



WP/06/244

IMF Working Paper

New Evidence on Fiscal Adjustment and Growth in Transition Economies

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IMF Working Paper

Fiscal Affairs Department

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October 2006

Abstract

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This paper analyzes the relationship between fiscal adjustment and real GDP growth in a panel of 26 transition economies during 1992–2001. Unlike most previous studies using cross-country regressions, the paper finds a positive and statistically significant relationship between fiscal adjustment and growth that is robust to different model specifications and estimation methods. The paper also presents country experiences to delve deeper into the mechanisms that may underlie this statistical relationship.

JEL Classification Numbers: C33, E62, H11, H60

Keywords: fiscal adjustment, growth, transition economies, fiscal policy

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¹ The authors would like to thank for their helpful comments Messrs. Flood, Chami, Flickenschild, Saadi-Sedik, Grigorian, Ding, Abiad, Gueorguiev, Klingen, Mody, and Szekely, and Mmes. Corbacho, Allard, Farhan, and Ohnsorge.

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I. INTRODUCTION

There is consensus in the literature on the crucial role played by initial conditions, macroeconomic stabilization, and structural reforms on growth patterns in transition economies.² The consensus on macroeconomic stabilization is reflected in that most studies of growth performance in transition economies include variables that measure the impact of inflation.³ However, there is no conclusive empirical evidence so far on the relationship between fiscal adjustment and growth in transition economies. As Havrylyshyn (2001) has noted, “the empirical literature is nearly unanimous on the negative impact of inflation on growth but has not been able to disentangle the separate effects of fiscal deficits and inflation on growth.” In fact, the fiscal balance is much less widely used in cross-country studies of growth performance (Fischer, Sahay, and Végh, 1996; Wolf, 1997; Loungani and Sheets, 1997; Fischer, Sahay, and Végh, 1998; Berg and others, 1999; Fischer and Sahay, 2000). While all these studies find a negative relationship between inflation and growth, only a few of them that use both inflation and the fiscal balance find the fiscal balance to be a robust explanatory variable.⁴ A recent study (Purfield, 2003) does not find a clear relationship between fiscal adjustment and growth in transition economies.

This empirical evidence seems at odds with the widely held view that fiscal adjustment is crucial for macroeconomic stabilization and therefore a necessary condition for growth. Agénor and Montiel (1999) survey the theoretical literature and conclude that fiscal adjustment is crucial for attaining macroeconomic stability. Excessive fiscal deficits may lead to inflation, balance of payments difficulties, external debt crises, and high real interest rates, outcomes that tend to be negatively correlated with economic growth. Case studies in these papers also show that in the absence of permanent fiscal adjustment, inflation does not stay low, with the well-known negative consequence that this has for growth.

The empirical literature on fiscal policy and growth also supports the notion that healthy budget balances are good for growth over the long run. While the effect of fiscal adjustment in the short run remains open to question, a large body of empirical research supports the notion of the

² Transition economies are those that were initially organized on the basis of government ownership of the factors of production and central planning and changed their economic organization to market based systems. The sample in this paper includes economies in Central and Eastern Europe, the Baltics, Commonwealth of Independent States, and Mongolia. See Table 5 (Appendix I) for a detailed list of countries in each group.

³ See, for example, Aslund, Boone, and Johnson (1996); Berg and others (1999); Brunetti, Kisunko, and Weder (1997); Christoffersen and Doyle (1998); de Melo, Denizer, and Gelb (1996); Fischer, Sahay, and Végh (1996, 1998); Fischer and Sahay (2000); Havrylyshyn, Izvorski, and van Rooden (1998); Havrylyshyn and van Rooden (2000); Hernández-Catá (1996); Loungani and Sheets (1997); and Wolf (1997).

⁴For example, Fischer and Sahay (2004), who focus on the role of institutional reforms in development, mention in passing that fiscal adjustment is associated with higher growth. Their growth regressions show a substantial and statistically significant positive coefficient for the fiscal adjustment variable.

salutary long-term effects of fiscal adjustment.⁵ However, a number of studies in industrial countries have found that improving fiscal positions can stimulate growth even in the short run. A central theme in these works is that the composition of fiscal adjustment plays a key role in determining whether fiscal contractions are sustainable over time and lead to higher growth.⁶ Gupta and others (2005a, 2005b) show that these results can largely be extended to emerging market and low-income countries.

This paper analyzes whether the relationship between fiscal adjustment and growth in transition economies is different from the one observed in industrial, emerging market, and low-income countries. This issue is analyzed using a sample of 26 transition economies covering the period 1992–2001. The results suggest that the impact of fiscal adjustment on growth in transition economies is not qualitatively different from what has been observed in industrial, emerging market, and low-income economies. In particular:

- The correlation between fiscal adjustment and growth is stronger for those countries that need to achieve macroeconomic stability. The largest fiscal adjustments in the sample have been observed in the Commonwealth of Independent States (CIS). These countries had unsustainable fiscal positions at the beginning of the 1990s created by large macroeconomic shocks as a result of the collapse of the former Soviet Union. The sustained consolidation efforts in the CIS have been accompanied by accelerations in growth in the sample.⁷
- However, for countries that have already achieved macroeconomic stability, the relationship between fiscal adjustment and growth is less clear. Other factors, such as the composition of spending,⁸ are more likely to affect growth in these countries.
- A fixed-effects panel-data error-correction model that controls for the effects of initial conditions, structural reforms, and inflation confirms the strong positive correlation of fiscal adjustment and growth. In addition, the positive effect of fiscal adjustment seems to hold in the short and long run. These results are robust to a variety of model

⁵ See for example Easterly, Rodríguez, and Schmidt-Hebbel (1994).

⁶ These studies show that improving fiscal positions through the rationalization of the government wage bill and public transfers rather than increasing revenues and cutting public investment can foster higher growth even in the short term. See for example, McDermott and Wescott (1996); Alesina and Perotti (1996); Alesina, Perotti, and Tavares (1998); Alesina and Ardagna (1998); Buti and Sapir (1998); Alesina and others (1999); and von Hagen and Strauch (2001).

⁷ Hausmann, Pritchett, and Rodrik (2005) use the term “growth accelerations” to describe episodes where the per capita growth rate increases by more than 2 percentage points a year and is sustained for at least eight years. By looking at jumps in country medium-term trends they expect to gain insight into the sources of successful growth transitions. While the paper does not follow this exact definition of growth acceleration and methodology, the concept of acceleration being used is consistent with a definition of this type.

⁸ See Patillo, Gupta, and Carey (2005) for evidence on the importance of the composition of fiscal spending on growth in low-income countries.

specifications and estimation techniques. These findings seem to confirm the dominant role of the CIS countries in generating the strong positive association between fiscal adjustment and growth.

- Considering several possible demand and supply channels by which fiscal policy can affect output growth in the short and long term, a qualitative analysis of country experiences seems consistent with the hypothesis that fiscal adjustment has been associated with higher growth primarily through two channels: (i) reduced government borrowing requirements, which curtailed the need to monetize budget deficits, and (ii) a credibility effect that signaled a political commitment to long-term fiscal sustainability and macroeconomic stability. These effects of fiscal adjustment in conjunction with structural reforms spurred an expansion in official and private capital flows that partially substituted for the previous net resource transfer from the Soviet Union and allowed aggregate demand to recover. While structural reforms also led to improved efficiency stemming from the reallocation of resources on the supply side and boosted growth, capital-flow-driven aggregate demand recovery, principally reflected in consumption growth, is likely to have dominated growth in the years following the transitional recession. As aggregate demand expands and full employment is reached, traditional supply-side growth forces based on capital accumulation and technological progress are likely to regain their traditional importance.
- The main policy implication is that countries that have managed to credibly stabilize and have achieved fiscal sustainability are unlikely to get large benefits in terms of growth by pursuing additional fiscal adjustment. For example, addressing microeconomic distortions with structural reforms to increase the rate of return to investment to attract capital flows, improving the composition of government spending while maintaining a prudent fiscal stance, and strengthening governance are likely to be more critical policies in generating growth in that context.

The remainder of the paper is organized as follows: Section II describes the empirical methodology and the data. Section III discusses some stylized facts on growth and fiscal adjustment in transition economies. Section IV discusses the main econometric results. Section V discusses country experiences. Section VI presents the conclusions.

II. EMPIRICAL METHODOLOGY AND SAMPLE

A. Overall Approach

The analysis of the relationship between fiscal adjustment and growth is carried out in three different stages.

The first stage provides a simple characterization of the data of fiscal adjustment and growth in transition economies to establish some simple stylized facts. In addition, assuming that there is some unspecified causal relationship between fiscal adjustment and growth, Appendix II includes a discussion of cyclical issues that may affect the direction of causality. Standard

deviations and coefficients of variation of fiscal balances are computed to describe the stability over time of fiscal adjustment efforts.

The second stage controls for other factors that could also affect the relationship between fiscal adjustment and growth so that the possible problem of omitted variables is limited. For example, in countries with important natural resources (most notably oil or gas), it is conceivable that favorable terms of trade could be simultaneously associated with a deficit-reducing increase in fiscal revenues and a large positive impact on growth. In these cases, the observed relationship could be spurious (e.g., Azerbaijan, Kazakhstan, and Russia).

