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## **Stabilization and growth in transition economies: The early experience**

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International Monetary Fund

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Stabilization and Growth in Transition Economies: The Early Experience

Prepared by Stanley Fischer, Ratna Sahay, and Carlos A. Végh 1/

April 1996

Abstract

This paper analyzes the growth and stabilization experience in 26 transition economies in eastern Europe, the former Soviet Union, and Mongolia for the period 1989-1994. Inflation rates have declined significantly in most countries following an inflation stabilization program. Growth resumes after stabilization occurs, typically with a lag of about two years. Reducing inflation thus appears to be a precondition for growth. An econometric analysis of the short-run determinants of inflation and growth illustrates the key roles of fixed exchange rates, improved fiscal balances, and structural reforms in spurring growth and lowering inflation, and confirms that inflation stabilization programs have been beneficial for growth even after controlling for structural reforms.

JEL Classification Numbers:

F41, F43, P20

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Summary

This paper analyzes the growth and inflation performance of 26 transition economies in eastern Europe, the former Soviet Union, and Mongolia during 1989-94. When the average performance for this group is profiled, a bleak picture emerges. Real GDP has fallen uninterruptedly since reforms began, while inflation has been high and rising, fueled by fiscal deficits averaging more than 6 percent of GDP.

Such profiles in chronological time hide the fact that countries started their inflation stabilization programs at different times. A brighter picture emerges when the data are rearranged in stabilization time. In the year of stabilization, inflation falls substantially and continues to fall thereafter, as fiscal deficits are brought under control. More remarkably, output quickly begins to recover and after two years growth is positive. These results strongly suggest that reducing high inflation is a precondition for the revival of growth.

After establishing the typical patterns of inflation and growth, the paper conducts an econometric analysis of the main short-run determinants of growth and inflation. As expected from the stabilization time profiles, it finds that lower fiscal deficits have led to lower inflation and higher growth. Moreover, pegged exchange rate regimes appear to have been more effective in reducing inflation and thus raising growth. This evidence is consistent with the idea that, while the reduction of fiscal deficits is a key precondition for disinflation, a pegged exchange rate may help in bringing about a more rapid disinflation from high inflation. Structural reforms also appear to have played a vital role in reviving growth and reducing inflation.



## I. Introduction

More than 30 countries that were in the Soviet orbit or the former Yugoslavia are currently in the process of economic transition from a centrally planned to a market-based system. A complete list of countries in such transition would include Cuba, Vietnam, China, and even certain African countries like Angola, Ethiopia, and Mozambique. The focus of this paper, however, will be on the nations of eastern Europe and those which were effectively part of the former Soviet Union (FSU).

The transition can be said to have begun in 1989, with Poland inaugurating its big bang stabilization and reform program on January 1, 1990. There were, of course, earlier attempts at reform among the transition economies: Yugoslavia in the 1950s, Hungary in 1968, and even the former Soviet Union at various times, including the attempts by Gorbachev. These attempts, however, did not have the explicit goal of making the transition to a market economy. At the time the transition began, there was thus little direct experience of the process of economic transformation, and those advising on and designing the reforms had to draw on general principles and related experiences--the lessons from structural reforms in developing countries in the 1980s and earlier, the experience of China since the late 1970s, and previous reform efforts in the transition economies themselves.

Mainstream analyses of the transition process generally emphasized the need for action in six areas (see, for example, Lipton and Sachs (1990) and Fischer and Gelb (1991)): macroeconomic stabilization, price liberalization, trade liberalization and current account convertibility, enterprise reform (especially privatization), the creation of a social safety net, and the development of the institutional and legal framework for a market economy (including the creation of a market-based financial system). Price and trade liberalization would reinforce each other in permitting international competition to affect domestic prices.

Given the goal of moving to a market economy, there could not be much disagreement over the general proposition that reform was needed in these areas. However, major controversies arose over the speed and sequencing of reforms, and the strategy to be followed in each area. The debate over the speed of reform was frequently cast in terms of "big bang" or "shock therapy" versus gradualism. <sup>1/</sup> In practice, the big bang could apply only to certain aspects of the reform process--macroeconomic stabilization and price and trade liberalization--for the other three elements of the reform

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<sup>1/</sup> See Aslund (1995), Balcerowicz and Gelb (1994), and Sachs (1993). For arguments favoring speedy reform strategies, see also Klaus (1994). For theoretical analyses of the speed of transition, see Aghion and Blanchard (1994), Castanheira and Roland (1995), and Cohen (1995). Kornai (1993) presents a more gradualist view of optimal reform strategy. See also the interviews with policymakers in Blejer and Coricelli (1995).



process inherently take time. However, decisions to initiate action and proceed in the other three areas could be taken earlier or later.

Interesting and critical as the answers to the questions of the optimal speed and sequencing of reform are, it was necessary to make decisions on how to proceed well before the evidence could be gathered. As time has passed, the experiences of individual countries and groups of countries have been examined and lessons drawn. More recently, as data have become available, more quantitative analyses of the experience of the transition economies have become available through the European Bank for Reconstruction and Development (EBRD) in its 1994 and 1995 Transition Reports, (de Melo, Denizer and Gelb (1995), Havrylyshyn and Botousharov (1995), and Sahay and Végh (1996), among others).

The focus of this paper is on the relationship between stabilization and growth. There are essentially two views on this issue. The first is that stabilization is necessary for the resumption of growth. This view draws on a priori arguments that inflation is bad for growth as well as evidence that inflation is negatively associated with growth (see, for instance, Fischer, 1993, and De Gregorio, 1993). Recent work by Bruno and Easterly (1995), which argues that 40 percent per annum inflation is a red line beyond which growth will not be sustained, is particularly convincing in this regard, though it does not draw on the experience of the transition economies.

The alternative view is that the transition economies are not like market economies, and that inflation in transition economies therefore cannot be reduced to below the 40-50 percent per annum range without adversely affecting growth, unless key structural reforms--particularly privatization and de-monopolization--have already been implemented. <sup>1/</sup> While no one argues that hyperinflation is good for growth, there are some who assert that, because firms need access to easy credit, inflation rates much below 10 percent per month are simply impossible if the economy is to grow.

In this paper, we first present and summarize data on the experience of growth and stabilization in 26 transition economies in eastern Europe, the former Soviet Union, and Mongolia, for the period 1989-1994. When the average performance for this group is profiled, a rather bleak picture emerges: real GDP has fallen uninterruptedly since reforms began, while

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<sup>1/</sup> This latter argument has been strongly propounded by Grigory Yavlinsky. Yavlinsky and Braguinsky (1994), for example, argue that de-monopolization needs to precede stabilization. The view that a tight monetary policy will not reduce the inflation rate in a monopolistic economy is an old one, though there is nothing in the quantity theory of money that requires a competitive economy for its operation. The familiar counterargument is that the existence of monopolies affects the level of prices, rather than their rate of change.

inflation has been high and rising, fueled by fiscal deficits averaging more than 6 percent of GDP. Such profiles in chronological time, however, hide a simple but key fact: countries started their inflation stabilization programs at different times. A brighter picture emerges when the data are rearranged in stabilization time: in the year of stabilization, inflation falls substantially and continues to fall thereafter, as fiscal deficits are brought under control. More remarkably, output quickly begins to recover and after two years growth is positive. These results strongly suggest that reducing high inflation is a precondition for the revival of growth.

After establishing the typical patterns of inflation and growth, we conduct an econometric analysis of the main short-run determinants of growth and inflation. As expected from the stabilization time profiles, we find that lower fiscal deficits have led to lower inflation and higher growth. Moreover, pegged exchange rate regimes appear to have been more effective in reducing inflation and thus raising growth. This evidence is consistent with the idea that while the reduction of fiscal deficits is a key precondition for disinflation, a pegged exchange rate may help in bringing about a more rapid disinflation from high inflation. Structural reforms also appear to have played a vital role in reviving growth and reducing inflation.

## II. Recent Experience in the Transition Economies

This section examines patterns of GDP growth, inflation, and fiscal deficits for 26 economies in transition in eastern Europe, the former Soviet Union, and Mongolia. Warnings about the data are essential before proceeding.

### 1. Data caveats

Most of the data used in this paper, which are available on request from the authors, have been provided to us by IMF economists working on these countries. They are based on estimates by national authorities or made by IMF economists for working purposes before official estimates become available. Given the often fragmentary information with which the IMF has to work and the differences in definitions of variables across countries, the country economists would put wide confidence intervals around the data. Thus, while it is customary when using data to issue warnings and then proceed, it is important in this case to emphasize that the biases in the data--particularly in output data--may well be very large and may affect some of the reported results.

