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A Note on Reform Reversals and Output Growth in Transition Economies

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A NOTE ON REFORM REVERSALS AND OUTPUT GROWTH IN TRANSITION ECONOMIES

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Abstract

The abandonment of central planning led to considerable output declines in countries of the former Soviet-bloc. The magnitude and length of the output declines, as well as recovery experiences have been very diverse. Various determinants of output growth have been identified in the literature. One of the most important elements in the transitional phase is the evolution to a market system. The closer an economy to a market system, the more beneficial effects on growth are expected. To measure this 'closeness', reform indicators have been developed. In the literature it is found that current reform affects growth negatively, while lagged reform (the 'stock of reform') affects growth positively and eventually starts to dominate the negative effect. We show that *the traditional empirical framework implies that reform reversals generate positive growth effects*. While a policy reversal might be beneficial to some agents concerned, a reversal does bear large costs with respect to credibility and uncertainty about further reform, restraining e.g. private initiatives. Consequently, *the positive contribution to output growth can be questioned*. We propose a simple modification to the traditional framework allowing us to explore the possibility of a negative effect on output growth. We present *evidence that reversals generate large negative growth effects, unlike the implicit positive effect found in the literature*. Since reform and inflation (stabilization) are found to be important determinants of growth, we examine these two in more detail. We find that the ultimate steps to a market economy appear very difficult to take. The analysis of the determinants of inflation stabilization reveals that price liberalization results in an upshot of inflation in the first years of transition. Monetization of large fiscal deficits accounts for the fact that inflation did not immediately come down after the initial upshot.

1 Introduction

In the early 1990s the countries of Central and Eastern European (CEE), the Baltic States and the other countries of the former Soviet Union (OFSU) abandoned the communist rule and began the transition to a market economy. Several studies empirically analyze the common large output decline at the start of transition, followed by different recovery patterns across countries (see Figure 1). Fisher *et al.* (1996) find macroeconomic stabilization as an important condition for growth to resume. De Melo *et al.* (1997) identify initial conditions and found them to be a significant determinant of output performance in the first years of transition. Berg *et al.* (1999) allow for time-varying effects of these initial conditions. De Melo *et al.* (1996) construct a reform indicator (RI) that covers different areas of structural reform. They find a significant negative impact of the current level of structural reform and a significant positive impact of the lagged level of reform on real output growth. In a regression analysis this takes the following form: $\alpha RI + \beta RI_{-1}$, with $\alpha < 0, \beta > 0$ and $|\alpha| < \beta$. This can be rewritten as $\alpha \Delta RI + (\alpha + \beta) RI_{-1}$, thus progress in reform affects growth negatively, while the stock of reform affects growth positively. The negative effect should be interpreted as an adjustment cost. The positive stock effect rests on the idea that the closer to a market economy, the more the economy can benefit from the market mechanism (in particular better resource allocation), which leads to improved growth performance. $\alpha < 0$ implies, however, that a reform reversal generates a positive growth effect. We are not aware of any study up to present that explicitly investigated whether this is actually true. While a policy reversal might be beneficial to some firms concerned, a (significant) reversal bears large costs with respect to credibility and uncertainty about further reform, e.g. restraining private initiatives. The (empirical) contribution of this paper is to modify the traditional set-up in order to explore the possibility of a negative effect on output growth. We present evidence that reversals generate large negative growth effects, unlike the implicit positive effect found in the literature. Since reform is so essential, we also provide an illustration of its nature organized by some stylized facts. We find that the ultimate steps to a market economy appear very difficult to take. Our empirical analysis also confirms (inflation) stabilization as an important condition for the recovery of growth. Therefore we also present an analysis of the determinants of inflation (stabilization). Price liberalization resulted in an upshot of inflation and monetization of large fiscal deficits prevented inflation to come down in several countries.

The paper is organized as follows. Section 2 briefly discusses three important 'groups' of determinants of economic performance as identified by the literature: reform, macroeconomic stabilization and initial conditions. In section 3 we explicitly address the case of reform reversals within the 'traditional' framework to assess output growth. In section 4 an analysis of the reform process is made next to an analysis of the determinants of (inflation) stabilization. Section 5 concludes by summarizing the main findings.

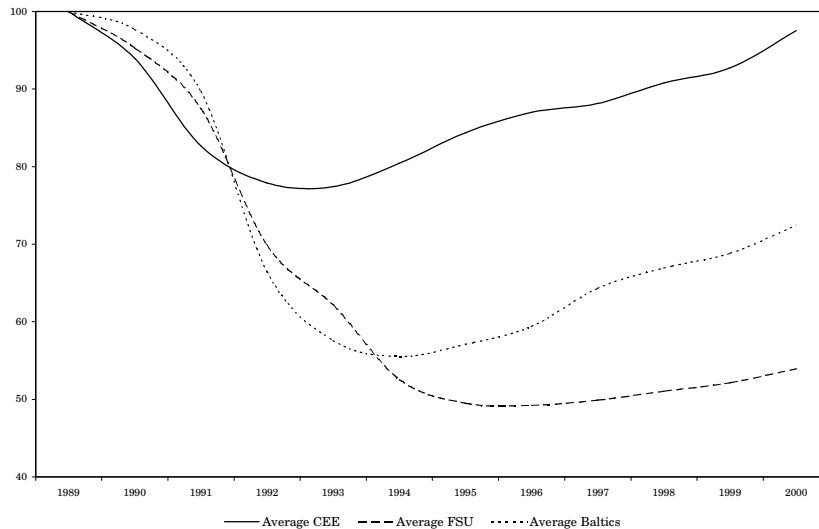


Figure 1: Output paths in transition countries (chronological time; source: IMF World Economic Outlook Database 1999)

2 Stabilization, Reform and Initial Conditions¹

Stabilization, reform and initial conditions have been identified as three important groups of determinants of output growth. Stabilization can be thought of as policies aimed at inflation (and fiscal balance) adjustment. Reform is 'the process of installing a market economy' (e.g. price liberalization, privatisation); in addition, market-enhancing institutions should be developed to sustain the functioning of the market. 'Initial conditions' (*ICs*) are differences in macroeconomic, institutional and natural resource conditions prevailing at the start of transition.

2.1 Stabilization

The collapse of the central planning system caused nearly all transition countries to experience three-digit inflation rates. The upshot of inflation is due to the price jump following initial price liberalization. This eliminated the existing repressed inflation² from previous years. However, in most countries (particularly in the OFSU) inflation remained at very high levels because of monetary financing of fiscal deficits (see Figure 2). The latter arose because the loss of

¹See Merlevede (2000) for a more complete discussion.