However, the panel-data analysis used in the second stage shares limitations with other cross-country regression studies of growth, which are likely to be especially important in transition economies. In particular:

- *Parameter heterogeneity.* As Hsiao and Sun (2000) have pointed out, the ability to exploit the information contained in panel data depends critically on the plausibility of pooling: “If individual observations are more appropriately viewed as generated from heterogeneous populations, there is no justification to pool the data, hence [we] cannot explore the many advantages associated with the use of panel data.”⁹ The problem of parameter heterogeneity would apply both across countries at a point in time, and over time within the same country.
- *Omitted variables.* Although country fixed effects are likely to attenuate the importance of this problem, given the radical transformations associated with the passage from a planned to a market economy and the numerous causal factors involved, having some kind of omitted-variables bias is difficult to avoid.
- *Multicollinearity.* Its presence makes it difficult to disentangle the effect of certain independent variables. Including several strongly correlated independent variables in the regression may distort standard errors and hence the ability to make inferences about particular independent variables.
- *Endogeneity and reverse causality.* While separating the cyclical component of fiscal deficits is one way to have a sense of the severity of this problem and address it, the

⁹ Hsiao and Sun (2000, p.181) note that the decision to pool or not to pool the data depends on whether, y_{it} , the i th individual observation of the dependent variable at time t , conditional on x , the independent variable(s) of interest, can be viewed as a random draw from a common population. This is the so-called exchangeability criterion. It implies that the individual and time subscript, it , is simply a labeling device. Observations on the dependent variable should be exchangeable so that, a priori, $E(y_{it} | x) = E(y_{js} | x)$. In other words, the expected probability of observing y_{it} or y_{js} , conditional on x , the independent variable(s) of interest, should be the same. If this condition is satisfied, by pooling the data we can obtain more robust and precise parameter estimates. However, if individual outcomes are more appropriately viewed as stemming from a heterogeneous population, then the subscript it contains important information that can be used to determine the specific heterogeneous population from which the particular observation is generated.

short length of the time series, and the existence of numerous shocks and volatility in the data, limits the possibility to introduce appropriate corrective factors (e.g., the use of a Hodrick-Prescott filter to calculate the structural balances).

- *Scope and quality of the data.* As noted by most papers, GDP series may have been underestimated in some countries, especially at the beginning of the transition. At the same time, the definition of the fiscal deficit may vary from country to country (central government, general government, nonfinancial public sector, etc.). Hence, the meaning of “fiscal adjustment” may not be the same in all countries.

Given these limitations, the third step complements the econometric analysis with qualitative evidence from country experiences. The qualitative review of country experiences is aimed at better specifying the causal mechanisms behind some of the key statistical relationships suggested by the econometric evidence.

Alternative channels by which fiscal policy affects economic activity are considered in the qualitative review of country experiences. These channels are resource allocation, income distribution, and stabilization. Resource allocation and income distribution typically refer to how the level and composition of taxation and public expenditures affect relative prices and factor returns, while stabilization refers mainly to the impact of the fiscal policy on short-term macroeconomic activity.

The supply-side or long-run economic growth effects of fiscal policy will depend on the extent to which it can affect the main growth determinants through the previously mentioned channels. These factors include the efficiency with which any existing stock of resources is utilized, factor accumulation (including physical, human, and other forms of intangible capital), and technological progress. Regarding the last of these, for many developing countries this will depend on their ability to absorb new technology from abroad.

The demand-side or short-term impact on economic activity of fiscal policy will depend on the change in the fiscal balance, the specific changes in public expenditure and taxation underlying it, and changes in its financing. In this regard, the expectations of economic agents regarding the use of money creation or debt instruments, with corresponding implications for medium-term debt sustainability and overall macroeconomic stability, are crucial. Implications for long-term growth along the lines discussed above are also important for analyzing the sustainability of the debt profile.

B. The Econometric Model

Preliminary considerations

Many previous papers had used either cross-sectional data (without examining variations over time) or a relatively short time series with fairly simple estimation techniques, and often without including fixed effects. In a way, this is understandable since (i) transition began only in the early 1990s, hence the phenomenon is too recent to have the relatively long time series of data that are generally available in other regions and (ii) researchers are most interested in the effect of specific initial conditions such as the size of the industrial sector and other specific characteristics of countries whose effects can be diminished (if not completely wiped out) by the use of fixed effects.

In contrast, in this paper fixed effects are used to obtain unbiased and consistent estimates. Transition economies are characterized by a fast and dramatic process of change whose very nature is likely to have varied significantly from one country to the next. The exclusion of fixed effects ignores these country-specific differences and increases the risk of omitted-variables bias. In addition to these theoretical reasons, this is ultimately an empirical question. If regression tests (usually an F-test or Chow test) show that fixed effects belong in the model, they should be included. Given the focus of this paper on the impact of fiscal adjustment on growth, as long as the error term is not correlated with the fiscal and other control variables, it is not a problem if the impact of other variables is negated by the inclusion of fixed effects.

Model and sample

The paper analyzes the relationship between fiscal deficits and real GDP growth using a sample of 26 transition countries over the 1992–2001 period.¹⁰ The basic regression framework is described by a one-equation error-correction model¹¹ given by:

$$\Delta Y_{i,t} = \alpha + \Delta X_{i,t-1} \beta_k + \phi (Y_{i,t-1} - X_{i,t-1} \gamma) + \varepsilon_{i,t}, \quad (1)$$

where, $Y_{i,t}$ is real GDP in country i during year t , Δ is the first differences operator, X is a vector of independent variables and $\varepsilon_{i,t}$ is a white noise error term. Although a number of different specifications have been used, a simple three-variables vector accounts for over 70 percent of the variation in the dependent variable. The model describes a short-term equilibrium relationship given by $\Delta Y_{i,t} = \alpha + \Delta X_{i,t-1} \beta_k + \varepsilon_{i,t}$ and a term $\phi (Y_{i,t-1} - X_{i,t-1} \gamma)$, which measures the deviation from this short-term equilibrium relationship. Equation 1 shows that a change in $X_{i,t-1}$ produces a short-term contemporary change in $Y_{i,t}$ that is measured by the k -dimensional vector of regressors β_k . In addition, when the impact of $X_{i,t-1}$ on $Y_{i,t}$ throws the model off its

¹⁰ The data are from the World Economic Outlook database of the International Monetary Fund.

¹¹ This section draws on Kaufman and Segura-Ubiergo (2001) and Segura-Ubiergo (forthcoming).

long-run equilibrium given by the cointegrating vector $Y^*_{i,t-1} = X^*_{i,t-1}\Upsilon$, where the “*” indicates equilibrium, the discrepancy or “error” ($Y_{i,t-1} - X_{i,t-1}\Upsilon$) is corrected at a yearly rate of ϕ .¹²

In order to estimate Equation 1, it is useful to restate it through a simple mathematical operation: Let β_j be defined as $-(\phi\Upsilon)$, where both parameters ϕ and Υ come from Equation 1; then it follows that $\Upsilon = \beta_j / -\phi$. Equation 1 can therefore be rewritten as:

$$\Delta Y_{i,t} = \alpha + Y_{i,t-1}\phi + \Delta X_{i,t-1}\beta_k + X_{i,t-1}\beta_j + \varepsilon_{i,t} \quad (2)$$

And Equation 2 can then be estimated through ordinary least squares (OLS). The variables used in Equation 2 are summarized in Table 1.

Table 1. Description of Main Variables

	Obs	Mean	Standard Dev.		Source
Dependent Variable					
D_NGDPR	234	0.95	7.88	Real GDP Growth	WEO
Independent Variables					
GGB_Y	260	-5.59	7.26	General Gov. Overall Fiscal Balance (in percent of GDP)	WEO
D_GGBY	234	0.85	5.21	Change in General Gov. Overall Fiscal Balance	WEO
BCA_Y	260	-5.54	11.68	Current Account Balance (in percent of GDP)	WEO
D_BCAY	234	0.06	10.18	Change in Current Account Balance	WEO
WDIINF	202	164.75	566.11	Average Annual Consumer Price Index	WDI
D_WDIINF	179	-93.33	533.73	Change in Average Annual Consumer Price Index	WDI
REF	240	3.12	0.80	EBRD Reform Index	EBRD
D_REF	216	0.13	0.24	Change in Reform Index	EBRD

Sources: IMF, *World Economic Outlook* (WEO), European Bank for Reconstruction and Development (EBRD), and World Bank, *World Development Indicators* (WDI).

¹² In addition, the importance of the short-term effects $\Delta X_{i,t-1}$ depends on the size of β_k and on how long the effects of changes in $X_{i,t-1}$ persist through time. A change in $X_{i,t-1}$ produces an immediate (contemporary) change in $Y_{i,t}$ that is measured by β_k . If at time t there is a change in $X_{i,t}$ in the opposite direction to the change in $X_{i,t-1}$, then there are no more effects. But if the change in $X_{i,t-1}$ is sustained, then the impact will continue in subsequent periods and can be measured by $\Delta X_{i,t-1} \cdot (1+\phi)^t$, where t is the number of periods after the initial change. Thus, for example, three years after the initial change $\Delta X_{i,t-1}$, the effect will be $\Delta X_{i,t-1} (1+\phi)^3$. Since $0 < \phi < 1$, the smaller the value of ϕ , the longer the sustained changes in X will persist through time.

The selection of variables included in the empirical analysis follow the existing literature on growth in transition countries. The model is relatively simple and includes four substantive variables measured both in “levels” and “first-differences:” a structural reform index, the general government overall fiscal balance, inflation, and the external current account balance.¹³ Unlike other studies, variables that measure differences in initial conditions are not included, but these country-specific factors will be captured by the inclusion of fixed effects in most of the models. As noted above, the inclusion of fixed effects is key to reduce the possible omitted-variables bias.

III. GROWTH AND FISCAL ADJUSTMENT IN TRANSITION COUNTRIES: SOME STYLIZED FACTS

Both growth and fiscal balances improved significantly in transition economies over the past decade. For the purposes of this analysis, the sample can be divided in two five-year periods: (i) the first period, from 1992–96, which can be broadly considered the “transition period” and (ii) the second period, from 1997–2001, which can be described as the “post-transition” period.¹⁴ Between the transition and post-transition periods, the average growth rate passed from about -2.0 percent to 4.5 percent, while the average fiscal deficit was cut in half from about 7.0 to about 3.5 percent of GDP.

