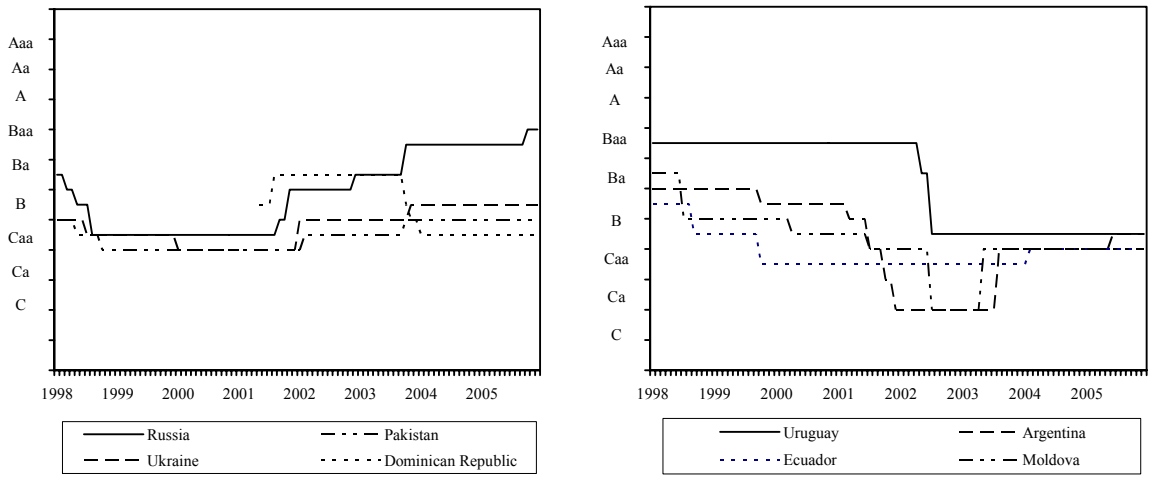
[52] Except for Russia (Baa2), none of the cases has been rated as investment grade since the respective debt operations.

Figure 13. Sovereign Spreads of Restructured Bonds, 2000–05
(Spreads over comparable U.S. Treasuries, in percentage points)



Source: Bloomberg.

Figure 14. Moody's Sovereign Credit Ratings, 1998–2005
(Ratings for long-term foreign currency borrowing)



Source: Bloomberg.

IV. CONCLUSIONS

29. **The purpose of this paper was to review recent experience with the restructuring of sovereign debt owed to private creditors**. The focus has been to try to determine whether the objective of restoring sustainability has been achieved. Three broad criteria have been applied in evaluating whether countries have succeeded in this objective: (i) the debt profile and debt vulnerability scores as estimated by an EWS model; (ii) vulnerabilities stemming from the liquidity position, as indicated by the financing needs and the level of international reserves; and (iii) medium-term debt-related vulnerabilities as presented in the sensitivity analyses of the respective DSAs.

30. **Countries that restructured pre-emptively have had diverse experiences since restructuring, with specific factors playing a prominent role.**

- Liquidity more than solvency was the issue in Ukraine and the Dominican Republic. Consequently, the focus was on debt service relief rather than debt reduction. In the case of Ukraine (classified as low vulnerability, implying that the country is currently regarded as having a low medium-term risk of a recurrent debt crisis), this appears to have been sufficient to ensure a durable exit from crisis, while in the Dominican Republic (medium vulnerability) risks regarding liquidity and debt dynamics remain.

- The scope of restructuring of private sector-held claims was too limited to have a significant impact on debt sustainability in Pakistan and Moldova. However,

reschedulings of debt owed to official creditors yielded significant debt relief for Pakistan, and moderate debt-service relief for Moldova.[53] In Pakistan (low vulnerability), this was sufficient to significantly reduce the probability of a future crisis, while vulnerabilities persist in Moldova (medium vulnerability).

- In the remaining cases, there was evidence pointing to solvency problems, yet sufficient debt relief could not be secured in Argentina (2001) and Uruguay. Argentina defaulted shortly thereafter. In Uruguay, considerable vulnerabilities remain in the aftermath of the crisis: while on a declining trend, debt remains high and the liquidity position relatively tight. However, near-term risks have been significantly reduced as a result of generally favorable external financing conditions, the build-up in international reserves, and the Fund arrangement remaining on track.

31. **None of the post-default restructuring cases is currently ranked as highly vulnerable.**

- In Russia, favorable external conditions played a key role, and the country is now classified as having a low vulnerability.

- Ecuador has been classified as a medium-vulnerability country as setbacks in domestic policy implementation have had a substantial impact on the debt dynamics, in spite of high oil prices.

- In Argentina, vulnerabilities also appear to be in the medium range, given the large stock of debt in arrears remaining after the closing of the 2005 debt exchange. Dealing with creditors that did not participate in the exchange is key to further reduce the debt burden and facilitate that access to international capital markets can be sustained in times of less favorable global liquidity conditions.