²Fixed quotas of goods were delivered at state-managed prices. Given the shortage of goods and since prices did not rise, cash paid wages rising beyond GDP growth implied an accumulation of financial assets. (De Melo et al. (1996))

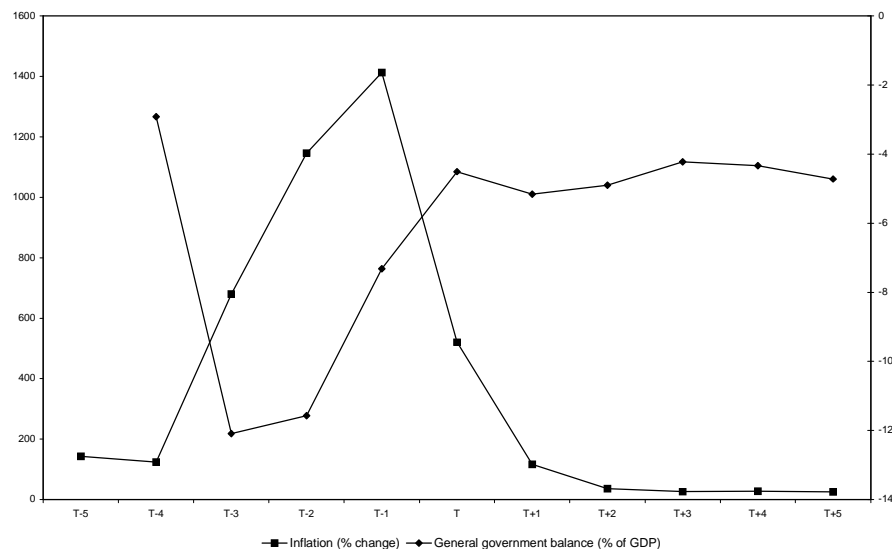


Figure 2: Inflation (LHS) and general government balance (RHS) averages for 24 transition countries in stabilisation timing (see footnote 3) (source: IMF World Economic Outlook Database and EBRD Transition Report 1999)

government revenues was not accompanied by a cut in government expenditures. The fall of revenues was due to an erosion of the tax base (cf. output drop) and inadequate 'tax-coverage' of (privatized) firms. In the absence of well functioning debt markets, governments had to resort to monetary financing (Budina and van Wijnbergen (1997)). The pressure for monetary expansion was further exacerbated by off-balance expenditures³. The monetization of (quasi-)deficits put additionally upward pressure on nominal wages in order to maintain real wages at their purchasing power level. Fiscal consolidation would not only lower the pressure for monetary financing, without a reduction of the fiscal deficit, high interest rates -needed to fight inflation- would take government debt to high, unsustainable levels relative to the small government revenues.

Empirically Bruno and Easterly (1998) find -for a more general sample- that growth becomes negative during inflation crises (>40% annual inflation) and positive afterwards. For a panel of 25 transition countries Loungani and Sheets (1997) present empirical evidence on the negative impact of inflation upon subsequent GDP growth. Fischer *et al.* (1996) show the profile of real GDP growth,

³E.g. subsidies taking the form of loans granted by state-owned commercial banks, wage and pension arrears. This is often referred to as the quasi-fiscal deficit, since sooner or later this will come back to the budget. Direct credit from the central bank to state enterprises (under government pressure) also increased inflationary pressures.

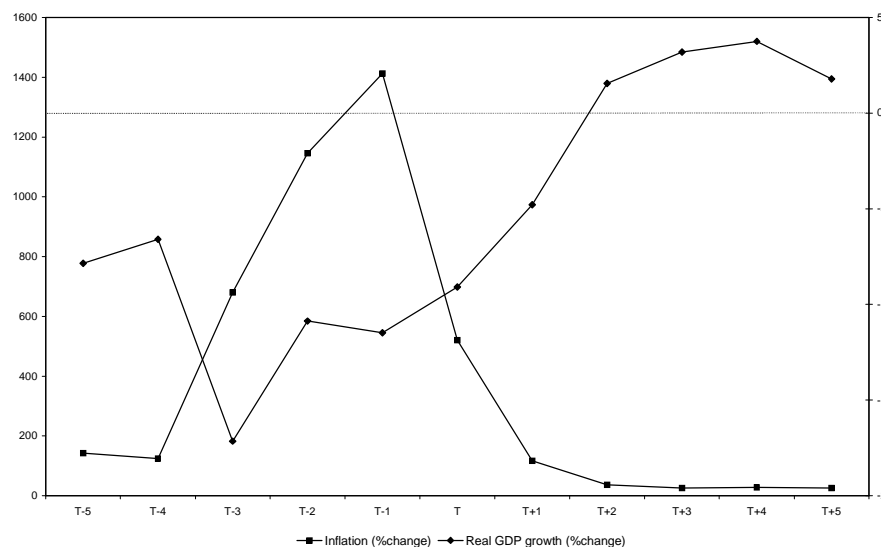


Figure 3: Inflation (LHS) and real GDP growth (RHS) averages for 24 transition countries in stabilisation timing (see footnote 3) (source: IMF World Economic Outlook Database and EBRD Transition Report 1999)

government balances and inflation (averaged over 24 transition countries) in 'stabilization' timing⁴. Real GDP growth starts to recover during the year of stabilization and becomes positive two years after stabilization, inflation comes down drastically when stabilization is started and remains relatively low thereafter (see Figures 2 & 3). Government balances start improving the year before stabilization and remain stable afterwards, thereby enabling inflation stabilization. Based on these findings stabilization has been argued to be a necessary condition for growth recovery. However, it is not a sufficient condition, growth recovery also requires structural reform.

2.2 Structural Reform

Kornai (1994) identifies two key elements of the transition to a market economy: the move from a sellers' to a buyers' market (by price liberalization, in order to install adequate incentives, and trade and foreign exchange liberalization) and the enforcement of a hard budget constraint (by means of privatisation, elimination of subsidy programs and creation and liberalization of a financial market). Blanchard (1997) offers two more essential elements of the process

⁴Year T is then the year in which inflation stabilisation is implemented, $T + i$ are then preceding and following years. See Fisher *et al.* (1996) for the exact dates. In Fisher *et al.* (1996) and (1998a) Turkmenistan is excluded from their analysis because no serious stabilisation attempt was made.

