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Abstract

The post-communist countries of Eastern Europe and the former Soviet Union introduced, at least initially, political and economic reforms simultaneously. This paper explores the consequences of simultaneous implementation of economic and political liberalization for economic growth. It is found that democracy indeed had a negative marginal effect on growth during early phases of transition (1990-93). Nevertheless, democracy reinforces progress in economic liberalization, which in turn has a strongly positive effect on growth. When accounting for this indirect effect, the overall effect of democracy on growth turns out overwhelmingly positive.

Keywords: Democracy, Liberalization, Economic Growth.
JEL codes: E63, O11, P26, P27

1 Introduction

After the communist regimes collapsed throughout Eastern Europe and the former Soviet Union, they were replaced (at least initially) by relatively wide-ranging democracy. Measured by the indices of political freedom and civil liberties published by the Freedom House (see the Annex for more details), by 1993—two to three years after political liberalization began—the Czech Republic, Hungary and Slovenia attained the same extent of democracy as the United Kingdom or Germany. Although other countries did not democratize as rapidly as the three front-runners, they also made considerable progress. Between 1989 and 1991, the average of the two Freedom-House indices rose from 0.26 to 0.57, on a scale from zero (no democracy) to one (full democracy).

This speed of political liberalization reflected not only the desire of these countries' citizens to live in democracy, but also the pressure from Western governments, international organizations such as the IMF and the World Bank, as well as the European Union (which made democracy an explicit precondition for accession negotiations). This approach, based on simultaneous implementation of political and economic reforms, stands in sharp contrast with the experience of countries such as Chile, Taiwan and South Korea, where democratization followed only after economic liberalization proved successful, or with the current Chinese approach based on economic liberalization without democratization.

Ten years later, democracy and prosperity are far from being the norm in the former communist countries. Overall, the outcomes in terms of economic performance and political developments have been very diverse. While some countries have been successful in sustaining the reform momentum and eventually resuming growth, others experienced reform reversals, reemergence of authoritarian regimes and/or protracted periods of economic decline. The objective of this paper is to examine the economic consequences of simultaneous implementation of economic and political reforms in the post-communist countries. Did the early introduction of democracy help or hinder growth of the advanced reformers? Did the countries that postponed or reversed political liberalization in turn achieve higher growth?

The literature offers an abundance of opinions but no consensus on the impact of democracy on economic growth. On the one hand, North (1990, 1993) and Olson (2000) argue that democracy is a precondition for sustained long-term growth and prosperity, because it guarantees the protection and enforcement of property rights. Similarly, Rodrik (2000) posits that democracy is a *meta-institution* that helps create growth-enhancing institutions. On the other hand, empirical studies based on large cross sections of countries suggest that the relationship may be negative (Helliwell, 1994) or at best hump-shaped (Barro, 1996, 1997), but not robustly so (see Przeworski and Limongi, 1993). Barro explains the negative effect of democracy on growth (beyond an intermediate level of democracy) by pointing out that democratic countries typically implement excessive redistribution programs. Democracy can also lead to inefficient policy outcomes, especially in case of economically costly policies. Fernandez and Rodrik (1991) show that rational voters may choose not to support efficiency-enhancing reforms because of individual uncertainty about payoffs. Similarly, Alesina and Drazen (1991) illustrate how war of attrition over asymmetric payoffs may lead to efficiency-enhancing reforms being delayed. Finally, governments facing elections may pursue policies that maximize the prospects of reelection, even if these are detrimental to long-term economic growth.

Experience of the post-communist countries can shed some new light on the relationships between democracy and growth. The transition process can be seen as a natural experiment, comprising a group of 25 countries starting off with little or no democracy and being ex-ante similar (though not identical) in terms of economic development. Subsequently, the paths followed by individual countries in terms of economic and political liberalization diverged dramatically, with some introducing democracy and economic freedom essentially at level with Western Europe, and others reverting to authoritarian rule and central planning. By observing the variety of approaches to democratization, as well as the outcomes in terms of economic growth, one can infer new insights about the importance of democracy for economic performance.

There is already a sizeable literature exploring the relationship between progress in economic liberalization and economic growth during transition, spurred by the initial contribution of De Melo et al. (1996). In general, the evidence suggests that progress in economic liberalization leads to better growth performance (see Havrylyshyn et al, 1998, Berg et al., 1999), although the progress in liberalization may in part be predetermined by initial conditions (see Krueger and Ciolko, 1998, and Heybey and Murrel, 1999). The literature, however, says little about the effect of political liberalization on growth. Nonetheless, De Melo et al. (1996) and Dethier et al. (1999) observe that the extent of democracy is positively correlated with the progress in liberalization and suggest that democratization reinforces economic liberalization and, in this way, has an indirect positive effect on growth. The direct effect of democracy on growth has been left unexplored though.