32. **The small sample of restructuring cases implies that broad conclusions are highly tentative**. Nevertheless, the recent experience suggests some differences between cases of pre-emptive and post-default restructuring:

- In all three cases where sovereign bonds were restructured after a default, there was clear evidence of solvency problems, and debt restructuring led to a sizeable reduction in principal payments and in the NPV of debt. However, the evidence in this paper has not disentangled the impact of the decision to default on incentives in negotiations from the broader economic circumstances surrounding that decision, including the more severe recessions that were endured in post-default countries.

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[53] The more substantial Paris Club reschedulings of Pakistan's public debt, particularly the concessional December 2001 ad-hoc rescheduling, had more of an impact.

- In contrast, the NPV reduction in the six countries that restructured pre-emptively was considerably smaller. The debt operations appear to have been geared to address liquidity rather than solvency concerns, even in the two cases where the evidence pointed to solvency problems. While the sample is very small, in these two cases, either the debt restructuring left significant debt vulnerabilities (Uruguay), or a crisis indeed reoccurred (Argentina).

Annex I: The Role of the Fund

1. The examined restructurings generally occurred while Fund arrangements were in place with the countries, but frequently the Fund-supported programs were off-track. All eight countries had a Fund arrangement when they restructured their public debt to external private creditors. However, Fund-supported programs with Pakistan, Ukraine, Russia, and Moldova were off-track during at least part of these restructuring episodes. Ecuador did not have a Fund-supported program prior to the restructuring of its domestic debt, but a program was agreed prior to the restructuring of external public debt. Argentina's program was on-track during the June 2001 megaswap, but went off-track soon afterwards, before the Phase I restructuring of November/December 2001. Similarly, during the 2005 global debt exchange, Argentina had a Fund-supported program which was off-track. Among the eight cases, only Uruguay and the Dominican Republic had Fund-supported programs that were on-track during the entire restructuring process (see Table I.1).

2. While the degree of detail in the fiscal and external sector projections varied, in nearly all cases the policy framework preceding the restructuring included medium-term assumptions for macroeconomic policies and the balance of payments related to the "envelope" of resources that could support an eventual agreement between sovereign debtors and their private creditors. In pre-emptive cases avoiding default, the Fund-supported programs that were in place before the restructuring were generally more specific in defining the medium-term macroeconomic framework than in post-default cases.

- For *Ukraine's* August 1998 EFF, the MEFP sketched a reserve target and the intended direction for the fiscal deficit (rather than the primary deficit) until 2001. The staff report supported this with detailed BoP assumptions through 2004 and fiscal projections through 1999, amended by an overall fiscal deficit path through 2001. Throughout the restructuring period, letters of intent were published, but not the staff reports. During the exchange offer of Eurobonds and Gazprom bonds, the Fund-supported program was off-track, and Fund management sent a letter in February 2000, describing Ukraine's macroeconomic performance and judging that the terms of the exchange offer would be consistent with financing needs of a program that could be supported by the Fund.

- *Pakistan's* December 1998 policy framework paper specified the primary balance path and reserve targets through 2002/03, while details on external financing projections were given through 2000/01. The policy framework paper was published, but the subsequent May 1999 staff report and letter of intent were not. The Fund-supported program went off-track in mid-1999, and Fund management sent a letter in November 1999, describing the macroeconomic program underlying the bond exchange and asking for support by the international community.

- In the case of *Argentina*, for the May 2001 SBA review, the MEFP specified a fiscal path by referencing the Fiscal Responsibility Law, which required the federal budget to be balanced by 2003 but did not set out specific primary balance targets. The staff report presented the full fiscal table through 2001 as well as a fiscal below-the-line presentation and full balance

of payments table through 2006. The May 2001 staff report was published, but for the August 2001 review, only the MEFP was made public. In September, the Fund approved an augmentation of Argentina's Stand-By Arrangement by approximately US$8 billion to about US$22 billion. US$3 billion of this augmentation could be used to support a voluntary and market-base operation by Argentina to increase the viability of its debt profile. The Fund-supported program went off-track before the Phase I restructuring. The Fund approved and fully disbursed an eight-month SBA in January-August 2003 (SDR 2.2 billion or 103 percent of quota), following which a three–year SBA (SDR 9 billion or 424 percent of quota) was approved in September 2003. Subsequent to the second review, which was completed in March 2004, no further reviews were completed under that program. The staff report for the second review was published, and contained fiscal and balance of payments projections through 2004, but not for the medium term. Fund management did not send letters supporting the Argentine debt operations.

- For *Moldova's* July 2002 PRGF review, the MEFP specified primary balance targets for 2002 and 2003. The staff report, which was published, presented the full fiscal table through 2003 and balance of payments projections through 2010. Fund management sent a letter in April 2002, describing performance under the PRGF, which was off-track at the time, but stating that financial support, including from the private sector, would be essential for the future success of Moldova's economic program. Moldova did not have a Fund-supported program during its 2004 Gazprom debt regularization.

- In the case of *Uruguay*, the March 2002 two–year SBA contained commitments for the primary balance through 2003, supported by full fiscal and external sector projections through 2003. For the March 2003 review, the MEFP contained primary balance projections until 2005, and the staff report (published) showed full fiscal and external sector projections through 2004. Fund management sent a letter in March 2003, describing the macroeconomic program, including the primary surplus target for 2003 and the medium term, and encouraging a high participation in the exchange offer.