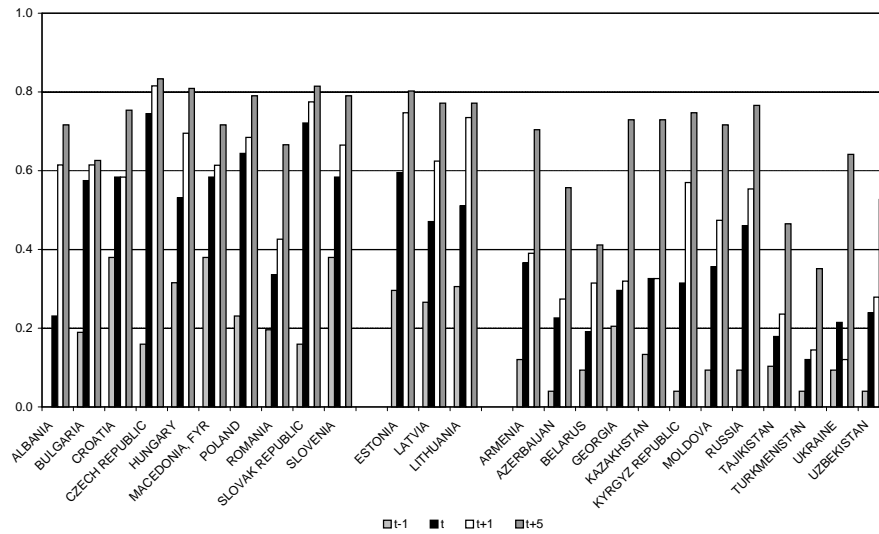


Figure 4: Stock of reform in selected years (in transition timing, see footnote 5) in 25 transition countries (source: De Melo *et al.* (1996) and own calculations based on EBRD Transition Report 1999)

of change: restructuring within surviving firms in search for cost and productive efficiency (via new investment and labor rationalization) and reallocation of resources from old to new activities (via closures and bankruptcies combined with the establishment of new enterprises). The ability of transition countries to reallocate resources toward their best use and to establish institutions to that end has been a major determinant of transition patterns (De Melo *et al.* (1997)). The idea is that the closer a country is to a market economy, the more it benefits from the market's growth generating (allocational) efficiency.

De Melo *et al.* (1996) defined an aggregate reform index based on three subindexes reflecting the progress of reform with respect to *i*) price liberalization, *ii*) trade and foreign exchange liberalization and *iii*) privatisation, restructuring and financial market reform. Following Havrylyshyn *et al.* (1998), we carried their index through to 1998 based on indicators of the European Bank for Reconstruction and Development (EBRD). Figure 4 gives an overview. A score of 1 indicates an institutional level comparable to a market economy. Note that in the CEE-countries and the Baltic States on average more (and somewhat faster) progress has been made than in OFSU-countries. Chronologically they also achieved earlier high levels, but transition started one or two years later in OFSU-countries (and the Baltic States) than in CEE-countries.

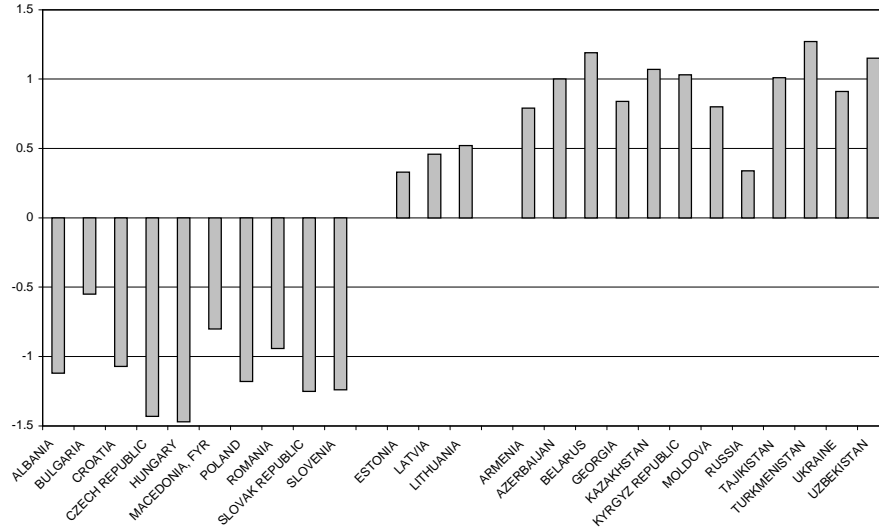


Figure 5: Initial Conditions: macroeconomic distortions cluster ($IC1$) (source: De Melo et al. (1997))

2.3 Initial Conditions

In the context of output performance differences in macroeconomic, institutional and natural resource conditions prevailing at the start of transition, commonly referred to as initial conditions, have received a lot of attention. De Melo *et al.* (1997) were among the first to identify initial conditions and to analyze their impact upon cumulative output growth. By means of a principal component analysis they reduced a set of eleven conditions to two clusters. *i*) An index of macroeconomic distortions at the beginning of transition and unfamiliarity with a market environment ($IC1$, see Figure 5) and *ii*) an index of the level of socialist development and associated distortions prior to transition ($IC2$, see Figure 6). High values for $IC2$ can be interpreted as reflecting '*higher income, resource poor countries that reached diminishing returns to investment and ran out of steam (low growth rates in 1985-89) before reforms began because of structural distortions reflected in overindustrialization*' (De Melo *et al.* (1997)). Note that the clusters express cross-country differences, rather than that their value has a direct interpretation. Macroeconomic distortions were clearly much larger in OFSU-countries than in CEE-countries, the picture on overall development is less clear. The Baltic States have the highest development levels, confirmed by their relatively high levels of GDP per capita in 1989. But their high trade integration with other transition countries was very unfavorable. The number of years spent under communism is often used as a proxy for a country's 'market memory'. The CEE-countries and the Baltic States were market economies be-

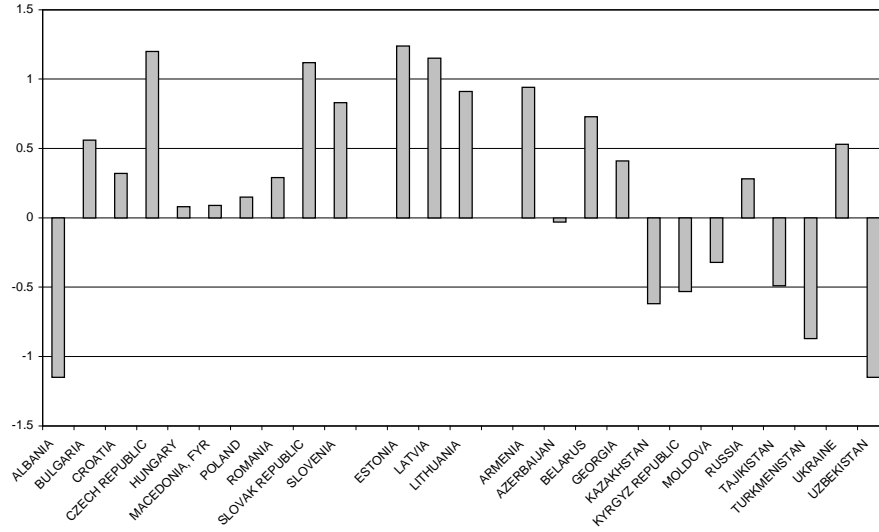


Figure 6: Initial Conditions: Level of socialist development and associated distortions ($IC2$) (source: De Melo et al. (1997))

fore WWII, while OFSU-countries, under the communist rule since the Russian Revolution in 1917, almost lack any market experience. This is often mentioned as one of the explanations for the wait-and-see approach to institutional reform in the OFSU-countries as compared to the CEE-countries and the Baltic States.