The paper at hand attempts to fill this gap. The analysis explores the effect of democracy on growth, both indirectly (through facilitating economic liberalization) and directly. Moreover, the paper studies the direction of causality between democracy and economic liberalization (the previous contributions merely pointed out the positive correlation) and shows that democracy indeed causes liberalization rather than the other way around. The results obtained with a sample of 25 transition economies suggest that democracy is good for growth, but only because it reinforces economic liberalization (which in turn has a positive effect on growth). The marginal effect of democracy after controlling for progress in economic liberalization, in contrast, is negative, at least during the initial transition period. Hence, democracy alone, if unaccompanied by a correspondingly far-reaching liberalization, actually appears to hinder growth.

2 Patterns of Growth during Transition

The initial response of output to economic reforms was similar across all post-communist economies—output declined sharply in the first few years of transition. The subsequent patterns of growth, however, turned out to be very diverse. While some countries bottomed out and resumed growth after two to four years of *transitional recession*, others experienced protracted periods of stagnation or continued decline. According to official statistics, the average transition economy saw its real output shrink cumulatively by 42% (this corresponds to the lowest point on the output trajectory, i.e. not taking account of the subsequent rebound of output). The range of decline was between 17% (Uzbekistan) and 75% (Georgia), for comparison, US GNP fell by 34 % during the Great Depression. By 1998, the average transition economy experienced only a ten-percent cumulative recovery. Only in Poland and Slovenia output exceeded the pre-transition level of output by 1998. In contrast, Russia, Ukraine, Moldova and Kazakhstan, reported essentially no recovery as of 1998. Table 1 presents summary statistics on growth as well other variables of interest for the 25 countries covered by the analysis in the present paper.

Enter Table 1 about here.

It is generally accepted that official statistics exaggerate the severity of output fall. The statistics directly measure the production of medium-sized and large firms but only estimate the output of small firms, which make up most of the new and growing private sector. Over-reporting under communism (for political reasons) and under-reporting at present (for tax purposes) also play a role. The official statistics only imperfectly estimate the transfer of economic activity from the official to the unofficial economy. Finally, part of the measured output fall is due to the elimination of undesired production, reduction of waste, and fall in inventories as the shortage economy turned into a surplus one, all of which are in fact efficiency enhancing development, even though they show up with a negative sign in output statistics. Nonetheless, even if overestimated by the official statistics, the reform-induced output fall in CEE and FSU was undoubtedly severe.

Several theoretical explanations have been suggested to account for the output fall. Calvo and Coricelli (1993) blame it on the credit crunch—credit restrictions and high real interest rates—due to overly restrictive monetary policy. Blanchard and Kremer (1997), and Roland and Verdier (1999) develop supply-side explanations based on disorganization of production (supplier-buyer) relationships due to asymmetric information about outside options in bargaining, or search frictions and relation-specific investment, respectively. Hillman (1999) and Hillman and Ursprung (2000) suggest that the output fall occurred because economic and political reforms were not accompanied by a change of political culture. Accordingly, the political culture of rent seeking remained in place, and time and resources spent for rent-seeking activities even increased, thus precipitating the output fall (see Shleifer, 1998, for comparisons of political elites in Poland and Russia).

3 Democracy and Growth during Transition

Post-communist countries generally implemented, at least initially, economic and political reforms simultaneously. This approach may have affected their economic performance in several ways. First, democracy brings about political constraints (see Roland, 2000) that may limit the government’s ability to proceed with far-reaching economic liberalization and, in turn, harm economic performance during transition. Second, democracy increases uncertainty, as future governments may not necessarily continue policies and honor commitments introduced by the previous government. Third, new democracies without stable institutions and deep democratic traditions may prove to be easy pray to populists and nationalists. On the other hand, as emphasized by North (1991, 1993), Olson (2000) and others, democracy ensures that property rights are guaranteed and is therefore a necessary condition for sustained long-term growth.

As discussed in the Introduction, the direct relationship between democracy and growth during transition has not been explored in the literature. Nevertheless, De Melo et al. (1996) and Dethier et al. (1999) point out that the extent of democracy among post-communist countries is positively correlated with the progress in economic liberalization. They argue therefore that democracy facilitates economic liberalization and thus has a positive, albeit indirect, effect on growth. Yet, they leave the precise nature of this relationship, as well as the possible direct impact of democracy on growth, unexplored.

The relationship between progress in economic liberalization and economic growth during transition has already received considerable attention in the literature (see the discussion in section 1). Although the discussion is still ongoing, the evidence appears to be largely supportive of a positive impact of liberalization on growth (although initial conditions also played an important role). The effect of liberalization on growth can be demonstrated by means of regression analysis (the sample includes 25 post-communist countries in Eastern Europe and the former Soviet Union for which data are available, see Table 1). When the average growth rate of per-capita GDP is regressed on the liberalization index[1], its sign is positive and strongly significant and the regression produces an adjusted R^2 of 0.57 (in a regression pooling together observations on average growth over 1990-93 and 1994-98; besides the liberalization index, the regression also includes the intercept and dummy for 1994-98). When additional explanatory variables are added, the following regression equation obtains (heteroskedasticity-robust t-statistics in parentheses, see the Technical Annex for more details on the estimation and Table A1 for additional results):

$$\text{Growth} = 1.41\ (1.11)\ +3.94\ (2.88)*\text{D9498}\ -41.25\ (4.75)*\text{LI}\ +57.00\ (5.84)*\text{LI}^2\ -0.43\ (1.16)*\text{BRU}\ +0.18\ (2.89)*\text{SEC}\ -9.35\ (5.80)*\text{WAR}\ +4.73\ (2.65)*\text{WARlagged}\ -3.28\ (3.00)*\text{GNP89} \qquad \text{adj. } R^2 = 0.802,\ 50 \text{ observations}$$

