

III Sovereign Debt Restructuring and Debt Sustainability

Given the different initial conditions, scopes, and outcomes of each of the debt operations, this chapter attempts to examine the extent to which debt sustainability has been restored. However, assessing the impact of the debt operations themselves on debt sustainability is difficult, as they took place amid changes in both the external environment and domestic economic policies that had, among others, an impact on market confidence. Against this background, this chapter asks whether the debt operations, in combination with supporting economic policies, contributed to a return to sustainability. The assessment is based on data available as of late 2005.

Criteria for Assessing Debt Sustainability

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.²³ Which of these two aspects of sustainability is more relevant in making a sustainability assessment depends on an individual country's 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.²⁴ In other words, the sovereign must be able to produce primary surpluses that, over the medium term, will 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 financing in each period to close any

financing gaps without having to resort to disorderly adjustment.

Assessing debt sustainability is highly sensitive to the assumptions underlying projections of growth, inflation, interest, and exchange rates. Moreover, the difficulty of estimating contingent liabilities that might arise, for example, from the resolution of financial sector problems, adds to the challenge. While some problems can be addressed by sensitivity analysis, including in the context of standardized alternative scenarios and stress tests, the analysis of debt sustainability will, of necessity, be subject to judgments.²⁵ In addition, it focuses on countries' underlying economic vulnerabilities but does not attempt a comprehensive evaluation of the near-term risk of a crisis.

Recognizing that elements of judgment and uncertainty are unavoidable, we can, in principle, consider the stock of debt following a restructuring to be sustainable if there is a fairly low probability of another debt crisis. At the other extreme, the debt level would be considered unsustainable if the probability of another crisis was fairly high. Between these extremes, there could be a "gray zone"—a range of debt levels consistent with a medium probability of a recurrence of debt problems.

To help classify the cases into the three categories, we apply three sets of criteria, which are discussed further in the following subsections:²⁶

- *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 vul-

²³See IMF (2002a).

²⁴A sovereign is perceived to be solvent if its net worth is not negative—that is, if its assets equal 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.

²⁵Recent 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 historical relationships are often unlikely to persist in a crisis, this approach also involves some element of judgment.

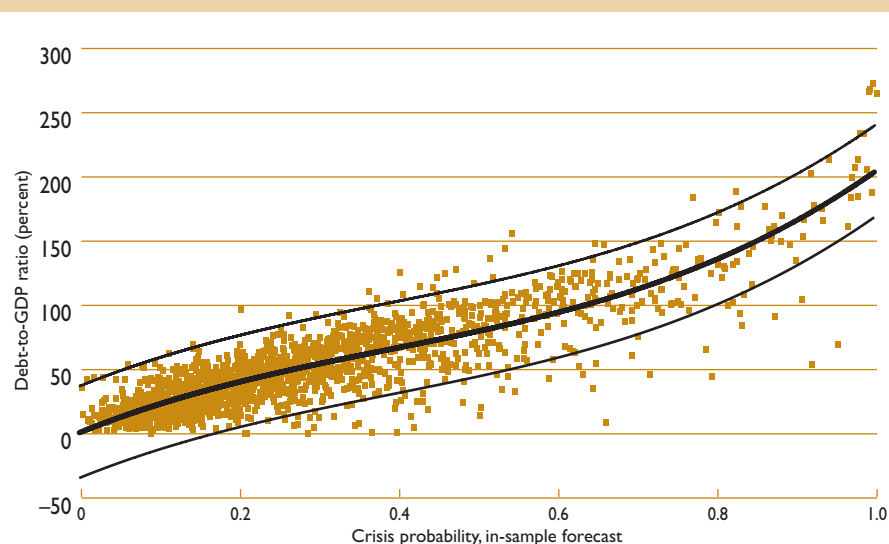
²⁶In addition to these three sets of criteria, practical key considerations for debt sustainability are a country's political implementation capacity and risks to sound economic policies.

Box 1. Debt Crises and the Level of Debt

- To analyze the relationship between debt levels and the probability of debt crises, we estimate the probability of 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 Appendix IV). The sample consists of 55 low- and middle-income countries during 1971–2002. The pooled probit model allows for an in-sample forecast of crisis probabilities (graphically shown as the dots in the first figure). We

Crisis Probabilities and Debt Levels



Sources: *World Economic Outlook*; and IMF staff calculations.

nerabilities based on the historical experience of a large sample of countries. However, EWS estimates, while useful as part of a broader analysis, should not be the only measure used in assessing the likelihood of debt distress (see Box 2). They 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 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 experiencing a debt-service crisis.
- *Medium-term debt-related vulnerabilities.* Debt-sustainability analysis, which includes the calculation of medium-term debt projections based on estimates for key macroeconomic variables, can provide useful information about medium-term debt dynamics and

related vulnerabilities. Stress tests and alternative scenarios bring to light related vulnerabilities.