While these averages mask important differences across countries, Table 2 provides compelling evidence that the higher growth trend and lower fiscal deficit have been quite general. In particular, growth improved in over 75 percent of the cases, while fiscal deficits were reduced in about two-thirds of the cases. Figures 1 and 2 graphically illustrate this relationship.

There also seems to be a strong correlation between fiscal adjustment and growth.¹⁵ Before moving to the results of the more sophisticated econometrics and a more detailed analysis of country experiences, we examine some simple descriptive patterns underlying the data. Figure 3 plots the change in the overall fiscal deficit and the change in the growth rate between the transition and post-transition periods. It shows that (i) fiscal adjustment was generally associated with higher growth and (ii) the effect is greater the higher the initial level of the deficit. When the adjustment exceeds about 10 percent of GDP, the impact on growth begins to decline (as can be shown by the concavity of the curve).

¹³ Not all empirical studies include this variable. Its inclusion or not in the model, as discussed below in Section IV, does not affect the main results.

¹⁴ To be sure, countries began the transition in different years. This paper follows the transition dating convention in Havrylyshyn and others (1999). Most countries are considered to have started transition in 1992. The exceptions are Bulgaria, the Czech Republic, Hungary, Poland, Romania, and the Slovak Republic, which started the process in 1990, and Albania, which started transitioning in 1991.

¹⁵ Note that at this stage, only correlations between the two variables are analyzed. There is no discussion on issues related to causality.

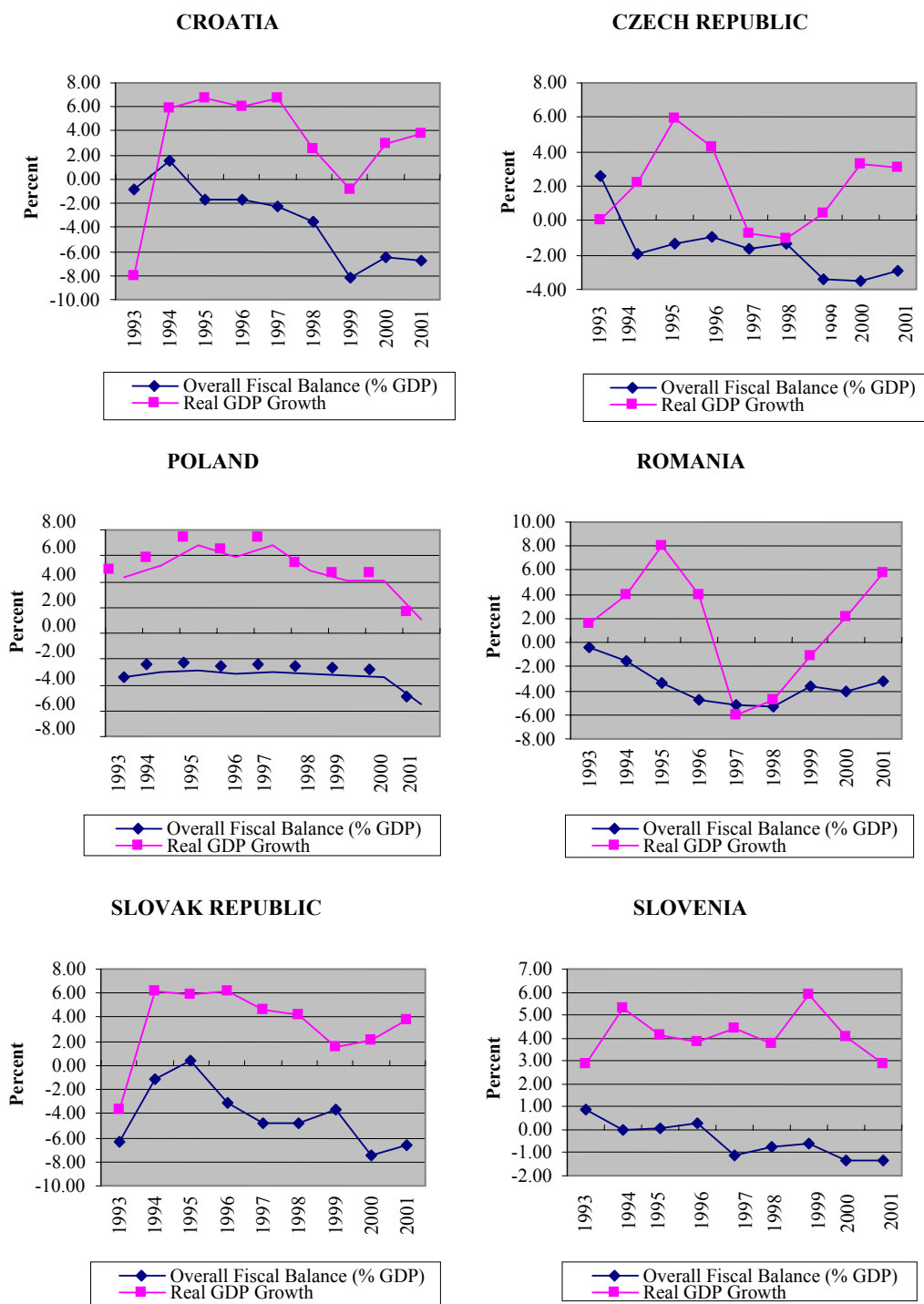
Table 2. Growth and Fiscal Adjustment Experience in Transition Countries, 1992–2001

Country	GBAL 92-96	GBAL 97-01	Fiscal Adj.	Growth 92-96	Growth 97-01	Growth Accel.
Poland	-3.78	-3.85	-0.08	5.82	3.50	-2.32
Romania	-3.32	-4.06	-0.74	2.28	0.47	-1.81
Croatia	-1.48	-6.24	-4.76	3.50	2.08	-1.42
Slovak Republic	-4.50	-5.63	-1.13	3.82	2.88	-0.94
Czech Republic	-0.89	-2.81	-1.92	2.35	1.44	-0.91
Mongolia	-12.45	-9.72	2.74	2.43	2.21	-0.22
Slovenia	0.22	-1.00	-1.21	4.11	4.14	0.03
Hungary	-6.59	-4.05	2.53	1.95	4.52	2.57
Estonia	-0.10	-1.28	-1.18	1.56	4.43	2.87
Macedonia	-4.76	-1.38	3.38	-1.44	1.94	3.38
Uzbekistan	-7.55	-2.55	5.00	-0.66	3.20	3.86
Albania	-11.75	-10.74	1.00	5.36	9.43	4.07
Armenia	-22.25	-5.60	16.65	1.49	6.56	5.07
Latvia	-1.63	-2.53	-0.90	0.40	5.58	5.18
Lithuania	-3.42	-4.76	-1.34	-2.19	4.00	6.19
Georgia	-20.69	-4.71	15.98	-3.21	3.12	6.33
Kyrgyz Republic	-13.12	-9.74	3.38	-4.31	4.11	8.42
Belarus	-1.90	-1.11	0.79	-3.28	5.57	8.85
Russia	-10.16	-1.36	8.80	-5.55	4.04	9.58
Moldova	-10.77	-2.35	8.41	-10.33	-0.43	9.91
Bulgaria	-6.64	-0.48	6.17	-6.10	3.95	10.05
Kazakhstan	-5.20	-2.72	2.47	-5.58	6.04	11.63
Ukraine	-9.73	-2.00	7.73	-12.47	3.21	15.68
Tajikistan	-12.84	-1.90	10.94	-9.54	6.87	16.41
Azerbaijan	-5.67	-2.40	3.27	-9.50	9.60	19.10
Turkmenistan	2.52	-0.56	-3.08	-10.50	15.50	26.00
Average	-6.86	-3.67	3.19	-1.91	4.54	6.44

Source: IMF, *World Economic Outlook* and staff estimates.