There are two broad sets of qualifications. First, the output data are likely to be seriously biased for both conceptual and measurement reasons. At a conceptual level, the prices at which goods were valued before the transition process began were out of line: the quality of goods was typically very poor and even purchasing power parity calculations are unlikely to capture the quality differences; goods were frequently not available at any price; and relative prices were different from world

prices. The combined impact of these factors is likely to overstate the decline in output and the increase in prices that have been such an extraordinary feature of the transition process. To understand why, imagine the extreme hypothetical situation in which goods had a positive price in the base period according to the national accounting system, but had zero value on the world market. Then, it could easily occur that output declines in terms of base period prices, but rises in terms of world market prices. 1/

Second, there is a serious measurement problem. Many of the republics of the former Soviet Union have had to build new independent statistical services, an inevitably slow process. Where earlier statistical systems did exist, they had been set up to measure output from the state sector. As the state sector output declines and private sector output rises, an increasing share of output is not recorded. Although no comprehensive re-estimates of GDP exist, Berg and Sachs (1992) provide a detailed analysis of the decline in Polish output between 1989 and 1990. They favor a demand-based estimate (that is, one based on consumption, investment, and net exports) which suggests a decline of 4.9 percent over a supply-based estimate (that is, one based on sectoral shares of output in agriculture, industry, and services) of a decline of 8.7 percent; both to be compared with a 12 percent decline in the official data. In general, in transition economies official statistical reports place greater reliance on supply-based estimates. Dobozi and Pohl (1995) estimate the drop in GDP using power consumption as a proxy for changes in output. They argue not only that output declines are much smaller than official estimates for virtually all transition countries but also that official underreporting in the countries of the former Soviet Union has been much higher than in eastern Europe. 2/ Kaufmann and Kaliberda (1995) present calculations of the size of the unofficial economy, also based in large part on electricity consumption. Their preliminary conclusions are that on average the growth of the unofficial economy reduces output declines for countries of the former Soviet Union by about half, but with wide variations across countries.

Some of the measurement problems related to output data also apply to inflation. Since price increases in the previous controlled-price regime may have been disguised as quality improvements and inflation in the black markets simply ignored, inflation during the transition may have been overestimated. Furthermore, during a period of price liberalization, both Laspeyres (base-year weighted) and Paasche (current-year weighted) price indices are likely to be biased upwards (see Osband, 1991). The

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1/ The opposite phenomenon happened in the Soviet Union in the 1930s, when growth in base year prices far exceeded that in later period prices (Fischer, 1994).

2/ Dobozi (1995) presents further estimates. In a letter to the editor of Transition (April 1995, p. 11), Koen criticizes the method, pointing to several implausible results, for instance, that output in Poland fell more in 1992 than indicated by the official data.

mismeasurement of inflation is likely to have been greater in the initial stages of the transition process when prices were freed than in later stages when relative prices better reflected the scarcity of goods.

## 2. Basic information and indicators

Table 1 lists the 26 countries in eastern Europe, the former Soviet Union, and Mongolia for which we have comprehensive data for the period 1989-1994. 1/ In the judgment of the IMF economists working on those countries, stabilization plans have been implemented in 25 of the 26 countries, with Turkmenistan being the exception. For each country, we list the date on which the stabilization program was implemented. The date given is the starting date of a country's inflation stabilization program, and not necessarily the starting date of an IMF program. 2/ When several stabilization attempts have been made (which was the case in six countries), we take the most serious attempt (as of mid-1995) as the reference date. 3/

The third column of Table 1 indicates the exchange rate regime adopted during the stabilization program. Countries that announced an exchange rate peg, including a crawling peg, are classified as having a fixed rate regime. 4/ In two cases--Croatia and the former Yugoslav Republic of Macedonia (FYRM)--the exchange rate regime is classified as a peg on the basis of the policies actually implemented, even though the authorities did

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1/ The 26 nations in Table 1 are closely comparable to the 28 countries in the list appearing in Murrell's paper in this symposium. We exclude Serbia for lack of sufficient data, and East Germany because of the special circumstances of its transition--namely, reunification with a wealthy and industrialized West Germany. While our study excludes China, Cambodia, Laos, and Vietnam, we do believe that there is much to be learned from the experience of these countries: the interested reader might begin with Gelb, Jefferson and Singh (1993), and Sachs and Woo (1994).

2/ In practice, however, most stabilization dates coincide with the starting date of an arrangement with the Fund.

3/ In principle, for the quantitative exercises undertaken below, all stabilization attempts should be included in the sample. However, due to the short sample period these data points would not be statistically independent, which would imply "double-counting" for the purposes of quantitative analysis. The choice of a particular stabilization program--when there have been multiple attempts--necessarily involved a judgment call on our part. We should stress through that the judgment about the seriousness of the stabilization attempt was not based on ex-post inflation performance but rather on an evaluation of the policy package associated with the stabilization attempt.

4/ Latvia and Lithuania had flexible rate regimes at the time of stabilization, but later moved to a fixed rate and hence are listed as flexible/fixed. We include Russia in the category of flexible since it did not move to an exchange rate band until July 1995.

Table 1. Initial Conditions and Stabilization Programs in Transition Economies

Country	Stabilization program date	Exchange regime adopted	CMEA exports to total GDP (1990) 1/	GNP\capita at PPP (US\$1988) 2/
Albania	August 1992	Flexible	2.3	1386
Armenia	December 1994	Flexible	21.3	4923
Azerbaijan	January 1995	Flexible	33.1	4456
Belarus	November 1994 3/	Flexible	44.5	7218
Bulgaria	February 1991 3/	Flexible	15.3	5968
Croatia	October 1993	Fixed	5.6	NA
Czech Republic	January 1991	Fixed	9.8	NA
Estonia	June 1992	Fixed	27.2	9078
Georgia	September 1994	Flexible	19.1	6390
Hungary	March 1990	Fixed	9.8	6569
Kazakhstan	January 1994	Flexible	17.8	4666
Kyrgyz Republic	May 1993	Flexible	21.3	3244
Latvia	June 1992	Flexible/Fixed 4/	31.3	7911
Lithuania	June 1992	Flexible/Fixed 4/	33.7	6816
Macedonia, FYR	January 1994	Fixed	5.6	NA
Moldova	September 1993	Flexible	24.8	4596
Mongolia	October 1992 3/	Flexible	17.3	NA
Poland	January 1990	Fixed	16.5	4941
Romania	October 1993 3/	Flexible	3.3	3722
Russia	April 1995 3/	Flexible	17.9	7519
Slovak Republic	January 1991	Fixed	9.8	NA
Slovenia	February 1992	Flexible	4.6	10663
Tajikistan	February 1995 3/	Flexible	22.1	2730
Turkmenistan	Not started	Not applicable	33.6	3825
Ukraine	November 1994	Flexible	24.6	5536
Uzbekistan	November 1994	Flexible	24.0	3046

Sources: IMF staff estimates; national authorities; De Melo, Denizer, and Gelb (1995).

1/ CMEA stands for the Council for Mutual Economic Assistance—a regional trading arrangement comprising the former USSR and 9 other Soviet bloc countries. In the case of FSU countries, the ratios are FSU exports to GDP.

2/ As currencies have generally been undervalued during the transition, the PPP measures are far higher than measures in US dollars based on market exchange rates.

3/These countries had more than one stabilization attempt.

4/ The Latvian currency was pegged to the SDR in February 1994; Lithuania adopted a currency board in April 1994. Both countries had flexible exchange rate regimes prior to these dates.

not explicitly announce it as such. Of course, many countries, in particular Azerbaijan and the Kyrgyz Republic, listed as having adopted a flexible exchange rate regime have often intervened in foreign exchange markets to stabilize the exchange rate.

The last two columns in Table 1 relate to initial conditions of the economy: estimates of per capita GNP in 1988, on a purchasing power parity basis, and the ratio of CMEA exports to GDP in 1990--both these measures are taken from de Melo, Denizer, and Gelb (1995). (CMEA stands for Council for Mutual Economic Assistance, a trading arrangement among the economies in the Soviet orbit.) The purchasing power parity GNP data provide a pretransition estimate of the relative income levels of the transition economies; current estimates, in dollars, would be far lower. The ratio of CMEA exports to GDP is an indicator of the extent of the shock the Soviet bloc countries suffered as their previous trading arrangements collapsed in the early 1990s. In the absence of data on CMEA exports for FSU countries, intra-FSU exports are reported for FSU countries.