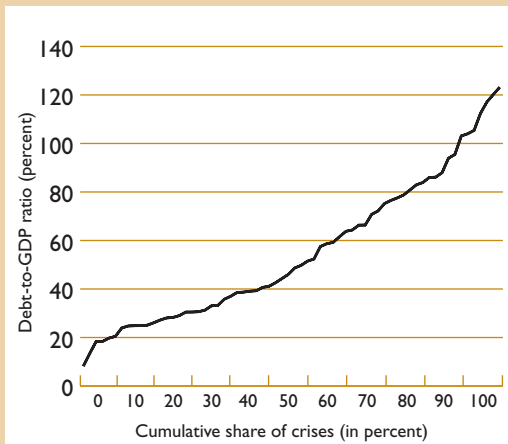
The Current Debt Level and Related Vulnerabilities

There are no clear-cut threshold levels for debt-to-GDP ratios that would allow the classification of 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 1971–2002, a debt-to-GDP ratio of 80 percent is estimated to be associated with a 50 percent probability of being in a debt crisis in the following year (see Box 1). Similarly, a debt level of 100 percent is associated with a sample probability (of being in crisis) of 63 percent, while a debt level

fit a polynomial through the in-sample forecasts (the thick line in the first figure) and show a \pm two-standard-deviation band around it. From this sample, a 50 percent probability of being in a debt crisis is associated with a debt-to-GDP ratio of 80 percent in the previous year. However, the standard deviation is substantial (18 percentage points). There is also no obvious cut-off point for the debt ratio that would allow us to distinguish between sustainable and unsustainable debt levels, although a correlation is evident.

- From the same data set, we isolate the episodes of entry into a debt crisis and order them by their observed debt-to-GDP ratios in the year before entry (see the second figure). Again, there do not appear to be obvious cut-off points. However, as noted in the text, 60 percent of entries into crisis in the sample occurred when debt levels in the year preceding the crisis had been above 39 percent of GDP. The average debt-to-GDP ratio in the year before a crisis entry was 57 percent (compared with 47 percent in tranquil times).
- In addition to the debt-to-GDP ratios, other factors related to current indebtedness play a role in the assessment of sustainability. For countries holding substantial amounts of concessional debt, an 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

Debt Levels in Year Before Crisis Entry



Sources: *World Economic Outlook*; and IMF staff calculations.

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.

of 40 percent corresponds to a sample probability of 20 percent. Moreover, 60 percent of entries into crisis occurred when debt levels in the year preceding the crisis exceeded 39 percent of GDP.²⁷ However, there do

²⁷A number of recent studies look at the relation of debt levels to crisis occurrence. According to IMF (2003b), more than half of the sovereign debt crises between 1970 and 2001 in a sample of 72 countries occurred at public debt levels below 40 percent of GDP, while about two-thirds happened at levels below 60 percent of GDP. Similarly, the IMF's *World Economic Outlook, September 2003* reported that, over the past 30 years, in 35 percent of sovereign debt default cases, defaults occurred at debt-to-GDP ratios below 40 percent, while in 55 percent of the cases 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 have taken 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 15–20 percent, depending on the country's history of default and inflation. Similarly, Manasse, Roubini, and Schimmelpfennig (2003) find that countries

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.

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 its global debt exchange. Argentina's early repayment of all its outstanding IMF obligations (SDR 6.7 billion) in January 2006 has also helped improve the country's debt structure. Debt ratios in four other countries ranged between 47 percent and 68 percent (Ecuador, Moldova, the Dominican Repub-

with external debt greater than 50 percent of GDP are more likely to experience default problems.

Table 8. Public Debt Ratios, 2004¹

(In percent of GDP)

Preemptive cases	
Ukraine	27.1
Pakistan ²	67.9
(net present value)	59.0
Moldova	48.3
(net present value)	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.

¹2004 is the most recent year for which data exist for all countries.

²End of fiscal year 2003/04.

Table 9. Early-Warning-System Vulnerability Scores

(In percent)

	2005	2006
Preemptive 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
<i>Memorandum item:</i>		
EWS signal threshold	24.8	24.8

Source: IMF staff calculations.

¹2005 and 2006 columns refer to fiscal years 2004/05 and 2005/06, respectively.

lic, and Pakistan), although Ecuador's debt ratio has since fallen to 36 percent in 2005.²⁸ The remaining two countries (Russia and Ukraine) had ratios under 30 percent.

An EWS can be used to supplement the analysis of debt-related vulnerabilities. Table 9 shows estimated vulnerability scores using a model based on Manasse, Roubini, and Schimmelpfennig (2003) (see Box 2 for a description of the methodology).²⁹ 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). This underscores that the 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 debt ratio after the global debt exchange enters into the projection.³⁰ Vulnerability scores for the remaining countries are much lower.

²⁸Pakistan holds some of its debt on concessional terms, and, in terms of net present value, its debt ratio is estimated at 9 percentage points below face value. The net present value in 2004 of Moldova's debt, which used to be largely concessional, exceeded its face value, indicating that the terms of Moldova's debt contracts deteriorated.

²⁹Vulnerability scores were estimated in October 2005 based on actual data for 2004 and projections for 2005 from the WEO database and latest IMF staff reports. Projections were made on the basis of the model as calibrated in 2003. The model's original sample did not include Moldova and Ukraine.