3 Reform Reversals and Output Growth

In this section we provide an accounting exercise of output dynamics during transition. We agree with Havrylyshyn *et al.* (1998) that output growth is the sum of actions of thousands of individual agents and that therefore estimation results based on a limited number of key variables should be seen as an illustration of the nature of output dynamics, organized by some stylized facts.

Before proceeding with the empirical part some remarks should be made. First of all it is widely known that data on transition countries⁵ are qualitatively not comparable to western country data, especially those from early in the transition phase. The decline in output is believed to be overestimated, because newly emerging activities were inadequately captured and existing firms had an incentive to underreport output and sales to avoid taxes (see Berg *et al.* (1999) or Havrylyshyn *et al.* (1998) for further details).

⁵See the appendix for data sources.

Second, the aggregate reform index used here is the index of De Melo *et al.* (1996), carried through to 1998 as an average of eight EBRD indices (belonging to one of the following categories: price liberalization; trade and foreign exchange liberalization; privatisation, restructuring and financial market reform, see also Havrylyshyn *et al.* (1998)). The index is rearranged to values between 0 and 1. Two drawbacks are the fact that EBRD indices take only certain values between 0 and 4.3 (see Transition Report 1999) and are therefore not continuous. It is also not always clear how e.g. an improvement from 0 to 1 compares to an improvement from 3 to 4. Averaging over 8 indices helps to overcome the drawbacks somewhat, though not perfectly. However, some quantification is necessary for empirical analysis and this is the best available indicator for reform achievements.

Third, all data were rearranged in transition timing: transition year 1 is defined as the year in which central planning was abandoned.⁶ This is especially useful to allow for time-varying effects of initial conditions (cf. *infra*). We also do not opt for large lag structures because this would imply a considerable loss of data (in particular at the start of transition).

Finally, in the estimations that follow one might argue that there could be endogeneity problems. For two reasons we will not explicitly take up this issue. First of all (good) instruments are hard to find. And second, Berg *et al.* (1999) found little or no difference using IMF program targets as instruments.

Specification (1), a model with country specific constants (fixed effects), is the basic specification that was used by e.g. De Melo *et al.* (1996). The dependent variable is percentage growth of real GDP in domestic currency. The macroeconomic variables are used to measure the impact of the macroeconomic environment and the stabilization efforts. Fisher *et al.* (1996) were the first to find macroeconomic stabilization as an important condition for growth to resume. Structural reform (RI is the aggregate reform index mentioned above) comes in as $\alpha RI_{i,t} + \beta RI_{i,t-1}$, where the expectation is that $\alpha < 0$, $\beta > 0$ and $|\alpha| < \beta$. The negative effect of current reform should be interpreted as adjustment costs. The expected positive stock effect rests on the idea that the closer to a market economy, the more the economy can benefit from the market mechanism (in particular better resource allocation), which leads to improved growth performance.

$$\Delta GDP_{i,t} = C_i + \alpha RI_{i,t} + \beta RI_{i,t-1} + \gamma f(\text{macroeconomic variables}) + \varepsilon_{i,t} \quad (1)$$

The country specific constants are somewhat uncomfortable because they turn out to be important determinants of cross-country differences, but at the same time they are hard to interpret. De Melo *et al.* (1997) replaced the fixed

⁶This is 1990 for Croatia, Hungary, FYR Macedonia, Poland and Slovenia; 1991 for Albania, Bulgaria, the Czech and Slovak Republic and Romania. For the Baltic States and the countries of the Former Soviet Union 1992 is taken to be the first year of transition.

effects with initial condition(s) (clusters) (*cf. supra*) and a war dummy ($WAR_{i,t}$ in specification (3)) in their estimations, using pooled least squares techniques.⁷

Berg *et al.* (1999) allowed for a time-varying effect of these initial conditions, based on the idea that they do not have a lasting impact upon output growth. We incorporate their approach in our own estimations (*i.e.* a piecewise linearization of an estimated cubic time function for each initial condition⁸). The first inflection point of the estimated cubic function for each initial condition x is used to identify dummy $D_{x,j}$ (for initial condition x , where j refers to a number of periods). This dummy takes the value 1 for all years since the beginning of transition (t) up to year $t + j$, where j corresponds to the integer preceding the first inflection point of the estimated cubic (time) function. The first term of (2), $\delta_1 D_{x,j} IC_x$, gives the basic effect of an initial condition in the early years of transition. The second term, $\delta_2 t D_{x,j} IC_x$, allows for a (linear) change in the effect as transition continues. The last term, $\delta_3 (1 - D_{x,j}) IC_x$, tests whether there is a lasting effect of an initial condition.

$$\delta_{1,x} D_{x,j} IC_x + \delta_{2,x} t D_{x,j} IC_x + \delta_{3,x} (1 - D_{x,j}) IC_x \quad (2)$$

Some rewriting of (1) gives $\alpha \Delta RI_{i,t} + (\alpha + \beta) RI_{i,t-1}$, which shows that progress in reform is expected to affect growth negatively, while the stock of reform affects growth positively (recall that $|\alpha| < \beta$ is expected). Combined with $\alpha < 0$, specification (1) implies that reform reversals ($\Delta RI_{i,t} < 0$) generate an immediate positive growth effect, only the following year they slow down growth because the stock of reform ($RI_{i,t-1}$) is smaller. As long as $|\alpha| > (\alpha + \beta)$ a reversal has an overall positive effect. While a policy reversal might be beneficial to e.g. some firms, a reversal does bear large costs with respect to credibility and uncertainty about further reform restraining private initiatives. The immediate positive effect can therefore be doubted (especially when using yearly data). Therefore we propose the following modification to (1) in order to explore the possibility of a immediate negative growth effect of a reform reversal. We introduce a dummy variable $D_{RI,i,t}$ that takes the value 1 in years with a reversal and 0 otherwise. With respect to our sample of 25 transition countries we have 22 reversals upon a total of 188 observations (>10%), the mean of the reversals is 0.04, the maximum and minimum are respectively -0.006 and -0.15 . We multiply this dummy with the change in reform, $\Delta RI_{i,t}$, and with the stock of reform, $RI_{i,t-1}$. The latter is included to test the hypothesis that the costs of reversals are higher when higher levels of reform have been achieved (see also Dewatripont and Roland (1995)). This then results in (3) as our final specification to estimate, where we use current and lagged inflation⁹ (INF) as

⁷The war dummy (for the majority of countries) and the initial conditions cannot be used together with fixed effects, because they take the same value throughout the whole sample period.

⁸ $\theta_1 t IC_x + \theta_2 t^2 IC_x + \theta_3 t^3 IC_x$ is added to the explanatory variables in (1). The cubic time function then takes the form $\theta_1 t + \theta_2 t^2 + \theta_3 t^3$.