- For the *Dominican Republic's* 2005 debt restructuring, the MEFP contained primary balance and external reserves projections through 2006. The accompanying staff report contained full fiscal and balance of payments projections through 2007 and 2009, respectively. The MEFP was published, but the staff report was not.

- For *Russia's* 1999 17–month SBA, the MEFP did not specify a primary balance target beyond 1999, and similarly, detailed fiscal and external sector projections were only given until 1999 in the staff report. However, an overview table containing a medium-term framework until 2005 was presented. The staff report was not published, but a press release showed the primary balance target and an overview of BoP projections for 1999. At the time of the restructuring of PRINs and IANs, Russia's SBA was off-track, and Fund management sent a letter in July 2000, describing economic developments, indicating that discussions were under way that could lead to a new SBA, and judging the proposed debt exchange as warranting the support of the international community.

- *Ecuador's* 12–month SBA was approved in April 2000, thus after the rescheduling of domestic debt but before the exchange offer on external debt of July/August 2000. The MEFP (published) did not specify quantified fiscal targets beyond 2000. The staff report (not published) provided detailed fiscal and external sector tables only through 2000 but a debt sustainability analysis laid out medium-term fiscal and BoP projections. For the restructuring of external debt, Fund management sent a letter in July 2000, describing the macroeconomic program (including the fiscal deficit target for 2000), and urging the private sector to support the exchange.

Table I.1. Fund Arrangements During Recent Sovereign Debt Restructuring Episodes

Type of Restructuring	Restructuring Case	Timing of debt operation	Fund Arrangement immediately before the restructuring	Fund Arrangement following the restructuring
Pre-Emptive	Ukraine	Four rounds of restructuring between September 1998 and April 2000.	Ukraine entered a three-year EFF arrangement in September 1998 (SDR 1.6 billion, 165 percent of quota), augmented in May 1999 by SDR 274 million, or 20 percent of quota. After the August 1999 review was completed, the program went off-track.	Disbursements under the existing EFF resumed in December 2000.
	Pakistan	Exchange offer took place in November/December 1999, as required under the comparability of treatment clause for a Paris Club rescheduling.	Pakistan entered a three–year combined PRGF and EFF arrangement in October 1997, in the amount of SDR 1.1 billion (110 percent of quota). The program went off-track in July 1999.	Pakistan entered a Stand-By Arrangement in November 2000 (SDR 465 million, 45 percent of quota).
	Moldova	Initiated Eurobond restructuring in June 2002. The final agreement was signed on October 15, 2002, and became effective October 30, 2002.	A PRGF arrangement was approved on December 21, 2000, in the amount of SDR 110 million (89 percent of quota). No review was completed until July 10, 2002 (date of completion of first review).	No further disbursements were made under the PRGF.
	Uruguay	Initiated restructuring in March 2003. Following consultations with investors, the debt exchange offer was launched on April 10, 2003 and completed on May 22, 2003.	Uruguay entered a two–year (later extended by one year) SBA (SDR 0.6 billion, 194 percent of quota) in March 2002, augmented in June and August 2002 to SDR 2.1 billion (694 percent of quota). Program reviews were delayed in the second half of 2002, but reviews were completed in March and July 2003.	The program track record remained uneven after the July 2003 review, and the subsequent review was not completed until February 2004.
	Dominican Republic	Executed a debt exchange offer in April/May 2005, and reached agreements with commercial banks in October 2005.	The Dominican Republic entered a 28-month SBA (SDR 437.8 million; 200 percent of quota) in January 2005.	The first and second reviews were completed, after some delays, in October 2005.

Type of Restructuring	Restructuring Case	Timing of debt operation	Fund Arrangement immediately before the restructuring	Fund Arrangement following the restructuring
Post-Default	Ecuador	Restructuring of domestic and external obligations between October 1999 and August 2000.	After an SBA in 1994–95, Ecuador did not have an arrangement prior to the financial crisis.	During the phase of restructuring, Ecuador entered a SBA in April 2000 (SDR 227 million, or 75 percent of quota).
	Russia	Restructuring of t-bills, a MinFin bond, and Soviet-era debt to the London Club between August 1998 and August 2000.	An existing EFF, in place since 1996, was augmented in July 1998 under CFF and SRF to a total of SDR 13.2 billion (222 percent of quota) and went off-track the following month.	In July 1999, Russia entered a new 18–month SBA (SDR 3.3 billion, 56 percent of quota). The program went off-track before the first review could be completed. Russia has not had a Fund program since then.
	Argentina	Two rounds of restructuring between June and December 2001, third round in January/February 2005.	An existing SBA, in place since March 2000, was augmented in January and September 2001 to SDR 16.9 billion (800 percent of quota). After September 2001, no reviews have been completed. After a transitional SBA in January-August 2003 (SDR 2.2 billion, 103 percent of quota), a three-year SBA (SDR 9 billion, 424 percent of quota) was approved in September 2003. After the second review (March 2004), no further reviews were completed.	No reviews under the SBA have been completed since the 2005 restructuring.