³⁰Argentina'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.

Vulnerabilities Stemming from Liquidity Needs

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 1 implies that complete lack of market access for one year would put pressures on the balance of payments. From a fiscal perspective, projections of gross financing needs show the resources a sovereign needs to secure, in addition to its projected revenues, to implement planned expenditures.

Within the country sample, the degrees of vulnerability are widely dispersed (see Table 10). Ecuador, Uruguay, and, to a lesser extent, Argentina show substantial 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 and debt-management operations in 2006, Uruguay's near-term risks have decreased. Moreover, in November 2006, Uruguay repaid all outstanding obligations to the IMF. Financing needs are in the medium range in the Dominican Republic, Ecuador, Moldova, Pakistan, and Ukraine, as well as in Argentina, although Argentina reduced them considerably with the full prepayment of its IMF obligations in early 2006. Russia's financing needs are relatively low.

Table 10. Liquidity Indicators, 2005–06

	Reserves/Short-term Debt ¹ (ratio)		Financing Need ² (percent of GDP)	
	2005	2006	2005	2006
Preemptive 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: *World Economic Outlook*; IMF staff reports; and staff calculations.

¹Ratio of gross international reserves to short-term external debt at remaining maturity.

²Defined as the overall fiscal deficit, plus amortization of medium- and long-term debt, plus short-term debt at end of previous period.

³2005 and 2006 columns refer to fiscal years 2004/05 and 2005/06, respectively.

⁴Financing-need projections exclude debt buybacks.

⁵Gross fiscal financing need is defined as federal overall cash balance plus federal amortization due.

Table 11. Debt-Sustainability-Analysis Projections

(Percent of GDP)

	Public Debt 2004	Medium-term Projections ¹		
		Baseline	Mean ²	STD ²
Preemptive 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.

¹Projections are for 2010, except for Ukraine (2009) and Pakistan (2009/10). Data are based on the 2003 debt-sustainability-analysis (DSA) framework, except for Pakistan, Russia, and Uruguay, which use the 2005 framework (see Box 3).

²Mean and standard deviation (STD) of scenarios and bound tests.

³Public debt in 2004 refers to 2003/04.

⁴Moldova's DSA is expressed in terms of net present value.

Medium-Term Debt-Related Vulnerabilities

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 IMF'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

Box 2. An Early-Warning-System Approach (EWS)

- Building on Manasse, Roubini, and Schimmelpennig (2003), an EWS model is specified based exclusively on data available in the World Economic Outlook (WEO) database. The estimation method is a binary regression (logit) with robust variance estimates for pooled data. The sample comprises 37 low- and middle-income countries over 1990–2002. A country is considered to be in debt distress if it is classified as being 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, and a dummy for hyperinflation episodes (by contrast, public debt as a 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 IMF 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. That said, the authors also conclude 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.”

¹Since 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.

debt paths under alternative sets of assumptions (see Box 3 for a description of the methodology).

Medium-term baseline projections tend to be somewhat below 2004 levels for all eight countries (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 in only 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).

A closer look sheds further light on medium-term debt-related vulnerabilities:

- *Ukraine.* In the baseline scenario in the IMF’s most recent debt-sustainability analysis, debt is projected to decline from 27 percent of GDP in 2004 to 16 percent by 2009.³¹ 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 lead to a steadily increasing debt ratio; in all the others, the debt ratio temporarily increases to 39 percent at most (see Figure 5).

- *Pakistan.* Figure 6 shows that, in 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.³² This projection is based on the assumption that primary deficits will average 0.4 percent of GDP annually 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

³¹See *Ukraine: 2004 Article IV Consultation—Staff Report; Staff Supplement; and Public Information Notice on the Executive Board Discussion*, IMF Country Report No. 05/15. Available on the IMF’s Web site, www.imf.org/external/pubs/ft/scr/2005/cr0515.pdf.

³²Debt projections are based on revised GDP statistics. See *Pakistan: 2005 Article IV Consultation and Ex Post Assessment of Longer-Term Program Engagement—Staff Reports; Staff Supplement; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for Pakistan*, IMF Country Report No. 05/409. Available on the IMF’s Web site, www.imf.org/external/pubs/ft/scr/2005/cr05409.pdf.

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

- The IMF 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 that is broadly comparable across countries.
- The IMF's standard sensitivity tests consist of an alternative scenario using historical averages of key variables (real GDP growth, real interest rate, primary balance), normally over a period of 10 years; and stress tests applying a two-standard-deviation shock to each of these variables in turn, leaving the remaining variables as in 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 an increase in debt equal to 10 percent of GDP that is due to events such as the realization of contingent liabilities from a

financial sector restructuring. Other alternative scenarios have been added more recently, 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 11), the empirical value of such stress tests in determining whether a case is sustainable is limited.

¹Based 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)).

that the applied shocks would not lead to explosive debt paths, with even the most adverse scenario (a one-time 30 percent real depreciation 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.* In the baseline scenario, debt is projected to decline from 54 percent in 2004 to 26 percent by 2010.³³ The projection is based on assumed primary deficits on the order of ½ percent of GDP, implying a loosening compared with a 2001–04 average surplus of 2.2 percent (see Figure 7).³⁴ 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.