⁹Following Berg *et al.* (1999) inflation (decimal notation) is transformed as $\ln(1 + \text{inflation})$. Taking logs the series is smoothed, adding to 1 the deflation observations are preserved.

indicator for the macroeconomic environment and stabilization efforts.

$$\begin{aligned}\Delta GDP_{i,t} = & \alpha \Delta RI_{i,t} + (\alpha + \beta) RI_{i,t-1} + \rho \Delta RI_{i,t} RI_{i,t-1} D_{RI,i,t} \\ & + \gamma_1 INF_{i,t} + \gamma_2 INF_{i,t-1} + \theta WAR_{i,t} + \varphi \Delta GDP_{i,t-1} \\ & + \delta_{1,x} D_{x,j} IC_x + \delta_{2,x} t D_{x,j} IC_x + \delta_{3,x} (1 - D_{x,j}) IC_x + \varepsilon_{i,t} \quad (3)\end{aligned}$$

We estimate (3) using cross-sectional weighting, i.e. we correct for cross-sectional heteroskedasticity. The Lagrange Multiplier test for cross-sectional heteroskedasticity (see Greene (1997, p. 652-655)) gives for specification (3) (estimated with a balanced panel of 7 observations per country, without cross-sectional weights and the initial conditions with the same structure as in (4)) a value of 94.76 for the test statistic, the 1% cut-off point (χ^2 distribution with 24 degrees of freedom) is 42.98; clearly the null hypothesis of cross-sectional homoskedasticity is rejected. Cross-sectional weighting implies that after a first estimation cross-sections with a smaller variance of the error term get a higher weight (i.e. the inverse of the variance) in a second step estimation. This boils down to assigning a higher weight to observations with a larger informational value. Estimation of (3) (with an unbalanced sample estimator this time) using the initial condition clusters of De Melo *et al.* (1997) yields the following result:

$$\begin{aligned}\Delta GDP_{i,t} = & \underset{(8.05)}{6.17} RI_{i,t-1} - \underset{(-7.28)}{24.19} \Delta RI_{i,t} + \underset{(3.33)}{91.04} \Delta RI_{i,t} RI_{i,t-1} D_{RI,i,t} \\ & - \underset{(-2.48)}{1.69} WAR_{i,t} - \underset{(-4.99)}{2.19} INF_{i,t} - \underset{(-2.00)}{0.77} INF_{i,t-1} \\ & - \underset{(-4.19)}{8.54} D_2 IC_1 + \underset{(5.17)}{5.95} t D_2 IC_1 + \underset{(0.78)}{0.30} (1 - D_2) IC_1 \\ & - \underset{(-2.69)}{3.02} D_6 IC_2 + \underset{(2.33)}{0.63} t D_6 IC_2 - \underset{(-2.47)}{2.01} (1 - D_6) IC_2 \\ & + \underset{(6.39)}{0.31} \Delta GDP_{i,t-1} \quad (4)\end{aligned}$$

$$Adj. R^2 = 0.79 \quad n = 188$$

$RI_{i,t-1}$ and $\Delta RI_{i,t}$ are both significant and are signed as expected; α is -24.19, implying that β is 30.36. This implies that early in transition when $\Delta RI_{i,t}$ was typically large and $RI_{i,t-1}$ was typically small, the adjustment cost dominated. But our main interest lies in the estimated coefficient on $\Delta RI_{i,t} RI_{i,t-1} D_{RI,i,t}$. The coefficient is positive and significant at the 1% level. Table 1 shows the 'immediate' growth effect of a reversal, calculated as: $-24.19 \Delta RI_{i,t} + 91.04 \Delta RI_{i,t} RI_{i,t-1} D_{RI,i,t}$. One can infer that its magnitude implies that even a small reversal has a negative impact on growth as soon as the stock of reform from the previous year amounts to 0.3.

$RI_{t-1} \backslash \Delta RI_t$	-0.015	-0.030	-0.045	-0.060	-0.100	-0.150
0.1	0.23	0.45	0.68	0.91	-	-
0.3	-0.05	-0.09	-0.14	-0.19	-0.31	-0.47
0.5	-0.32	-0.64	-0.96	-1.28	-2.13	-3.20
0.7	-0.59	-1.19	-1.78	-2.37	-3.95	-5.93
0.9	-0.87	-1.73	-2.60	-3.46	-5.77	-8.66

Table 1: Immediate growth effect of a reversal (%-points on annual basis, based on (4))

Next to this 'immediate' impact on growth, a reversal also leads to a smaller stock of reform, resulting in an additional cost in the next year. Table 2 shows the 'cumulative' impact of a reversal, calculated as: $-24.19\Delta RI_{i,t} + 91.04\Delta RI_{i,t}RI_{i,t-1}D_{RI,i,t} + 6.17\Delta RI_{i,t}$. The last term reflects the increase in the growth loss, due to the fact that tomorrow's stock of reform will be ' $|\Delta RI_{i,t}|$ ' smaller than today's stock.

$RI_{t-1} \backslash \Delta RI_t$	-0.015	-0.030	-0.045	-0.060	-0.100	-0.150
0.1	0.13	0.27	0.40	0.53	-	-
0.3	-0.14	-0.28	-0.42	-0.56	-0.93	-1.39
0.5	-0.41	-0.83	-1.24	-1.65	-2.75	-4.13
0.7	-0.69	-1.37	-2.06	-2.74	-4.57	-6.86
0.9	-0.96	-1.92	-2.88	-3.83	-6.39	-9.59

Table 2: Cumulative growth effect of a reversal (%-points on annual basis, based on (4))

Furthermore, one should also take into account the lagged growth effect ($0.31\Delta GDP_{i,t-1}$). By forward substituting the growth loss in (3) one can calculate the *ceteris paribus*- growth loss as

$$\sum_{i=0}^{n-1} \varphi^i \underbrace{(\alpha \Delta RI + \rho D_{RI} RI_{-1} \Delta RI)}_{\text{'immediate' effect}} + \sum_{j=1}^{n-1} (n-j) \varphi^{j-1} \underbrace{(\alpha + \beta) \Delta RI}_{\text{'stock' effect}} \quad (5)$$

where n is the number of years since the reversal (for $n = 5$ (5) calculates the total growth loss over five years following a reversal). For $n \rightarrow \infty$, with $|\varphi| < 1$ (cf. estimation (4)) the first term converges to $\frac{1}{1-\varphi} (\alpha \Delta RI + \rho D_{RI} RI_{-1} \Delta RI)$, but the second term goes to infinity. Implying an infinite growth loss. The model is however 'valid' only during the transitional phase (for convenience this phase can be thought to last until $RI = 1$). Constraining ourselves to e.g. a period of five years we find *ceteris paribus*- a cumulative loss of 6.09% for $RI_{-1} = 0.5$ and $\Delta RI = 0.06$, after eight years the cumulative loss amounts

already to 15.19%.