Annex II. Outcomes of Recent Restructurings

Ukraine restructured treasury bill debt held by nonresidents equivalent to approximately US$300 million into a two–year zero-coupon Eurobond with an annual yield of 20 percent in September and October 1998. Subsequently, it renegotiated its debt owed to Chase Manhattan clients (US$109 million) in October 1998. The deal involved up-front cash payments of 25 percent and converted the remainder into a two–year loan carrying 16.75 percent interest and involving graduated principal payments. This was followed in August 1999 by the renegotiation of debt held by ING and Merrill Lynch, together covering US$405 million. The deal involved the negotiated rollover into other instruments, including the augmentation of existing DM Eurobonds. After this piecemeal approach proved insufficient, Ukraine launched a more comprehensive restructuring in February 2000, involving Eurobonds and Gazprom bonds with a face value of US$3.3 billion (including the recognition of past due interest) and coupons ranging from 8.5 percent to 16.75 percent. Investors were given a choice of converting their claims into either a EUR-denominated Eurobond with 10 percent coupon or a US$-denominated Eurobond with 11 percent coupon. Both bonds carried a seven-year maturity and one-year grace period. The operation was sweetened by an up-front cash payment (see Table 6). None of the Ukrainian debt treatments involved principal reductions.

Pakistan restructured US$929 million of commercial loans in 1998/99, of which US$777 million involved the rolling over of trade finance facilities on an annual basis for three years. In November 1999, Pakistan exchanged its outstanding Eurobond obligations (US$608 million) into a US$-denominated six-year Eurobond with three years grace and a 10 percent coupon. The restructuring involved a nominal increase in principal outstanding.

Argentina's June 2001 megaswap attracted about US$30 billion in outstanding government bonds. The exchange featured a reduction in near-term government debt service, however at the expense of steeply increasing liabilities in later years. It also involved a small increase in principal outstanding. Subsequently, the government announced a two-stage approach to a more comprehensive debt restructuring. During Phase I in December 2001, approximately US$41 billion in sovereign debt and US$9 billion in provincial debt was exchanged into new government-guaranteed loans featuring a reduction of interest rates to 70 percent of the contractual level (up to a maximum of 7 percent), a 17–month grace period for interest payments, and a three-year extension of maturities for those original claims maturing up to 2010. The exchange involved no reduction in principal. Before Phase II could be addressed, Argentina defaulted in late December 2001.

In January and February 2005, after three years in default, *Argentina* launched a global debt exchange offer to restructure defaulted bonds to private creditors residing both inside and outside of Argentina. Eligible for exchange were 152 different securities, amounting to a total of US$81.8 billion, including US$2.1 billion past due interest accrued through end-2001. Past due interest accrued since 2002 (around US$20 billion) was not recognized. Eleven new securities were offered in exchange, each with a detachable GDP warrant. The new securities include par bonds, which are not subject to a haircut on nominal principal, quasi par bonds with a principal haircut of 30 percent and discount bonds with a principal

reduction of 66 percent. The new bonds differ in their repayment structures (grace periods between 21 years and 33 years, maturity between 30 years and 42 years), coupon structures (step-up structures on the par and discount bonds, fixed rate of 5.57 percent on the quasi par bonds), interest capitalization provisions, and cash sweeteners, which were designed to yield approximately equal net present value reductions.

Moldova employed a piecemeal debt restructuring strategy. In March 2000, agreements were reached with Dresdner Bank to cancel government-guaranteed debt, and with Hewlett-Packard to reschedule US$22.6 million in government guarantees over six years. In May 2000, a government guarantee to the Italian company TMCI Padovan (US$1.9 million) was restructured with a nine–year amortization schedule, and in August 2000, government guarantees worth US$4.6 million to the German company AKA were restructured over 15 years, with five years grace period. Arrears to Gazprom were cleared by issuance of promissory notes and by agreement on a debt-equity swap in early 2001. Moldova's Eurobond exchange was the smallest exchange of the cases considered, covering US$39.7 million in outstanding principal of a single Eurobond. The restructuring was unique given that 78 percent of the outstanding principal was held by a single asset management company. Restructuring negotiations started in June 2002, an agreement in principle was reached in August 2002, and the agreement became effective in October 2002. Under the agreement, there was a US$2.55 million principal reduction and an upfront cash payment of US$3.97 million. The remaining obligation was restructured into a 6½–year amortizing U.S. dollar-denominated bond with back-loaded principal payments. The bond paid U.S. dollar six-month LIBOR plus 426.5 bp. In September 2003, a rescheduling agreement was reached with Dresdner Bank regarding a called guarantee of EUR 2.3 million. Principal payments were stretched over three years, and there was a NPV reduction of 3 percent (using a 10 percent discount rate). In April 2004, an agreement was reached with Gazprom for cash settlement of defaulted promissory notes. The notes with a face value of US$111 million were settled for a cash payment of US$47 million, implying a NPV reduction of 58 percent (discounted at 10 percent). In June 2004, Moldova settled refinanced lease payments (US$11.1 million) that were in default, with Hewlett-Packard. The cash settlement implied a NPV reduction of 55 percent (discounted at 10 percent).

