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Defying the odds: initial conditions, reforms and growth in the first decade of transition

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Abstract

This paper investigates the relative importance of three sets of factors – initial conditions, macroeconomic stabilisation and structural reforms – as determinants of growth in transition economies during the first 10 years. The paper has two main results. First, average growth over the last 10 years was substantially determined by initial conditions, both directly and indirectly through their impact on structural reforms. Second, controlling for different starting points, there is strong evidence that reforms pay off, while the effect of initial conditions tends to diminish over time. In addition, we find that stabilisation measures are important for growth but there is little evidence of a feedback effect from growth to reforms.

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1. INTRODUCTION

The first decade of transition has seen wide variation in economic performance across the countries of central and eastern Europe and the Baltic states (CEE) and the Commonwealth of Independent States (CIS). A considerable literature has appeared in recent years to explain this variation. It focuses on three explanatory factors: initial conditions, macroeconomic stabilisation measures and structural reforms.

Most of the literature concludes that all three factors play a role in explaining differences in performance across countries. However, there is disagreement about the *relative* importance of, for example, initial conditions versus reforms. There is also considerable debate in the literature about whether the effect of initial conditions is persistent, about the appropriate way of measuring reforms, and about whether reforms are endogenous in the growth process. Most importantly, given the close correlation across transition countries between good initial conditions, progress in reform and rapid stabilisation, it is unclear from the present literature whether countries that made a special effort to implement reforms have benefited from doing so.

This paper uses both cross-section and panel growth regressions to address these unresolved issues. The comparison of cross-section and panel results – largely overlooked by much of the existing literature – leads to several new and potentially important interpretations of the data. First, the cross-sectional evidence suggests that initial conditions substantially determined both subsequent growth performance and the average level of reform. Controlling for the effect of initial conditions on reforms, we also find that countries that "defied the odds", i.e. that overcame unfavourable starting points by resolute commitment to reforms, reaped some benefit in terms of economic growth. However, the effect is neither large nor statistically significant and suggests that over the first decade, on average, differences in starting points have been far more important than reform commitment.

In contrast, our panel data results confirm the established finding in the literature that reforms have a strong pay-off even when controlling for initial conditions, while the effect of the latter on growth is declining over time. One explanation for these seemingly contradictory results is that the cross-section results pick up country variation in average growth rates, whereas the panel results largely reflect variation in growth rates within each country over time.

In moving beyond the existing literature, we examine whether the apparent positive effect of reforms on growth results from a co-movement of output and reforms that is uniform to all transition economies. A careful econometric specification reveals that this is not the case. Countries that "defied the odds" by reforming more rapidly and extensively than predicted by a simple non-linear time trend, have reaped substantial growth dividends and this time the effect is highly significant. We also find that the impact of initial conditions on reform levels diminishes over time, as the laggards in reform tend to catch up in later years. These results suggest a process of convergence in both growth and reform between countries with favourable and less favourable initial conditions, where catch-up can be accelerated through resolute commitment to reform. Because this process is as yet incomplete, initial conditions still tend to dominate in the cross-section results.

In addition to these main conclusions we find that, while stabilisation is undoubtedly a necessary condition for good economic performance, the effect of conventional measures of stabilisation on growth is somewhat ambiguous and difficult to quantify. Finally, we find little evidence that better

economic performance induces more reforms. Our main results about the effect of reforms on growth are unchanged when we control for this potential endogeneity.

The remainder of the paper is structured as follows. We begin in Section 2 with a brief discussion of the existing literature, highlighting the main questions that remain unresolved so far. Section 3 discussed data issues in the measurement of initial conditions, reforms and transition outcomes. Section 4 presents cross-section and panel data results on the relationship between initial conditions, reforms and growth; and Section 5 concludes the paper.

2. LITERATURE REVIEW

A number of recent papers have tried to disentangle the relative importance of different influences on growth in transition economies. There is general agreement that different starting points are important for economic performance, particularly during the first years of the transition. However, both De Melo et al. (1997) and Berg et al. (1999) argue that the quantitative impact of initial conditions is small and rapidly declining over time.

A successful macroeconomic stabilisation is also generally accepted to be a precondition for economic recovery during the transition (see, for example, Fischer, Sahay and Vegh, 1996; Lougani and Sheets, 1997). Lower inflation rates and smaller budget deficits are associated with higher growth rates, although there seems to be a threshold inflation level below which further improvements in growth are negligible (Christophersen and Doyle, 1998) – a result consistent with evidence from developing countries (Sarel, 1996). However, the positive impact of macroeconomic stabilisation is not particularly robust and is subject to concerns over endogeneity (see Berg et al., 1999).

Most papers in the literature find that structural reforms have a significant positive impact on economic growth in the transition. De Melo et al. (1997) find a non-linear effect over time, with reforms initially causing a decline in growth rates (presumably due to adjustment costs), which is more than compensated by a positive effect in the year after reforms were first introduced. Berg et al. (1999) challenge this conclusion and provide evidence of a non-linear effect of reforms across sectors of the economy – a smaller negative impact on state sector performance is offset by a much larger positive impact on private sector growth. Hebey and Murrell (1998) offer a less sanguine view on the positive impact of reforms, arguing that once initial differences in reform levels are controlled for, subsequent reform efforts have no significant additional impact on average growth. Berg et al. dispute these findings in a panel framework. However, as we argue in this paper, cross-section and panel results tell different stories about reforms and growth and the apparently contradictory results may not be inconsistent.

