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## An Analysis of Pakistan's Vulnerability to Economic Crisis

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### 1. INTRODUCTION

The post 9/11 scenario in Pakistan's economy can readily be identified with a host of positive developments. Real GDP growth rates have averaged around 6 percent since 2002, stock market surges have broken all the previous records, there is much more dynamism in the banking industry, capital flows are pouring into the economy, foreign exchange reserves have swelled to record high levels, and poverty has witnessed a declining trend. However, what mars these celebrations since last year is the scepticism of some market commentators on the growing vulnerability of Pakistan's economy to crisis.<sup>1</sup> The main weakness, as widely pointed out, remains the sustainability of current account deficit along with rising fiscal imbalances.

A review of empirical literature on the determinants of currency crisis introduces a host of macroeconomic fundamentals broadly based on the predictions of the seminal first- and second-generation models. Although the list of these determinants varies from study to study, the consensus appears to be on the sustainability of external and fiscal positions as the main predictors of a crisis. An overview of the Pakistani fundamentals since 2000 reveals that broadly key Pakistani economic indicators do not give an immediate cause for concern. However, the emergence of primary budget balance as a deficit and the growing trade and current account deficits in the last two years does seem to be a cause for concern.

Therefore, the objective of this study is to analyse the vulnerability of Pakistan's economy to crisis by evaluating the sustainability of its external and fiscal positions in the recent past. In particular, we focus on Masson's (1999) model of contagion to assess Pakistan's external position and Bohn's (1998) fiscal sustainability regressions to evaluate Pakistan's fiscal position. Our findings are that the Pakistani fundamentals do not present an adverse scenario as particularly indicated in the external and fiscal sustainability conditions of the recent past.

The rest of the paper is organised as follows. Section 2 reviews the empirical literature on the determinants of crisis as broadly predicted by the first- and second-generation models. Section 3 gives an overview of the key Pakistani fundamentals since 2000. Section 4 outlines the methodologies and Section 5 gives the results. Section 6 concludes the study.

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<sup>1</sup>Since last year, scepticism on the sustainability of Pakistan's current account deficit often appears in the media.

## 2. MODELS OF CRISIS: THEORY AND EVIDENCE

The painstaking implications of the crisis of 1990s notwithstanding, they have been a source of great intellectual excitement as well. Following these crisis therefore a considerable amount of literature on their causes and symptoms has emerged. There are broadly two lines of argument on this issue. The first school is the so called first-generation models of crisis and the other school is termed as the second-generation models of crisis. While the former follows the seminal work by Krugman (1979) and Flood and Garber (1984), the latter follows Obstfeld (1986) and (1996).

The first-generation models simply argue that a crisis, collapse of an exchange rate peg in particular, is an outcome of inconsistent monetary policy induced by fiscal considerations of monetisation of budget deficit that result in the loss of foreign exchange reserves. When foreign exchange reserves fall below a critical value, speculators attack the exchange rate peg leading to the unique equilibrium of crisis. The main prediction of these models is the deterioration in fiscal imbalances preceding a crisis. The second-generation models, on the other hand, predict crisis as an outcome of self-fulfilling expectations not driven by fiscal imbalances alone but from a host of other economic fundamentals. These include, most notably, growth rate, unemployment, inflation, debt, and current account deficit.

The main distinguishing feature between the first- and second- generation models is that the former is subject to unique equilibrium and the latter to multiple, given its feature of self-fulfilling prophecies. This feature is based on the notion of speculation. While its proponents *imply* self-fulfilling in its literal meaning, they *suggest* 'speculation' as its driver. They do not however explain what really drives speculation, other than the deterioration in fundamentals. Eventually, it is economic fundamentals that predict the outcome. Therefore, the distinction between these models remains theoretical, as the crisis is 'fundamentals-driven' in both models.

On the other hand, there is no commonly agreed set of macro fundamentals to assess the vulnerability of an economy to speculative attacks. Indeed, in actual events of crisis in the 1990s, the fundamentals differed widely across, for example, Exchange Rate Mechanism crisis of 1992-93, Tequila crisis of 1994-95, and East Asian crisis of 1997-98. Therefore, in the empirical contents of the literature on currency crisis a wide variety of fundamentals as the leading indicators has emerged. These indicators stem mainly from the actual episodes of crisis and from the predictions of the aforementioned seminal models and are a result of a fairly large number of empirical studies.