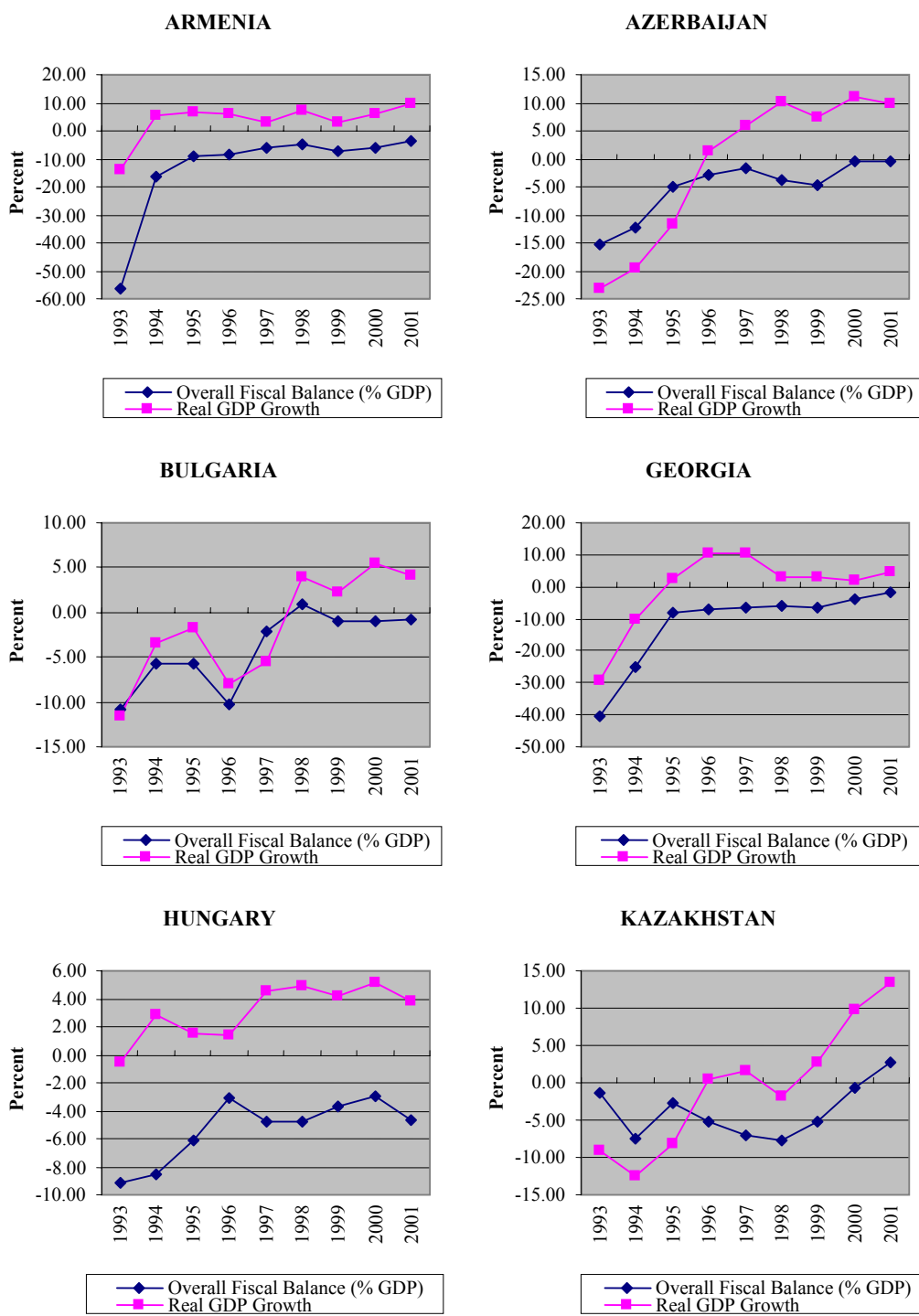
Note: Countries are ranked in terms of the magnitude of growth acceleration. GBAL is the General Government Overall Fiscal Balance.

Figure 1. Group I. Low Fiscal Adjustment-Low Growth Acceleration



Source: IMF, *World Economic Outlook* and staff estimates.

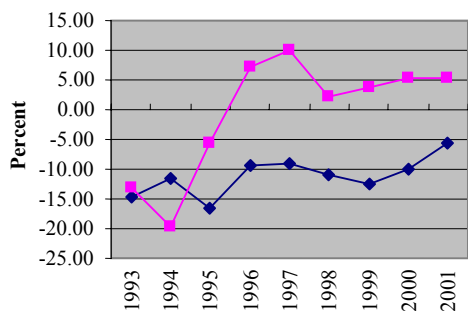
Figure 2. Group II. High Fiscal Adjustment-High Growth Acceleration



Source: IMF, *World Economic Outlook* and staff estimates.

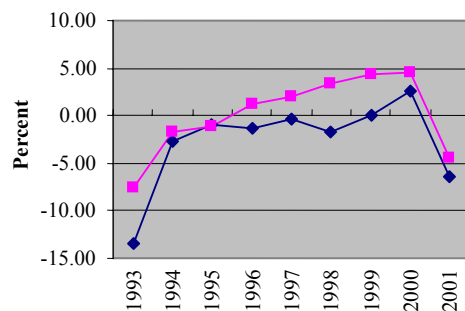
Figure 2 (continued)

KYRGYZ REPUBLIC



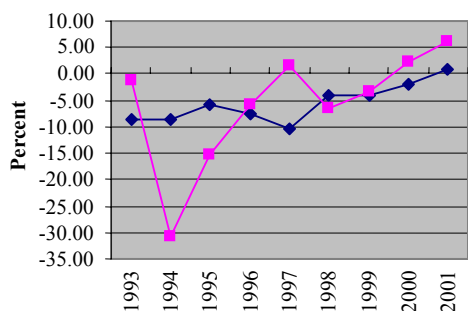
◆ Overall Fiscal Balance (% GDP)
■ Real GDP Growth

MACEDONIA



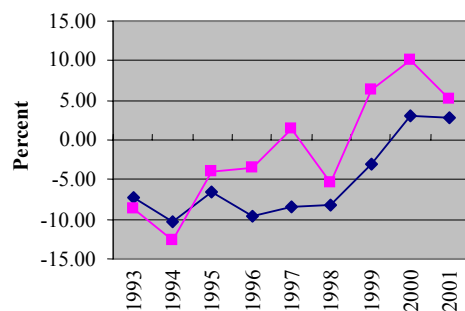
◆ Overall Fiscal Balance (% GDP)
■ Real GDP Growth

MOLDOVA



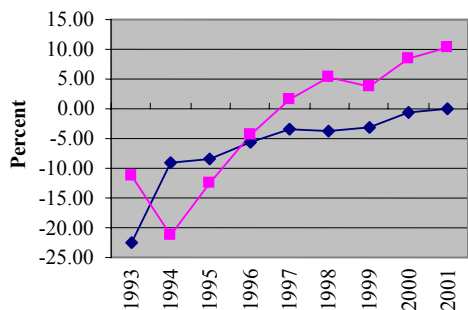
◆ Overall Fiscal Balance (% GDP)
■ Real GDP Growth

RUSSIA



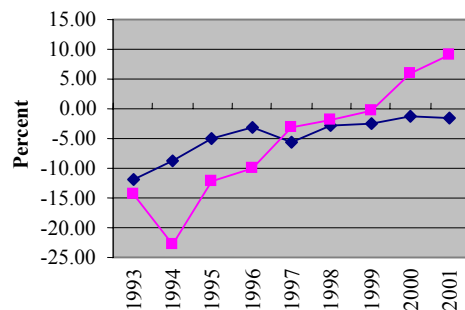
◆ Overall Fiscal Balance (% GDP)
■ Real GDP Growth

TAJIKISTAN



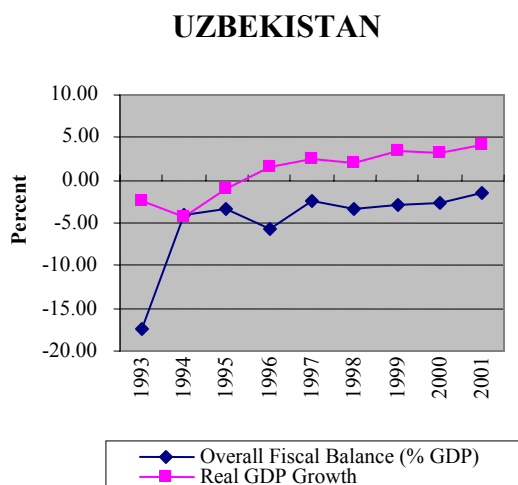
◆ Overall Fiscal Balance (% GDP)
■ Real GDP Growth

UKRAINE



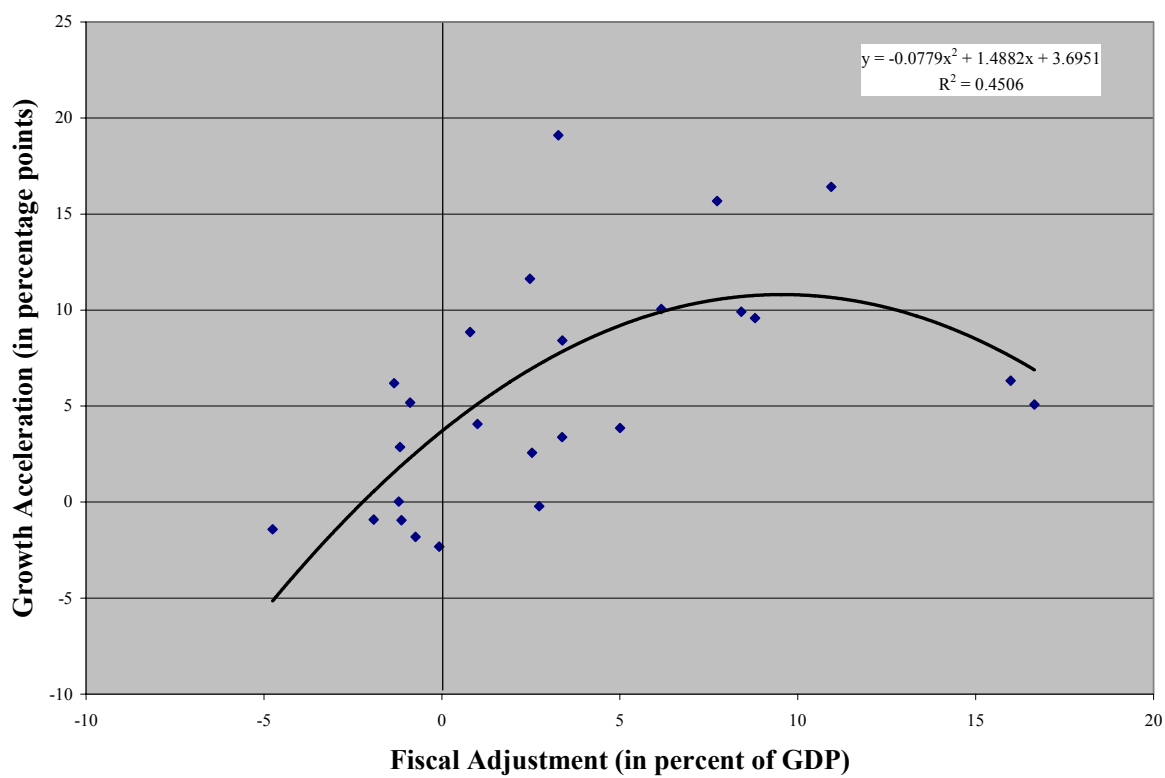
◆ Overall Fiscal Balance (% GDP)
■ Real GDP Growth

Figure 2 (concluded)



Source: IMF, World Economic Outlook and staff estimates.