The *Uruguayan* bond exchange in April and May 2003 involved US$5 billion in outstanding debt. Investors were given the choice between two options: the first option exchanged each existing bond for a new obligation carrying a similar coupon and a longer maturity (five years, generally, blended in some cases with a 30–year bond). The second option would offer investors longer-dated bonds, which would serve as benchmark bonds and would consequently be more liquid than bonds offered under the first option. In some cases, also under this option these bonds would be blended with 30–year bonds. The exchange resulted in a reduction of principal of US$49 million, equivalent to 1.0 percent of the exchanged bonds.

The *Dominican Republic* exchanged in April/May 2005 US$1.4 billion in two outstanding bonds into two new amortizing bonds with longer maturities (2007–11 and 2013–18). The exchange did not involve a reduction in principal and reduced the net present value of claims only marginally (1 percent), as the case was largely seen as confined to the realm of liquidity

needs. In October 2005, the Dominican Republic concluded an agreement with its London Club creditors to reschedule US$125 million in principal falling due in 2005–06. The agreement featured a maturity of five years and a grace period of three years, and the average interest rate was reduced by 2 percentage points. In the same month, an agreement was finalized with a Dutch bank to restructure US$50 million on similar terms.

In *Ecuador*, domestic debt (earning about 10.4 percent interest before the restructuring) was rolled over without a reduction of principal into seven-year bonds with two years grace period, paying LIBOR plus two percent interest rate. The defaulted external bonds were swapped into a single global US$-denominated 30-year step-up bond carrying an initial 4 percent interest rate that would increase by one percentage point per year to a maximum of 10 percent. This operation involved a principal reduction of between 0 percent and 60 percent on the different types of bonds. Bondholders were offered an option to convert this latter bond into a 12-year US$-denominated bond with 12 percent interest rate, at the price of accepting a further principal reduction of 35 percent. All in all, Ecuador received a principal reduction of nearly 40 percent on its defaulted external bonds. The deal also involved the cash payment of overdue interest obligations on the Brady bonds.

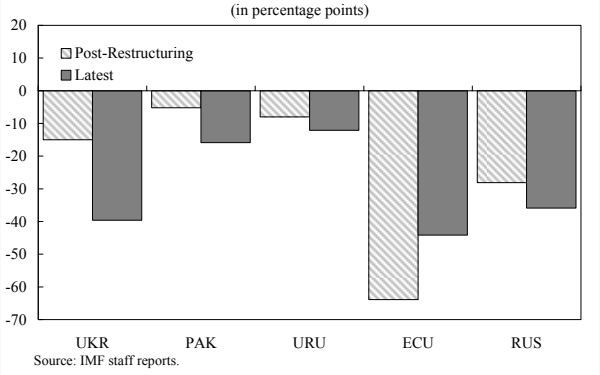
In *Russia*, the restructuring of domestic ruble debt (10.8 percent of GDP) in May 1999 involved the discounting of outstanding claims using a 50 percent discount rate. The resulting claim was exchanged into a menu of new assets: 10 percent in cash as well as three- and six-month treasury bills, 70 percent into four- and five–year bonds with coupons yielding 30 percent per annum in the first year, declining steadily to 10 percent in the final year, and 20 percent in government paper that could be used to settle tax arrears or invest in Russian enterprises. Regarding the defaulted MinFin-3 bonds, investors were allowed to exchange their claims for a combination of new foreign currency denominated eight–year bonds and four–year ruble denominated bonds at an interest rate of 15 percent in the first year and 10 percent thereafter. The Soviet-era debt owed to the London Club (US$29 billion in PRINs and IANs) was exchanged into US$21.2 billion worth of new 30-year Eurobonds with seven years grace period, paying interest of initially 2.3 percent, increasing over time to 7.6 percent. Simultaneously, past due interest on PRINs and IANs was capitalized into a ten-year Eurobond with six years grace, carrying coupons of 8.25 percent. The operation was sweetened by an up-front cash element (see Table 5). Overall, the Russian restructuring operations involved a principal reduction of approximately 4.1 percent of GDP.

Annex III. Debt Decompositions in the Post-Restructuring Phases

This Annex provides an analysis of the comparison between actual debt dynamics of the country cases in their respective post-restructuring periods with staff's projections made in the staff reports following the restructurings. Since this analysis requires at least one year of post-restructuring period, it is confined to cases that completed their restructurings prior to 2004 (Ecuador, Pakistan, Russia, Ukraine, and Uruguay).[54]

The comparison of the evolution of the debt-to-GDP ratio in the post-restructuring period (from the respective central year of restructuring until 2004) relative to Fund staff projections shows that in a majority of cases (Pakistan, Russia, Ukraine, and Uruguay), debt dynamics fared better then anticipated (see Figure III.1). Only in the case of Ecuador did debt decline by less than had been anticipated in the aftermath of the restructuring.

Figure III.1. Change in Debt/GDP Ratios, Post-Restructuring Period
(in percentage points)



Source: IMF staff reports.