These studies can be classified into two categories. First category investigates the determinants of crisis in a single country analysis; while the second focuses on the multi-country ones. Tables 1 and 2 summarise the list of economic fundamentals in both select single- and multi-country studies. The country-specific studies suggest domestic credit growth, exchange rate misalignments, foreign exchange reserve losses, debt structure, and expansionary fiscal and monetary policies as some of the leading indicators. The results obtained from multi-country category are not as interesting and robust as the single country's ones. Nevertheless, they introduce a wide variety of determinants. These studies do not consider structural and/or political factors, except Klein and Marion (1997), Bussière and Mulder (2000), Saqib (2003), and Fic and Saqib (2006) and focus exclusively on economic fundamentals.

What emerges from Tables 1 and 2 and the above discussion is the significance of fiscal and external fundamentals in predicting a crisis. In particular, fiscal sustainability as manifested in budget deficits, domestic credit, and public debt; and the external sustainability as apparent in international reserves, real exchange rate, external debt, and trade deficit.

Table 1

*Indicators of Crisis: Select Single-country Literature*

Study	Indicator(s)	Findings
Blanco and Garber (1986) [Mexico, 1973-1982]	Domestic credit growth	Very significant
Cumby and Van Wijnbergen (1989) [Argentine, 1978-1981]	Domestic credit growth	Very significant
Goldberg (1994) [Mexico, 1980-1986]	(1) Domestic credit growth; (2) Exchange rate misalignments; (3) Relative prices; (4) External credit; (5) Demand for money	Very significant: (1), (2); Significant: (3), (4), (5)
Pazarbasioglu and Ötoker (1997) [Mexico, 1982-1994]	(1) Domestic credit; (2) Real exchange rate; (3) Foreign reserves; (4) Real output growth; (5) Inflation differential; (6) Expansionary monetary and fiscal policies	Very significant
Ötoker and Pazarbasioglu (1997) [ERM crisis, 1992: Belgium, Denmark, France, Ireland, Italy, Spain]	(1) Domestic credit; (2) Budget deficit; (3) Unemployment rate; (4) Foreign price level	Significant: (1)-(4) for all except Denmark
Saqib (2003) [Brazil, 1999 Maxi-devaluation]	(1) Macroeconomic: Government expenditure, Foreign reserves, Real Exchange rate; Net exports; (2) Political: Elections, Number of political parties forming a government	Very significant: (2) Significant: (1)
Fic and Saqib (2006) [Russia, August 1998 Crisis]	(1) Macroeconomic: Real effective exchange rate, GDP, Inflation, Domestic credit, External debt, oil price; (2) Political: Political instability index	Very significant: (2) Significant: (1)

Table 2

*Indicators of Crisis: Select Multi-country Literature*

Study	Indicators	Findings
Frankel and Rose (1996) [Over 100 Countries, 1971-1992]	(1) Debt composition [commercial bank, concessional, variable-rate, short-term, FDI, Public sector]; (2) External variables [international reserves to monthly imports, current account, external debt, real exchange rate]; (3) Domestic macroeconomic variables [government budget, domestic credit growth, real output per capita growth]; (4) Foreign interest rate; (5) Developed countries' growth rate	Significant: FDI, international reserves, domestic credit growth, foreign interest rate, real exchange rate; Not significant: government budget, current account
Klein and Marion (1997) [17 Countries, 1957- 1990]	(1) Macroeconomic variables [real exchange rate, net foreign assets, multiple exchange rate]; (2) Structural factors [openness, geographical trade concentration]; (3) Political factors [executive transfers, coups]	Significant: real exchange rate, openness, geographical trade concentration, executive transfer
Esquivel and Larraín (1998) [30 Countries, 1975-1996]	(1) Seignorage; (2) Current account balance; (3) Terms of trade shock; (4) Real exchange rate; M2/Reserves; (5) Per capita income growth; (6) Contagion effects	Significant: seignorage, real exchange rate, terms of trade shocks, contagion, current account balance, international reserves, income growth
Kaminsky, Lizondo, Reinhart (1998) [20 Countries, 1970-1995]	(1) International reserves; (2) Domestic credit; (3) Domestic inflation; (4) Real exchange rate; (5) Credit to public sector; (6) Trade balance; (7) Money growth; (8) Fiscal deficit; (9) Export performance; (10) Real GDP growth	Very significant: (1)-(5); Significant: (6)-(10)
Bussière and Mulder (2000) [1994 and 1997 Crisis Episodes]	(1) Political variables: effective number of parties, elections, uncertainty, coalition, ; (2) Economic fundamentals: real exchange rate, lending boom, liquidity level.	Very significant: (1) but conditional on the weaknesses in fundamentals as in (2).
Athukorala and Warr (2002) [East Asia , 1997- 1998 Crisis]	(1) Domestic credit; (2) Real exchange rate; (3) Mobile capital accumulation	Very significant