[1] The liberalization index used in the analysis is based on the index constructed by De Melo at al. (1996), and extended by Havrylyshyn et al. (1998) using the progress-in-transition indicators published annually by the European Bank for Reconstruction and Development (EBRD). The index measures progress in implementation of economic reforms. It is scaled to range between zero (an unreformed socialist economy) and one (a liberal market economy such as the US. Among the transition economies, Hungary achieved the highest value (0.88) of this index in 1998, followed by the Czech Republic, Estonia and Poland (0.82). In contrast, Belarus and Uzbekistan appear almost unreformed (with 0.34 and 0.35, respectively).

where *Growth* is the average growth rate of per-capita GDP over 1990-93 and 1994-98 (the regression thus pools observations over the two sub-periods), *D9498* is a dummy variable for the second sub-period, *LI* is the liberalization index, *BRU* is the distance from Western Europe (Brussels) used as a proxy for initial conditions (thought to be correlated with social, cultural and religious legacies and institutions, initial economic development, as well as the costs of engaging in trade with Western Europe)[2], *SEC* is the secondary school enrollment (as a percentage of the relevant age category, taken from Denizer, 1997), *WAR* is a dummy variable denoting countries that engaged in military conflicts (internal or external) during 1990-93 whereas *WARlagged* denotes the same countries during 1994-98 (when most conflicts ended or subsided), and, finally, GNP89 is the log of per-capita GNP in 1989 in purchasing power parity (from De Melo, 1996).

The results suggest that the effect of liberalization on growth is positive and strongly significant, although it appears better approximated by a non-linear (U-shaped) relationship (see also the results reported in the Annex, Table A1, obtained with different regression specifications). Accordingly, liberalization hinders growth at low levels but improves growth after a moderate level has been attained. Either no liberalization or complete liberalization is better than intermediate liberalization. The minimum effect of liberalization is attained with liberalization index around 0.36, which is close to the average levels of liberalization attained by Azerbaijan, Belarus, Ukraine and Uzbekistan during 1990-98. Once the minimum level has been exceeded, there are increasing returns to further liberalization. When considering patterns of growth over 1990-93 and 1994-98 separately (see Table A1 in the Annex), the U-shaped relationship appears particularly pronounced during the early transition period (1990-93). In contrast, growth during 1994-98 is better explained by a linear pattern. Importantly, the results are sustained also when the liberalization index is instrumented by its lagged value, a quadratic transition-time trend, and measures reflecting initial conditions (initial GNP per capita, number of years under communism, and the war dummy—see the technical Annex for more details). The instrumentation is intended to remedy the possible endogeneity of the liberalization index, as countries that experienced favorable economic performance may have found it easier to implement radical reforms. Hence, the results suggest that economic liberalization indeed has had a strong a positive effect on growth. Next, the analysis proceeds

[2] Of course, better measures of initial conditions would be desirable. However, reliable data are hard to find, in part because many historical data are not available for the individual successor countries of the Soviet Union, Yugoslavia and Czechoslovakia. Moreover, given the low number of degrees of freedom, inclusion of many more additional variables would dramatically reduce the feasibility of estimation.

examine the effect of democracy on growth—directly, as well as via the effect that democracy may have had on the progress in economic liberalization.

At a first sight, democracy seems associated with better growth performance among the transition economies. The countries that introduced widest democracy (as measured by the indices of political freedom and civil liberties[3] achieved the best results in terms of economic performance. In contrast, some of the countries that implemented only moderate democracy (for example Russia, Ukraine and Moldova) saw their economies plunge with little signs of subsequent recovery. This pattern is unlikely to be merely due to reverse causality—faster growing countries being able to introduce greater democracy—in fact, the countries of Central Europe and the Baltics introduced relatively wide democracy already at the outset of transition, before the resumption of growth.