Most studies of the impact of reforms on growth in transition economies use average reform indices developed by the World Bank and the EBRD. A number of recent studies have broken these indices down into their sub-components. Havrylyshyn and van Roden (1999) show that economic liberalisation has a more significant impact on economic performance than measures of the quality of the institutional environment, although the latter's importance is increasing over time. Fischer and Sahay (2000) show that average growth over the first decade of transition is best explained by the EBRD's liberalisation and small-scale privatisation indices, whereas the other EBRD transition indicators do not add significant explanatory value. Stiglitz (1999) reports simple cross-section results that growth is positively influenced by progress in privatisation only if there has been concomitant improvement in governance. In this paper, we maintain the focus on liberalisation and small-scale privatisation as our main indicators of structural reforms.

Despite the large body of literature that has developed, there are still some striking omissions from these studies. First, few studies have so far explicitly addressed the endogeneity of reforms to initial conditions. An important exception is De Melo et al. (1997), which estimates the impact of initial conditions on growth in two stages, allowing first for an indirect impact on reforms. Second, no study we know of examines the possibility that the positive impact of reforms on growth in a panel data framework might be due to a uniform non-linear time trend in both series. This is surprising, as the general patterns of a U-curve in growth rates and an S-curve in reforms are by now well established. Third, there is little attempt in the literature to clarify the apparent contradiction between cross-

sectional and panel results on the impact of initial conditions on growth (large and persistent in the former, small and declining in the latter). Fourth, no study has so far explicitly taken the ordinal nature of reform indices developed by the EBRD and the World Bank into account and examined the possibility of a non-linear effect of reform levels on growth. Finally, most existing studies take reforms to be exogenous to growth. Exceptions are Hebey and Murrell (1998) and Wolf (1999), who allow for a feedback of growth to structural reforms, and Berg et al. (1999) and Ghosh (1997), who adopt an instrumental variables approach to control for the endogeneity of stabilisation.

3. DATA DESCRIPTION AND METHODOLOGY

The data used in the empirical analysis below were compiled from a number of sources: detailed definitions and sources for each variable are contained in Annex Table 1. Three points should be highlighted before proceeding to the methodological discussion and results.

First, as is well known by now, data on output and growth in transition economies should be treated with caution. Statistical measurement remains poor in many cases, especially when dealing with the new private sector, much of which may be operating in the informal economy. If more accurate data were available, they might well reveal that the severity of the transition recession was greatly exaggerated (this point is argued forcefully in a recent paper by Filer and Hanousek, 2000). In fact, the variation in performance tends to be reduced by taking into account estimates of the size of the unofficial economy. Lougani and Sheets (1997) and Selowski and Martin (1997) test the sensitivity of results on the determinants of growth to such a correction, and they find their results are unaffected by it. We stick to official data in this paper, as there are no satisfactory time series estimates for the unofficial economy beyond 1995.[1]

Second, measures of the reform process are also highly imperfect as both the EBRD and the World Bank have relied on subjective indices rather than directly observable variables. Raiser et al. (2000) suggest a latent variable representation for institutional reforms to take into account measurement error in the reform variables, but this has not yet been integrated into an analysis of economic outcomes. Most importantly, our measure of reform captures progress across a few dimensions only, namely price and trade liberalisation and small-scale privatisation. For this we backdated the EBRD's transition indicators along these three dimensions using all available evidence, as well as the liberalisation and private sector development indices constructed for 1990-97 by the World Bank (Annex Table 2). Ideally one would like to examine the effect of broader institutional reforms on growth, but data availability restricts us to the narrower measure for the time being. This point should be borne in mind throughout the rest of the paper when statements are made about the determinants and influence of "reforms".[2]

Third, we have consolidated a number of different measures of initial conditions into one index, based on a principal components analysis (see Box 2.1 of the EBRD's *Transition Report* 1999 for more details). The resulting country scores are reported in Annex Table 3 and the variables included in the construction of the index are listed in Annex Table 1. Note that the more negative the score, the more favourable were the initial conditions. This approach follows De Melo et al. (1997) and the variables included in our initial conditions index are largely the same as those used in this earlier study. However, it is important to note one difference in their calculations, and by implication in all those studies that have relied on De Melo et al.'s indices as measures of initial conditions. Their sample included China, Mongolia and Vietnam, and the resulting country scores can only be interpreted as measures of distance between countries based on this larger sample. This could

[1] The correction of GDP data with electricity consumption suggested by Kaufmann and Kaliberda (1996) does not work well for the post-1995 period, when electricity consumption was falling dramatically as a result of reforms in a number of countries (e.g. Kazakhstan) leading to negative growth estimates for the unofficial economy.

[2] One methodological advantage of using our narrower set of reforms is that they are less likely to be subject to concerns about endogeneity than deeper measures of reform would be.

introduce a bias when using country scores for initial conditions in a sample of east European and CIS economies only. We hence recalculated the index "within sample" (see Annex Table 2 for our initial conditions scores). A high correlation of 0.96 with the original initial conditions scores suggests that the bias introduced by the change in sample is small.