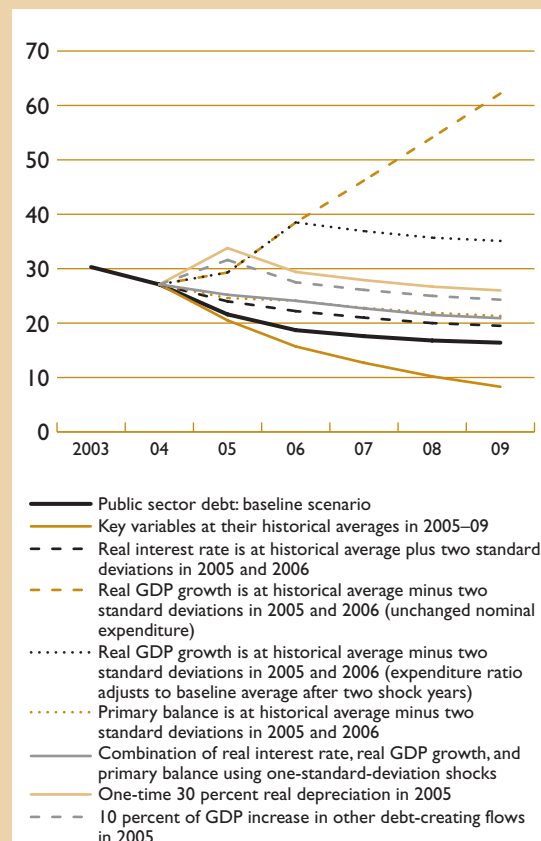
- *Uruguay.* The baseline scenario projects a steady decrease in the debt ratio from 93 percent in 2004 to 54 percent by 2010, contingent on sustained primary surpluses of 3.5–4 percent of GDP. While this would not imply substantial tightening relative to the 2004 outcome (3.8 percent), it would nonetheless require sustained fiscal discipline, against a background of substantially lower surpluses in recent years (0.1 percent during 2000–03).³⁵ The scenario also does not factor in the projected fiscal contingent liabilities associated with restructuring the public banks, which could add up to 5 percentage points

³³The debt-sustainability analysis for Moldova is expressed in terms of net present value. 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.

³⁴See *Republic of Moldova: 2004 Article IV Consultation—Staff Report; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for the Republic of Moldova*, IMF Country Report No. 05/48. Available on the IMF's Web site, at www.imf.org/external/pubs/ft/scr/2005/cr0548.pdf.

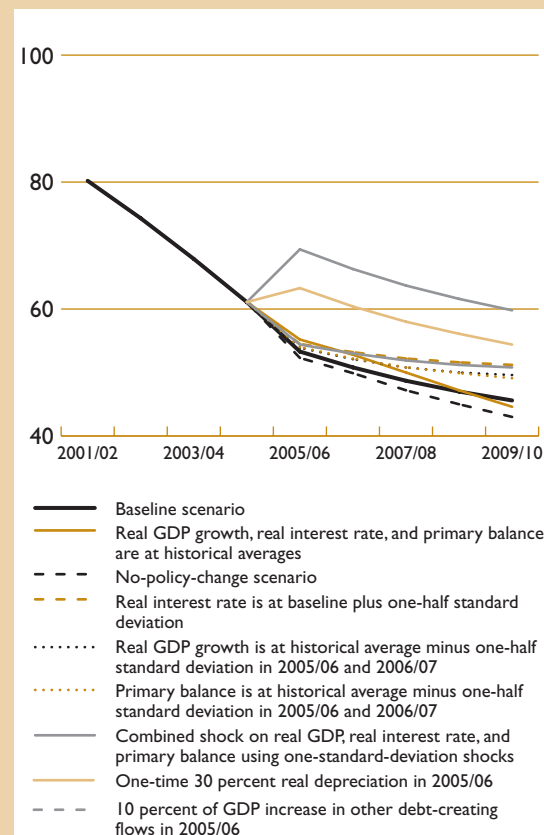
³⁵See *Uruguay: First Review Under the Stand-By Arrangement and Request for Modification of Performance Criteria—Staff Report; Staff Statement; Press Release; and Statement by the Executive Director for Uruguay*, IMF Country Report No. 05/431. Available on the IMF's Web site, www.imf.org/external/pubs/ft/scr/2005/cr05431.pdf.

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



Source: Ukraine: 2004 Article IV Consultation—Staff Report; Staff Supplement; and Public Information Notice on the Executive Board Discussion, IMF Country Report No. 05/15. Available on the IMF's Web site, www.imf.org/external/pubs/ft/scr/2005/cr0515.pdf.

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



Source: Pakistan: 2005 Article IV Consultation and Ex Post Assessment of Longer-Term Program Engagement—Staff Reports; Staff Supplement; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for Pakistan, IMF Country Report No. 05/409. Available on the IMF's Web site, www.imf.org/external/pubs/ft/scr/2005/cr05409.pdf.

to the debt ratio by 2010.³⁶ 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).³⁷ However, vulnerabilities are mitigated by the reduction of

³⁶Depending on various factors, including the amount of nonperforming loans recovered, the actual figure might be smaller.