Estimating the effect of democracy on growth during transition is complicated by the high correlation between democracy and liberalization (the correlation coefficient between annual values of the liberalization and democracy indices over 1990-98 is 0.66). Democracy then appears with a positive and significant coefficient when entered in a growth regression without controlling for the progress in liberalization (see Popov, 2000). However, the result is strikingly different when democracy is entered alongside liberalization (heteroskedasticity-robust t-statistics in parentheses):

Growth = 8.31 (0.75) –1.83 (0.55)*D9498 –26.64 (2.36)*LI +44.89 (4.04)*LI^2 +1.42 (0.38)*DI –8.71 (2.05)*DI*D9093 –0.36 (0.75)*BRU +0.16 (2.92)*SEC –10.11 (5.77)*WAR +4.91 (2.70)*WARlagged –2.72 (2.16)*GNP89 adj. R^2 = 0.802, 50 observations

with *DI* denoting the democracy index and *DI*D9093* standing for the product of the democracy index and a dummy for 1990-93—this interaction variable thus captures the differentiated effect of democracy on growth during the first sub-period (see the Annex for additional details and Table A2 for further results). Since the regression equation holds the

[3] The democracy index is the average of indices of political freedom and civil liberties reported annually by the Freedom House (see www.freedomhouse.org). The former reflects freedoms pertaining to electoral processes while the latter focuses on personal freedoms such as the freedom of expression and association. The average index has been re-scaled so as to range between zero (no democracy) and one (complete democracy). For example, the US and The Netherlands are examples of countries with full democracy. Iraq is an example with no democracy at all. In 1988, Albania, Romania and Bulgaria attained a value of 0.0, the former Soviet Union, while still non-democratic, scored 0.25, while Hungary was moderately democratic with 0.42. By 1998, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland and Slovenia all attained the same level of democracy as Germany or the UK (0.92), while Turkmenistan, Uzbekistan and Belarus effectively reinstated dictatorships (with 0.0, 0.8 and 0.17, respectively).

progress in liberalization constant, the coefficient estimate of the democracy index captures the *marginal effect* of democracy on growth. Over the entire transition period, the marginal effect of democracy on growth appears insignificant. Nevertheless, the effect turns out negative and significant during the first part of transition, as reflected in the negative coefficient on an interaction term between the democracy index and a dummy for 1990-93, with the overall effect remaining insignificant. This pattern is confirmed also by the separate regression for 1990-93 (see Table A2 in the Annex), although only with a marginally significant coefficient (this can largely be attributed to the smaller sample size). Hence, after controlling for progress in economic liberalization, democracy was apparently harmful to growth, at least during the early transition period.

However, the *overall* effect of democracy on growth need not be negative. As argued by De Melo et al. (1996) and Dethier et al. (1999), democracy may reinforce progress in economic liberalization and, because liberalization has a positive effect on growth, the total effect of democracy may in fact be positive. Indeed, a simple Granger-causality test reveals democracy does cause liberalization rather than the other way around (see technical notes in the Annex for details).

To account for the indirect effect of democracy on growth through its impact on economic liberalization, the liberalization index is replaced by an index of *residual liberalization*, constructed as the residual from a regression relating the progress in economic liberalization to the extent of democracy (see the Technical Annex for details). The index of residual liberalization so constructed measures the progress in economic liberalization that exceeds the level that can be attributed to prevailing democracy and political freedom. With this procedure, the coefficient obtained for the democracy index measures the *overall effect* of democracy on growth, i.e. including the indirect effect going through the positive impact of democracy on liberalization. (heteroskedasticity-robust t-statistics in parentheses, see Table A3 in the Annex additional results):

$$\text{Growth} = -0.87\ (0.8) - 9.05\ (2.44)*\text{D9498} + 20.80\ (4.22)*\text{ResLI} + 27.52\ (1.95)*\text{ResLI}^2 + 10.10\ (3.48)*\text{DI} - 20.02\ (4.71)*\text{DI}*\text{D9093} - 0.11\ (0.20)*\text{BRU} + 0.11\ (1.89)*\text{SEC} - 10.63\ (5.22)*\text{WAR} + 4.50\ (2.64)*\text{WARlagged} - 1.58\ (1.17)*\text{GNP89} \qquad \text{adj. } R^2 = 0.771,\ 50 \text{ obs}$$

where *ResLI* stands for residual liberalization. The effect of residual liberalization remains positive and significant at least at the 10 percent level—additional liberalization, beyond the level attributable to the extent of democracy, is beneficial for growth. Importantly, the *overall effect* of democracy turns out positive and strongly significant.

In summary, democracy indeed has exerted a positive overall effect on growth during transition through its positive impact on progress in economic liberalization. However, democracy alone, when not accompanied by correspondingly far-reaching liberalization, has had a negative marginal effect on growth during the initial transition period. The negative marginal effect can be ascribed to two factors (at least). First, democracy is associated with greater political uncertainty, as democratic governments are faced with political backlash in the wake of short-term adverse effects of the reforms. Such uncertainty may reduce the incentives for economic agents to engage in long-term profit-seeking activities. Second, governments facing election may pursue short-term political aims or implement policies that constrain actions of the future government (see Chapter 2 in Roland, 2000) even if the outcome of such actions is detrimental to economic performance. Both factors become less important during the later phase of the transition, as economic and political developments consolidate.