Figure 3. Fiscal Adjustment and Growth Acceleration in Transition Countries



The positive relationship between fiscal adjustment and growth is particularly strong for the CIS. Reorganizing Table 1 with a regional focus¹⁶ (i.e., Baltic countries, Central and Eastern European countries, and CIS countries), large fiscal adjustment cases in the sample has predominantly occurred in CIS countries. In the Eastern European countries, only Bulgaria had a fiscal adjustment comparable to that of a CIS country.¹⁷ With the exceptions of Hungary and the Slovak Republic, most Central European countries had already achieved relatively low levels of fiscal deficit by 1992. All the Baltic countries had deficits below 3 percent of GDP by 1992.

The correlation between fiscal adjustment and growth is unclear in countries that had relatively low deficit levels at the beginning of the period. Table 5 (Appendix I) shows that in the Central and Eastern European group, countries where the fiscal deficit increased from a relatively low position (e.g., the Czech Republic) experienced lower growth. The opposite seems true in the Baltic countries, which are generally viewed as leaders in the implementation of structural reforms and macroeconomic stabilization. Other factors including the composition of spending may have played a role as well.

These results become evident if countries are divided along two criteria: the magnitude of fiscal adjustment (high-low) and the degree of growth acceleration (high-low). The matrix diagonal of Table 3 shows cases of either low adjustment-low growth acceleration or high adjustment-high growth acceleration. About 75 percent of the cases fall into this category. But there is also an important group of countries with low fiscal adjustment and high growth acceleration. This corresponds mostly to cases in three situations: (i) “early adjusters” such as the Baltic countries (i.e., most of the adjustment had taken place before 1992, hence the adjustment precedes the trends captured in the sample); (ii) countries where growth is affected primarily by changes in the international price of specific commodities (Belarus and Turkmenistan); or (iii) outliers such as Albania. Mongolia is the only case of high fiscal adjustment and low growth acceleration.

Fiscal adjustment was largely sustained through time and appears not to be driven by cyclical fluctuations. Figure 5 (Appendix II) shows that coefficients of variation of fiscal deficits of countries were modest, suggesting relative stability through time. In addition, there does not seem to be strong evidence of significant cyclical driving fiscal adjustment. Table 7 (Appendix II) suggest that both revenue and expenditure elasticities with respect to GDP are low.

¹⁶ See Table 5 (Appendix I). This regional classification follows Havrylyshyn and others (1999).

¹⁷ The Eastern European countries are Macedonia, Albania, Bulgaria, and Romania. Romania had a low overall balance at the beginning of the sample period.

Table 3. Fiscal Adjustment and Growth Acceleration in Transition Countries

		Growth Acceleration	
		Low (<2.5 percentage points)	High (>2.5 percentage points)
		Low (<2.5% GDP)	High (>2.5% GDP)
Fiscal Adjustment	Low (<2.5% GDP)	Croatia [-4.8, 0.5] 1/ Czech Rep. [-1.9, -1.0] Poland [-0.1, -2.3] Romania [-0.7, -1.8] Slovak [-1.1, -1.0] Slovenia [-1.2, 0.0]	Albania [1.0, 4.1] Belarus [0.8, 8.8] Estonia [-1.2, 2.9] Latvia [-1.0, 5.2] Lithuania [-1.3, 6.2] Turkmenistan [-3.1, 26.0]
	High (>2.5% GDP)	Mongolia [2.7, -0.2]	Armenia [16.6, 5.1] Azerbaijan [3.3, 19.1] Bulgaria [6.2, 10.1] Georgia [16.0, 6.3] Hungary [2.5, 2.6] Kazakhstan [2.5, 11.6] Kyrgyz [3.4, 8.4] Macedonia [3.4, 3.4] Moldova [8.4, 9.9] Russia [8.8, 9.6] Tajikistan [10.9, 16.4] Ukraine [7.7, 15.7] Uzbekistan [5.0, 3.9]

Note: The first figure in parenthesis corresponds to fiscal adjustment and the second corresponds to growth acceleration.

1/ If the big slump of 1992 (a large outlier) is included, Croatia would move to the upper right cell in Table 3.

IV. ECONOMETRIC MODEL RESULTS

The use of more sophisticated econometric techniques confirms the strong relationship between fiscal adjustment and growth. The results presented in Table 4 show that fiscal adjustment is positively associated with growth both in the short run (as captured by the first-difference variable) and in the long run (as captured by the lagged variable in levels).

The positive association of fiscal adjustment and growth is robust to a variety of model specifications and estimation techniques. With the exception of Model 9 (the Arellano-Bond estimator without including inflation as a regressor)¹⁸ all parameter estimates for the lagged level and change in the fiscal deficit are statistically significant, and in most cases at the 1 percent level of significance.

¹⁸ It is not entirely obvious why the “level” variable of the fiscal deficit in the model without inflation is not statistically significant. Since the variable turns statistically significant in the model with inflation, and inflation turns out to be statistically significant in all models across the board, there is a strong likelihood that Model 9 is misspecified.

Table 4. Econometric Models: Estimation Results 1/

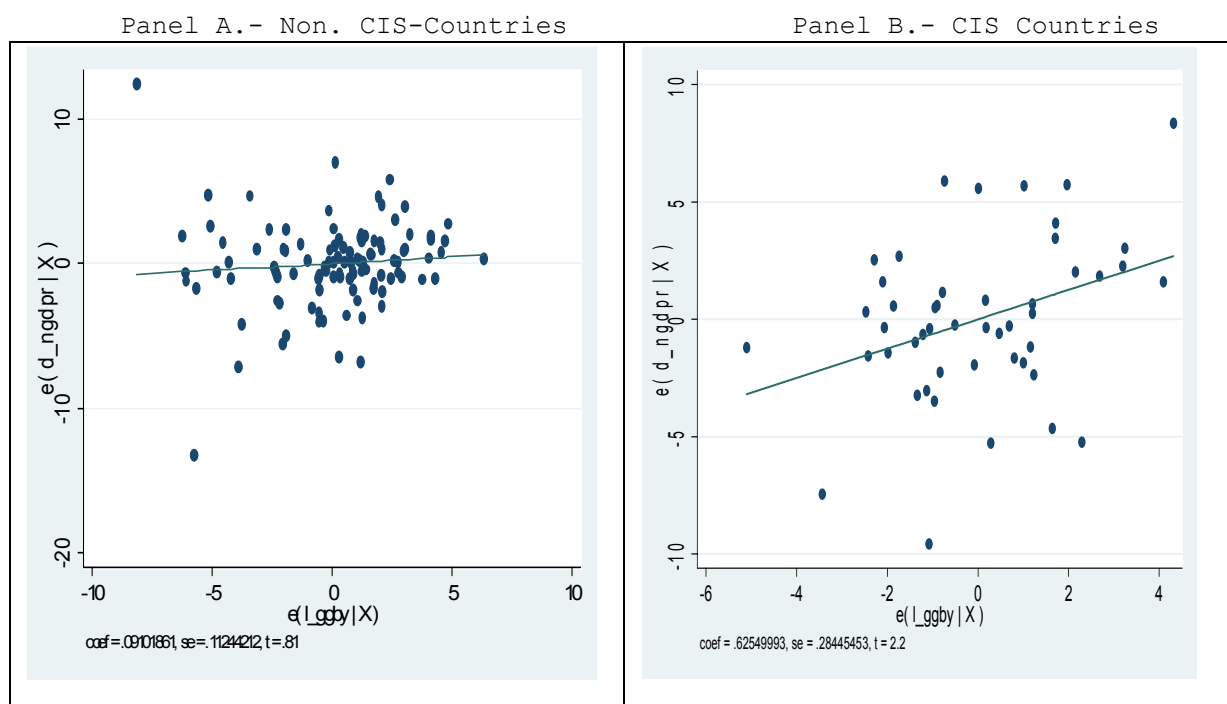
	OLS		OLS		Robust Regression		GLS		GMM	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
L.DNGDPR	0.5346 *** [0.0673]	0.3462 *** [0.0966]	0.453 *** [0.0698]	0.2378 ** [0.0974]	0.4608 *** [0.0454]	0.1469 *** [0.0526]	0.3162 *** [0.0608]	0.2804 *** [0.0543]	0.4318 *** [0.0760]	0.2234 *** [0.0838]
L.REFORM	1.4998 *** [0.7805]	5.9487 *** [2.0655]	-0.3138 *** [0.6322]	0.9441 *** [1.6103]	1.9951 ** [0.9905]	0.7881 *** [1.2493]	6.3277 *** [1.3411]	0.9341 *** [1.2423]	8.8624 *** [1.9282]	-0.2043 *** [2.5225]
D.REFORM	-0.9755 *** [2.1926]	1.5448 *** [2.6141]	-0.4137 *** [2.0046]	-1.2453 *** [2.2435]	-1.0749 *** [1.5377]	-2.5095 *** [1.8842]	1.6359 *** [2.0336]	-0.6626 *** [1.9831]	5.1984 *** [2.5361]	-3.4134 *** [2.8779]
L.GGBY	0.4047 *** [0.1475]	0.6025 *** [0.1799]	0.2562 * [0.1479]	0.6349 *** [0.1742]	0.4666 *** [0.1159]	0.8769 *** [0.1369]	0.6034 *** [0.1552]	0.6002 *** [0.1382]	0.1839 *** [0.2051]	0.5918 *** [0.2289]
D.GGBY	0.742 *** [0.2167]	0.9161 *** [0.1986]	0.6812 *** [0.2034]	0.7665 *** [0.1832]	0.9220 *** [0.1273]	0.8967 *** [0.1299]	0.8979 *** [0.1688]	0.7555 *** [0.1369]	0.4947 *** [0.2065]	0.7825 *** 0.1222
L.BCAY	-0.0940 *** [0.0723]	-0.0915 *** [0.0920]	-0.0536 *** [0.0569]	0.0365 *** [0.0803]	-0.1005 *** [0.0454]	0.0411 *** [0.0721]	-0.0850 *** [0.0617]	0.0892 *** [0.0725]	0.0587 *** [0.0750]	[0.1086] 0.028
D.BCAY	[0.0503]	-0.0217 *** [0.0950]	-0.0685 *** [0.0814]	0.0365 *** [0.0803]	-0.1532 *** [0.0471]	-0.0007 *** [0.0654]	-0.0201 *** [0.0625]	0.0308 *** [0.0687]	-0.0047 *** [0.0691]	[0.0916] -0.0086 ***
L.WDIINF			-0.0083 *** [0.0017]	-0.0083 *** [0.0013]		-0.0083 *** [0.0012]		-0.0084 *** [0.0012]		[0.0020]
D.WDIINF			-0.007 *** [0.0016]	-0.0074 *** [0.0013]		-0.0062 *** [0.0012]		-0.0076 *** [0.0013]		-0.0068 ***
Constant	-1.9036 [2.6739]	-11.436 [7.5059]	4.5312 ** [2.3633]	9.8426 [6.5827]	1.2436 [4.3452]	14.3635 [5.1236]	-12.4879 [5.8945]		-0.0751 [0.2215]	-0.2059 [0.2039]
Observations	192	155	155	155	192	155	192	155	192	134
F	22.89	24.41	24.41	20.48	15.68	17.64				
Prob >F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
Wald Chi2										
Prob >Wald										
R-Squared	0.5427	0.6303	0.6303	0.7277	n.a	n.a	299.7000	504.58	139.28	120.68
Root MSE	5.1058	3.7401	3.7401	3.4567	n.a	n.a	0.0000	0.0000	0.0000	0.0000
Fixed Effects	No	Yes	No	Yes	Yes	Yes	Yes	Yes	n.a	n.a