### 3. OVERVIEW OF KEY PAKISTANI FUNDAMENTALS

After the so-called 'lost decade' of 1990s, Pakistan's economy rebounded in 2000s by posting impressive growth rates with relatively stable prices. Table 3 summarises some of the key indicators of Pakistan's economy that present a reasonably stable macroeconomic environment.

Table 3

#### Key Pakistani Macroeconomic Indicators, 2000-2007

	(Units as Indicated)							
	2000	2001	2002	2003	2004	2005	2006	2007
Inflation <sup>a</sup>	3.60	4.40	3.50	3.10	4.60	9.30	7.90	7.80
Growth Rate <sup>b</sup>	4.87	1.97	3.11	4.73	7.48	8.96	6.61	7.02
Interest Rate <sup>c</sup>	12.0 (8.8)	12.7 (10.3)	10.1 (8.2)	8.0 (4.1)	7.5 (1.7)	7.9 (4.7)	9.0 (8.2)	9.5 (8.8)
Fiscal Balances <sup>d</sup>	-5.39 (1.74)	-4.32 (2.03)	-4.33 (1.60)	-3.74 (1.15)	-2.39 (1.08)	-3.30 (-1.14)	-4.22 (-0.84)	-4.29 (-1.25)
Public Debt <sup>e</sup>	86.13 (3.25)	91.09 (3.76)	83.05 (3.72)	75.16 (3.78)	67.89 (3.92)	62.68 (4.16)	57.67 (4.46)	55.61 (4.93)
Current Account <sup>f</sup>	-0.29 (-1.90)	0.50 (-1.80)	3.90 (-0.40)	4.90 (-0.43)	1.80 (-1.30)	-1.40 (-4.10)	-3.90 (-6.60)	-4.90 (-6.82)
External Debt <sup>g</sup>	44 (32.19)	45 (32.14)	46 (33.40)	40 (33.35)	34 (33.31)	31 (34.04)	28 (35.65)	27 (38.69)
International reserves <sup>h</sup>	1.84 (.14)	3.16 (.21)	6.48 (.48)	11.85 (.99)	11.45 (1.11)	9.63 (10.48)	10.41 (12.13)	10.86 (15.61)
Real Exchange Rate <sup>i</sup>	102.43	89.57	92.49	89.19	91.48	93.34	95.14	95.63

Source: State Bank of Pakistan.

Note: The annual observations mentioned here correspond to the fiscal years; for example, 2000 is FY00.

<sup>a</sup>growth in Consumer Price Index (CPI).

<sup>b</sup>annual percentage change in real GDP.

<sup>c</sup>SBP Discount rate; figures in parenthesis are 6-month T-bill rate.

<sup>d</sup>budget deficit as percent GDP; figures in parenthesis are primary balance as percent GDP.

<sup>e</sup>public debt as percent GDP; figures in parenthesis are billions of rupees.

<sup>f</sup>current account balance as percent GDP; figures in parenthesis are trade balance as percent GDP.

<sup>g</sup>external debt as percent GDP; figures in parenthesis are millions of dollars.

<sup>h</sup>international reserves as percent GDP; figures in parenthesis are billions of dollars.

<sup>i</sup>real effective exchange rate (REER; a rise in the index indicates appreciation of rupee).

The average growth rate of more than 6 percent since 2004 in Pakistan was observed on the back of favourable developments in various sectors. Inflation recorded two fold increases of 9.30 percent in 2005 as compared to the previous year of 2004. This hike in inflation was observed for the first time since 2000, as it remained below 5 percent most of the time (from 2000–2005). During the next two years, however inflation increased, albeit less than the hike of 2005; therefore, prompting the authorities to raise discount rate as a policy measure.