4 Conclusions

This paper investigates the repercussions of political liberalization and democratization on growth during the post-communist transitions in Central and Eastern Europe. Previous literature pointed out that democracy facilitates economic liberalization, which in turn has a positive effect on growth. The effect attributed to democracy thus is only indirect, whereas the direct effect has been left largely unexplored. The present paper explores the specific nature of the impact democracy has had on growth during post-communist transition, accounting for the direct as well as the indirect effect of democracy. The results confirm that democratization indeed reinforces economic liberalization—in the sense of Granger causality, democracy causes liberalization, not the other way around. Economic liberalization, in turn, improves growth performance. Because of the reinforcing effect of democracy on liberalization, its overall effect on growth therefore is overwhelmingly positive. Nevertheless, the marginal effect of democracy—when holding progress in liberalization constant—appears negative, although only during the early transition period (1990-93). In other words, democracy that is not accompanied by economic liberalization has had a negative effect on growth during the initial transition period. Hence, rapid democratization without simultaneous economic liberalization may worsen economic performance—possibly because of increasing uncertainly about future political developments and/or creating incentives for the government to pursue measures aimed at increasing its political support rather implementing sound economic policies. Nevertheless, the joint effect of democratization and economic liberalization is unambiguously positive.

These results have important policy implications. In particular, they show that simultaneous implementation of economic and political reforms in the post-communist countries did not bring about lower growth. On the contrary, democracy has a positive effect of growth because it facilitates progress in economic liberalization. This is an important lesson for those post-communist countries that retained or reinstated autocratic regimes (Belarus, much of Central Asia, and until recently Serbia) or may currently be doing so (Russia), in the hope of improving economic performance.

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Table 1 Countries in Transition: Indicators of Economic Performance, Liberalization, Democracy, and Initial Conditions

	Avg. Growth	Avg. Growth	Output Fall	Output Recovery	GNP p.c. [USD]	Liberal. Index	Liberal. Index	Democr. Index	Democr. Index
	1990-93	1994-98	1990-98	1990-98	1989	1990-93	1994-98	1990-93	1994-98
Czech Rep.	-3.65	2.28	85.24	10.54	8600	0.68	0.83	0.854	0.917
Slovakia	-6.83	5.86	74.97	24.67	7600	0.66	0.79	0.771	0.733
Hungary	-4.78	3.08	81.89	13.36	6810	0.73	0.84	0.854	0.917
Poland	-3.05	6.00	82.21	34.94	5150	0.76	0.81	0.833	0.900
Slovenia	-4.08	4.28	82.04	21.95	9200	0.73	0.79	0.729	0.917
Bulgaria	-7.40	-1.94	63.69	2.23	5000	0.58	0.63	0.729	0.783
Romania	-6.45	0.18	74.99	1.10	3470	0.40	0.65	0.396	0.717
Albania	-8.83	5.68	60.38	26.02	1400	0.40	0.63	0.479	0.517
Croatia	-12.35	5.50	58.58	17.94	6171	0.69	0.75	0.500	0.500
Macedonia	-13.05	0.86	55.11	4.09	3394	0.68	0.67	0.563	0.600
Estonia	-11.23	4.16	60.76	14.98	8900	0.49	0.80	0.646	0.867
Latvia	-14.33	3.06	50.97	8.27	8590	0.40	0.72	0.625	0.850
Lithuania	-12.05	2.30	53.47	12.12	6430	0.45	0.74	0.688	0.900
Russia	-7.80	-4.82	55.89	0.00	7720	0.31	0.67	0.563	0.567
Ukraine	-10.63	-10.02	36.76	0.00	5680	0.13	0.52	0.563	0.583
Belarus	-5.35	-0.10	62.69	15.06	7010	0.17	0.41	0.479	0.250
Moldova	-12.33	-9.90	32.36	0.00	4670	0.26	0.62	0.375	0.567
Armenia	-22.98	5.68	31.00	9.84	5530	0.25	0.57	0.479	0.483
Azerbaijan	-14.53	-2.86	36.96	6.65	4620	0.16	0.45	0.313	0.250
Georgia	-25.80	3.08	25.38	7.42	5590	0.23	0.55	0.354	0.483
Kazakhstan	-6.38	-4.16	61.26	0.00	5130	0.22	0.58	0.375	0.250
Kyrgyzstan	-9.25	-1.32	50.39	9.99	3180	0.25	0.70	0.500	0.483
Tajikistan	-12.18	-5.76	39.19	2.78	3010	0.15	0.41	0.313	0.067
Turkmenistan	-4.50	-11.38	41.99	1.76	4230	0.09	0.31	0.188	0.000
Uzbekistan	-3.08	0.44	83.36	6.23	2740	0.16	0.54	0.208	0.050
Average	**-9.71**	**0.01**	**57.66**	**10.08**	**5432**	**0.401**	**0.640**	**0.535**	**0.566**

Sources: EBRD Transition Report (various issues), de Melo et al. (1996, 1997), Freedom House, World Bank World Development Report 1996.

Notes: Output Fall is the lowest level of GDP attained between 1990 and 1998, with 1989=100. Output Recovery is the cumulative increase in GDP since reaching the lowest level. GNP per capita in 1989 is in US$ at purchasing power parity as reported by de Melo et al. (1996). Liberalization Index is the unweighted mean of the indices constructed by de Melo et al., as extended by Havrylyshyn et al. (1998) using the EBRD progress-in-transition indicators. The index ranges between zero (no liberalization) and one (complete liberalization). Democracy Index is the average of political rights and civil liberties, respectively, both constructed by the Freedom House, re-scaled to range between zero (no democracy) and one (complete democracy).