The reasons for deviations from the projected paths can be analyzed by decomposing the debt dynamics into contributions by the primary balance, the interest-growth differential, the exchange rate, and other identified debt-creating flows, capturing any changes in public sector liabilities that are not reflected in the fiscal balance.[55] [56] Comparisons of the decomposition of the debt dynamics are made difficult by the fact that around the time of the examined restructurings, many staff analyses and reports did not show the full set of assumptions necessary to compute the decomposition. In these cases, reasonable assumptions were added to the set of published variables to complement the dataset.

Table III.1. shows such decompositions for the five-country cases during their respective post-restructuring periods (showing cumulative contributions from the year after the restructuring until 2004), comparing projections made in the staff reports following the restructurings ("Post-" columns) with actual outcomes or latest estimates ("Latest") columns.

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[54] This analysis is confined to comparing outcomes to Fund staff projections made after the restructurings. The staff's analysis may have differed from private sector market participants' views.

[55] These may include, for example, the cost of bank recapitalization following a financial sector crisis, or principal reduction during a restructuring.

[56] The decomposition and methodology is described in more detail in IMF, 2002a.

From the decomposition, it appears that only a minority of countries (Russia and Uruguay) outperformed the primary fiscal path projected by staff following the restructurings, whereas in the case of Ecuador, and to a smaller extent also in Pakistan and Ukraine, the primary balance was worse than projected (see Figure III.2).[57] [58] Individual country circumstances differed.[59]

Table III.1. Evolution of Debt/GDP Ratios Since the Crises

(in percent of GDP; unless otherwise stated)

	Ukraine		Pakistan		Uruguay		Ecuador		Russia	
	t+1 to 2004 1/		t+1 to 2003/04 2/		2004 3/		t+1 to 2004 5/		t+1 to 2004 5/	
	Post-	Latest	Post-	Latest	Post-	Latest	Post-	Latest	Post-	Latest
Aggregate change in debt/GDP ratio 5/	***-15.0***	-39.6	-5.2	-15.9	-8.0	-12.1	-63.9	-44.2	-28.1	-35.9
Contribution by:										
Primary balance	***-4.6***	-1.9	-10.2	-9.0	-3.2	-3.8	-24.0	-18.6	-10.1	-17.1
Interest-growth differential	***-27.7***	-29.2	***-9.2***	-9.7	-14.1	-11.6	-39.9	-26.5	***-19.7***	-23.4
Exchange rate	***17.3***	1.1	***14.2***	6.3	***9.3***	1.5	0.0	0.0	***1.7***	1.8
Identified debt-creating flows	***0.0***	-4.2	0.0	-0.5	0.0	0.0	0.0	0.0	0.0	0.0
Other (including residual)	***0.0***	-5.3	0.0	-3.0	0.0	1.9	0.0	0.9	0.0	2.8
Assumptions										
Average primary balance	***0.9***	0.4	2.6	2.3	3.2	3.8	6.0	4.7	2.5	4.3
Average real GDP growth (in percent)	***4.3***	8.4	5.2	4.1	4.5	12.3	2.9	4.1	4.1	6.1
GDP deflator (average annual percent change)	***14.0***	10.9	4.6	5.6	16.5	7.0	14.6	11.6	***9.8***	16.0
Average nominal interest rate on public debt (in percent)	***5.9***	4.7	***7.3***	6.4	5.4	6.8	6.6	6.3	***5.2***	5.9
Average nominal depreciation (in percent)	***11.9***	0.4	***6.7***	2.9	***10.5***	1.8	0.0	0.0	***1.1***	-0.4
Memorandum Items:										
Average real interest rate	***-8.1***	-6.2	***2.7***	0.8	-11.1	-0.2	-8.0	-5.3	***-4.6***	-10.1
Average real interest-growth differential	***-12.4***	-14.6	***-2.5***	-3.3	-15.6	-12.5	-10.9	-9.4	***-8.7***	-16.2
Central year of restructuring (t)	1999		1999/2000		2003		2000		2000	

Sources: IMF staff reports; and staff calculations.

1/ Change in debt ratio from end-1999 to end-2004, and contributions during 2000–04.
2/ Change in debt ratio from end-1999/00 to end-2003/04, and contributions during 2000/01–03/04.
3/ Change in debt ratio from end-2003 to end-2004, and contributions during 2004.
4/ As reported or implicit in the respective staff report; numbers in bold Italics indicate that additional assumptions had to be made.
5/ Change in debt ratio from end-2000 to end-2003, and contributions during 2001–03.

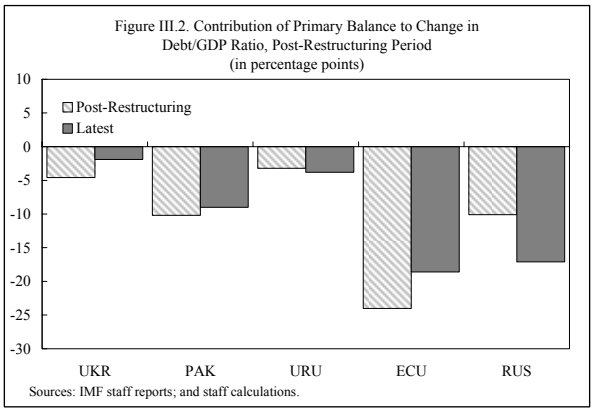
[57] Definitions of the fiscal sector used for program monitoring differ across countries. Russia: general government; Pakistan: federal and provincial government; Ukraine: consolidated government; Ecuador: nonfinancial public sector; and Uruguay: public sector.