Our first principal component now explains around 50 per cent of the total variance over all initial conditions, whereas De Melo et al.'s first factor accounted for only 39 per cent of the variance. Our second principal component explains another 17 per cent against 28 per cent in De Melo et al.. We thus feel justified in restricting attention to the first factor of initial conditions only, significantly simplifying the subsequent analysis.

4. MAIN RESULTS

4.1 CROSS-SECTION RESULTS

Focusing first on the cross-section analysis for the whole period, Table 1 presents the results from a number of different specifications based on variants of the general linear cross-section model:

$$\log(Y_{1998}) - \log(Y_{1989}) = f(IC, Ref1, Stab) + e, \qquad (1)$$

where Y_t is an index of real GDP in year t, IC is the first factor of initial conditions (discussed above), Ref1 is the average of the EBRD ratings for price liberalisation, trade liberalisation and small-scale privatisation, Stab captures different measures of stabilisation, and e is an error term. All specifications based on equation (1) are estimated by ordinary least squares.

Table 1: Cross-section results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-0.44	-1.51	-0.92	-0.44	-0.33	-0.32	-0.65
	(8.21)	(5.60)	(2.38)	(8.24)	(4.81)	(4.23)	(10.42
Initial conditions	-0.11		-0.07	-0.11	-0.10	-0.08	-0.07
	(5.31)		(2.12)	(5.26)	(4.25)	(3.16)	(2.84)
ref1		0.42	0.19				
		(4.50)	(1.28)				
ref1r				0.19	0.19	0.15	0.11
				(1.28)	(1.39)	(1.06)	(0.79)
Fis					0.02		
					(1.86)		
inf1 (x100)						-0.03	
						(3.40)	
stab1							0.12
							(3.54)
R-square	0.50	0.47	0.52	0.52	0.59	0.63	0.58
F	28.14	20.27	13.92	13.92	12.62	34.79	18.91

Note: the dependent variable is the difference in logs between real GDP in 1998 and real GDP in 1989. t-statistics (absolute values) are in parentheses. All regressions are estimated with robust standard errors.

Source: See Annex Table 1.

Columns 1-3 of Table 1 demonstrate the high correlation among average growth, reform in liberalisation and favourable initial conditions. Both initial conditions and reforms have a strong and statistically significant effect on growth by themselves (Columns 1 and 2), with either one explaining about half of the cross-country variation in growth. However, if both variables are included in the regression, the R-square barely increases, the marginal effects of both variables become much smaller and for reforms the coefficient is statistically insignificant (see Column 3). This is clearly due to multicollinearity between the two variables.[3]

[3] The partial correlation coefficient between the two variables is –0.84.

An alternative way to view the results in Columns 1-3 is to exploit the fact that initial conditions are clearly exogenous to reforms, but not vice versa. One can then adopt a two-step procedure. First, regress average reforms on initial conditions (and a constant), and use the results from this regression to construct a new variable, ref1r, defined as the difference between the actual level of reforms and the level that would be predicted from knowledge of initial conditions alone.[4] Second, regress growth on both initial conditions and this new measure of "residual reform". Clearly, the coefficients on initial conditions and residual reforms are equivalent to those in Column 1 for initial conditions and Column 3 for reforms.[5] Thus, the combined direct and indirect effect of initial conditions on growth is relatively large and highly significant, whereas residual reforms are positive but statistically insignificant. The point estimate for reforms suggests that a one point increase in the reform score (on a total range of 1 to 4) accounts for a 19 percentage point difference in average growth, giving a tentative indication that "defying the odds" has a sizeable pay-off. However, this result does not come with any great statistical precision.

Columns 5-7 test the robustness of this result to the inclusion of different measures of stabilisation. Three proxies for stabilisation are tested in turn: the government's fiscal balance, the level of inflation, and the number of years since stabilisation was achieved (see data annex for detailed definitions). All three have the expected effect on growth (although the first of the three variables – the size of the fiscal deficit – is significant only at 10 per cent). The effect of initial conditions on growth is virtually unchanged. However, residual reforms lose further statistical significance in these specifications. As a result, our conclusion that defying the odds paid off is tentative at this stage.

4.2 PANEL RESULTS: DETERMINANTS OF REFORM

The cross-section results suggest a strong and persistent effect of initial conditions on relative growth performance in the transition economies – operating directly, and indirectly through their impact on reforms. However, these results allow only weak inference on the benefits to reform in any given country. While a lot has been made in public debate about the apparent failure of reform programmes in many countries and reference is often made to cross-country comparisons of performance, this may not be fair to reformers, if such variance is largely due to exogenous factors. An answer to the question whether reforms pay off in a given country context is ideally investigated with panel data.

The move to a panel data framework further allows us to address several questions of interest that remain at least partially unresolved in the literature. First, what are the determinants of reform and, specifically, how is the pace of reform affected by different starting points across countries and how does this effect change over time? Second, is the positive impact of reform on growth found in existing studies simply a reflection of a uniform pattern of policies and outcomes during the transition? Third, how does this evidence bear on the question of path dependence versus convergence in the

[4] Note that the simple regression explains around 70% of the total variation in average reform over the 1990-98 period.