The other results in (4) are in line with findings in the literature. An unstable macroeconomic environment, measured by inflation and lagged inflation, has a negative impact upon growth. Moreover with average inflation¹⁰ (end year, annual percentage change) of 994, 2268 and 810 at $t, t + 1$ and $t + 2$, implying e.g. for two consecutive years of 900% annual, end year inflation a growth loss of $(-2.19 - 0.77) \ln(1 + 9) = -6.81\%$ *points*. Neglecting initial conditions and assuming no progress in reform (which would contribute negatively to growth), a stock of reform of 0.75 and lagged growth of 3% results in about 5.56% *points* of growth. This confirms the idea of Fisher et al. (1996) that (inflation) stabilization is a necessary condition for growth to resume. The war dummy has also a significant, negative impact on growth. Lagged growth positively contributes to current growth, this can be interpreted as a 'confidence' effect. A favorable economic record is likely to enhance confidence and to induce more investment initiatives. The first initial conditions cluster (IC_1 , macroeconomic distortions) has a significant negative impact in the first two years after transition (hence, D_2) and no more impact afterwards; the second initial conditions cluster (IC_2 , level of socialist development and associated distortions) also has a significant negative impact, but this impact does not disappear, not even after 6 years (D_6). IC_2 , however, reflects both the level of socialist development and the associated distortions, which may have different effects on output growth. Note also that since the principal component analysis results in figures between -1.5 and $+1.5$ (see Figure 5 and 6), there are also positive contributions to the growth record of some countries. The correct interpretation is thus that countries with a higher IC_1 and IC_2 are less well off to start their transition and experience serious disadvantages during several years.¹¹ Therefore, as a robustness test, we reestimated (3) using three, representative, specific initial conditions from De Melo et al. (1997): trade dependence, overindustrialisation and initial GDP *per capita*.¹²

¹⁰Descriptive statistics on inflation

	t	$t + 1$	$t + 2$
Mean	994	2268	811
Median	953	250	116
Max.	2984	10986	6474
Min.	23	9.1	1.1
StDev.	885	3622	1381

¹¹Recall that the clusters express differences across countries, rather than that their value has a direct interpretation.

¹²Some descriptive statistics

	TDep	OInd	IGDP
Mean	0.203	0.083	5.593
Median	0.238	0.080	5.530
Max.	0.410	0.230	9.200
Min.	0.037	-0.040	1.400
StDev.	0.123	0.083	2.112

$$\begin{aligned}
\Delta GDP_{i,t} = & \underset{(2.33)}{3.97} RI_{i,t-1} - \underset{(-2.83)}{9.77} \Delta RI_{i,t} + \underset{(2.56)}{63.03} \Delta RI_{i,t} RI_{i,t-1} D_{RI,i,t} \\
& - \underset{(-5.38)}{4.05} WAR_{i,t} - \underset{(-3.71)}{0.90} INF_{i,t} - \underset{(-0.92)}{0.22} INF_{i,t-1} \\
& - \underset{(-6.83)}{38.01} D_4 TDEP + \underset{(5.55)}{10.27} t D_4 TDEP + \underset{(0.81)}{2.22} (1 - D_4) TDEP \\
& - \underset{(-3.12)}{27.73} D_5 OIND + \underset{(3.79)}{8.77} t D_5 OIND - \underset{(-0.54)}{2.45} (1 - D_5) OIND \\
& - \underset{(-2.33)}{0.04} IGDP + \underset{(5.03)}{0.29} \Delta GDP_{i,t-1} \tag{6}
\end{aligned}$$

$$Adj.R^2 = 0.83 \quad n = 188$$

The results are comparable to those in (4). Only lagged inflation becomes insignificant. The coefficient on current inflation becomes smaller but is still significant. The negative effect of 900% inflation (*cf. supra*) is now about 2.5%-points loss of growth. Again neglecting initial conditions and assuming no progress in reform, a stock of reform of 0.75 and lagged growth of 3% now results in about 3.85%-points growth. Though larger than 2.5%, stabilization again can be argued to be necessary for considerable positive growth figures, especially because initial conditions are all positive figures (except for three *underindustrialised* countries) and thus contribute negatively to growth. The fact that trade dependence and overindustrialisation are positive figures (as opposed to negative values for the clusters) for all, resp. nearly all countries, accounts for the drop in magnitude. The implied time pattern for the coefficients of trade dependence and overindustrialisation can be found in table 3. Both effects have a considerable negative impact. The effect of overindustrialisation does not tail off, but becomes positive before it loses significance. The data do not contradict the following plausible explanation for this time pattern: overindustrialised countries might have a better human capital stock that can be reinserted in productive projects after macroeconomic stabilization has been achieved and as such, stimulate economic growth. The effect of *IGDP* proved to be time-invariant, i.e. $\delta_1 = \delta_3$ and $\delta_2 = 0$ (at the 1% level). The negative sign indicates some convergence, but this effect is very small compared to the reform effect. The last line in table 3 shows the growth loss due to unfavorable initial conditions for a country with the average initial conditions (*TDep*, *OInd* and *IGDP*; see footnote 12).

	t	t+1	t+2	t+3	t+4	t+5
TDep	-27.74	-17.47	-7.20	3.07	0	0
OInd	-18.96	-10.19	-1.42	7.35	16.12	0
Growth loss	-7.43	-4.62	-1.80	1.01	1.11	-0.22

Table 3: *Implied time varying coefficients of trade dependence and overindustrialisation and growth loss (%-points) associated with adverse initial conditions*

Table 4 shows the cumulative reform effect based on (6). The results are very much in line with those based on (4). The range of figures ($-7.64, -0.01$) is smaller than in table 2, but even reversals with a small stock now have negative growth effects. Taking into account the lagged growth effect (*cf. supra*) we find for a period of five years *ceteris paribus*- a cumulative loss of 5.06%-points for $RI_{-1} = 0.5$ and $\Delta RI = 0.06$, after eight years the cumulative loss amounts to 11.81%-points. Compared to the losses of 6.09 and 15.19%-points above, they are smaller but still very large.

$RI_{t-1} \backslash \Delta RI_t$	-0.015	-0.030	-0.045	-0.060	-0.100	-0.150
0.1	-0.01	-0.01	-0.02	-0.03	-	-
0.3	-0.20	-0.39	-0.59	-0.79	-1.31	-1.96
0.5	-0.39	-0.77	-1.16	-1.54	-2.57	-3.86
0.7	-0.57	-1.15	-1.72	-2.30	-3.83	-5.75
0.9	-0.76	-1.53	-2.29	-3.06	-5.09	-7.64

Table 4: Cumulative growth effect of a reversal (based on (6))

In sum, we can state that quantitatively, results vary somewhat with the use of specific initial conditions or the clusters. Qualitatively, results are fairly robust: reversals clearly bear larger costs in terms of growth than the standard framework implies. Initial conditions are important in the early years of transition. As the latter become less important, reform starts to dominate output growth. The stock of reform has a positive impact, whereas additional reform bears an adjustment cost. Reform reversals are costly in terms of growth. The higher the stock of reform at the moment the reversal occurs, the larger the growth loss. Finally, inflation stabilization is confirmed as an important condition for growth to resume.