Technical Annex

As is standard in growth literature, most of the regressions are estimated with the growth rate of per-capita GDP as the dependent variable. Nevertheless, since the previous literature on growth patterns during transition typically used the growth rate of GPD, results with this dependent variable are presented as well. Since the objective of the analysis is to investigate long-term patterns of growth rather than annual fluctuations, the regressions are estimated with averages of all variables over four or five year periods rather than annual observations (cf. Havrylyshyn et al., 1998; Berg et al., 1999; and Wolf, 1999, who use annual data). This approach should minimize the *noise* component in the data originating from measurement errors or short-term fluctuations caused by external factors, at the cost of having fewer degrees of freedom. The transition period is split for the purposes of the analysis into two sub-periods: 1990-93 and 1994-98. This increases the sample size when running pooled regressions with both sub-periods, and, on the other hand, allows separate analysis of growth determinants during early transition (when virtually all countries experienced dramatic output contractions) and the later period, characterized by stabilization and recovery (albeit not in all countries).

The explanatory variables are the liberalization index, the distance from the country's capital to Western Europe (Brussels) as a proxy for initial conditions[4], a dummy for countries engaging in military conflicts, secondary school enrollment, and initial income per capita. Several other variables were tried, most notably primary school enrollment and the investment, but proved insignificant. The distance from Western Europe is used instead of the common dummy for the former Soviet Union because it offers a continuous measure of initial conditions—undoubtedly, initial conditions in Estonia were dramatically different from those in Tajikistan.

The results are summarized in Table A1. Columns (1) through (4) were obtained by pooled regressions over 1990-93 and 1994-98 whereas columns (5) and (6) present results separate regressions over the two sub-periods. The variable of interest—the liberalization index—appears to exert a significant and strongly positive effect on growth, although the effect may be non-linear (U-shaped), especially during 1990-93. Nevertheless, even when

[4] For Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, the distance to Brussels is estimated as 6,000 km.

allowing for non-linearity, the *worst* impact of liberalization is attained at a relatively low level (0.35-0.39) and full liberalization is clearly superior to no liberalization.

Insert Table A1 about here.

Regressions reported in columns (7) through (9) of Table 2 were estimated with the liberalization index instrumented by its lagged value (LI_{t-1}), the initial GNP per capita (GNP), the number of years under communism (YrsCom), the conflict dummy and a quadratic transition-time trend (the first-stage regression is thus estimated with annual observations). The resulting fist-stage regression (with heteroskedasticity-robust t-statistics in parentheses) is:

$$LI_t = 0.343\ (5.72) + 0.607\ (7.85)*LI_{t-1} + 0.010\ (2.53)*GNP - 0.004\ (4.43)*YrsCom$$
$$-0.014\ (0.93)*Conflict + 0.053\ (3.63)*t - 0.006\ (4.32)*t^2 \qquad [\text{adj. } R^2 = 0.875]$$

The transition-time trend, *t*, is set to zero for years preceding the onset of transition. The starting date of transition is defined following Fischer and Sahay (2000, Figure 1).

The results on the *marginal* effect of democracy on growth (i.e. the effect of democracy when holding liberalization constant) are reported in Table A2. The regressions are analogous to those discussed above and reported in Table A1, with the addition of the democracy index among explanatory variables. Columns (1) through (3) report the results of regressions pooling data over 1990-93, whereas columns (4) and (5) contain results of separate regressions for the two sub-periods. The marginal effect of democracy is insignificant in the regressions spanning the entire period but appears negative and significant during the first sub-period. This is evidenced by the negative and significant coefficient on the interaction variable in column (2) and marginally significant coefficient on the democracy index in the regression for 1990-93 (column 4).

Insert Table A2 about here.

The specific nature of the relationship between democracy and liberalization is explored by means of a simple Granger-causality test. When regressing annual observations of the democracy index on the liberalization index, and vice versa, the following results obtain[5]:

$$LI_t = 0.108\ (8.12) + 0.720\ (15.58)*LI_{t-1} + 0.166\ (3.73)*DI_{t-1} \qquad [\text{adj. R2} = 0.884]$$

[5] Heteroskedasticity-robust t-statistics in parentheses. The regressions were estimated with 225 observations (i.e. 9 years and 25 countries). Because of the short length of the series, only one lag was included.

$DI_t = 0.109\ (4.32) - 0.068\ (-1.37)*LI_{t-1} + 0.921\ (21.89)*DI_{t-1}$ [adj. R2 = 0.771]

where LI_t and DI_t stand for the liberalization and democracy indices, respectively. The results clearly show that whereas the lagged value of the democracy index is significant as a determinant of subsequent liberalization, the lagged value of the liberalization index *does not cause* subsequent democracy. The results are analogous when additional variables (initial per-capita GNP, years under communism, military conflict dummy and quadratic time trend) are included (not reported). Hence, the causality indeed runs from democracy to liberalization rather than the other way around.