Table 2 provides information on inflation and output performance in all 26 economies during 1989-94. The inflation rate is based on the consumer price index (CPI) when available; when the CPI was not available or the series was too short, the retail price index was used. Depending on whether inflation (or any other variable) is measured within a particular period (an "end-period" measure) or as an average in a particular period as compared to a previous period (an "average" measure), comparisons across countries or across time within the same country are likely to differ, particularly when inflation rates are high and variable. It is more common to report average measures, as these are more useful in studying and comparing the evolution of inflation over time. On the other hand, end-period measures are likely to convey more information if the focus is on developments within a particular period or on the response to policy variables within a short time period. Accordingly, average measures are reported in profiling the time path of inflation, while end-period measures are used in documenting extreme annual values and in conducting the econometric exercises.

Inflation has been extremely high in the transition economies. Of the 26 countries listed in Table 1, 22 experienced at least triple-digit annual inflation, in the twelve months preceding the month the stabilization program was implemented. The remaining four countries--the Czech Republic, the Slovak Republic, Hungary, and Tajikistan--had double-digit inflation. By the end of 1994, however, over half the countries had reduced inflation to the double-digit range, with Croatia having moved all the way to deflation. The maximum inflation rate was typically recorded at the start of the transition process, when price and, in most cases, trade controls were lifted. A qualification to these high inflation numbers is in order, as part of the recorded inflation during the year in which prices were freed was accounted for by one-time price jumps that eliminated the monetary overhang from previous years (see Sahay and Végh (1996) for details). Table 2 shows the year in which inflation was highest and the annual rate of inflation in that year.

Table 2. Inflation and Output Performance in Transition Economies, 1989-94

Country	Year in which inflation was highest 1/	Maximum annual inflation 1/	Year in which inflation fell below 50% 1/2/	Year in which output was lowest 3/	Cumulative output decline (1989=100) 3/	Cumulative output growth since lowest level 4/
Albania	1992	236.6	1993	1992	39.9	19.9
Armenia	1993	10896.2	—	1993	66.8	5.4
Azerbaijan	1994	1788.0	—	1994	59.0	—
Belarus	1993	1994.0	—	1994	39.3	—
Bulgaria	1991	338.8	—	1993	27.4	1.4
Croatia	1993	1149.7	1994	1993	36.9	1.1
Czech Republic	1991	52.1	1992	1993	21.4	2.5
Estonia	1992	946.7	1993	1993	34.9	3.0
Georgia	1994	8273.5	—	1994	74.6	—
Hungary	1990	34.6	n.a	1993	18.3	2.1
Kazakhstan	1992	2566.6	—	1994	51.2	—
Kyrgyz Republic	1993	1365.6	—	1994	50.6	—
Latvia	1992	958.2	1993	1993	52.0	2.8
Lithuania	1992	1162.6	1994	1993	61.1	1.7
Macedonia, FYR	1992	1927.3	—	1994	45.2	—
Moldova	1992	2198.4	—	1994	60.6	—
Mongolia	1992	325.0	—	1993	22.3	2.1
Poland	1989	639.6	1992	1991	17.8	13.0
Romania	1993	295.5	—	1992	26.4	4.8
Russia	1992	2510.4	—	1994	48.3	—
Slovak Republic	1991	58.3	1992	1993	25.1	4.8
Slovenia	1991	246.7	1993	1992	16.8	6.9
Tajikistan	1993	7343.7	1994	1994	61.3	—
Turkmenistan	1993	9743.0	—	1994	36.5	—
Ukraine	1993	10155.0	—	1994	52.1	—
Uzbekistan	1994	1232.8	—	1994	15.6	—
All transition economies 5/		2632.3			40.8	
Eastern Europe and Baltics 5/		619.0			32.6	
FSU and Mongolia 5/		4645.6			49.1	

Sources: IMF staff estimates; national authorities.

1/ Inflation calculated from December to December.

2/ A " - - " indicates that inflation was above 50% during the transition years, as of 1994. In Hungary's case, this criterion is not applicable because inflation was below 50% even before 1989.

3/ Output decline from 1989 to the year in which output was lowest. For countries in which output has not begun to grow, 1994 is taken as the year of minimum output. GDP measured on an annual average basis.

4/ Lowest level refers to the lowest output level reached during 1989-94. A " - - " indicates that no positive growth has been recorded as of 1994.

5/ Simple average.

Inflation in the transition economies often met Cagan's (1956) definition of a hyperinflation--inflation exceeding 50 percent in a period of one month or less. The classic hyperinflations studied by Cagan (1956) took place in the aftermath of the first (upon the breakup of the Austro-Hungarian Empire) and second world wars. Although inflation exceeded 50 percent in at least one month in 17 out of the 26 countries in our sample, it persisted at this rate for more than four months in only two countries, Armenia and Georgia. 1/ In most countries, the brief hyperinflationary outburst reflected the elimination of the monetary overhang upon price liberalization.

The reported cumulative output declines in the transition economies range from a minimum of 15.6 percent in Uzbekistan to an almost incredible 74.6 percent in Georgia. Table 2 shows the year in which output was lowest, and the cumulative output decline in these 26 economies. 2/ As already noted, these data are certainly inaccurate, perhaps highly so, with some estimates suggesting that output in the countries of the former Soviet Union decreased on average by about one half the reported amounts. Some of the largest output declines were recorded in countries that experienced civil war or trade embargoes, such as Croatia, FYRM, Armenia, Georgia, Azerbaijan, and Tajikistan. From a welfare point of view, the significance of aggregate output measures should also be qualified, in light of the massive redistribution of income which is taking place during the transition process.

The overall picture of poor economic performance conveyed by the indicators just discussed is summarized in Figure 1. 3/ Panel (a) shows the (unweighted) average growth rate of measured real GDP since 1989--which we take to be the year in which the transformation process began--until 1994. Measured growth has on average been negative in every year. The growth rate reached a trough in 1992, reflecting the effects of the breakup of the Soviet Union and the collapse of CMEA trade. The growth rate then increased, but remained negative. The corresponding plot for the level of real GDP in panel (b) shows that, on average, GDP in 1994 was about 60 percent of its initial level. Despite the gloom of the aggregate output data, it should be noted that output growth was positive in more than half of the 26 economies in 1994. The story on inflation since the start of the

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1/ Serbia, which is not in our sample, also experienced hyperinflation -- by Cagan's definition--during 1993 and part of 1994 (Bogetic, Dragutinovic, and Petrovic (1994), and IMF staff estimates). All three countries--Armenia, Georgia, and Serbia--were affected by war.

2/ For countries in which output has not begun to grow, we take 1994 as the year of minimum output. This means that the eventual recorded maximum output decline for some of the economies is likely to exceed the level reported in Table 2.

3/ For reasons explained later, Turkmenistan is excluded from the time profiles in all figures and from the econometric analysis.



transition process, presented in panel (c), appears equally disturbing, with average inflation rising markedly since 1991. Panel (d) in Figure 1 profiles the fiscal balance of the government as a percent of GDP; the data are official estimates, based mainly on IMF staff discussions with the national authorities. An attempt was made to define the fiscal balance on a commitment, rather than a cash, basis; when not available the fiscal balance was reported on a cash basis. Also, the general government budget figures are reported; when not available, central government data are used. Panel (d) highlights the large fiscal deficits during the transition.

### 3. Stabilization time

The picture conveyed by the data just presented is obscured by looking at profiles in chronological time. As Table 1 indicates, countries started their stabilization programs at different points in chronological time. An alternative way of looking at the data is to compute the profiles in "stabilization time." <sup>1/</sup> Stabilization time is denoted by  $T+j$ , where  $T$  is the year in which the stabilization program was implemented and  $j$  is the number of years preceding or following the year of stabilization. In the case of Poland, for instance, which stabilized in 1990, the year 1990 takes the value  $T$  in stabilization time, and a year such as 1994 takes the value  $T+4$ . We then compute the average value for each variable in stabilization time. For example, GDP growth in the stabilization year is averaged for all countries, and this average is graphed at time  $T$  in panel (a) of Figure 2. The average for GDP growth one year after stabilization is graphed at time  $T+1$  in that panel, and so on. Note that the number of observations for each year in stabilization time may differ. For example, there are only two observations relating to year  $T+4$ --those for Hungary and Poland whose stabilizations started in 1990. For the purposes of the time profiles shown in the paper, we report averages only for those years in stabilization time for which there are at least 3 observations.

The shift from chronological time in Figure 1 to stabilization time in Figure 2 changes the picture dramatically. Panel (a) in Figure 2 shows real GDP growth falling until the year of stabilization, but then recovering, with growth on average becoming positive in year  $T+2$ . Panel (b) shows correspondingly that, in terms of levels, real GDP begins to increase two years after stabilization. Panel (c) shows that inflation, in turn, peaks in the year before stabilization, comes down very sharply when the stabilization plan is implemented, and remains low thereafter. <sup>2/</sup> The behavior of fiscal balances roughly mirrors the behavior of inflation.