4 Stabilization and Reform Progress

In this section we analyze the determinants of inflation (stabilization) and reform, two variables that turned out to have an important impact upon real GDP-growth.

4.1 Inflation

(8) and (9) give the results for the estimation of an inflation (transformed as $\ln(1 + inf) = INF$) equation (7) of the following form:

$$\begin{aligned}
INF_{i,t} = & \phi_1 \Delta RI_{i,t} + \phi_2 (1/t) RI_{i,t-1} + \phi_3 \Delta RI_{i,t} RI_{i,t-1} \\
& + \phi_4 WAR_{i,t} + \phi_5 FER_{i,t} + \phi_6 FB_{i,t} \\
& + \phi_{7,x} D_{x,j} IC_x + \phi_{8,x} t D_{x,j} IC_x + \phi_{9,x} (1 - D_{x,j}) IC_x + \varepsilon_{i,t} \quad (7)
\end{aligned}$$

The independent variables are: the war dummy (WAR), the fiscal balance (general government, FB) initial conditions clusters ($IC1, IC2$), a fixed ex-

change rate dummy (FER)¹³ and some transformations of the aggregate reform index (RI) (we also consider the more specific price liberalization index (LIP)). Apart from differences in magnitude of coefficients, the significance and interpretation in (8) and (9) are the same for the aggregate index and the price index. We hypothesize that faster price liberalization generates higher inflation than a more gradual approach. We do this by assigning higher weights to the stock of price liberalization early in transition (i.e. we multiply by $1/t$). (7) further includes $\Delta RI_{i,t} RI_{i,t-1}$ to test the whether further price liberalization is less costly in terms of inflation if higher levels of price liberalization have already been achieved.

$$\begin{aligned}
INF_{i,t} = & \underset{(9.65)}{4.74} \Delta RI_{i,t} + \underset{(9.84)}{4.21} (1/t) RI_{i,t-1} - \underset{(-4.60)}{7.80} \Delta RI_{i,t} RI_{i,t-1} \\
& + \underset{(2.82)}{0.39} WAR_{i,t} - \underset{(-5.49)}{0.45} FER_{i,t} - \underset{(-4.51)}{0.024} FB_{i,t} \\
& + \underset{(10.27)}{1.48} D_4 IC_1 - \underset{(-6.83)}{0.34} t D_4 IC_1 + \underset{(1.23)}{0.07} (1 - D_4) IC_1 \quad (8)
\end{aligned}$$

$$Adj. R^2 = 0.68 \quad n = 188$$

$$\begin{aligned}
INF_{i,t} = & \underset{(4.66)}{5.73} \Delta LIP_{i,t} + \underset{(11.85)}{3.02} (1/t) LIP_{i,t-1} - \underset{(-2.39)}{4.23} \Delta LIP_{i,t} LIP_{i,t-1} \\
& + \underset{(2.33)}{0.29} WAR_{i,t} - \underset{(-4.02)}{0.27} FER_{i,t} - \underset{(-5.26)}{0.028} FB_{i,t} \\
& + \underset{(9.58)}{1.15} D_4 IC_1 - \underset{(-6.52)}{0.26} t D_4 IC_1 + \underset{(1.06)}{0.05} (1 - D_4) IC_1 \quad (9)
\end{aligned}$$

$$Adj. R^2 = 0.66 \quad n = 188$$

Countries involved in a war do not seem to have experienced higher inflation than other countries. Some form of a fixed exchange rate regime helps to bring inflation down as does a better fiscal balance. More macroeconomic distortions (higher IC_1) results in higher inflation, the level of socialist development and associated distortions prior to transition turned out to have no impact on inflation. These findings are in line with De Melo *et al.* (1997). The time-varying effect of macroeconomic distortions lasts four periods. Differences in distortions account to a large extent for the (near) hyperinflation experiences in the OFSU-countries early in transition. Estimation (9) shows a significant positive impact on inflation of both the change in and the stock of price liberalization. (8) and (9) indicate that faster price liberalization does generate higher inflation than a more gradual approach.¹⁴ The coefficient on $\Delta RI_{i,t} RI_{i,t-1}$ is negative and significant, implying that further price liberalization is less costly in terms of

¹³Clearly, the use of a dummy is somewhat restrictive since transition countries span(ned) a wide range of exchange rate mechanisms.

¹⁴Both the t-statistic and the adjusted R^2 increase considerably when we use the $1/t$ transformation *vis-a-vis* the use of RI_{-1} .

inflation if higher levels of price liberalization have already been achieved.

Results can be summarized as follows. Price liberalization results in an upshot of inflation in the first years of transition. The more severe macroeconomic distortions in the FSU-countries account for the higher upshot of inflation. Faster price liberalization results in higher inflation, but further liberalization is less harmful, the higher the level of liberalization already achieved. Monetization of large fiscal deficits accounts for the fact that inflation did not come down after the initial upshot (related to price liberalization and macroeconomic distortions). A fixed exchange rate regime helps to bring inflation down. Countries affected by war experience higher inflation.

4.2 Reform

Whereas the inflation analysis can be thought of as reflecting causation, the analysis in this section again should be seen as an illustration of the nature of reform progress, organized by some stylized facts. The following specification is proposed:

$$\begin{aligned}\Delta RI_{i,t} = & C + \kappa_1 RI_{i,t-1} + \kappa_2 FS_{i,t} (1 - RI_{i,t-1}) + \kappa_3 WAR_{i,t} \\ & + \kappa_4 GDPC_{i,t-1} (1 - RI_{i,t-1}) + \kappa_{5,x} D_{x,j} IC_x \\ & + \kappa_{6,x} t D_{x,j} IC_x + \kappa_{7,x} (1 - D_{x,j}) IC_x + \varepsilon_{i,t}\end{aligned}\quad (10)$$

A common intercept is used to reflect whether on average progress has been made. Other independent variables are: the freedom status of a country (FS , an indicator of political and democratic freedom; De Melo *et al.* (1997) identified this as an important contributor to reform), lagged *per capita* ($GDPC_{i,t-1}$; successful reform is expected to stimulate further reform), the stock of reform ($RI_{i,t-1}$) and initial conditions ($IC1$ and $IGDP$ - initial GDP *per capita* (1989, in USD), reflecting the level of development prior to transition). The war dummy ($WAR_{i,t}$) tests whether countries involved in a regional conflict implement less reform. More political and democratic freedom have a positive impact on reform, confirming the findings of De Melo *et al.* (1997). The intercept is significant, indicating that on average progress has been made. Regional tensions have no impact upon reform. Macroeconomic distortions ($IC1$) have a negative effect on the progress in reform for two years. This reflects the difference between CEE and FSU countries; the latter started two to three years later with implementing considerable reforms. Exactly these countries suffered from more severe distortions. A higher level of development prior to transition ($IGDP$) leads to more reform in the first two years after transition. One period lagged GDP *per capita* is used to test whether a better growth record (partly due to earlier reforms) stimulates further reform. We have to reject that there is a significant impact. The coefficient on $RI_{i,t-1}$ reveals the negative impact of the stock of reform on changes in reform. This is a straightforward result since

the reform index has a maximum value of 1; therefore the closer it was to 1 in the previous year the less scope for further reform. This is also confirmed in the specifications that follow.