Note: The first four models are estimated using ordinary least squares with White-corrected (heteroscedasticity-consistent) standard errors. Models 5 and 6 use robust regression in order to correct for outliers. Models 7 and 8 are estimated with generalized least squares assuming a common AR process and homoscedastic panels. Models 9 and 10 are estimated using the Arellano-Bond generalized method of moments estimator. Where possible, Lagrange Multiplier tests were used to test whether there was any remaining serial correlation. In most cases no serial correlation was found. This means that any possible bias due to the simultaneous inclusion of a lagged dependent variable and fixed effects is likely to be very small.

1/ Variables preceded by "L" have been lagged, while variables preceded by "D" have been first-differenced. GDP Growth is the dependent variable.

The results suggest that the positive impact of fiscal adjustment is rather large, both in the short and long run.¹⁹ Over the long run, controlling for everything else, if country A maintained a fiscal deficit 1 percent of GDP lower than country B, long-term growth²⁰ would be higher by between 0.5 and 1 percentage points, depending on the estimation model. The effect of fiscal adjustment on growth in the short term also seems to be positive.²¹ Consistent with the previous sections, this relatively large effect seems to be driven by CIS countries. In fact, if we split the sample into CIS and non-CIS countries, the regression coefficient in the CIS sample is about six times larger. Figure 4 captures the different effects in both samples by plotting the fiscal balance (x-axis) versus GDP growth (y-axis), controlling for other factors in the model. The contrast in the slope of the partial regression line is striking.

Figure 4. Relationship Between Changes in the Fiscal Balance and Growth in CIS and Non-CIS Countries 1/



1/ The graph is based on a partial regression scatterplot based on the same regression model. The estimation split the sample into CIS and non-CIS countries. The results indicate clearly that the effect of fiscal adjustment on growth is much larger in CIS countries. Running the same regression model (excluding fixed effects to limit the loss of statistical power associated with the split of the sample) shows that the regression coefficient associated with the (lagged) fiscal deficit is over five times larger in CIS countries.

The effect of the other variables is similar to that found in other studies. A reduction in inflation has a positive and highly significant effect on growth. Progress in reforms (as measured by the

¹⁹ The discussion focuses on Models 5 and 6, which are robust to the presence of outliers.

²⁰ Note that by long-term growth, we simply refer to growth over the life of the model.

²¹ The results are therefore consistent with a recent paper by Rzonca and Cizkowicz (2005).

institutional reform index of the EBRD) also has a strong impact on growth. However, the inclusion of both inflation and the reform index in the same model wipes out the statistical significance of the reform index. This is not surprising, since inflation stabilization is one of the components of the reform index, and including both terms in the same equation leads to multicollinearity problems. An adjustment in the current account balance is associated with a significant decline in growth in one of the model specifications (Model 5), but it also loses statistical significance once inflation is included as a regressor.

V. QUALITATIVE ANALYSIS OF COUNTRY EXPERIENCES

The qualitative analysis of country experiences will focus on the CIS countries. Given that the strong association between fiscal adjustment and growth established in the previous sections is likely to be driven by the CIS countries, it seems only natural to explore the possible causal mechanisms underlying the econometric relationship by analyzing the experiences of these countries. The CIS country experience discussion will draw on several different papers discussing different aspects of the transition growth process in the CIS and on the discussion on channels of impact of fiscal policy on growth discussed in Section II.A.²²

The CIS countries shared certain common characteristics. GDP was concentrated in the industrial sector (overindustrialization) and depended extensively on trade with other Council of Mutual Economic Assistance (CMEA) members.²³ Trade was conducted at prices unrelated to markets. For example, imports of energy products were heavily subsidized. In addition, most countries received significant transfers and loans from the Soviet Union to finance their budgets.

However, there were differences in terms of pre-transition macroeconomic imbalances, certain structural characteristics, and involvement in conflicts. Specifically, there were countries that had large amounts of natural resources, particularly energy (Russia, Turkmenistan, Azerbaijan, and Kazakhstan) while others heavily depended on imports to receive them (in particular,

²² The experience of two countries (Mongolia and Belarus) is somewhat puzzling because at first sight they do not fit the strong positive association between fiscal adjustment and growth presented in Table 2 and discussed in this section. Belarus seems to have experienced fast acceleration of economic growth even though structural reforms have been limited and fiscal adjustment low. However, this result is driven by other important exogenous factors that helped boost growth in Belarus: the continuing sale by Russia of subsidized oil inputs, a geographically advantageous position for energy transportation, and favorable oil price developments. Mongolia, unlike Belarus, seems to have undergone significant fiscal adjustment but no acceleration in economic growth. Cheng (2003) suggests that favorable initial conditions may have contributed to the milder initial recession. However, the composition of fiscal adjustment in Mongolia may explain why fiscal adjustment was not associated with higher growth: most of the fiscal adjustment in Mongolia was revenue-based while the level of expenditures was kept relatively high. This suggests that the public sector may not have been sufficiently reformed and may have crowded out private sector activity.

²³ The CMEA was composed of Bulgaria, Cuba, Czechoslovakia, former German Democratic Republic, Hungary, Mongolia, Poland, Romania, the former Soviet Union countries, and Vietnam.

Armenia). Several CIS countries were also involved in armed or civil conflicts (Armenia, Azerbaijan, Georgia, and Tajikistan).

The collapse of the Soviet Union implied an enormous macroeconomic shock for many CIS countries. This generated a severe terms of trade loss as the relative price of imported energy, and raw material prices rose sharply when the trade subsidies received from Russia were phased out. In addition, transfers and loans from the Soviet Union to finance the CIS budgets fell. The resulting impact on the macroeconomic imbalances depended on the differences in economic structure of the countries, and their involvement in conflicts.

In particular, the highly distorted production structures, the severe terms of trade shock, and the sudden cutoff of financing from Russia generated an output collapse. The combination of the output collapse with the cut in fiscal transfers generated large fiscal deficits in many countries. Difficulties to cut public spending in a short time period and limited or nonexistent access to domestic or foreign debt financing in the first years of transition forced most of the deficit to be monetized, thus leading to high rates of inflation. Countries also resorted to involuntary financing by running arrears, particularly on the external front. The large fiscal deficits were quickly associated with growing and unsustainable current account imbalances (Table 6, Appendix I).

Most CIS countries responded with fiscal adjustment and structural reforms, although to varying degrees. Countries with stronger fiscal adjustment efforts achieved stabilization faster. With respect to private inflows, Garibaldi and others (2002) show that rising foreign direct investment was the main form of private capital inflow to transition economies and that it followed a sharply rising trend during the 1990s.²⁴ In addition, the paper argues that foreign direct investment was influenced by macroeconomic fundamentals. In particular, the stronger the fiscal position, the higher were the direct investment flows. Anecdotal evidence also suggests that remittances²⁵ were another source of private capital flows. Official flows also rose sharply, and were associated with rapid increases in debt levels. Helbling, Mody, and Sahay (2004) document, for example, a large increase in external debt after 1992 in the CIS-7, with a significant share of public and publicly guaranteed debt in total external debt (above 80 percent).²⁶

There is evidence that supports the hypothesis that the GDP growth recovery in the CIS during the 1990s was driven by demand growth. Helbling, Mody, and Sahay (2004) suggest that the accumulation of external debt in the CIS-7 was associated with large external current account

²⁴ While foreign direct investment averaged below 2 percent of GDP per year at the beginning of transition, by 1999 these flows reached about 4 percent of GDP per year.

²⁵ Anecdotal evidence of unrecorded foreign remittances abound. For Armenia, unrecorded private remittances are thought to be in the form of “pocket money” from Armenians working in Russia. See Gelbard and others (2005) for more details.