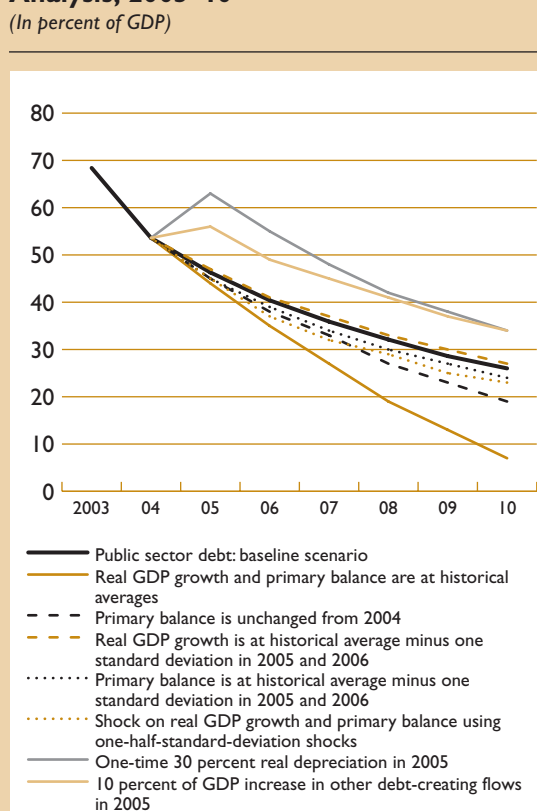
³⁷In addition to standard stress tests, IMF staff also present less severe shocks, which are projected to keep the debt-to-GDP ratio on a declining path (*Uruguay: First Review Under the Stand-By Arrangement*).

rollover risk brought by the lengthening of maturities in connection with the debt restructuring.³⁸

- *Dominican Republic.* In 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 the achievement of primary surpluses of 0.8–2.5 percent of GDP, implying a substantial fiscal consolidation: during 2001–04, the Dominican Republic posted an average primary deficit of

³⁸Uruguay also restored access to private financial markets soon after the restructuring. It recently conducted substantive debt-management operations and fully repaid its outstanding obligations to the IMF.

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

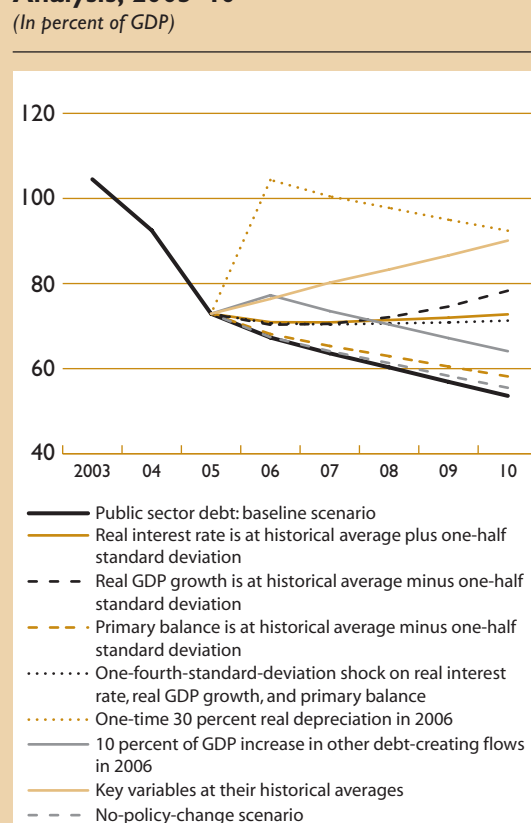


1.8 percent of GDP. The sensitivity tests show that some vulnerabilities remain: in two scenarios featuring a one-time real depreciation of 30 percent and a 10 percent increase in other debt-creating flows, the debt ratio would again temporarily rise above 55 percent. However, most other scenarios project roughly steady or slightly falling debt ratios.

- **Ecuador.** Figure 10 shows that, in the 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 sizable primary surpluses (2–5 percent range), which would be consistent with recent experience (from 2000 to 2003, the primary surplus averaged 5.3 percent), although the outlook remains uncertain.³⁹ The sensitivity tests show that

³⁹The debt-sustainability analysis is based on a passive scenario that assumes limited success in implementing substantial policy initiatives.