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<sup>1/</sup> Of the 26 countries in the sample, Turkmenistan was excluded in computing profiles in stabilization time because there has been no stabilization attempt as of mid-1995.

<sup>2/</sup> We do not show profiles of money growth, which would look very similar to the inflation profiles. Havrylyshyn and Botousharov (1995) present evidence showing a strong positive correlation between money growth and inflation for the transition economies.

Figure 1. Growth, Inflation and Fiscal Balance

for the calendar years All Trade into Economic 1/

Figure 1(a). Real GDP growth profile

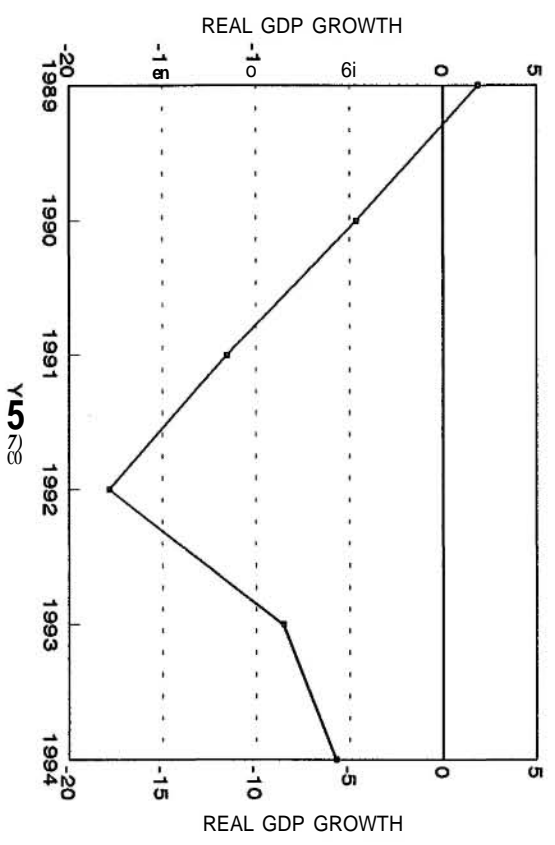


Figure 1(b). Real GDP Index (1989=100)

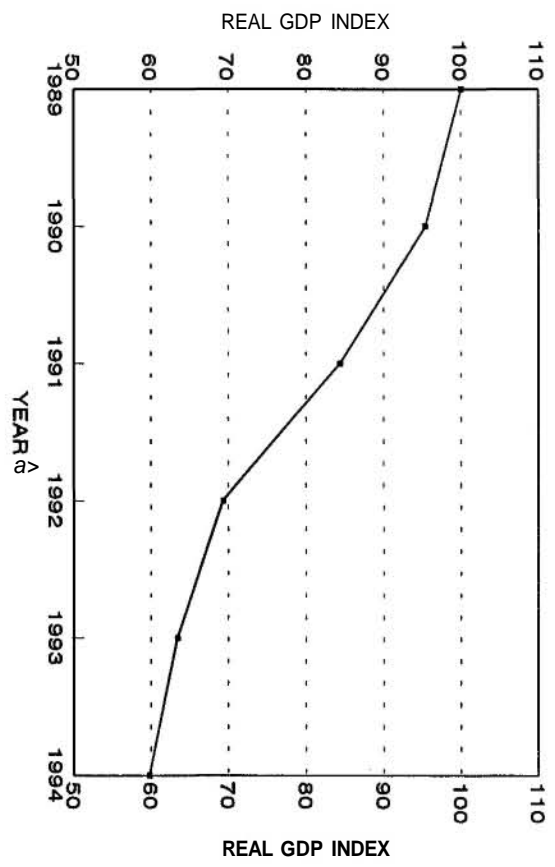


Figure 1(c). Average Inflation

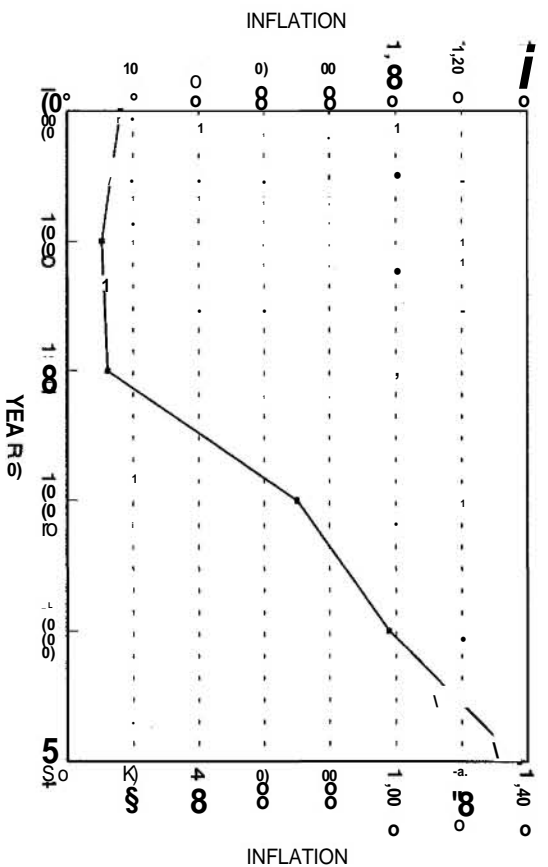
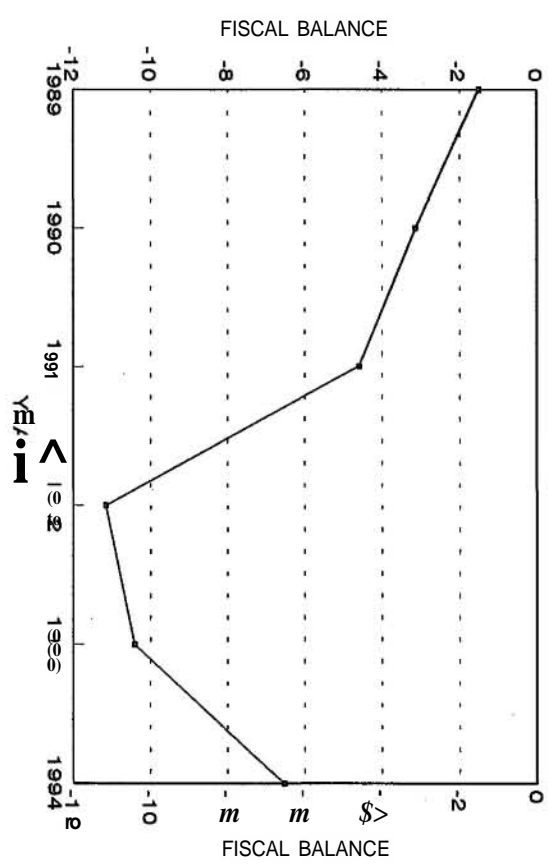


Figure 1(d). Fiscal Balance (as % of GDP)



The sample comprises the 25 countries mentioned in the report Turkmenistan which had no stabilization program as of mid-1995.

Figure 2. Growth, Inflation and Fiscal Balance Profiles in Stabilization Time: All Transition Economies 1/

Figure 2(a). Real GDP growth profile

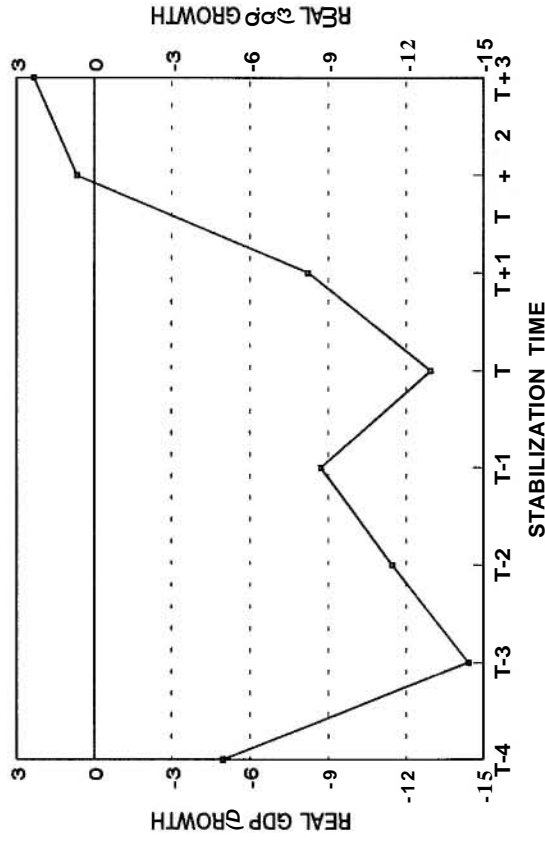


Figure 2(b). Real GDP index profile (T-4=100)