While the public debt to GDP ratio has been on a declining trend since 2001, fiscal balances, budget and primary budget balances, are emerging as a source of concern for

the last two years. Public debt as a percent to GDP was recorded at 86.13 percent in 2000, from where it came down to 55.61 percent in 2007. Primary budget balance remained in surplus along with reductions in budget deficits until 2004. However, these favourable developments started to reverse from 2005 onwards when primary budget balance went into deficit and the budget deficit also increased. Although with high GDP growth rates these fiscal imbalances appear to be sustainable, rising current account deficit in the last two years pose a threat to this perceived stability.

It is encouraging to note that external debt to GDP ratio is declining consistently since 2002; from 46 percent in 2002 to 27 percent at the end of 2007. Similarly, other indicators such as burden of short term debt and liquid foreign exchange reserves with respect to financing of imports are at satisfactory levels. Along with the favourable movement of foreign exchange reserves, the real effective exchange rate depicted stability, especially in the last two years of 2006 and 2007.

From 2000 to 2005, the current account balance to GDP ratio has remained positive mainly due to the shrinking of trade deficit during this time period. However, in the following three years (2005-2007), the situation reversed and current account balance started to deteriorate. During 2005, trade balance was recorded at  $-4.10$  percent of GDP, which pushed current account deficit to increase by  $-1.40$  percent in the same year. Similarly, the trade deficit of  $-6.82$  percent of GDP caused further deterioration in current account deficit by  $-4.90$  percent of GDP in 2007. Usually, in developing countries fiscal imbalances are considered as one of the most important factors of current account deterioration; this however is not the only factor in Pakistan as the growth in imports had a major contribution in this regard. The trade deficit which was only 0.4 percent of GDP in 2002 (U.S. \$ 294 million) rose sharply to 6.8 percent of GDP (U.S. \$ 9.9 billion) in 2007.

There are no universally accepted threshold values for either fiscal balances or current account deficits that can guide in exactly determining the degree of susceptibility of a country to a crisis. Nonetheless, Pakistani fiscal and current account (especially, trade balance) balances in 2006 and 2007, when compared to previous few years, do raise concerns. Therefore, this calls for a detailed examination of the sustainability of Pakistani fiscal and external balances.

#### **4. ASSESSING VULNERABILITY: THE METHODOLOGY**

Following the consensus of the preceding two sections, we now present the basic methodology to assess Pakistan's vulnerability to crisis by evaluating its external and fiscal positions. We focus on Masson's (1999) model of contagion to assess Pakistan's external position and Bohn's (1998) model to evaluate its fiscal position.

##### **4.1. External Vulnerability**

Masson's (1999) model, which views crisis as a result of contagion, refers to the vulnerability of an economy to crisis for only certain ranges of fundamentals where changes in expectations are self-fulfilling and markets are subject to multiple equilibria. The model is based on Jeanne (1997). Jeanne derives the necessary conditions on Obstfeld's (1986) and (1996) hypothesis of grey area of country fundamentals and shows that fundamentals determine the grey area where multiple equilibria of a crisis is possible.

The study focuses on the 1992-93 crisis of the French franc and describes government temptation to devalue in order to decrease the unemployment rate. In the context of emerging economies, however, a variable such as external debt is more relevant than unemployment rate. Therefore, Masson's model places prime emphasis on a country's external indebtedness, which as argued, weakens its fundamentals.

In particular, the vulnerability to crisis depends upon the location of a country's (specifically, external) fundamentals *vis-à-vis* a certain range of equilibriums: the 'good,' the 'bad,' and the 'multiple equilibria' regions. The former two produce unique equilibriums of either 'crisis' or 'no-crisis' respectively; the third depicts the situation of both 'crisis'/'no-crisis.' The model formulates the expectations of investors in a cumulative distribution function (c.d.f.) as follows.

The probability of crisis ( $\pi_t$ ) depends on the size of external debt ( $D$ ) and the extent of devaluation ( $\delta$ ) along with the value of composite fundamental ( $b_t$ ). Where,  $b_t \equiv C_t + R_{t-1} - \bar{R} - r_t^* D_t$ .<sup>2</sup> Letting  $\alpha = \delta D$ ,  $\phi_t = E_t(b_{t+1})$ , and assuming innovation in  $b_t$ ,  $\varepsilon_t = b_t - \phi_{t-1}$ , to have a c.d.f.  $F$ , then:

$$\pi_t = F[\alpha\pi_t - \phi_t] \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (1)$$

Equation (1) describes the expectations of investors in which a decrease in the "expectations-augmented" composite fundamental ( $\phi_t$ ) and a higher external debt ( $D$ ) leads to higher probability of crisis. Note that the presence of ( $\pi_t$ ) on both sides of Equation (1) implies the probability of multiple solutions.