Finally, to examine the overall effect of democracy on growth, a two-step procedure is implemented. First, the liberalization index is regressed on the democracy index. This yields the following estimates (t-statistics in parentheses):

1990-98: Liberalization = 0.185 (5.42) + 0.632 (12.45)*Democracy (Adj.R^2: 0.759)
1990-93: Liberalization = -0.111 (2.70) + 0.956 (15.34)*Democracy (Adj.R^2: 0.662)
1994-98: Liberalization = 0.393 (11.06) + 0.435 (8.78)*Democracy (Adj.R^2: 0.752)

Second, the residual is used as an explanatory variable, denoted *residual liberalization*, alongside the democracy index. This residual liberalization measures liberalization beyond, or falling short of, the extent corresponding to the level of democracy. The results are reported in Table A3. Again, columns (1) through (3) report results pooling observations over 1990-93 and 1994-98, while columns (4) and (5) contain regressions estimated separately for the two sub-periods. The *overall* effect of democracy on growth appears clearly positive, although it was apparently weaker during 1990-93 (as reflected in the negative coefficient on the interaction term in columns 2 and 3).

Insert Table A3 about here.

Table A1 Economic Liberalization, Initial Conditions and Growth

Period:	**1990-98**	**t-stat**	**1990-98**	**t-stat**	**1990-98**	**t-stat**	**1990-98**	**t-stat**	**1990-93**	**t-stat**	**1994-98**	**t-stat**	**1990-98**	**t-stat**	**1990-93**	**t-stat**	**1994-98**	**t-stat**
Growth Rate of:	GDPpc		GDPpc		GDPpc		GDP		GDPpc		GDPpc		GDPpc		GDPpc		GDPpc	
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
Constant	-7.438	-0.68	-2.335	-0.21	11.409	1.11	18.264	1.64	16.048	1.46	-15.582	-0.88	6.427	0.61	19.632	1.62	-21.395	-1.23
Dummy 1994-98	4.160	2.92	-8.479	-1.64	3.937	2.88	3.926	2.85					1.768	1.18				
Liberalization Index	12.941	4.08	8.752	2.57	-41.252	-4.75	-51.148	-5.44	-40.539	-2.98	22.675	3.13	-29.365	-2.87	-52.121	-2.63	28.103	3.79
Liberalization Squared					56.998	5.84	66.337	6.40	58.712	4.09			48.758	4.45	74.249	3.66		
Liberalization 1994-98			20.657	3.12														
Dist. fr. Brussels [ths km]	-0.356	-0.83	-0.145	-0.30	-0.427	-1.16	-0.194	-0.51	0.037	0.08	-0.796	-1.47	-0.021	-0.05	-0.112	-0.20	-0.263	-0.45
Sec. School Enrollment	0.1389	1.57	0.097	1.39	0.175	2.89	0.164	2.79	0.088	1.36	0.225	2.73	0.173	3.08	0.083	1.49	0.256	3.62
War Dummy	-8.404	-4.02	-9.011	-4.49	-9.346	-5.80	-9.529	-5.73	-10.037	-6.71			-9.518	-5.58	-10.218	-6.60		
War Dummy (lagged)	2.865	1.55	4.056	2.44	4.725	2.65	4.981	2.93			4.567	2.92	4.978	2.65			5.079	3.03
1989 GNP p.c. [log, ths $]	-1.908	-1.47	-1.957	-1.61	-3.275	-3.00	-3.779	-3.11	-3.183	-2.93	-1.939	-1.00	-3.082	-2.75	-3.222	-2.81	-2.196	-1.13
Adj.R^2	0.705		0.757		0.802		0.793		0.735		0.546		0.800		0.723		0.576	
Joint Sign. Liberalization					0.000		0.000		0.000				0.000					
Number of observations	50		50		50		50		25		25		50		25		25	
Min/Max effect at:					0.36		0.39		0.35				0.30		0.35			

Notes: Estimated by OLS with heteroskedasticity robust t-statistics, for the 25 countries included in Table 1. Dependent variable is the growth rate of GDP per capita (GDPpc), or the growth rate of GDP. Columns (1) through (4) are estimated with observations for 1990-93 and 1994-98 pooled together. In columns (7) through (9), the liberalization index has been instrumented by its lagged value, initial GNP, years under communism, conflict dummy, and quadratic time trend (see the Technical Annex for details). The liberalization index is the average annual liberalization index over the respective period, as constructed by de Melo et al. (1996) and extended by Havrylyshyn et al. (1998). Liberalization 1994-98 is an interaction term between the liberalization index and the dummy for 1994-98. The conflict dummy equals one for Croatia, Macedonia, Armenia, Azerbaijan, Georgia and Tajikistan. The initial per capita GNP is in purchasing power parity terms, in US dollars. The distance from Brussels for Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan is estimated as 6,000 km. Secondary school enrolment is according to Denizer (1997), in percent. Joint Significance Liberalization is the joint significance level of the liberalization index and its squared value. Minimum/Maximum effects refer to the level where the effect of liberalization reaches its minimum or maximum in the non-linear specification.