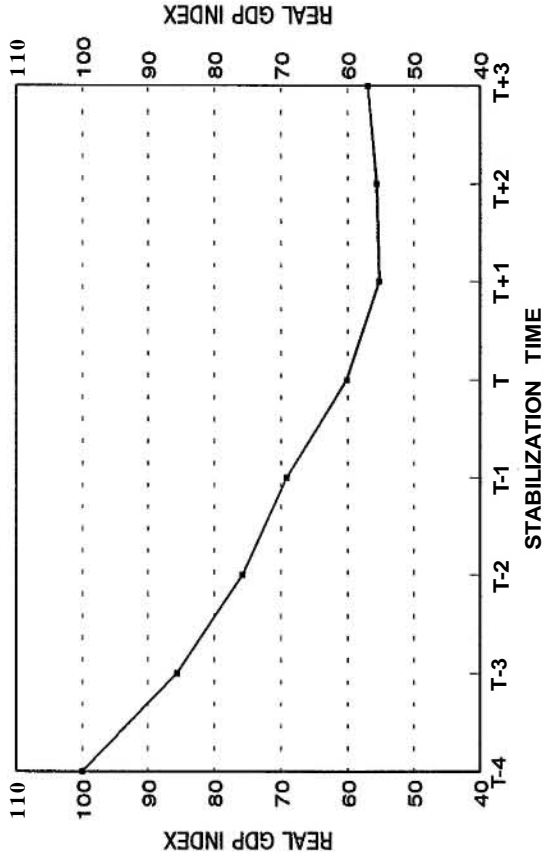


Figure 2(c). Average inflation profile

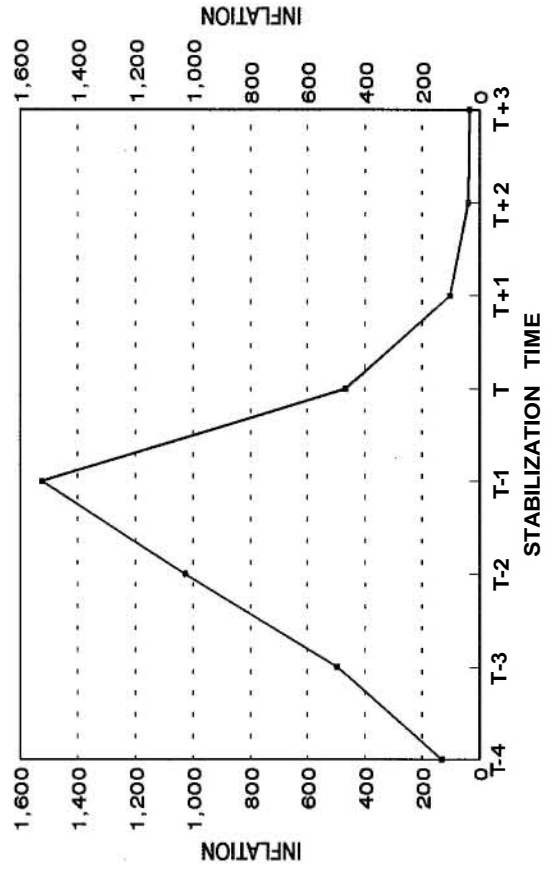
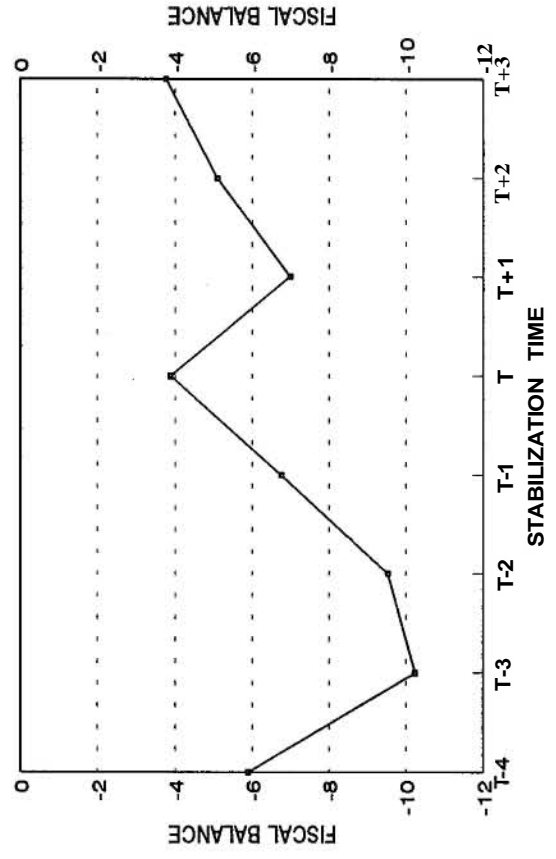


Figure 2(d). Fiscal balance profile (percentage of GDP)



1/ The sample comprises the 26 countries mentioned in the text, except Turkmenistan which had no stabilization program as of mid-1995. Stabilization time T is defined as the year the stabilization program started. For details see text.

Panel (d) in Figure 2 shows very large average fiscal deficits before stabilization--around 8-10 percent of GDP--followed by a significant improvement in the year of stabilization and, with a brief interruption, continued improvement. <sup>1/</sup> The message that emerges from Figure 2 is that real GDP rebounds following inflation stabilization, which in turn appears highly correlated with the improvement in the public finances.

Since there were systematic differences in the date of stabilization between the countries of the former Soviet Union and those of eastern Europe, the stabilization time profiles in Figure 2 represent a changing population of countries. In particular, the observations for T+2 and T+3 come from eastern Europe and the Baltics, rather than from the other republics of the former Soviet Union. Therefore, we divided the sample into two groups: the first group comprises all countries of the former Soviet Union (excluding the Baltics) and Mongolia, referred to as FSUM in Figure 3; the second group includes all eastern European countries and the Baltics, referred to as EEB in Figure 3.

Figure 3 presents profiles in stabilization time for the two groups of countries. Since we do not show data points for which there are less than three observations, no post-stabilization experience is shown for the FSUM group. For this group, panels (a) and (b) show that the level of output has continued to decline. Inflation, however, declined sharply in the year of stabilization, as shown in panel (c), helped by a significant improvement in public finances (panel (d)), albeit to an average deficit close to 10 percent of GDP.

As in the FSUM countries, growth in eastern Europe and the Baltics is negative up to the year of stabilization (Figure 3). Real GDP growth turns positive two years after stabilization. Indeed, output has begun to grow in all these countries except FYRM, which was subject to a trade embargo. In terms of levels, average GDP for the EEB countries never fell as low as it did for the FSUM countries. Also, inflation in these economies never reached the levels that it did in the former Soviet Union, reflecting the fact that fiscal deficits were relatively lower. After stabilization, the average rate of inflation quickly fell below 100 percent, and then below 50 percent, although the scale of the chart makes this difficult to discern.

#### 4- Inflation and growth

The time profiles of Figures 2 and 3 suggest that growth follows stabilization: inflation falls sharply in the year of stabilization and then growth revives. It is also apparent that much higher fiscal deficits are associated with higher inflation and thus lower growth.

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<sup>1/</sup> The temporary deterioration in the fiscal balance a year after stabilization appears to be associated with the initial large expenditures needed for structural reforms (for example, creating social safety nets and cleaning up bad loans in the banking system).

We now report some efforts to investigate the growth-inflation association in more detail. In Figure 4 we plot the average (logarithmic) inflation and growth rates for each country during the period 1992-1994. The relationship is negative and statistically significant ( $R^2 \ll 0.63$ ), which confirms the existence of a negative correlation between inflation and growth for the countries in this sample.

We also examine the relationship between inflation and growth by asking whether there are individual country counterexamples to the negative association found in the regression. First we consider the 14 countries among the 26 where output growth had begun by 1994 (Table 2). In 10 of these countries, annual inflation fell below 50 percent in the same year as growth began, or in an earlier year. The 10 countries are Albania, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, and Slovenia. Of the four remaining countries in which growth has begun, inflation in Mongolia was just above 60 percent in 1994, the year growth began. In the case of Armenia, inflation was reduced more or less simultaneously with the recovery of output, and inflation was running at an annual rate of just above 50 percent in Armenia in the first six months of 1995. Bulgaria and Romania were the only two countries where growth was recorded as positive one or two years prior to inflation being reduced to below 50 percent. However, in the first half of 1995, both countries were still growing and inflation was reduced to an annual rate of less than 35 percent (annualized).