We also take into account the fact that the reform index is constrained to 1 by multiplying the freedom status and lagged GDP per capita with $(1 - RI_{i,t-1})$. By doing so, we hypothesize that the impact of political and democratic freedom and prosperity becomes smaller the closer a country is to a market economy and effectively becomes zero when the index reaches 1 (~western type of market economy established). Initial conditions have no lasting effect and therefore can be assumed to have no impact at the time when the index reaches one (note that in the sample one is not reached). Therefore no modification is needed. Furthermore we should also restrict the common intercept to be equal in absolute value to the coefficient of the stock of reform. This then reflects that progress in reform ceases to exist if the index reaches 1. If we do this the common intercept and the stock of reform become insignificant, if not we see that in absolute value the intercept is significantly smaller than the coefficient on $RI_{i,t-1}$. Using the intercept and the coefficients of the freedom status and the stock of reform one can calculate different combinations of the level of reform and the freedom status that result in a zero change in reform. The implied combinations coincide with the combinations of reform and freedom status for the last years of our dataset. Therefore our results reflect that most countries quickly attained relatively high levels of reform, but then stagnated and fail(ed) to take the last steps to become a market economy. This especially holds for the CEE-countries and the Baltic States who attained levels of 0.7-0.8 after three to four years in transition, but showed only little or no progress afterwards. This also confirms the ideas of Piazzolo (1997) who argues that the initial success (in CEE-countries) was based on three essentially temporary factors¹⁵ and that further progress requires substantial efforts. (Piazzolo (1997) shows that institutional integration with the EU facilitates institutional progress.)

¹⁵Neighbouring developed economies could be easily used as an example to implement the first reforms. As the transition process continues reform becomes more complicated and developed economies do not serve any more as clear-cut examples. (e.g. in enterprise and financial sector reform progress is much smaller). Second, several interest groups gained strength and form opposition to reforms that endanger their position. Third, the public will no longer accept the government pushing through its policy without public consensus, once the initial 'market-euphoria' has been offset by large output declines and a difficult recovery. (Piazzolo (1997))

$$\begin{aligned}
\Delta RI_{i,t} = & \underset{(6.04)}{0.12} - \underset{(-8.14)}{0.24} RI_{i,t-1} + \underset{(10.00)}{0.40} FS_{i,t} (1 - RI_{i,t-1}) \\
& - \underset{(-0.38)}{2.67} GDP_{i,t-1} (1 - RI_{i,t-1}) - \underset{(-0.71)}{0.005} WAR_{i,t} \\
& - \underset{(-4.30)}{0.088} D_2 IC_1 + \underset{(2.61)}{0.032} t D_2 IC_1 \\
& - \underset{(-0.17)}{0.001} (1 - D_2) IC_1 + \underset{(2.95)}{0.013} D_2 IGDP \\
& - \underset{(-3.57)}{0.008} t D_2 IGDP + \underset{(0.67)}{0.001} (1 - D_2) IGDP
\end{aligned} \tag{11}$$

$$Adj. R^2 = 0.80 \quad n = 188$$

Summarizing, we can state that the ultimate steps to a market economy appear very difficult to take. Especially in the FSU-countries further reform will have to be associated with more political and democratic freedom. Countries with more macroeconomic distortions are relatively more reserved with reform in the initial stages of transition, as are countries with lower development under socialism. Unexpectedly, prosperity achieved during transition does not boost reform. Finally, countries involved in a military conflict do not appear to progress less than other countries.

5 Conclusions

Previous analysis showed that the evolution to a market system is one of the central elements in the transitional phase. The closer to a market system, the more beneficial effects on growth are expected. In the literature it is found that current reform affects growth negatively, while the stock of reform (lagged reform) affects growth positively and eventually starts to dominate. We showed that the traditional analysis implies that a reform reversal generates a positive growth effect. While a policy reversal might be beneficial to some firms, a reversal bears large costs with respect to credibility and uncertainty about further reform, restraining e.g. private initiatives. We explored the possibility of a negative effect on output growth. We found that reversals generate large negative growth effects, unlike the implicit positive effect found in the literature. This result is robust to the replacement of initial condition clusters by specific initial conditions. The results for the other variables in the analysis are in line with the literature.

Since reform is so essential, we also provide an illustration of its nature organized by some stylized facts. We found that the ultimate steps to a market economy appear very difficult to take. The FSU-countries, with their larger macroeconomic distortions are relatively more reserved with reform in the initial stages of transition. Countries with lower development under socialism are also more reserved with reform in the initial stages. Unexpectedly, prosperity

achieved during transition does not seem to boost reform. Especially in the FSU-countries further reform will have to be associated with more political and democratic freedom.

Another important condition for growth to resume is (inflation) stabilization. Our empirical analysis confirms (inflation) stabilization as important for the recovery of growth. But the quantitative impact is somewhat less clear however. An analysis of the determinants of inflation stabilization revealed that price liberalization results in an upshot of inflation in the first years of transition. The more severe macroeconomic distortions in the FSU-countries account for the higher upshot of inflation. Faster price liberalization results in higher inflation. Further liberalization is less harmful, the higher the level of liberalization already achieved. Monetization of large fiscal deficits accounts for the fact that inflation did not come down after the initial upshot. A fixed exchange rate regime helps to bring inflation down. Countries affected by war experienced higher inflation.

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Appendix: Data Sources

Real GDP growth (domestic currency, annual percentage change): IMF World Economic Outlook Database September 1999, Piazolet (1999)

Inflation, yearly average: IMF World Economic Outlook Database September 1999

Inflation, end year: EBRD (1999)

Fiscal Balances: EBRD (1999) & Fisher *et al.* (1996)

Initial conditions (clusters & individual components): De Melo *et al.* (1997)

Liberalization indices: De Melo *et al.* 1996; EBRD (1999)

Population: International Business Database (Prepared by the U.S. Bureau of the Census, International Programs Center)

Exchange rate dummy: Fisher *et al.* (1996); EBRD (1999); IMF International Financial Statistics

Freedom status: Freedom House (2000)

War dummy: De Melo et al. (1996), Freedom House (1999)