Table A2 Democracy and Growth: Marginal Effect

Period:	**1990-98**	**t-stat**	**1990-98**	**t-stat**	**1990-98**	**t-stat**	**1990-93**	**t-stat**	**1994-98**	**t-stat**
Growth Rate of:	GDPpc		GDPpc		GDP		GDPpc		GDPpc	
	(1)		(2)		(3)		(4)		(5)	
Constant	11.284	1.10	8.308	0.75	15.876	1.32	12.312	1.25	-14.138	-0.82
Dummy 1994-98	4.024	3.05	-1.828	-0.55	-0.965	-0.27				
Liberalization Index	-40.846	-4.73	-26.635	-2.36	-39.631	-3.32	-35.507	-2.78	16.307	1.61
Liberalization Squared	56.046	5.83	44.886	4.04	57.663	4.97	57.623	4.40		
Democracy	0.854	0.22	1.423	0.38	-0.029	-0.01	-8.016	-1.56	4.861	0.90
Democracy 1990-93			-8.709	-2.05	-7.203	-1.58				
Dist. fr. Brussels [ths km]	-0.385	-0.82	-0.357	-0.75	-0.196	-0.41	-0.120	-0.25	-0.567	-0.87
Sec. School Enrollment	0.176	2.95	0.162	2.92	0.152	2.75	0.089	1.22	0.267	2.91
War Dummy	-9.274	-5.40	-10.109	-5.77	-10.263	-5.93	-10.732	-6.61		
War Dummy (lagged)	4.791	2.54	4.910	2.70	5.042	2.82			4.912	2.90
1989 GNP p.c. [log, ths $]	-3.340	-2.96	-2.724	-2.16	-3.231	-2.30	-2.388	-2.20	-2.453	-1.23
Adj.R^2	0.798		0.802		0.789		0.739		0.530	
Joint Sign. Liberalization	0.000		0.000		0.000		0.000			
Number of observations	50		50		50		25		25	
Min/Max effect at:	0.36		0.30		0.34		0.31			

Notes: Estimated by OLS with heteroskedasticity robust t-statistics, for the 25 countries included in Table 1. See also Notes to Table A1. Democracy Index is the based on the average of political rights and civil liberties according to the Freedom House and normalized so that it ranges between zero and unity. The indices used in the regressions are the averages for the respective periods. Joint Significance Liberalization is the joint significance level of the liberalization index and its squared value. Minimum/Maximum effect refers to the level where the effect of liberalization reaches its minimum or maximum in the non-linear specification.

Table A3 Democracy and Growth: Overall Effect

Period:	**1990-98**	**t-stat**	**1990-98**	**t-stat**	**1990-98**	**t-stat**	**1990-93**	**t-stat**	**1994-98**	**t-stat**
Growth Rate of:	GDPpc		GDPpc		GDP		GDPpc		GDPpc	
	(1)		(2)		(3)		(4)		(5)	
Constant	-3.897	-0.38	-0.869	-0.06	2.925	0.22	-6.848	-0.64	-7.725	-0.45
Dummy 1994-98	4.820	3.31	-9.049	-2.44	-10.004	-2.36				
Residual Liberalization	9.961	2.47	20.796	4.22	20.651	3.98	17.213	3.85	16.307	1.61
Res. Liberalization Sqrd.	16.967	1.08	27.522	1.95	29.028	1.92	35.741	1.76		
Democracy	13.815	3.23	19.099	3.48	18.811	3.36	9.130	1.60	11.947	2.87
Democracy 1990-93			-20.015	-4.71	-21.412	-4.23				
Dist. fr. Brussels [ths km]	0.000	0.00	-0.112	-0.20	0.121	0.21	0.703	1.09	-0.567	-0.87
Sec. School Enrollment	0.142	1.65	0.111	1.89	0.092	1.37	0.012	0.18	0.267	2.91
War Dummy	-8.022	-3.60	-10.631	-5.22	-10.853	-4.95	-11.331	-5.35		
War Dummy (lagged)	3.714	2.05	4.496	2.64	4.492	2.73			4.912	2.90
1989 GNP p.c. [log, ths $]	-2.679	-2.02	-1.580	-1.17	-1.774	-1.10	-1.056	-0.88	-2.453	-1.23
Adj.R^2	0.712		0.771		0.730		0.617		0.530	
Joint Sign. Liberalization	0.048		0.000		0.000		0.001			
Number of observations	50		50		50				25	
Min/Max effect at:	-0.29		-0.38		-0.36		-0.24			

Notes: Estimated by OLS with heteroskedasticity robust t-statistics, for the 25 countries included in Table 1. See also Notes to Table A1. Democracy Index is the based on the average of political rights and civil liberties according to the Freedom House and normalized so that it ranges between zero and unity. The indices used in the regressions are the averages for the respective periods. Joint Significance Liberalization is the joint significance level of the liberalization index and its squared value. Minimum/Maximum effect refers to the level where the effect of liberalization reaches its minimum or maximum in the non-linear specification.

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