²⁶ The CIS-7 are Armenia, Azerbaijan, Georgia, the Kyrgyz Republic, Moldova, Tajikistan, and Uzbekistan.

deficits. This mirrored the increase in capital flows financing higher consumption, while investment as a share of GDP either remained constant or declined. Recent research by Loukoianova and Unigovskaya (2004) also supports this result, and argues that only after 1998 did growth start to be driven more by the expansion of exports and investment in export oriented sectors.

However, the impact of structural reforms on growth has also been important and has reinforced the effects of fiscal adjustment on growth. Price and market liberalization, liberalization of the exchange and trade system, privatization, and establishing a competitive environment with few obstacles to market entry have certainly contributed to an environment that fosters efficiency improvements and attracts foreign direct investment. In addition, privatization and enforcing of hard budget constraints on public enterprises have helped reduce quasi-fiscal operations, thereby facilitating fiscal adjustment by reducing implicit and explicit government subsidies.

VI. CONCLUSIONS

The main result of the paper is that the impact of fiscal adjustment on growth in transition economies is not qualitatively different from the one found for industrial, emerging markets, and low-income economies. In particular:

- A simple bivariate correlation analysis suggests a strong positive correlation between fiscal adjustment and growth. In particular: (i) the correlation between fiscal adjustment and growth seems stronger the higher the initial level of the deficit, and (ii) when fiscal adjustment exceeds about 10 percent of GDP, the positive impact on growth begins to decline.
- The correlation between fiscal adjustment and growth is stronger for those countries that need to achieve macroeconomic stability. The largest fiscal adjustments in the sample have been observed predominantly in the CIS, since these countries had unsustainable fiscal positions at the beginning of the 1990s. The sustained consolidations efforts in the CIS have been accompanied by the largest accelerations in growth in the sample.
- However, for countries that have already achieved macroeconomic stability, the correlation between fiscal adjustment and growth is less clear. As Adams and Bevan (2005) have shown, this may be because other factors such as the composition of expenditures or deficit financing play a bigger role, or because these countries could invest in structural reforms that have moderate up-front fiscal costs that yield significant long-term benefits. Further research in this area is therefore needed.²⁷
- A fixed-effects panel-data error-correction model that controls for the effects of initial conditions, structural reforms and inflation confirms the strong positive relationship between fiscal adjustment and growth. In addition, the positive effect of fiscal

²⁷ Data limitations (consistency, validity, and reliability) did not allow us to probe deeper in this area.

adjustment seems to hold in the short and long run. These results are robust to a variety of model specifications and estimation techniques. These findings seem to confirm the dominant role of the CIS countries in generating the strong positive correlation between fiscal adjustment and growth in the sample.

- The analysis of country experiences suggests that fiscal adjustment is likely to have been associated with higher growth in transition economies primarily through two channels: (i) reduced government borrowing requirements, which reduced the need to monetize budget deficits; and (ii) enhanced policy credibility, which signaled a political commitment to long-term fiscal sustainability and macroeconomic stability. These effects in conjunction with structural reforms spurred an expansion in official and private capital flows that partially substituted for the previous net resource transfer from the Soviet Union and allowed aggregate demand to recover. While structural reforms improved resource allocation on the supply side and boosted growth, capital-flow-driven aggregate demand recovery, principally reflected in consumption growth, is likely to have dominated growth in the years following the transitional recession.
- The policy implication is that countries that have managed to credibly stabilize and achieve fiscal sustainability are unlikely to get large benefits in terms of growth by pursuing additional fiscal adjustment. For example, addressing microeconomic distortions with structural reforms to increase the rate of return to investment to attract capital flows, improving the composition of government spending while maintaining a prudent fiscal stance, and strengthening governance are likely to be more important policies to generate growth in that context.

Appendix I. Additional Tables

Table 5. Table 1 Reorganized by Transition Regions

Country	GBAL 92-96	GBAL 97-01	Fiscal Adj.	Growth 92-96	Growth 97-01	Growth Accel.
Central and Eastern Europe						
Poland	-3.8	-3.9	-0.1	5.8	3.5	-2.3
Romania	-3.3	-4.1	-0.7	2.3	0.5	-1.8
Croatia	-1.5	-6.2	-4.8	3.5	2.1	-1.4
Slovak Republic	-4.5	-5.6	-1.1	3.8	2.9	-0.9
Czech Republic	-0.9	-2.8	-1.9	2.4	1.4	-0.9
Slovenia	0.2	-1.0	-1.2	4.1	4.1	0.0
Hungary	-6.6	-4.1	2.5	2.0	4.5	2.6
Macedonia	-4.8	-1.4	3.4	-1.4	1.9	3.4
Albania	-11.8	-10.7	1.0	5.4	9.4	4.1
Bulgaria	-6.6	-0.5	6.2	-6.1	4.0	10.1
Average	-4.3	-4.0	0.3	2.2	3.4	1.3
Baltics						
Estonia	-0.1	-1.3	-1.2	1.6	4.4	2.9
Latvia	-1.6	-2.5	-0.9	0.4	5.6	5.2
Lithuania	-3.4	-4.8	-1.3	-2.2	4.0	6.2
Average	-1.7	-2.9	-1.1	-0.1	4.7	4.7
Commonwealth of Independent States and Mongolia						
Mongolia	-12.5	-9.7	2.7	2.4	2.2	-0.2
Uzbekistan	-7.6	-2.6	5.0	-0.7	3.2	3.9
Armenia	-22.3	-5.6	16.7	1.5	6.6	5.1
Georgia	-20.7	-4.7	16.0	-3.2	3.1	6.3
Kyrgyz Republic	-13.1	-9.7	3.4	-4.3	4.1	8.4
Belarus	-1.9	-1.1	0.8	-3.3	5.6	8.9
Russia	-10.2	-1.4	8.8	-5.6	4.0	9.6
Moldova	-10.8	-2.4	8.4	-10.3	-0.4	9.9
Kazakhstan	-5.2	-2.7	2.5	-5.6	6.0	11.6
Ukraine	-9.7	-2.0	7.7	-12.5	3.2	15.7
Tajikistan	-12.8	-1.9	10.9	-9.5	6.9	16.4
Azerbaijan	-5.7	-2.4	3.3	-9.5	9.6	19.1
Turkmenistan	2.5	-0.6	-3.1	-10.5	15.5	26.0
Average	-10.0	-3.6	6.4	-5.5	5.4	10.8
Overall Average	-6.9	-3.7	3.2	-1.9	4.5	6.4

Source: IMF, *World Economic Outlook* and staff estimates.

Table 6. Selected Economic Indicators at the Beginning and at the End of the Sample Period
(Averages for Years 1992–1993 and 2000–2001)

Country	Total Revenues (TR)		Total Expenditures (TE)		Overall Balance		Current Account (percent of GDP)		Change in TR	Change in TE
	92-93	00-01	92-93	00-01	92-93	00-01	92-93	00-01		
Central and Eastern Europe										
Poland	45.2	38.1	50.5	42.6	-5.2	-4.5	-3.0	-5.0	-7.1	-7.8
Romania	35.6	30.7	38.1	34.3	-2.5	-3.6	-6.2	-4.7	-4.9	-3.8
Croatia	33.2	45.5	35.5	52.1	-2.4	-6.7	4.5	-3.1	12.3	16.6
Slovak Republic	42.9	37.7	52.0	44.7	-9.1	-7.0	-2.6	-5.9	-5.2	-7.3
Czech Republic	44.5	39.2	44.3	42.4	0.3	-3.2	1.7	-5.5	-5.3	-1.8
Slovenia	41.7	41.2	40.7	42.5	1.0	-1.3	3.6	-1.3	-0.5	1.8
Hungary	45.9	45.8	54.4	49.6	-8.5	-3.9	-4.0	-4.8	-0.1	-4.8
Macedonia	39.7	35.5	51.3	37.5	-11.6	-1.9	-1.7	-4.5	-4.2	-13.9
Albania	23.2	22.5	36.4	31.1	-13.2	-8.7	-40.2	-6.8	-0.7	-5.2
Bulgaria	37.8	38.1	45.9	39.1	-8.1	-0.9	-7.2	-5.9	0.3	-6.8
Average	39.0	37.4	44.9	41.6	-5.9	-4.2	-5.5	-4.7	-1.6	-3.3
Baltics										
Estonia	37.2	37.8	37.6	37.9	-0.5	-0.1	2.6	-5.9	0.6	0.2
Latvia	32.2	36.2	32.3	38.9	-0.1	-2.7	6.6	-8.2	4.0	6.6
Lithuania	31.1	30.4	33.5	32.8	-2.4	-2.4	-1.1	-5.4	-0.7	-0.8
Average	33.5	34.8	34.5	36.5	-1.0	-1.7	2.7	-6.5	1.3	2.0
Commonwealth of Independent States and Mongolia										
Mongolia	30.0	36.5	43.6	42.7	-13.7	-6.2	1.2	-5.9	6.5	-0.9
Uzbekistan	33.8	27.0	48.6	29.1	-14.8	-2.1	-7.2	0.3	-6.8	-19.6
Armenia	28.8	17.5	75.6	22.5	-46.9	-5.1	-34.6	-12.3	-11.3	-53.1
Georgia	14.8	15.7	53.3	18.7	-38.5	-3.0	-21.4	-5.5	0.9	-34.6
Kyrgyz Republic	21.0	19.5	37.1	27.2	-16.1	-7.7	-10.7	-5.0	-1.5	-9.9
Belarus	48.8	45.4	51.1	46.3	-2.4	-1.0	-3.3	-3.1	-3.4	-4.8
Russia	37.9	37.1	50.9	34.2	-13.0	2.9	0.0	14.0	-0.8	-16.7
Moldova	26.4	30.0	42.6	30.6	-16.2	-0.6	-8.9	-6.9	3.6	-12.0
Kazakhstan	27.0	23.7	31.3	22.7	-4.3	1.0	-30.1	0.4	-3.3	-8.6
Ukraine	38.5	33.5	56.5	34.9	-18.0	-1.4	-4.6	4.2	-5.0	-21.6
Tajikistan	24.2	14.4	49.5	14.8	-25.3	-0.4	-22.1	-6.7	-9.8	-34.7
Azerbaijan	45.8	20.7	52.1	21.2	-6.3	-0.5	-14.4	-2.2	-25.1	-30.9
Turkmenistan	47.3	1.7	36.1	1.5	11.2	0.2	56.5	3.4	-45.6	-34.6
Average	32.6	24.8	48.3	26.6	-15.7	-1.8	-7.7	-1.9	-7.8	-21.7
Overall Average	35.2	30.8	45.4	33.5	-10.2	-2.7	-5.6	-3.6	-4.4	-11.9