[5] This can be shown formally to be the case. Intuitively, residual reform is orthogonal to initial conditions by construction and hence its coefficient should not be affected by the inclusion of this variable. Residual reform can be broken down into its constituent components, reforms and predicted reforms. Since the latter contains only information already captured by initial conditions, the coefficient on the former remains unchanged in the two specifications.

transition paths across the region? Below, we provide an attempt to address these questions and a number of other issues raised by the literature.

We first turn to a highly stylised examination of the determinants of reform by estimating:

$$Ref_{it} = f(IC_i, t, t^2, (?Y/Y)_{i,t-1}, FREE_{i,t}), \qquad (2)$$

where t is time and FREE represents different measures of political freedom. As discussed below, interaction terms between initial conditions and time are also included.

The time trend and its square are included to capture the slowdown in reforms in the later years of transition.[6]

Table 2: Determinants of reform: panel results

	(1)	(2)	(3)	(4)
Constant	1.02	1.02	0.75	1.62
	(11.24)	(11.49)	(6.11)	(6.71)
initial conditions	-0.22	-0.14	-0.20	-0.29
	(7.86)	(3.52)	(3.67)	(3.69)
Time	0.51	0.51	0.62	0.60
	(14.30)	(14.97)	(11.90)	(9.10)
$(time)^2$	-0.03	-0.03	-0.04	-0.04
	(7.07)	(6.91)	(7.02)	(6.48)
(init.cond.) x time		-0.07	-0.04	0.03
		(4.41)	(1.96)	(1.01)
(init.cond.) x $(time)^2$ (x100)		0.68	0.54	-0.01
		(4.61)	(2.59)	(0.07)
lagged growth			0.0004	
			(0.12)	
political freedom				-0.11
				(2.56)
civil liberties				-0.12
				(2.40)
free-market				0.04
				(0.34)
R-Square	0.77	0.78	0.75	0.75
Chi-Square	878.0	980.6	731.7	580.2
Hausman	0.00	0.00	8.06	1.97
	(1.00)	(1.00)	(0.15)	(0.96)

Note: the dependent variable is Ref1. t-statistics (absolute values) are in parentheses. All regressions are estimated with robust standard errors. The Hausman statistic is a specification test of the assumption that unidentified country effects are uncorrelated with the other regressors, and p-values are in parentheses. A p-value greater than 0.05 indicates that the assumption cannot be rejected at the 95% confidence level.

Source: See Annex Table 1.

[6] For all the panel regressions in Tables 2 - 4 we also report the results of a Hausman specification test of the random effects model against a fixed effects specification. The tests accept the random effects model in all but two cases (the specifications for growth that include the fiscal deficit as a measure of stabilisation). This is important, as we can only estimate a coefficient on a time invariant variable such as initial conditions with a random effects model. The assumption needed for its validity is that the unidentified country effects are uncorrelated with the rest of the regressors.

Column 1 of Table 2 reports the results of a random effects specification that includes only initial conditions and the two time variables. All three variables have the expected signs and are highly significant. Indeed, it seems that the combination of differences in starting points and a uniform time trend can explain over three-quarters of the variation in reform in the sample – an extraordinarily high degree of precision. However, this specification cannot tell us whether the effect of initial conditions on reforms is increasing or decreasing over time, i.e. whether there is divergence or convergence in reforms. To investigate this, we interacted our initial conditions index with the time trend and its square (see Column 2). Looking at the coefficients on the two interaction terms, we see that for the first five years of transition, favourable initial conditions have an increasing effect on reforms. After five years, however, the effect tails off. This result puts our cross-sectional evidence into perspective. Initial conditions have a strong effect on reforms, but this effect is getting weaker as the transition proceeds.

Column 3 includes lagged growth on the right-hand side in order to test whether there is a feedback effect from good economic performance to reform. The sign of this variable is ambiguous *a priori*: on the one hand, higher growth gives the government a window of opportunity to push ahead with necessary reforms; on the other hand, reforms may also be driven by low growth and the necessity to "do something". The result in Column 3 suggests that these effects cancel out, as the coefficient is not significantly different from zero. This is an important result, as it provides justification for treating the reform process as exogenous to growth. Finally, Column 4 examines the effect of different measures of political freedom on reforms. The results show that countries with better political rights and civil liberties have made further progress with reforms.

4.3 PANEL RESULTS: DETERMINANTS OF GROWTH

Turning now to the determinants of annual growth, Table 3 reports the results from a number of different random effects specifications of the general model:

$$(?Y/Y)_{i,t} = f(IC_{i,t}, Ref1_{i,t}, Ref1_{i,t-1}, Stab_{i,t}, t, t^2,), \qquad (3)$$

where interaction terms between time and initial conditions are also included (as in the reform regressions).

Column 1 presents the simplest specification: growth is regressed on current and lagged reforms, initial conditions, and the number of years since stabilisation. Two results from this regression stand out. First, current reforms are *negatively* associated with growth (as in De Melo et al., 1997), but the effect is outweighed by the positive effect of lagged reform. Column 1 implies that a one-unit increase in reforms, from 2 to 3 say, reduces growth by almost 4 per cent in the same period, but increases growth by around 7 per cent in the following year. Second, the effect of initial conditions on growth disappears from this simple specification. Stabilisation has the familiar positive effect on growth.