Examining the preliminary data for the first half of 1995 more systematically, we find there are now 15 economies which have begun to grow--the additional country is the Kyrgyz Republic, which also reduced its inflation rate very sharply. In each of these economies, annualized inflation was around 50 percent or less in the first six months of 1995. These figures tend to support the view that low inflation--below 50 percent in annual terms--is a precondition (i.e., is a necessary condition) for growth to begin.

There is also the question of whether countries that have low inflation are growing. As of 1994, 11 countries had reduced annual inflation below 50 percent. In ten of these countries, growth revived either in the same year or with a lag of one to two years. The only exception is Tajikistan, which had very low inflation but negative growth in 1994. In this case, the low inflation was apparently due to an outright shortage of banknotes and not a result of a deliberate anti-inflation policy. Preliminary data show that Tajikistan returned to high inflation in the first six months of 1995. In addition, as of mid-1995, two other countries--Georgia and FYRM--have brought annualized inflation below 50 percent but growth has not yet revived. As mentioned earlier, FYRM still faced trade embargoes during this period.

In conclusion, there are only two countries in this sample that were able to grow before inflation was reduced to an annual rate below 50 percent per annum. Conversely, countries that succeeded in reducing inflation also

Figure 3. Growth, Inflation and Fiscal Balance Profiles in Stabilization Time

Figure 3(a). Real GDP growth profile

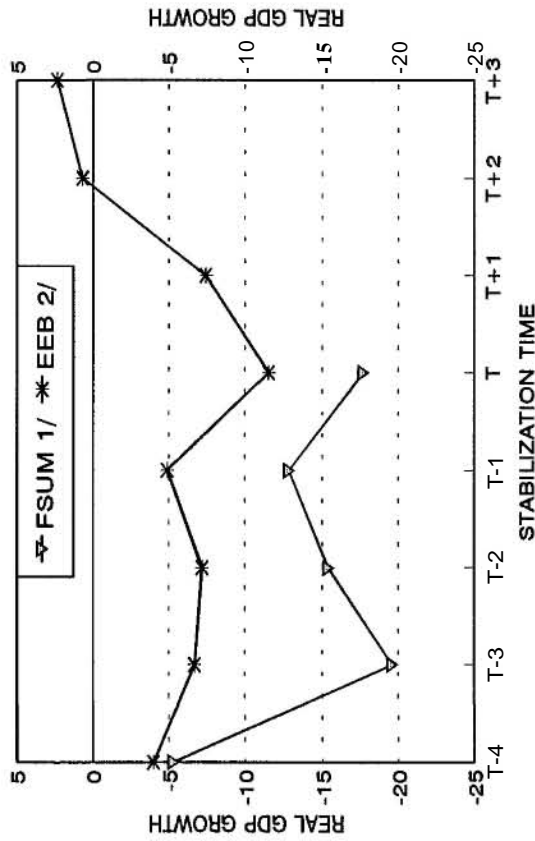


Figure 3(b). Real GDP index profile (T-4=100)

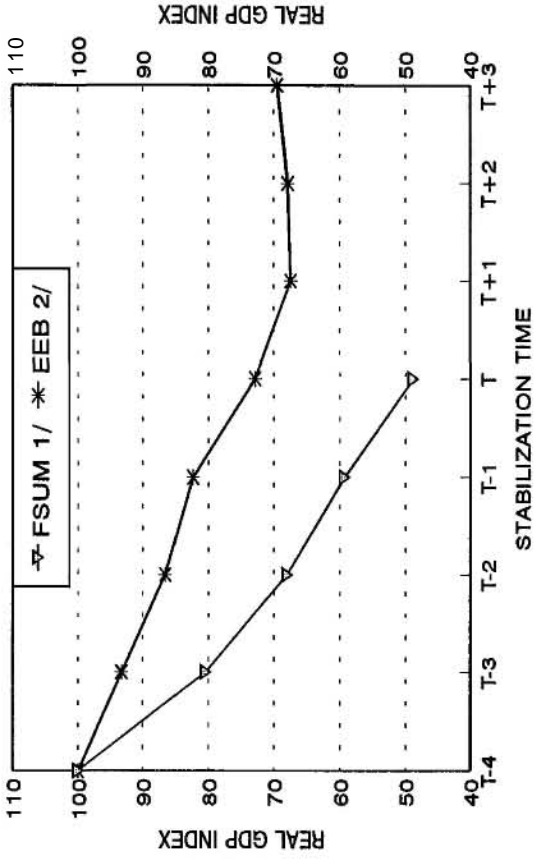


Figure 3(c). Average inflation profile

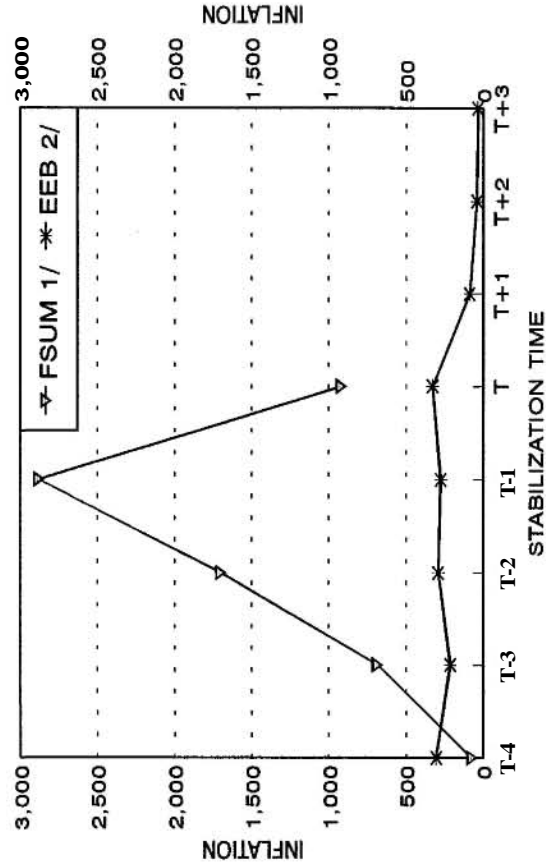
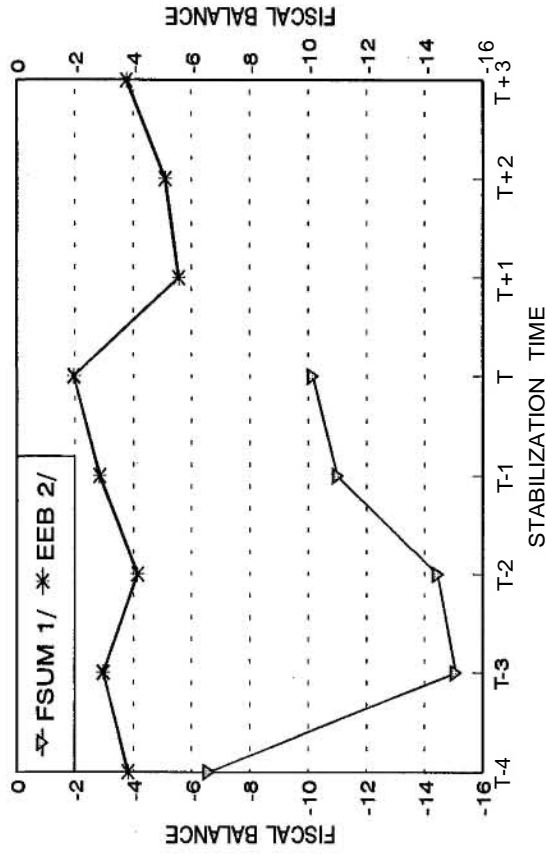
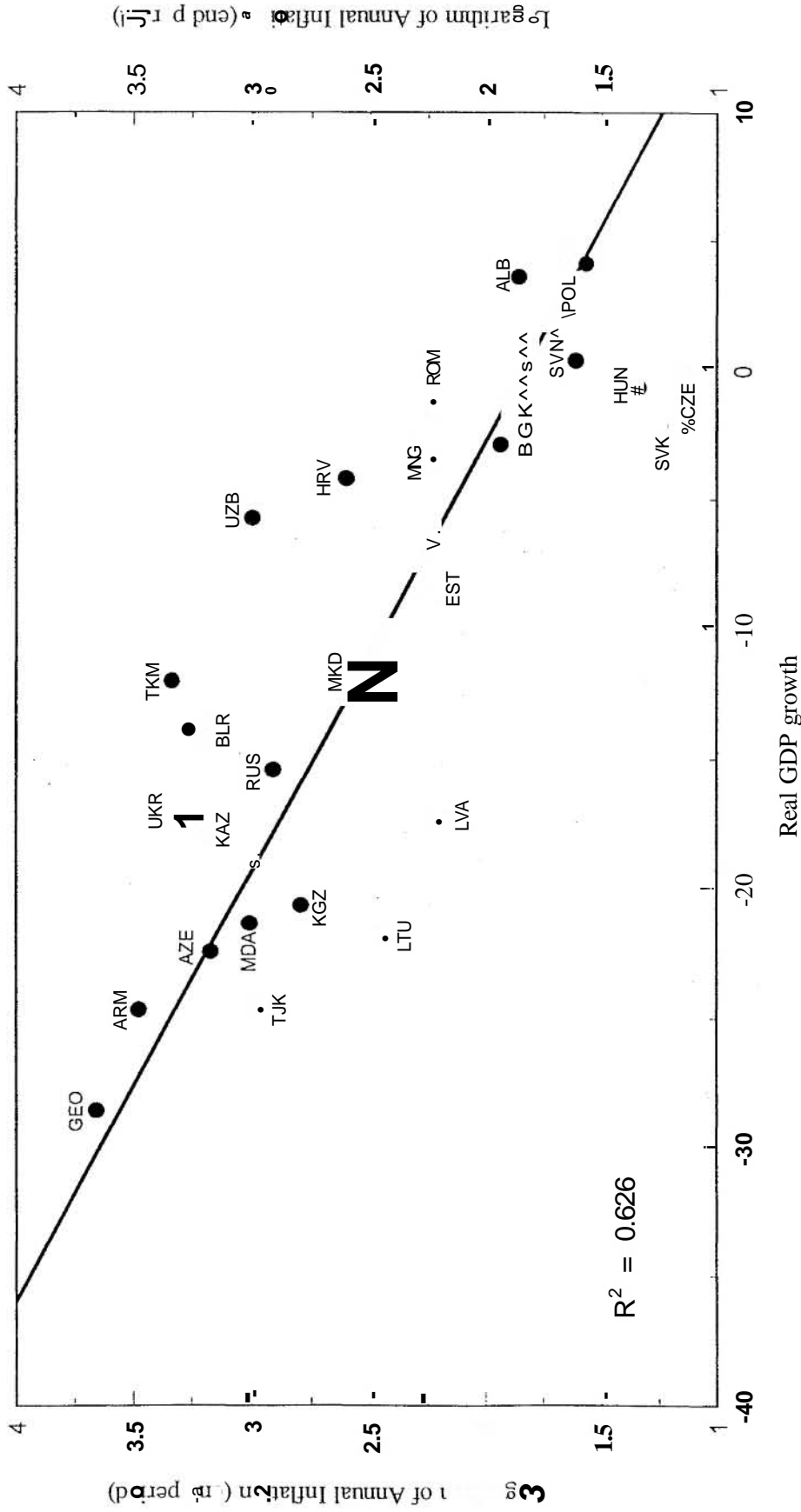