Appendix II. Cyclicalities and Sustainability of Fiscal Adjustment

The study of the relationship between fiscal adjustment and growth is often complicated by the difficulty in determining the direction of causality between these two variables. In particular, GDP growth (the dependent variable) can have an impact on the size of the fiscal balance (the independent variable). This may be the case because higher growth leads to higher tax collections and a lower need for certain expenditure programs (i.e., unemployment benefits). To avoid this problem, researchers focusing on OECD countries have used cyclically adjusted fiscal balances. As explained below, given the small length of the time series for transition economies and the existence (in some cases) of large shocks, this approach would not yield robust results.

A three-step procedure is applied to assess the potential direction of causality. First, estimates of the sensitivity of revenue and expenditures to changes in GDP are computed by regressing, for each country, the change in revenues and the change in expenditures from T to $T+1$ on real GDP growth. This yields, for each country, an estimate of the revenue and expenditure growth elasticities. The second step entails estimating the impact of the increase in growth from one period to the next on both revenues and expenditures. This yields the “automatic” change in revenues and expenditures that can be expected from changes in GDP growth. The third and final step involves adjusting the observed fiscal adjustment by netting out the “automatic” component.

While this procedure has its limitations, this simple approach seems better suited to the shortness of the time series than more traditional methods. The regression-based elasticity estimates in the three-step procedure are computed on a short number of years with structural breaks, which is clearly problematic. However, given the limited length and volatile profile of the data series, this seems less problematic than the traditional way of addressing this issue, which is to separate the cyclical component of fiscal adjustment through an estimation of the structural or cyclically adjusted fiscal balance. Researchers usually use a Hodrick-Prescott filter to extract trend GDP. In addition, the notion of a “business cycle” in this context defined as deviations around a trend seems conceptually inadequate.

The results suggest that there is no strong evidence of an important cyclical component in fiscal adjustment. The first two columns of Table 7 show that for both revenue and expenditures, the elasticity estimates with respect to GDP tend to be very low in absolute value. In addition, in most cases, the null hypothesis of no effect of GDP growth on the ratios of revenue and expenditures to GDP cannot be rejected. These results need to be interpreted with care, however, since the time series are rather short, and statistical tests have consequently low power.

In particular, the cyclically adjusted estimates of fiscal adjustment are not very different from the unadjusted ones (Table 7). As a result, most of the countries that were classified as cases of high fiscal adjustment would still be classified as such after applying a cyclical correction (with the only exceptions being Azerbaijan, Kazakhstan, and the Kyrgyz Republic).

Table 7. Cyclical Component of Fiscal Adjustment

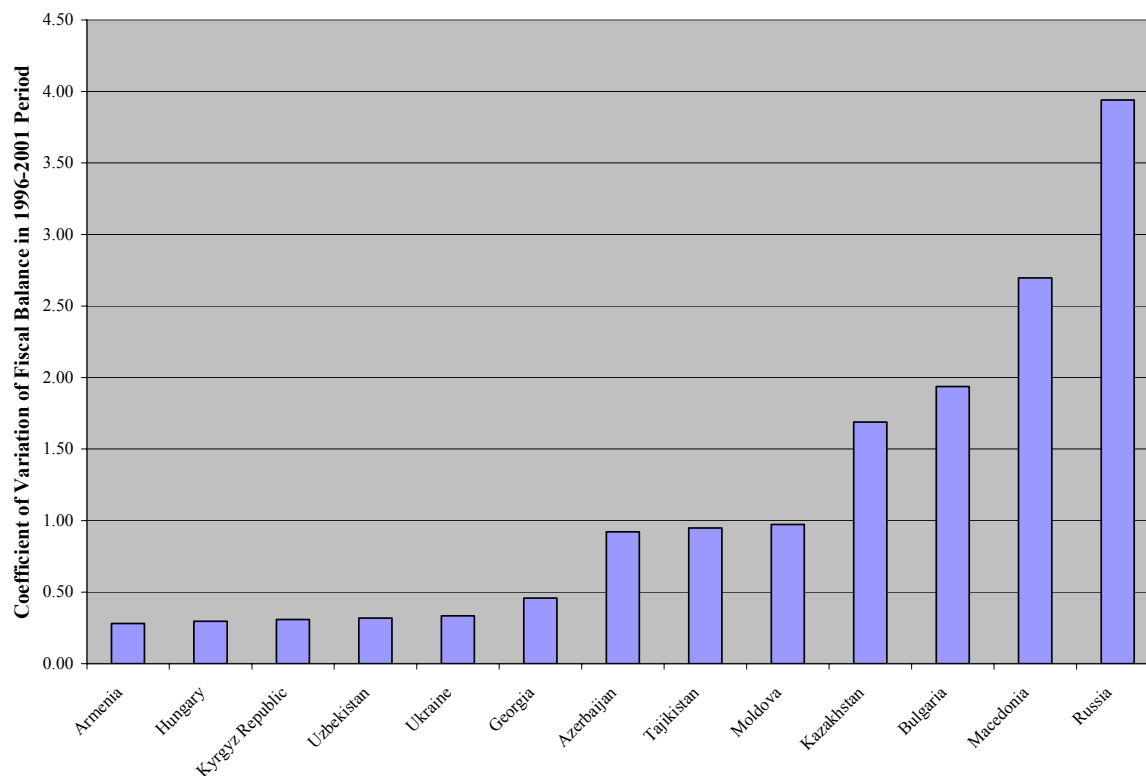
Country	Change in Revenues		Change in Expenditures		Growth Accelerat.	Fiscal Adjust.	Cyclical Component of Fiscal Adjustment	Cyclically Adjusted Fiscal Adjustment
Albania	0.00		-0.23		4.07	1.00	0.85	0.15
Armenia	-0.09		-1.23	***	5.07	16.65	1.07	15.58
Azerbaijan	0.38	**	0.18		19.10	3.27	4.01	-0.74
Belarus	0.17		0.17		8.85	0.79	1.86	-1.07
Bulgaria	0.24		0.05		10.05	6.17	2.11	4.06
Croatia	0.15		0.27		-1.42	-4.76	-0.30	-4.46
Czech Republic	0.00		0.05		-0.91	-1.92	-0.19	-1.73
Estonia	-0.25		-0.46	***	2.87	-1.18	0.60	-1.78
Georgia	0.06		0.03		6.33	15.98	1.33	14.65
Hungary	0.13		0.31		2.57	2.53	0.54	1.99
Kazakhstan	0.28		0.15		11.63	2.47	2.44	0.03
Kyrgyz Republic	0.01		0.00		8.42	3.38	1.77	1.62
Latvia	-0.41	**	-0.41	***	5.18	-0.90	1.09	-1.98
Lithuania	0.02		-0.18	*	6.19	-1.34	1.30	-2.64
Macedonia	0.06		-0.37		3.38	3.38	0.71	2.67
Moldova	-0.38	***	-0.45	**	9.91	8.41	2.08	6.33
Mongolia	-0.97		-2.33	***	-0.22	2.74	-0.05	2.78
Poland	-0.32		-0.58	**	-2.32	-0.08	-0.49	0.41
Romania	-0.16		-0.07		-1.81	-0.74	-0.38	-0.36
Russia	0.24		0.12		9.58	8.80	2.01	6.78
Slovak Republic	0.64	***	1.01	**	-0.94	-1.13	-0.20	-0.94
Slovenia	-0.41		-0.27		0.03	-1.21	0.01	-1.22
Tajikistan	0.01		0.31		16.41	10.94	3.45	7.49
Turkmenistan	0.44		0.25		26.00	-3.08	5.46	-8.54
Ukraine	-0.05		0.16	**	15.68	7.73	3.29	4.44
Uzbekistan	-0.12		0.57		3.86	5.00	0.81	4.19
Entire Panel								
with Fixed Effects	-0.33	***	-0.12	***				

Source: IMF, *World Economic Outlook* and staff estimates.

Another important issue is the extent to which fiscal adjustment is sustained. If fiscal adjustment is reversed from one year to the next, then it becomes theoretically difficult to understand why episodes of fiscal consolidation should be associated with higher growth (e.g., there would be no “crowding in” effect in this case because the private sector would perceive that the government has no credibility in its fiscal policies). In most cases, however, the observed fiscal adjustment was largely sustained through time. Average values for fiscal adjustment would lose their meaning if the dispersion around the mean is too large. Figure 5 presents the 10 cases where the fiscal deficit in the second period was more volatile. In most

cases, the coefficient of variation²⁸ is below 1 and in only two cases (Russia and Macedonia) does it exceed 2, suggesting that fiscal adjustment has been maintained.

Figure 5. Cases of Greater Volatility in Fiscal Policy



²⁸ The coefficient of variation is a measure of dispersion of a probability distribution. It is defined as the ratio of the standard deviation to the mean and allows comparison of the variation of populations that have significantly different mean values. Similar results were obtained, however, using just the standard deviation.

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