Table 3: Determinants of growth: panel results

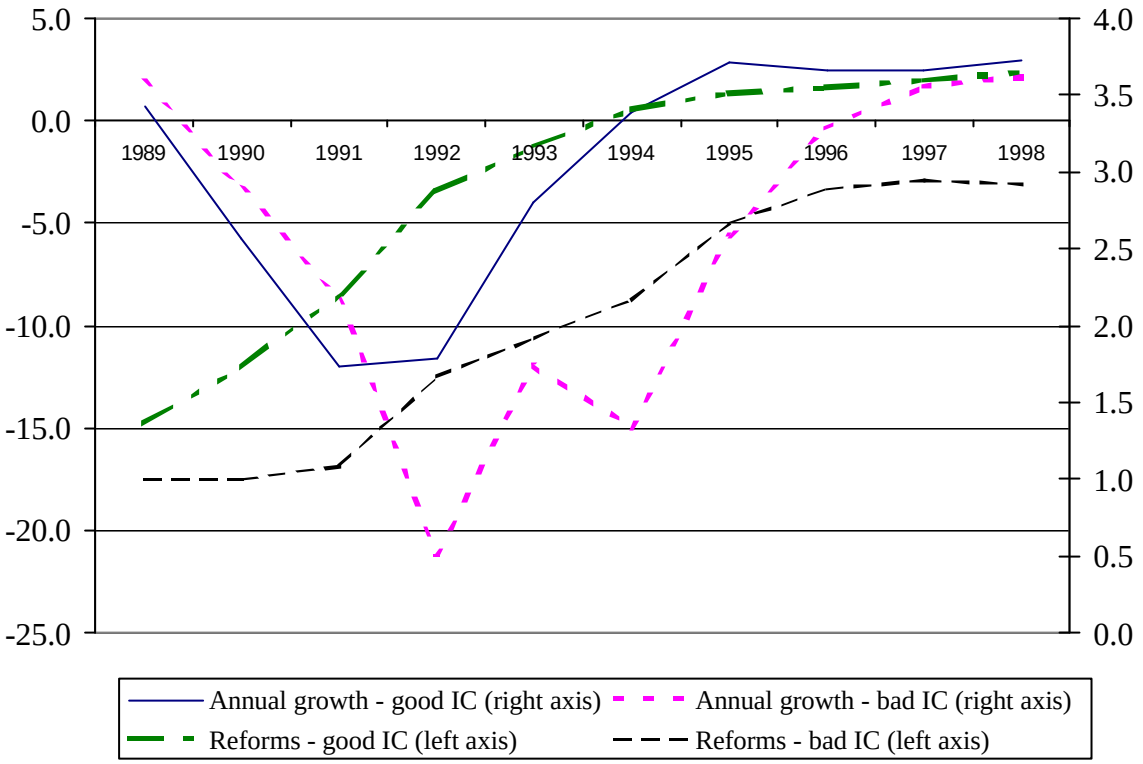
	(1)	(2)	(3)	(4)	(5)
Constant	-12.84	-11.45	-9.49	-11.75	-15.24
	(6.77)	(6.10)	(4.54	(4.46)	(7.08)
Initial conditions	-0.04	2.10	2.42	2.43	2.74
	(0.14	(2.36)	(2.69)	(2.32)	(3.16)
Ref1	-3.88	-3.60	-2.61	-1.45	
	(2.66)	(2.50)	(1.73)	(0.91)	
Lagged reform	6.83	5.67	5.82	5.90	
	(4.49)	(3.80)	(3.76)	(3.64)	
Stab1	1.24	1.61	1.00		1.65
	(3.16)	(4.04)	(1.71)		(4.08)
(init.cond.) x time		-1.48	-1.52	-1.41	-1.66
		(3.70)	(3.69)	(3.10)	(4.14)
(init.cond.) x $(time)^2$ (x100)		0.16	0.16	0.14	0.18
		(4.21)	(4.10)	(3.39)	(4.52)
Time			-2.25	-1.76	
			(2.00)	(1.39)	
$(time)^2$			0.23	0.23	
			(2.14)	(2.12)	
Fiscal				0.28	
				(3.91)	
IV reform					2.95
					(3.05)
R-square	0.39	0.44	0.45	0.51	0.42
Chi-Square	137.9	170.4	177.0	199.1	160.3
Hausman Test	1.45	2.02	3.29	24.72	1.84
	(0.69)	(0.85)	(0.86)	(0.00)	(0.76)

Note: The dependent variable is annual real GDP growth. See note to Table 2 for other details.
Source: See Annex Table 1.

It is not surprising that a variable that does not vary over time (initial conditions) does poorly in explaining a variable that is very volatile in all countries (annual growth). Conversely, the effects of reforms on growth might be largely due to the strong time pattern inherent in both data series. Chart 1 graphs the average year-on-year growth rate and the average level of reforms for two groups of countries in the sample with "good" and "bad" initial conditions to illustrate these concerns. We therefore examined whether allowing the effect of initial conditions on growth to vary over time returns a statistically significant result. Column 2 of Table 3 highlights the non-linear effect of initial conditions on growth. Curiously, the effect appears to be negative in the first year,[7] but this apparently surprising result disappears by the second year, by which time better initial conditions are having the familiar positive effect on growth. The effect increases until about the fourth year, after which it gradually dissipates. The other results remain broadly unchanged.