[58] By contrast, in all cases except Russia, projections made *before* the restructuring had assumed a greater role for fiscal constraint than actually materialized.

[59] For Ukraine, the medium-term projections included in the post-restructuring staff report are not detailed enough to allow for an analysis.

- In *Russia*—where the outcome exceeded projections by the widest margin—reasons for rapid improvements in the primary balance can be traced to higher-than-projected revenue, owing largely to favorable developments in oil prices.

- *Uruguay's 2004* primary surplus (3.8 percent of GDP) was higher-than-had been anticipated after the restructuring largely because of expenditure restraint. Lower than anticipated spending on social security benefits and on wages, coupled with lower capital expenditure largely explain the better outcome.



- In *Pakistan*, fiscal performance fell marginally short of the ambitious projections, in spite of a surge in grants given Pakistan's increased geopolitical importance after the events of September 11, 2001.[60]

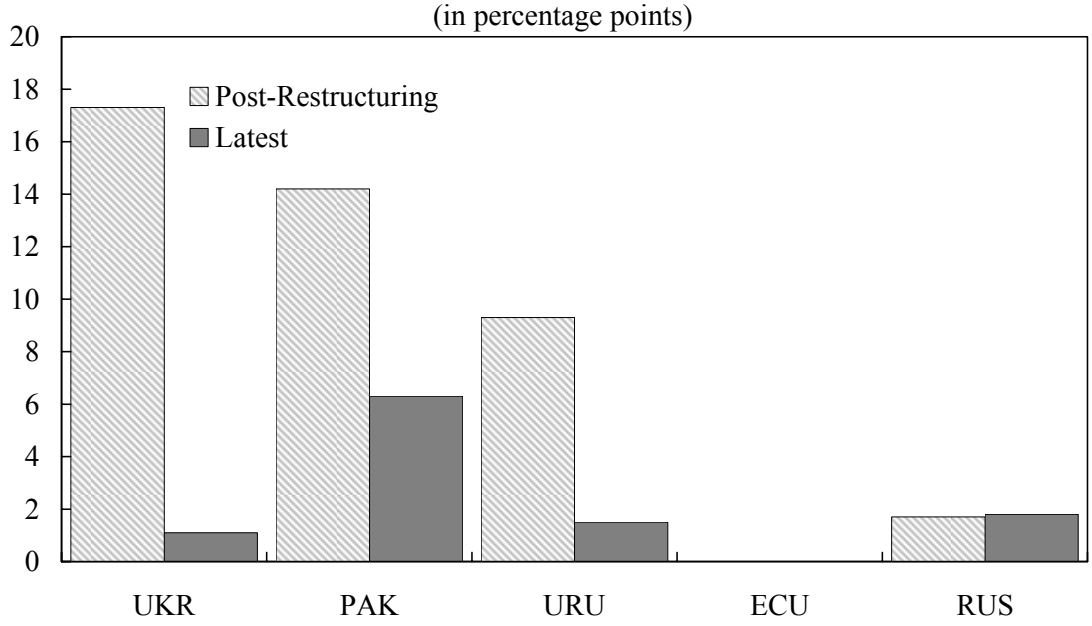
- *Ecuador* showed underperformance relative to projections by the widest margin. Despite having posted substantial primary surpluses in the post-crisis period, levels projected after the restructuring could not be attained, as the country was unable to fully capitalize on higher oil prices against the backdrop of large increases in the wage bill and social security benefits, discretionary tax cuts, and a rapid decline in oil output owing to inefficiencies at the state oil company.

In the post-restructuring period, the contribution of the exchange rate to debt dynamics was generally better than anticipated in post-restructuring Fund projections (see Figure III.3). Programs generally anticipated a debt-increasing effect of the exchange rate, and actual performance in most cases shows a smaller-than-expected increase. This was the case in Pakistan, Ukraine, and Uruguay, while the contribution was slightly above expectations in Russia. Due to full dollarization, there was no exchange rate effect in Ecuador.

In a slight majority of countries (Pakistan, Russia, and Ukraine), the real interest-growth differential turned out more favorable than assumed after the restructurings (see Figure III.4). This was brought by higher-than-expected growth (Russia and Ukraine) as well as lower-than-expected real interest rates (Pakistan and Russia).