The model gives two conditions for multiple equilibria to occur: first condition requires that in Equation (1) slope of the right hand side to be steeper than that of the left hand side:<sup>3</sup>

$$z = \frac{\alpha}{\sigma\sqrt{2\Pi}} > 1 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

$\Pi$  is the conventional constant (3.141) and the condition shows the size of external debt and the extent of devaluation, relative to the standard deviation ( $\sigma$ ) of shocks to the composite fundamental.

The second condition requires  $\phi_t$  being within minimum and maximum values:

$$\alpha F(-\omega) + \sigma\omega < \phi_t < \alpha F(\omega) - \sigma\omega \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (3)$$

Where,  $\omega = \sqrt{2 \ln z}$ . In particular, Inequality (3) gives the tangency points of the c.d.f of the normal distribution. Where,  $\phi_t^{\max}$  (right hand side) is the 'good' equilibrium,  $\phi_t^{\min}$

<sup>2</sup> $c_t$  is the current account deficit,  $r^*$  is the foreign interest rate,  $D_t$  is the external debt, and  $R_t$  and  $\bar{R}$  are the actual and threshold levels of foreign exchange reserves. The intuition behind this identity is the crucial role of foreign exchange reserves and external debt that play in the formation of investors' expectations. For detailed derivation and justification of the identity, see Masson (1999), pp. 589–591.

<sup>3</sup>The intuition behind this condition is to do with the size of external debt (or the extent of devaluation) and shock; such that, if the debt is too small or the standard deviation of shock,  $\sigma$ , too large there is going to be a single equilibrium solution.

(left hand side) is the ‘bad’ equilibrium, and in between the range  $(\phi_t^{\min}, \phi_t^{\max})$  is the ‘multiple’ equilibria region.

In implementing both conditions, an autoregressive process of order one for the current account deficit ( $C_t$ ) as a percent of GDP is estimated. The standard error of this regression is taken as the estimate of  $\sigma$  and some conservative estimate of  $\delta$  is assumed.

After determining the criterion [Equation (2)] and the range [Inequality (3)], the “expectations-augmented” composite fundamental ( $\phi_t$ ) is calculated using the following equation:

$$\phi_t = E_t[C_t + R_{t-1} - \bar{R} - r_t^* D_t]_{t+1} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

Where,  $C_t$  is the fitted value from the regression for the current account deficit,  $R_{t-1}$  the level of foreign exchange reserves,  $\bar{R}$  the threshold value of foreign exchange reserves (assumed to be zero),  $r_t^*$  the foreign interest rate (U.S. one year rate on Treasury Bill), and  $D_t$  the external debt.

**4.2. Fiscal Sustainability**

Fiscal sustainability is assessed by Bohn’s (1998) test in which government is evaluated for its resilience in running large primary budget surpluses amid expanding public debt. This test, in turn, is mainly driven from Robert Barro’s seminal work on the determinants of public debt in general and the study of U.S. budget deficits in particular [Barro (1979, 1986)].

In particular, a government is solvent in the long run if its primary budget surplus increases in response to rising debt. This amounts to running the following regression:

$$s_t = \alpha_d d_t + \mu_t \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

Where,  $s_t$  is primary budget surplus to GDP ratio and  $d_t$  is debt to GDP ratio. In Equation (5) a positive  $\alpha_d$  would then confirm the above hypothesis. However, this result would be efficient if  $s_t$  and  $d_t$  are both non-stationary with  $\mu_t$  as stationary. Otherwise, Regression (5) would imply inconsistent estimates of the determinants of  $s_t$  due to omitted variable bias. To overcome this problem, Equation (5) is expanded to include non-debt determinants of  $s_t$  based on Barro’s (1979) revenue-smoothing model:

$$s_t = \alpha_0 + \alpha_d d_t + \alpha_G GVAR_t + \alpha_Y YVAR_t + \varepsilon_t \quad \dots \quad \dots \quad \dots \quad \dots \quad (6)$$