[7] This is probably due to the fact that the regressions are in "real" time rather than "transition" time: some of the countries with most favourable initial conditions were the first to reform, and also the first to suffer deep recessions.

Chart 1: Growth, reform and initial conditions in the first decade



Source: See Annex Table 1.

Column 3 tests the robustness of this result to inclusion of the time trend (and square). Reassuringly, the results on initial conditions and reform from the previous column remain more or less unchanged. Thus, the positive effect of reforms on growth is not driven by the uniform time pattern in the data. The only statistically insignificant variable is the number of years since stabilisation. By construction, this variable is highly collinear with the time trend, and when replaced by an alternative measure – fiscal balance (see Column 4) – the familiar positive effect of stabilisation on growth returns.

The specification reported in Column 5 returns to the issue of endogeneity of reforms, and adopts a two-step procedure to overcome this potential problem. The procedure is similar to the one adopted in the cross-section regressions. In the first step, we regress reforms against their lagged value for the two preceding years, and form a new variable – predicted level of reforms. This measure is included on the right-hand side of our growth regressions. Although this measure of reforms obscures the differential effects of current and lagged reforms highlighted above, it gives a qualitatively similar result, namely, a one-unit increase in predicted reforms generates a growth bonus of more than 3 per cent per annum.

4.4 PANEL RESULTS: NON-LINEAR REFORMS

An important issue that has not yet been addressed concerns our measure of reforms. As explained in Section 2, this measure not only has a large degree of subjectivity, but is also ordinal rather than cardinal: a score of "4" for a country does not necessarily mean that it has made twice as much progress in reform as a country that receives a "2". Treating reforms as linear and cardinal, as we

have done up to now, is a convenient short-cut but runs the risk of obscuring important non-linear level effects of reforms on growth.

To overcome this problem, we transform our reform measure into four dummy variables: dumref1 takes the value 1 if our reform measure is greater than or equal to 1 (the minimum value) and less than 2, and 0 otherwise. Dumref2, dumref3 and dumref4 are defined analogously. We also take lagged values of each dummy variable.

Table 4 reports two specifications similar to Columns 2 and 4 of Table 3, except for the inclusion of the dummy variables. The omitted (reference) dummy is dumref2. Column 1 shows that moving from the lowest reform category to the one above lowers growth in the same period by around 3.5 per cent, but raises it the following period by 7 per cent, highlighting the earlier message that reforms pay off, but with a lag. Interestingly, there appears to be no gain, either contemporaneous or lagged, to moving from the second reform category to the third or fourth. All other coefficients are more or less unchanged from earlier specifications (with linear reforms).

Table 4: Determinants of growth: non-linear reforms

	(1)	(2)
Constant	-6.38	-3.81
	(3.69)	(1.03)
Initial conditions	2.65	3.04
	(2.84)	(2.74)
Stab1	2.13	
	(5.52)	
(init.cond.) x time	-1.69	-1.78
	(4.00)	(3.74)
(init.cond.) x $(time)^2$ (x100)	0.18	0.17
	(4.37)	(3.84)
dumref1	3.54	1.38
	(1.73)	(0.62)
dumref3	0.16	1.49
	(0.07)	(0.64)
dumref4	-2.28	3.29
	(-0.36)	(0.54)
lagged dumref1	-6.89	-6.84
	(3.06)	(2.91)
lagged dumref3	0.92	0.70
	(0.44)	(0.32)
lagged dumref4	2.99	1.23
	(0.30)	(0.13)
Time		-0.62
		(0.50)
$(time)^2$		0.18
		(1.63)
Fiscal		0.31
		(4.17)
R-Square	0.43	0.49
Chi-Square	160.3	183.92
Hausman Test	7.58	40.45
	(0.58)	(0.00)

Note: See Table 3.
Source: See Annex Table 1.

How sensitive is this result to the inclusion of a time trend and its square? Column 2 of Table 4 shows that the contemporaneous effect of reforms is sensitive to this modification (although both time and time squared are statistically insignificant), but the lagged effect is robust. Column 2 therefore suggests that being in the second-lowest reform category carries a 7 per cent growth bonus relative to staying in the lowest category, although the effect comes with a one-year lag. Being in higher reform categories, however, does not boost growth significantly. However, one should interpret this result carefully. It suggests that partial reforms in liberalisation and privatisation pay off strongly, whereas further advances in these dimensions towards the standards of Western market economies do not *by themselves* reap further dividends. It does not suggest that there is little or no benefit to further reforms in general.

5. CONCLUSION

The purpose of this research was to try to resolve some of the main debates about the determinants of growth and reform in transition economies. While we do not claim to have arrived at definitive answers, we argue that the econometric evidence presented above robustly supports a number of key results. First and foremost, carrying out basic reforms in liberalisation and privatisation has paid off for countries in transition, albeit with a delayed effect. This is true even when we take into account the strong impact of initial conditions on subsequent reform efforts. The benefit from reforms is quantitatively large – around 3 percentage points of GDP per annum for every one-point increase in reforms. Second, initial conditions make an important difference, but the importance wanes over time and, after ten years of transition, can no longer be considered the main explanatory factor. Third, stabilisation also matters, although the benefits are harder to quantify and depend on how one measures macroeconomic policy.