Figure 3(d). Fiscal balance profile (percentage of GDP)



1/ FSU and Mongolia except the Baltics.  
2/ Eastern Europe and the Baltics.

Figure 4. Transition Economies: Inflation-Growth Correlation, Average of 1992-94



Source: IMF staff estimates and national authorities.

1/ ALB-Albania, ARM-Armenia, AZE-Azerbaijan, BLR-Belarus, BKG-Bulgaria, HRV-Croatia, CZE-Czech Republic, EST-Estonia, GEO-Georgia, HUN-Hungary, KAZ-Kazakhstan, KGZ-Kyrgyz Republic, LVA-Latvia, LTU-Lithuania, MKD-Macedonia, FYR, MDA-Moldova, MNG-Mongolia, POL-Poland, ROM-Romania, RUS-Russia, SVK-Slovak Republic, SVN-Slovenia, TJK-Tajikistan, TKM-Turkmenistan, UKR-Ukraine, UZE-Uzbekistan.

began to grow, typically with a lag. For this group of countries, therefore, stabilization appears close to being both a necessary and sufficient condition for growth.

### III. Determinants of Growth and Inflation

In the previous section we documented the time patterns of GDP, inflation, and the fiscal balance in the transition economies during the period 1989-1994. In this section we use some simple econometric analysis to examine the determinants of growth and inflation. We run two sets of regressions, the first with the average annual rate of growth of real GDP as the dependent variable, and the second with the annual end-period inflation rate, expressed as a logarithm, as the dependent variable. As explanatory variables we considered: macroeconomic policies (exchange rate and fiscal policy); the extent of structural reforms; and initial conditions--such as the initial level of per capita GDP, dependence on intra-FSU and CMEA trade, and the effects of the CMEA collapse in 1991 and the breakup of the Soviet Union in January 1992.

#### 1. Data definitions and methodology

The growth rate data are the same as those presented in the previous section, and the inflation rate data are based on end-period prices, as compared with annual averages in the time profiles. The figures for the fiscal balance of the government (measured as a percent of GDP) are also the same as those used in the previous section. The effects of the exchange rate regime (as listed in Table 1) were captured by a dummy variable which takes on a value of one when the exchange rate was fixed, and zero otherwise. If the exchange rate regime changed during the sample period 1992-94 (as in Latvia and Lithuania), we adopted the procedure of assigning the value of one (zero), if the exchange rate regime was fixed (flexible) for more than six months in that year.

The extent of structural reforms in each year was measured as an economic liberalization index (as computed by de Melo, Denizer, and Gelb, 1995, for the period 1989-94, based on information presented in the 1994 and 1995 Transition Report), where 0 represents an unreformed planned economy and 1 represents a fully reformed economy. This index is a weighted average of three indices: price liberalization and competition (with a weight of 0.3), trade and foreign exchange regime (with a weight of 0.3), and privatization and banking reform (with a weight of 0.4). On the basis of the yearly liberalization index, De Melo, Denizer, and Gelb (1995) construct a cumulative liberalization index (CLI) to capture the depth of reforms over the 1989-94 period. For econometric purposes, we used the CLI.

We experimented with two different ways of capturing the effects of the trade disruptions caused by the breakup of the CMEA and of the Soviet Union. The first was to use a dummy variable (Y92) which takes a value of 1 for the year 1992 and 0 otherwise; the second was to use the ratio of CMEA exports (or intra-FSU exports in the case of FSU countries) to GDP, presented in



Table 1. To the extent that intra-FSU exports are an underestimate of CMEA exports for the FSU countries, the estimated coefficient associated with the ratio of intra-FSU exports to GDP will provide a lower bound of the impact of the breakup of the CMEA trade for FSU countries. Finally, World Bank estimates of per capita purchasing power parity income figures for 1991 were used.

To carry out the econometric analysis, we pooled the cross-section and time series data for all 25 countries for three years, 1992-1994. The main reason for excluding the period 1989-1991 is that macroeconomic policy as commonly understood in market economies simply did not exist in more than half the countries before 1992, especially in the former Soviet Union and Albania. In particular, it is difficult to define the exchange rate regime as either fixed or flexible during the pre-reform period.

Estimation was carried out using annual data for the three years for the 25 country sample. <sup>1/</sup> We allowed for the intercept to vary across countries (to capture "fixed effects"), except when the CMEA exports to GDP variable (CMEAGDP) or initial income (LPCWB91) were included in the regression, since the regressors become collinear (in that case, a common intercept was assumed). This formulation enables us to test whether there are differences across countries (presumably reflecting omitted variables), modeled as parametric shifts in the regression function.

The role of the exchange rate regime in stabilization and growth has been a subject of controversy for some time. Based on our reading of previous experience, we expected growth to be higher and inflation lower in countries with a fixed exchange rate. Stabilizations from high inflation have typically relied on a nominal exchange rate anchor, which tends to allow for a rapid remonetization of the economy (see Sargent (1982) and Végh (1992)). But such stabilizations are not sustainable unless fiscal deficits are reduced. In the context of the transition economies, the benefits of pegged exchange rates have been stressed by Hansson and Sachs (1994) and

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<sup>1/</sup> To be specific, the estimated equation for the pooled cross-section time-series regressions takes the form:

$$\text{DEPVAR}_{it} = a_i + P_1\text{FIXED}_{it} + P_2\text{FISCAL}_{it} + P_3\text{CLI}_{it} + \\ + P_4\text{Y92}_{it}(P_5\text{CMEAGDP}_{it}) + P_6\text{LPCWB91}_{it} + u_{it},$$

where DEPVAR is either log inflation or GDP growth, as defined above;  $i$  ( $=1, \dots, 25$ ) indexes the country;  $t$  ( $=1992, 1993, \text{ and } 1994$ ) indexes time; and  $u$  is an error term assumed to be i.i.d over  $i$  and  $t$  and uncorrelated with the explanatory variables. FIXED is the exchange rate dummy; FISCAL is the government balance variable (thus, a fiscal deficit would take on a negative value); CLI is the cumulative value of the liberalization index; Y92 is the time dummy for 1992; CMEAGDP measures the exports going to other CMEA or FSU countries; and LPCWB91 is the log of per capita income in 1991, from World Bank data.