$GVAR_t$  and  $YVAR_t$  capture the unusual variations in government’s expenditure and output (business cycle) respectively. They are calculated using Barro’s (1986) method as presented in Valderrama (2005):

$$GVAR_t = (G - G^{tr}) / y$$

$$YVAR_t = (1 - (Y^{tr} / Y))(G^{tr} / y) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (7)$$



$G$ : government expenditure;  $G^T$ : trend government expenditure;  $Y$ : GDP;  $Y^T$ : trend GDP;  $y$ : GDP growth rate.

Equation (6) can further be expanded to capture the non-linear relationship between  $s_t$  and  $d_t$  by introducing a variable  $(d_t - \bar{d})^2$ :

$$s_t = \alpha_0 + \alpha_d d_t + \alpha_G GVAR_t + \alpha_Y YVAR_t + \beta(d_t - \bar{d})^2 + \varepsilon_t \quad \dots \quad \dots \quad (8)$$

The variable  $(d_t - \bar{d})^2$  measures the squared deviation of debt to GDP from its mean. Therefore, a positive  $\beta$  implies that  $s_t$  would react more the larger the deviation of debt from its mean.

## 5. THE RESULTS

### 5.1. Pakistan's External Vulnerability

In implementing 'Back-of-the-Envelope' calculations from Masson's model, an autoregressive process of order one for Pakistan's current account as percent of GDP is estimated (sample: 1975-2007). The standard error of this regression, that is 1.81 percent, is taken as the estimate of  $\sigma$  and  $\delta$  is assumed to be 35 percent. Note that in actual episodes of crisis, currencies have usually depreciated by much more than this assumption; for example, in the maxi-devaluation of Brazil in 1999 the real depreciated by more than 70 percent. Furthermore, recall that  $z = \delta D / \sigma \sqrt{2\Pi}$  and  $\omega = \sqrt{2 \ln z}$ ; therefore, a higher value of  $\delta$  might produce biased results.

After determining the criterion for multiple equilibria ( $\phi_t^{\min}, \phi_t^{\max}$ ) using Equation (3), we calculate  $\phi_t$  using Equation (4). Note however that in actually calculating  $\phi_t$  we assume time period  $t + 1$  as time period  $t$ . This facilitates us in determining  $\phi_t$  for 2007 without calculating the forecasted values for the 2008 components of  $\phi_t$ . Therefore, for the sake of maintaining symmetry of the analysis we have used time period  $t$  for all the years.<sup>4</sup>

Table 4

#### *Pakistan's External Vulnerability*

(Units in % GDP, Except  $r_t^*$ )

	$D_t$	$R_t$	$C_t$	$r_t^*$	$z_t$	$\phi_t^{\min}$	$\phi_t^{\max}$	$\phi_t$
2003	40.02	13.76	-0.43	1.24	3.08	3.66	10.35	14.12 <sup>a</sup>
2004	34.00	13.43	-1.31	1.89	2.62	3.51	8.39	9.93 <sup>a</sup>
2005	30.70	12.03	-4.07	3.62	2.36	3.40	7.34	6.31 <sup>b</sup>
2006	27.67	11.32	-6.55	4.94	2.13	3.29	6.40	3.92 <sup>b</sup>
2007	26.54	11.90	-6.82	4.82	2.04	3.25	6.03	3.92 <sup>b</sup>

Source: Authors' calculations based on methodology as outlined in Section 4; data taken from State Bank of Pakistan.

Note: The annual observations mentioned here correspond to the fiscal years; for example, 2003 is FY03.

<sup>a</sup>Inside 'no-crisis' region.

<sup>b</sup>Inside 'multiple equilibria' region.

<sup>4</sup>This is a departure from the predictions of the model; nonetheless, one can hardly undermine the possibility of investors' expectations not to include the current values of relevant fundamentals as well.

Table 4 summarises the results of these calculations. As evident, Pakistan's composite fundamental in all the years never remained below the lower limit of the  $(\phi_t^{\min}, \phi_t^{\max})$  range; that is, in 'crisis' equilibrium region. In particular,  $\phi_t$  was within 'no-crisis' equilibrium region in both 2003 and 2004 and close to the upper limit of the multiple equilibria region in 2005. In the years 2006 and 2007,  $\phi_t$  has remained within the multiple equilibria region.