One methodological caveat is that our results as the remainder in this literature are somewhat sensitive to specification error. As Berg et al. (1999) demonstrate, omitted variable bias can easily lead to the wrong conclusions in models that are not fully specified. However, given high multicollinearity between the exogenous variables, the testing down procedure these authors suggest produces models that are highly sensitive to the order of exclusion. We believe it is preferable to focus on the main variables of interest, in the awareness that they may act as proxies for a range of closely related processes. It is in the nature of both the subjective reform measures used in this literature and of the transition process itself that precise measurement and identification cannot be achieved.

What do our results suggest for growth patterns across the region in the next decade? Should the patterns we identify continue, a gradual convergence in both reform profiles and growth rates would be expected. Indeed, our results on the non-linear effects of reforms on growth suggest that only modest steps to liberalise prices and trade as well as start small-scale privatisation are needed for the laggards in reform to achieve growth rates comparable to those in the advanced countries. Note, however, that given current differences in per capita incomes across the region, much more than modest convergence in growth rates will be needed to reverse the recent increase in the disparity of living standards.

Are the patterns we identify likely to be sustained? There is increasing evidence that the efficiency benefits of moving to a market allocation of resources are fully realised only if market-supporting institutions are created. The literature on reforms and performance in the transition has so far largely failed to address the important question of potential complementarities between further liberalisation and privatisation and deeper institutional reform, which have recently received so much emphasis in the policy debate. This paper does not close this gap. Hence, while we can take comfort from our analysis that the policy advice given in favour of rapid liberalisation and privatisation (particularly of smaller enterprises) was not ill judged, the transition is a moving process. Responding effectively to the challenges of the next decade will require more than the recipes of the past.

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ANNEX

Table 1: Data sources and definitions

Variable name	Source	Definition
GDP growth	EBRD database; based on official publications, IMF, World Bank, and specialised statistical institutions. See *Transition Reports* for details on each country	Cross section data: = Log GDP 1998 – Log GDP 1989 Panel data: Annual growth rate of GDP in year t, in per cent
Reform (Ref1)	EBRD rating from 1 (no reform) to 4+ (standards typical of market economies). For the purposes of this paper all "-" and "+" were converted into decimal points by substracting or adding 0.3 points.	Ref1 is the simple average of reform ratings for price liberalisation, trade liberalisation and small-scale privatisation. See *Transition Reports* Table 2.1 for details on thresholds for each category. Data prior to 1994 were backdated using all available information, including the World Bank's liberalisation indices.
Initial conditions	EBRD staff calculations based on data in De Melo et al. (1997) updated and slightly modified. See *Transition Report* 1999, Box 2.1 for details.	Country score calculated from the first principal component of a factor analysis over 11 indicators (GDP per capita in 1989; pre-transition growth rate; trade dependence on CMEA; degree of over industrialisation; urbanisation rate; natural resources dummy; years spent under central planning; distance to EU; dummy for pre-transition existence as a sovereign state; repressed inflation; black market premium). The country score is calculated by multiplying each variable with a factor loading. It is normalised to have a mean of zero.
Stabilisation (Stab1)	EBRD staff calculations, based on Fischer, Sahay and Vegh (1996) for the determination of stabilisation time.	Number of years since the introduction of the first serious stabilisation programme.
Inflation (lnf)	EBRD database, based on official publications, IMF, World Bank, and specialised statistical institutions. See *Transition Reports* for details on each country	Average yearly inflation rate in per cent.
Fiscal balance (Fis)	EBRD database, based on official publications, IMF, World Bank, and specialised statistical institutions. See *Transition Reports* for details on each country	Consolidated balance of the general government, in per cent of GDP. Note that this variable is negative if the balance is in deficit.
Civil liberties	Freedom House	Index ranging from 1 (low) to 7 (high). Index gives weight to freedom of expression and assembly.
Political rights	Freedom House	Index ranging from 1 (low) to 7 (high). Index gives weight to democratic freedoms such as freedom to forma political party, fairness of voting system etc.
Freedom index	Freedom House	Overall assessment of freedom with three-tier rating: Free, Partially free, Not free.

Note: All indicators are available year on year for most years since 1989. For the cross-section estimations a simple 10-year average was formed, except for growth rates, where the difference in log of GDP was used.