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

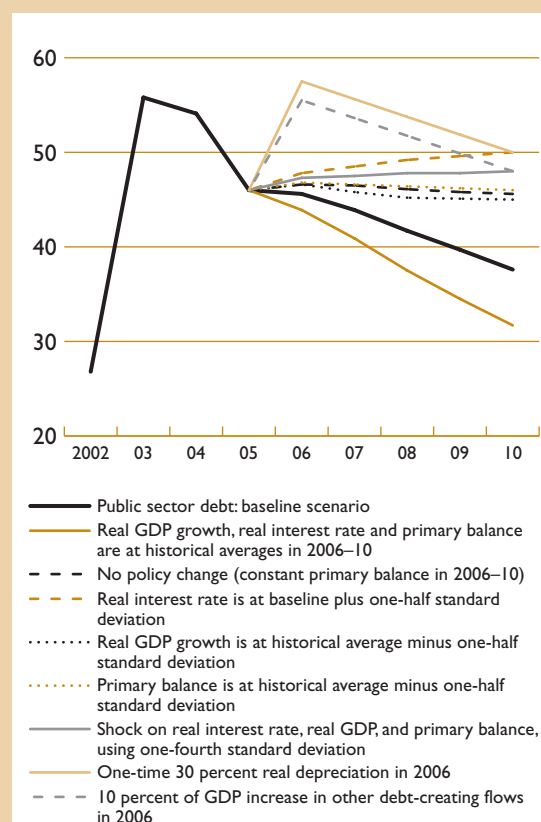


vulnerabilities are pronounced. Under a number of the standardized stress tests, debt would stabilize only at a substantially higher ratio of about 70 percent. Moreover, a shock to GDP growth would cause debt to rise sharply.

- **Russia.** Russia's debt as a share of GDP is projected to fall from 22 percent in 2004 to 7 percent in 2010 in the baseline scenario, conditional on primary surpluses in the 5–9 percent range, which would be facilitated by favorable petroleum prices (during 2001–04, the primary surplus averaged 4.3 percent).⁴⁰ Limited vulnerabilities remain, as evidenced by the stress tests (see

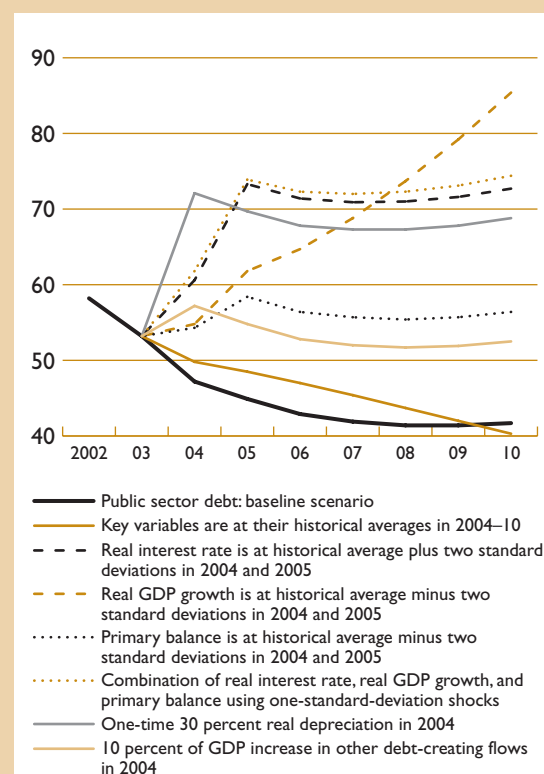
⁴⁰See *Russian Federation: 2005 Article IV Consultation—Staff Report; Staff Statement; and Public Information Notice on the Executive Board Discussion*, IMF Country Report No. 05/377. Available on the IMF's Web site, www.imf.org/external/pubs/ft/scr/2005/cr05377.pdf.

Figure 9. Dominican Republic: Debt-Sustainability Analysis, 2002–10
(In percent of GDP)



Source: IMF staff reports.

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



Source: IMF staff reports.

Figure 11). A marked fall in oil prices, as assumed in one of the stress tests, would lead to steadily increasing debt ratios that would reach 34 percent by 2010. Two other applied shocks would each lead to a debt-to-GDP ratio over 40 percent by end-2006, which would then gradually decline. However, because the stress tests are based on 10-year historical averages and standard deviations, they are based on a historical period that 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 an annual decline in real GDP of 8.1 percent for two consecutive years (compared with, for example, a fall of 4.2 percent in Ecuador). Despite such harsh shocks, Russia's debt would exceed 30 percent in 2010 in only two scenarios.

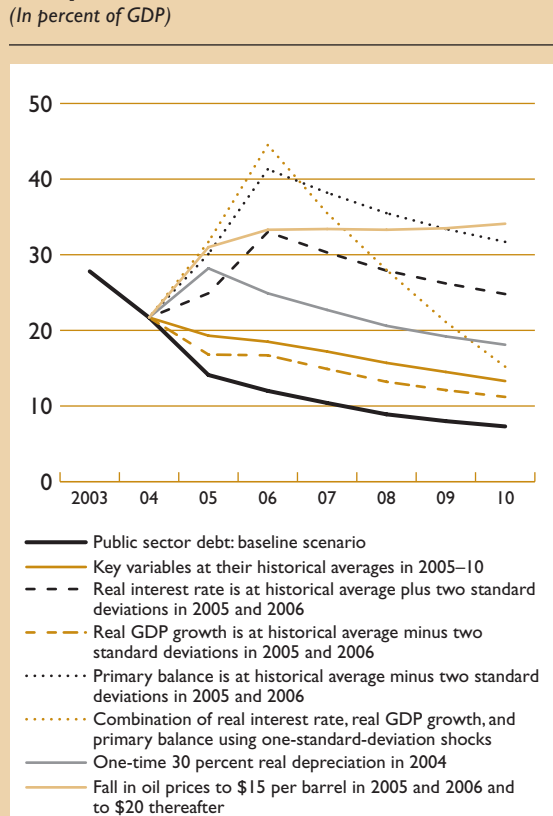
- *Argentina.* The baseline scenario projects a decline in the debt-to-GDP ratio from 78 percent in 2005