Note that while external debt to GDP ratio has declined significantly from 40.02 percent in 2003 to 26.54 percent in 2007, the shift of  $\phi_t$  from 'no-crisis' equilibrium region to multiple equilibria region in 2005 and onwards can be attributed to two main developments. In the first place, current account deficit as a percent to GDP has risen sharply from -0.43 percent in 2003 to -4.07 percent in 2005 to -6.82 percent in 2007. Second, the deterioration in current account deficit has been accompanied by falling foreign exchange reserves and rising foreign interest rates. Nevertheless, the fact that economy remained within the multiple equilibria region in the recent past can be translated into a lower probability of crisis.

## 5.2. Pakistan's Fiscal Sustainability

The results for the fiscal sustainability tests are presented for yearly data series (1975-2007), divided into two sub-periods (1975-1995 and 1996-2007). The sub-periods roughly correspond to periods of pre and post financial market reforms implemented in the Pakistan's economy. To carry out the tests, we present two alternative specifications for the overall and the two sub-periods' samples. The first, the benchmark specification [Equation (6)] and the second [Equation (8)] add a term to capture the nonlinearities in the response of primary budget surplus to increases in public debt.

Table 5 gives the results of the regressions using yearly observations for full sample size and of its sub-sample periods. The results of the two sub-periods differ diametrically from each other. However, we find the results of post financial reforms Sub-Sample (1996-2007) in the same direction as obtained for the Full-Sample (1975-2007).

In the Full-Sample (1975-2007), the coefficient on debt, 0.06, is positively related to primary budget surplus and is statistically significant. While the coefficient, 3.2, to capture the non-linear relationship between debt and primary budget surplus is positive, it is statistically insignificant. The positive and significant coefficient, in the benchmark regression, suggests that fiscal policy in Pakistan has remained sustainable amid expanding public debt.

For the first Sub-Sample (1975-1995) the coefficient for debt is negative, albeit insignificant. While statistically it is not a robust result, it nonetheless implies that for the pre reform period until 1995 government's fiscal policy was not sustainable. While the non-linear specification is statistically significant, with strong adjusted  $R^2$  and D-W statistics, the coefficient, -57.09, of  $(d_t - \bar{d})^2$  however does not appear to be reasonable.

The results of the second Sub-Sample (1996-2007) are rather encouraging. In the benchmark specification, the coefficient of public debt, 0.03, is positive and statistically significant thus representing government's fiscal policy sustainability. The result of the estimates on the non-linear specification is consistent with the benchmark's one. The

Table 5

*Pakistan's Fiscal Sustainability*

Full Sample: 1975–2007								
	<i>Const.</i>	$d_{t-1}$	<i>GVAR</i>	<i>YVAR</i>	$(d_t - \bar{d})^2$	$\bar{R}^2$	<i>DW</i>	<i>TotalObs.</i>
Benchmark	-9.90*	0.06*	-2.09E-05*	3.64E-05		0.67	1.02	33
	(-5.22)	(2.71)	(-6.03)	(0.44)				
Non-linear	-10.75*	0.07*	-1.97E-05*	6.26E-05	3.2	0.67	1.04	33
	(-4.32)	(2.53)	(-4.48)	(0.67)	(0.61)			
Sub-Sample: 1975–1995								
	<i>Const.</i>	$d_{t-1}$	<i>GVAR</i>	<i>YVAR</i>	$(d_t - \bar{d})^2$	$\bar{R}^2$	<i>DW</i>	<i>TotalObs.</i>
Benchmark	-2.35	-0.043	-4.75E-05*	0.00055		0.42	1.39	21
	(-0.67)	(-1.01)	(-2.99)	(0.37)				
Non-linear	8.87***	-0.13*	-2.99E-05*	-0.0013	-57.09*	0.69	1.95	21
	(1.72)	(-2.32)	(-2.30)	(-1.3)	(-3.98)			
Sub-Sample: 1996–2007								
	<i>Const.</i>	$d_{t-1}$	<i>GVAR</i>	<i>YVAR</i>	$(d_t - \bar{d})^2$	$\bar{R}^2$	<i>DW</i>	<i>TotalObs.</i>
Benchmark	-2.97*	0.033*	-1.90E-06	-9.69E-05*		0.39	1.60	12
	(-1.94)	(2.1)	(-0.69)	(-2.4)				
Non-linear	-6.06*	0.05*	-6.69E-07	-3.09E-05	7.60*	0.58	1.90	12
	(-4.24)	(4.32)	(-0.34)	(-0.89)	(3.18)			

*Source:* Authors' estimations based on the methodology as outlined in Section 4; data taken from State Bank of Pakistan.