Sahay and Végh (1996). In addition, stabilization from high inflation has typically been associated with growth rather than recession (Rebelo and Végh, 1995; Easterly, 1995).

We also expected inflation to be higher and growth lower the larger the fiscal deficit, the smaller the extent of market-oriented reforms, and the higher the ratio of CMEA exports to GDP (because the breakup of the CMEA would then have a greater impact on the economy). Given the short time period, we did not have a firm expectation on whether initial per capita GDP would matter, or, if it did, in which direction. Endogenous growth theory predicts a negative relationship between the initial per capita income and the growth rate over some subsequent period in the long run. In the short run, however, it is quite possible that the quality of economic management may have been positively associated with income, in which case higher income would be associated with more rapid growth during the transition.

Of course, since our regressions are not based on a particular structural model, causation is in some cases not self-evident, and given that the data are sparse and preliminary, the empirical analysis should be viewed as exploratory and the results merely indicative of the relative importance of some key policy and structural variables.

## 2. Output estimation results

The first three columns in Table 3 report the output growth results obtained from the fixed-effects model. In all cases, country-specific effects turned out to be highly significant (using a likelihood ratio test), indicating that there were some differences across countries which are not captured by the explanatory variables. Equation (1) shows that a pegged exchange rate regime and tighter fiscal policy were conducive to higher growth.

However, when further explanatory variables are added (equations (2) and (3) in Table 3), the fiscal variable loses significance. These additional variables--Y92, the time dummy intended to capture the effects of the trade disruptions, and CLI, the cumulative liberalization index--are highly significant. These results thus seem to confirm our prior that the CMEA collapse and the breakup of the Soviet Union had a major negative impact on growth across countries in 1992. <sup>1/</sup> The state of market-oriented reforms, as reflected in the liberalization index CLI, appears to have been critical in spurring growth (regression (3)). This is an important result from the policy viewpoint. In addition, countries with lower initial per capita income had lower output declines (not reported in Table 3).

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<sup>1/</sup> We also found (but do not report) that countries with larger shares of CMEA exports in total exports or intra-FSU exports suffered larger output declines.

**Table 3. Fixed Effects Model for 25 Transition Economies, 1992-94**  
(t-statistics in parenthesis)

	Dependent Variable: GDP growth			Dependent Variable: Log of inflation		
	(D)	(2)	(3)	(4)	(5)	(6)
<b>FIXED</b>	18.10 (3.04)	15.77 (3.10)	11.35 (2.00)	-2.72 (-3.03)	-2.55 (-2.90)	-1.84 (-2.08)
<b>FISCAL</b>	0.53 (2.31)	0.30 (1.48)	0.30 (1.42)	-0.09 (-2.47)	-0.07 (-1.96)	-0.06 (-1.68)
<b>CLI</b>			7.42 (3.54)			-0.97 (-2.97)
Y92		-9.28 (-4.41)			0.69 (1.90)	
<b>R-squared</b>	0.64	0.75	0.72	0.71	0.73	0.75
<b>Adjusted R-squared</b>	0.45	0.60	0.55	0.55	0.57	0.61
<b>Likelihood ratio</b>	56.61	70.00	53.98	54.61	57.00	46.53
<b>Probability value</b>	0.00019	0.00000	0.00043	0.00035	0.00017	0.00382
<b>Total observations</b>	75	75	75	75	75	75

The regressions thus suggest that countries that achieved macroeconomic stabilization (through the use of fixed exchange rates) and undertook deeper reforms grew faster. The results also point to the importance of initial conditions--trade dependency and initial per capita income--in influencing the growth rate during the transition.

### 3. Inflation estimation results

As in the growth regressions, we found the country-specific effects to be highly significant in the inflation regressions (as indicated by the likelihood ratio tests reported in Table 3). Our most prominent finding (last three columns of Table 3) was that the pegged exchange rate dummy and the measure of the fiscal position of the government are highly significant and, when used together (equation (4)), explain more than 70 percent of the time-series-cross-country variation in inflation. The negative shock associated with Y92 is only marginally significant (at the 10 percent level, equation (5)). In contrast, and somewhat surprisingly, the liberalization index CLI turns out to exert a strong downward effect on inflation (equation (6)). The inclusion of CLI, however, improves the fit only marginally. We also found (but do not report in Table 3) that countries that started with higher per capita incomes and those that suffered a larger CMEA shock had higher inflation rates during the transition.

The results thus strongly suggest that, in addition to addressing the fundamental fiscal disequilibria, a pegged exchange rate has been a key component of successful inflation stabilization packages. Moreover, structural reforms and initial conditions influenced the inflationary process during the transition.

## IV. Policy Lessons and Conclusions

As of the first half of 1995, growth had revived in 15 of the 26 transition economies studied here. With the exception of the former Yugoslav Republic of Macedonia, all eastern European countries are growing, and so are some countries in the former Soviet Union. Considering the extent of the transformations taking place in these economies, the decline in inflation and the return of positive growth within a few years has to be regarded as a major and striking achievement. The evidence discussed in this paper strongly suggests that growth requires stabilization, and that stabilization leads to growth. Moreover, it appears that for growth to begin, annual inflation should be less than 50 percent. A fixed exchange rate and smaller fiscal deficits seem especially important in reducing inflation and raising growth rates.

However, there are alternative interpretations of the connection between inflation and growth. For instance, it may be that stabilizations succeed only if growth follows. If growth does not follow stabilization, then governments may find it impossible to sustain the stabilization. While this could be true, it is nonetheless striking that there are only two cases in which growth has taken place without inflation having been reduced to

less than 50 percent per annum; moreover, even in these two cases inflation was on its way down and had declined to less than 35 percent soon after growth revived.

Alternatively, it could be argued that there is no inherent link between inflation and growth in these economies but, rather, that the link is forced by the policy conditionality of international financial institutions which accompanies the access to external financing that is necessary for growth. A variant of this view would be that it is the benefit from foreign technical assistance provided by an IMF/World Bank program that produces growth, rather than the financing by itself. In most transition economies, inflation has been reduced in the context of explicit IMF stabilization programs with two exceptions, Croatia and Slovenia, which still received technical assistance from the IMF. <sup>1/</sup> Thus, the idea that the stabilization-growth link is a product of IMF program design cannot be dismissed. However, the fact that the inflation-growth results for the transition economies so closely resemble those for other economies reported by Bruno and Easterly (1995)--in their case that countries in which inflation exceeds 40 percent per year get into trouble, and that countries that stabilize from high inflation typically experience growth--leads us to doubt that the results in this paper merely reflect IMF program design.

Yet another hypothesis is that countries that want to reform undertake a whole set of actions, of which inflation stabilization is one, but that the other components may be more important. The correlation between the index of structural reforms and stabilization is high, and would thus support this view. While the results in Table 3 strongly support the view that structural reforms also promote growth, we do advance the hypothesis--based on prior results and those reported in this paper--that stabilization to an inflation rate of below 4 percent per month is a necessary condition for sustainable growth. We also regard the evidence as supporting the notion that transition countries that stabilize inflation will begin to grow within two years, though this assumes that governments that stabilize have a proclivity to reform, for one could imagine a country which stabilized inflation but undertook no structural measures and failed to grow. An additional aspect to keep in mind is that stabilization efforts in all these countries are also likely to be mutually reinforcing to the extent that these economies initially depend on each other for export markets.

It could also be argued that the results on stabilization and growth presented in this paper reflect what has happened in the more advanced, more market-oriented economies of eastern Europe, and that they are not applicable to the other economies in transition--those of the former Soviet Union and Mongolia. That could be, but we doubt it. For one thing, the Baltics were, in most respects, deeply integrated into the economy of the

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1/ The Serbian stabilization program, not part of this study, was also highly successful in reducing inflation in early 1994 (Bogetic, Dragutinovic, and Petrovic, 1994) without an explicit IMF arrangement.

former Soviet Union, but they stabilized early and began to grow just as the leading countries of eastern Europe. For another, in Albania, one of the least developed economies of eastern Europe, growth revived soon after a radical stabilization program.

While it is not possible to settle the issue of causation with the data available so far, we venture a prediction that is implied by the hypotheses we are advancing. The prediction is that the profile for the countries of the former Soviet Union and Mongolia will follow the pattern seen in Figure 3 in the next few years. In other words, growth in these countries will on average increase in 1995 and will turn positive in most of these countries by 1996 or 1997.

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