to 57 percent by 2010, and does not yet factor in the favorable effects of the early repayment of all outstanding IMF obligations.⁴¹ While Argentina still needs to resolve its arrears to nonparticipating creditors, projections are based on the IMF staff's reform scenario and assume full participation in the 2005 debt exchange and federal primary surpluses between 3.3 percent and 3.7 percent in 2005–10.⁴² These surpluses are consistent with the 2004 outcome (3.9 percent), but Argentina's primary

⁴¹See *Argentina: 2005 Article IV Consultation—Staff Report; Staff Supplement; Public Information Notice on the Executive Board Discussion; and Statement by the Executive Director for Argentina*, IMF Country Report No. 05/236. Available on the IMF's Web site, at www.imf.org/external/pubs/ft/scr/2005/cr05236.pdf. The federal government refinanced the prepayment of its IMF obligations mainly with a 10-year low-interest compensation bond held by the central bank.

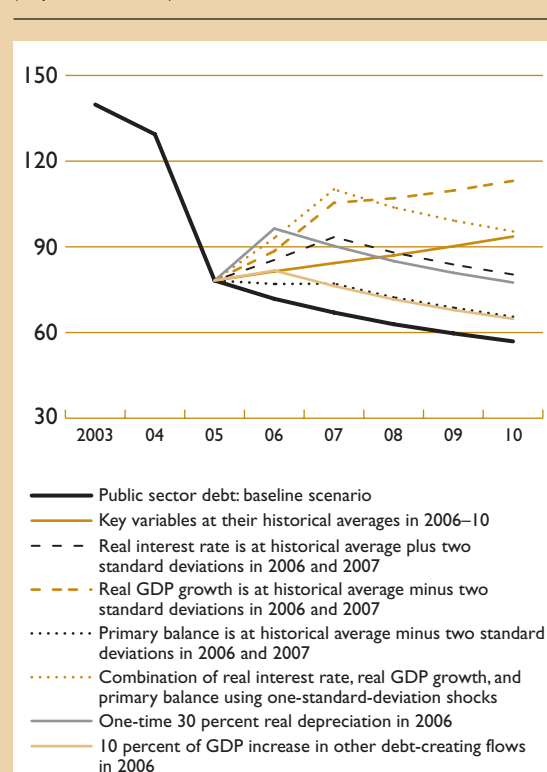
⁴²Consolidated primary surpluses over this period range from 4 percent to 4.5 percent.

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



surpluses have historically 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 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 in 2001/02, the calibration, for instance, implies a 12.3 percent decline in growth in 2006 and 2007, compared with 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 the debt-to-GDP ratio to more than 100 percent by

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



2007.⁴³ A scenario based on historical averages as well as the GDP shock scenario would imply continuously rising debt ratios through 2010.⁴⁴

Summary for the Eight Countries

Based on the above analysis, medium-term vulnerabilities appear low in Pakistan, Russia, and Ukraine,

⁴³The GDP shock scenario assumes real GDP growth in 2006 and 2007 at its 10-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.

⁴⁴The scenario based on historical averages assumes real GDP growth, real interest rates, and the primary balance at historical averages during 2006–10.

Table 12. Debt-Sustainability Indicators

	Debt Level in 2004 (percent of GDP)	Early-Warning-System Vulnerability Score (in percent)		Reserves/ Short-term Debt (ratio)		Financing Need (percent of GDP)		Debt-Sustainability- Analysis Projections ¹ (percent of GDP)			Assessment of Debt Vulnerability
		2005	2006	2005	2006	2005	2006	Baseline	Mean ²	STD ²	
Preemptive 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.

¹For 2010, except for Ukraine (2009) and Pakistan (2009/10).

²Mean and standard deviation (STD) of scenarios and bound tests in final year.

³Net present value of debt-to-GDP ratio in 2003/04 was 59 percent.

⁴Debt levels and DSA projections are expressed in terms of net present value.

⁵Post-restructuring debt level is 78.2 percent (end-2005 projection based on assumption of full creditor participation in the debt exchange).

and in the medium range in Argentina, the 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. Although its debt level is substantially higher than Russia's or Ukraine's, the composition of its 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.
- 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 considerably reduced as a result of generally favorable external financing conditions.⁴⁵