*Note 1:* *t*-statistics are reported in parenthesis; \*, \*\*, and \*\*\* indicate significance at 1, 5, and 10 percent levels, respectively.

*Note 2:* The annual observations mentioned here correspond to the fiscal years; for example, 2007 is FY07.

nonlinear term, 7.60, is statistically significant and signifies a greater reaction of fiscal policy to larger deviations of debt from its long-term mean. Therefore, the results of the second Sub-Sample (1996–2007) is the indication of stronger evidence that Pakistan's fiscal policy has remained sustainable even in the recent past.

## 6. CONCLUDING REMARKS

The results of the tests carried out in this study do not present an adverse scenario for Pakistan's economy. In addition to this, Pakistan's foreign exchange reserves reached its record high level of U.S. \$ 16.3 billion on October 30, 2007. Above all, Pakistan's GDP growth rate, averaging more than 7 percent within the last four years, considerably guarantees its external and fiscal sustainability. Therefore, if examined from within the predictions of the first- and second-generation models of crisis, Pakistan can be placed in 'no-crisis' zone.

While there is a broad consensus that deterioration in fundamentals is a major cause of crisis, policy-makers have generally failed to prevent several crisis in the past. Why? Krugman (1997) while observing on how to prevent a crisis notes, "the real cause of currency crisis is not much what you are actually doing, as what the financial markets suspect you might *want* to do." Arguing on the same lines, Saqib (2003) and Fic and Saqib (2006) note that while deterioration in fundamentals did precede the Brazilian crisis of 1999 and Russian crisis of 1998, political commitment and stability were other important determinants.

In particular, for Brazilian crisis, Saqib (2003) argues, “[T]he divided coalition government and a president facing impending elections eschewed the correction of external misalignments and fiscal austerity at a time when the markets were already excited by the 1997-1998 East Asian and 1998 Russian financial crisis.” For Russian crisis, Fic and Saqib (2006) argue, “[T]hat the political instability was an important factor behind the collapse of the Russian ruble in August 1998. Frequent changes in and of government undermined the implementation of much needed institutional and structural reforms... Inability to implement consistent and coherent policies to achieve, primarily fiscal balances was an equally important determinant of Russian crisis.”

In effect, the aforementioned Krugman’s argument and the importance of political variables in some past crisis suggest that currency crisis is a short run phenomenon and the deterioration in fundamentals alone do not dictate a crisis. Therefore, to eventually prevent a crisis markets must have a positive view of other crucial factors such as political commitment and stability.

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## Comments

This paper is very good and touches a crucial issue. The authors explore vulnerability of Pakistan's economy to any crisis by evaluating the sustainability of fiscal deficit and current account balance using Masson and Bohr's models. Though this paper is already published under working paper series of State Bank of Pakistan—Working Paper 21, January 2008. However, I have few comments, queries and suggestions.

- (a) Authors expanded the model by including non debt determinants variables to overcome the problem of non-stationary without checking the problem. I think author should check for stationary first and if problem exist then they can use remedial measures.
- (b) The authors indicate that results for two periods differ from each other. However, it is not mentioned how or which test they have used to check the difference in parameters. If they have not used statistical method, they must test the results statistically.
- (c) Authors indicate that the level of current account balance and fiscal deficit signal some danger but model results does not point out to any immediate danger for Pakistan economy. The study did not take political factors [number of elections, uncertainty, effective number of parties, coalition etc.] and structural factors [openness, trade concentration etc.] into account that may be the reason that model results does not indicate the danger of crisis. This can be checked after inclusion of some or all above mentioned factors. This expansion will render more in valuable results.
- (d) The author should conduct some counterfactual simulation analysis to find remedial measures in case Pakistan faces a crisis in future. This will be the major contribution of the paper.

The statement about 'September 11' may be modified as it does not look nice. You can associate it with foreign capital flow as increase in foreign capital inflow after September 11.

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