Table 2: Reform indices in transition economies

REF1 (liberalisation and small scale privatisation)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Albania	1.0	1.0	1.3	2.7	3.0	3.3	3.7	3.7	3.7	3.7
Armenia	1.0	1.0	1.3	2.0	2.0	2.7	3.0	3.3	3.3	3.3
Azerbaijan	1.0	1.0	1.0	1.3	1.3	1.7	2.0	2.3	2.8	3.0
Belarus	1.0	1.0	1.7	1.7	1.7	1.7	2.3	2.3	2.0	1.7
Bulgaria	1.0	1.3	2.3	2.7	2.7	3.0	3.3	3.0	3.3	3.3
Croatia	2.3	3.3	3.3	3.3	3.3	3.7	3.7	3.8	3.8	3.8
Czech Republic	1.0	1.0	2.7	3.3	3.7	3.7	3.7	3.9	3.9	3.9
Estonia	1.0	1.0	2.0	3.3	3.7	3.7	3.7	3.8	3.8	3.8
FYR Macedonia	2.3	2.7	3.0	3.0	3.3	3.7	3.7	3.7	3.7	3.7
Georgia	1.0	1.0	1.0	1.3	1.7	1.7	2.7	3.3	3.7	3.7
Hungary	2.0	2.0	3.0	3.3	3.7	3.7	3.7	3.9	4.0	4.0
Kazakhstan	1.0	1.0	1.0	1.7	2.0	2.0	2.7	3.3	3.4	3.7
Kyrgyzstan	1.0	1.0	1.0	2.0	3.0	3.3	3.7	3.7	3.7	3.7
Latvia	1.0	1.0	1.0	2.3	2.7	3.3	3.7	3.7	3.7	3.7
Lithuania	1.0	1.3	1.3	2.7	3.3	3.7	3.7	3.7	3.7	3.7
Moldova	1.0	1.0	1.0	1.7	2.0	2.3	3.3	3.3	3.3	3.4
Poland	1.0	3.3	3.3	3.7	3.7	3.7	3.7	3.9	3.9	4.0
Romania	1.0	1.0	1.3	2.3	2.7	3.3	3.3	3.0	3.3	3.4
Russia	1.0	1.0	1.0	3.0	3.0	3.0	3.3	3.7	3.7	3.0
Slovak Republic	1.0	1.0	2.7	3.7	3.7	3.7	3.7	3.9	3.8	3.9
Slovenia	2.0	2.5	3.0	3.0	3.5	3.7	3.7	3.9	3.9	3.9
Tajikistan	1.0	1.0	1.0	1.7	2.0	2.0	2.3	2.3	2.2	2.7
Turkmenistan	1.0	1.0	1.0	1.3	1.3	1.3	1.3	1.3	1.7	1.7
Ukraine	1.0	1.0	1.0	1.0	1.3	1.7	2.7	3.0	3.1	3.0
Uzbekistan	1.0	1.0	1.0	1.3	1.7	2.7	2.7	2.7	2.4	2.2

Source: EBRD staff ratings. See Annex Table 1 for details.

Table 2 continued

STAB1 (No. of years with macroeconomic stability)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Albania	0	0	0	0	1	2	3	4	5	6
Armenia	0	0	0	0	0	0	1	2	3	4
Azerbaijan	0	0	0	0	0	0	0	1	2	3
Belarus	0	0	0	0	0	0	1	2	3	4
Bulgaria	0	0	0	1	2	3	4	5	6	7
Croatia	0	0	0	0	0	1	2	3	4	5
Czech Republic	0	0	0	1	2	3	4	5	6	7
Estonia	0	0	0	0	1	2	3	4	5	6
FYR Macedonia	0	0	0	0	0	0	1	2	3	4
Georgia	0	0	0	0	0	0	1	2	3	4
Hungary	0	0	1	2	3	4	5	6	7	8
Kazakhstan	0	0	0	0	0	1	2	3	4	5
Kyrgyzstan	0	0	0	0	0	0	1	2	3	4
Latvia	0	0	0	0	1	2	3	4	5	6
Lithuania	0	0	0	0	1	2	3	4	5	6
Moldova	0	0	0	0	0	1	2	3	4	5
Poland	0	1	2	3	4	5	6	7	8	9
Romania	0	0	0	0	0	1	2	3	4	5
Russia	0	0	0	0	0	0	0	1	2	3
Slovak Republic	0	0	0	1	2	3	4	5	6	7
Slovenia	0	0	0	0	1	2	3	4	5	6
Tajikistan	0	0	0	0	0	0	0	1	2	3
Turkmenistan	0	0	0	0	0	0	0	0	0	1
Ukraine	0	0	0	0	0	0	1	2	3	4
Uzbekistan	0	0	0	0	0	0	1	2	3	4

Source: EBRD staff. See Annex Table 1 for details.

Table 3: Initial conditions country scores

	First principal component (IC1)	Second principal component (IC2)
Albania	-2.09	-3.08
Armenia	1.11	1.44
Azerbaijan	3.24	0.07
Belarus	1.07	1.94
Bulgaria	-2.12	-0.01
Croatia	-2.54	-0.15
Czech Republic	-3.53	0.60
Estonia	0.40	1.72
FYR Macedonia	-2.51	-0.29
Georgia	2.20	0.56
Hungary	-3.25	-0.69
Kazakhstan	2.54	-0.04
Kyrgyzstan	2.27	-1.94
Latvia	0.24	1.85
Lithuania	0.00	1.53
Moldova	1.09	-0.31
Poland	-1.87	-0.68
Romania	-1.69	-0.88
Russia	1.09	1.91
Slovak Republic	-2.95	-0.03
Slovenia	-3.18	0.49
Tajikistan	2.87	-2.22
Turkmenistan	3.43	-1.07
Ukraine	1.40	1.54
Uzbekistan	2.78	-1.94
Proportion of total variance explained	0.497	0.177

Source: EBRD staff calculations. See Annex Table 1 for details.