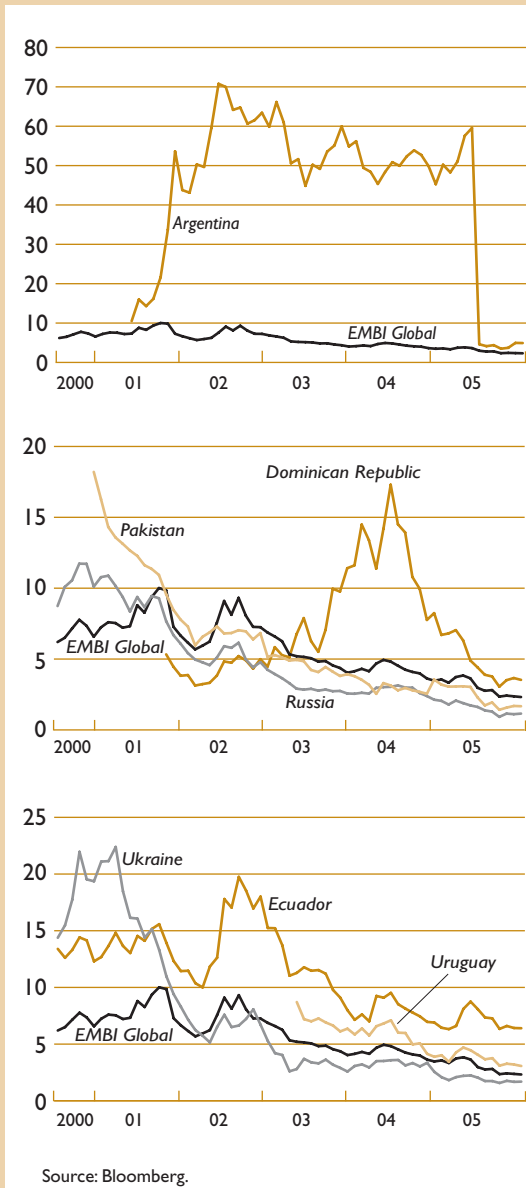
Developments in sovereign debt markets and credit ratings lend some support to the above analysis.

- Liquidity conditions in international bond markets have been very favorable in recent years—the overall EMBI Global spread fell from 1,000 basis points (bps) in late 2001 to below 240 bps in December 2005—complicating attempts to make inferences from country spread movements. However, spreads on sovereign debt issuance by Pakistan, Russia, and Ukraine indicate that market confidence has been restored following the resolution of their debt 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 peak of the crises, while improvements in sovereign spreads have been less systematic in

⁴⁵This assessment is mirrored in Uruguay's *Letter of Intent and Memorandum of Economic and Financial Policies and Technical Memorandum of Understanding* (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. . . ." Available on the IMF's Web site, www.imf.org/external/np/loi/2006/ury/031306.pdf. See also *Uruguay: Third Review Under the Stand-By Arrangement and Request for Modification and Waiver of Nonobservance of Performance Criteria—Staff Report; Staff Statement; Press Release on the Executive Board Discussion; and Statement by the Executive Director for Uruguay*, IMF Country Report No. 06/197. Available on the IMF's Web site, www.imf.org/external/pubs/ft/scr/2006/cr06197.pdf.

Figure 13. Sovereign Spreads of Restructured Bonds, 2000–05

(Spreads over comparable U.S. treasuries, in percentage points)

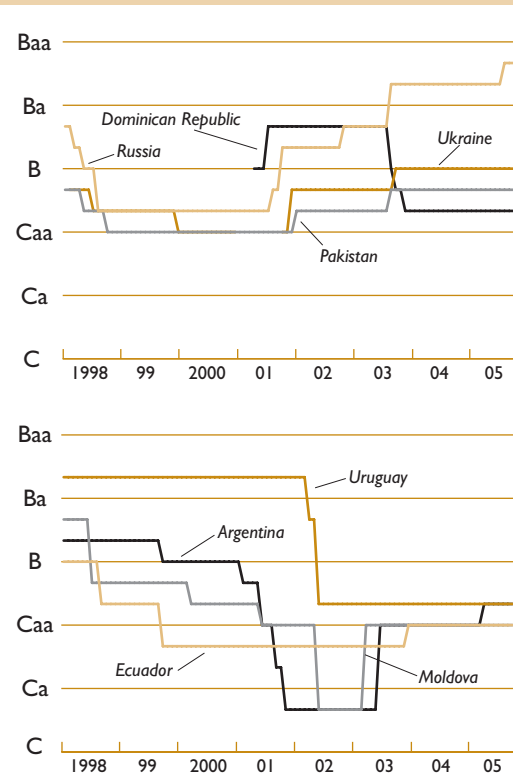


Ecuador. The spread on Argentina's sovereign debt remained extraordinarily high until mid-2005 but fell below 500 bps shortly after the global debt exchange, and has declined further since then.⁴⁶

⁴⁶Spread data for Moldova are not available.

Figure 14. Moody's Sovereign Credit Ratings, 1998–2005

(Ratings for long-term foreign-currency borrowing)



Source: Bloomberg.

- Credit ratings have improved considerably in Argentina, Moldova, Pakistan, Russia, and Ukraine, while improvements in Ecuador have been less pronounced.⁴⁷ 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, however (see Figure 14). Standard & 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 & Poor's downgraded Ecuador in 2005 to CCC+ and assigned a B rating to the Dominican Republic after its 2005 bond exchange.

⁴⁷Since the debt-restructuring operations, none of these countries has been rated as investment grade except for Russia (Baa2).