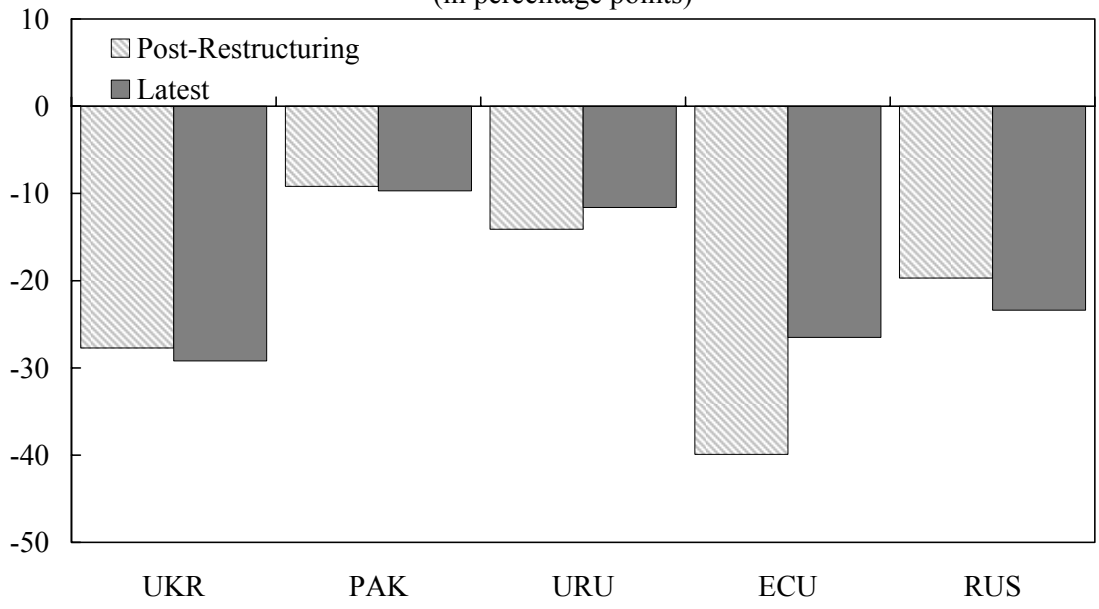
[60] For the purpose of the debt sustainability analysis, the primary balance including grants is considered.

Figure III.3. Contribution of Exchange Rate to Change in Debt/GDP Ratio, Post-Restructuring Period
(in percentage points)



Sources: IMF staff reports; and staff calculations.

Figure III.4. Contribution of Interest-Growth Differential to Change in Debt/GDP Ratio, Post-Restructuring Period
(in percentage points)



Sources: IMF staff reports; and staff calculations.

Annex IV. Public Debt Ratios and Probabilities of Debt Crisis

We analyze the relationship between crisis probabilities and the ratio of public debt to GDP using a pooled probit model on an unbalanced sample of 55 low- and middle-income countries over the period 1971–2002. The countries in the sample are: Algeria, Argentina, Bangladesh, Bolivia, Brazil, Burkina Faso, Cameroon, Chile, Colombia, Costa Rica, Côte d'Ivoire, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, Gabon, Ghana, Guatemala, Haiti, Honduras, Hungary, India, Indonesia, Jamaica, Jordan, Kenya, Korea, Malaysia, Mexico, Morocco, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Russia, South Africa, Senegal, Sri Lanka, Tanzania, Thailand, Togo, Tunisia, Turkey, Ukraine, Uruguay, Venezuela, and Zimbabwe.

The binary dependent variable (CRISIS) represents the occurrence of public debt crisis. It takes the value of 1 when a country is classified as in default by Standard and Poor's. Independent variables are the lagged ratio of public debt to GDP (DEBT1), lagged GDP growth (GGDP1), and the lagged ratio of short-term external debt to GDP (ST_EXTDEBT_GDP1). All coefficients have the expected sign. DEBT1 and GGDP1 are significant at the one percent level, while ST_EXTDEBT_GDP1 is significant at the 10 percent level (see Table IV.1). The goodness of fit, as measured by the McFadden R-squared, is fairly low at 0.17, not untypical for this type of pooled probit regression.

Table IV.1. Probit Estimation of Crisis Probability

Dependent Variable: CRISIS

Variable	Coefficient	Std. Error	Prob.
C	-1.1984	0.0779	0.0000
DEBT1	0.0145	0.0011	0.0000
GGDP1	-0.0641	0.0075	0.0000
ST_EXTDEBT_GDP1	0.0040	0.0021	0.0598
McFadden R-squared	0.17	S.E. of regression	0.41
Observations:	1509		

Source: IMF staff calculations.

We compute in-sample forecasts from this equation to yield predicted crisis probabilities associated with the sample data points. From this, we plot inferred crisis probabilities against lagged debt ratios (see Figure 1.1). In order to be able to associate a single probability with any given level of debt, we fit a polynomial through the data (see Table IV.2).

Table IV.2. Polynomial Fit Through In-Sample Forecasts

Dependent Variable: DEBT1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.2804	2.5895	0.4945	0.6210
CRISIS_FIT	251.2821	32.0361	7.8437	0.0000
CRISIS_FIT^2	-325.3811	101.5895	-3.2029	0.0014
CRISIS_FIT^3	277.2418	87.7342	3.1600	0.0016
Adjusted R-squared	0.76	S.E. of regression		17.91

Source: IMF staff calculations.

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