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Jenni Pääkkönen

Economic freedom as a driver for growth in transition

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Tiivistelmä

Tässä tutkimuksessa tarkastellaan talouskasvua entisissä kommunistisissa maissa, jotka ovat nyt siirtymässä markkinatalouteen. Tutkimus keskittyy talouspolitiikan ja instituutioiden roolin arvioimiseen. Tutkimuksessa testataan hypoteesia, jonka mukaan paremmat instituutiot – tässä tapauksessa talouden vapauden asteella mitattuna – vavistavat talouden kasvua. Siirtymätalouksista saadut empiiriset tulokset tukevat tätä näkemystä. Lisäksi tutkimus osoittaa, että kasvumalli on näissä maissa epälineaarinen. Tuloksiin vaikuttaa se, miten taloudellinen hyvinvointi määritellään.

Asiasanat: Talouden kasvu, instituutiot, inhimillinen pääoma

Economic Freedom as a Driver for Growth in Transition*

Jenni Pääkkönen†

January 14, 2009

Abstract

This paper reviews the political economy view of economic growth in post-communist economies making the transition to free markets, focusing on the role of economic policy and institutions. We test the hypothesis that better institutions, measured in terms of economic freedom, contribute to growth. The empirical results from the cross-section of transition economies confirm this hypothesis. The paper concludes that non-linearities are present in the growth model and that differences arise depending on how economic well-being is defined.

JEL Classification: O17, O40, O57.

Key Words: Growth, Institutions, Human Capital

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1 Introduction

The 1991 collapse of the Soviet Union created 15 new independent states. These, along with the other countries in eastern Europe, entered in a transition from centrally planned economy to market economy. Each met with varying degrees of success; some posted solid growth, others struggled with sharp reversals of fortune (see Havrylyshyn and Wolf, 1999). This paper analyzes the determinants of growth in transition. In line with the emerging academic consensus, we present evidence that successful governmental and institutional reforms are necessary conditions for sustained growth.

The debate on determinants of growth initially crystallized around Solow's seminal 1956 paper. The research community a half century later now generally concurs that good government is critical for economic success (e.g. Acemoglu, 2008; Giavazzi and Tabellini, 2005). As growth studies evolved, there also emerged a recognition that poor protection of property rights impairs growth by reducing incentives to invest (Mauro, 1995) and that investment and technological advances, both major drivers of growth, can be easily disturbed by bureaucratic propensities to rent-seeking or corruption. There is also today a general acceptance of the corollary notion that bad economic policy engenders poor economic performance. Indeed, the lousy economic performances of transition economies was soon linked to their institutional shortcomings (e.g. Frye and Shleifer, 1997).

Glaeser et al. (2004) reject the argument that institutions cause growth[1], claiming the causation actually works in the opposite direction; i.e. growth and human capital accumulation drive institutional development. They further provide evidence that human capital rather than political institutions is the crucial element of growth. Galor et al. (2008) extend this argument with their model treating *human capital promoting institutions* as primary to growth.

In the present discussion, we empirically investigate the relationship of the government, institutions, human capital, and economic growth. Transition economies form an ideal set for study as they have all been part of a natural experiment. All faced the same shock as they abandoned communism and command economies; all inherited dysfunctional institutions. Further, the citizens in all these countries are generally well educated, and

[1] Treisman (2000) notes that a low level of development may promote corruption and that corruption can restrain development, i.e. causation runs both ways.

perhaps more important for our purposes here, education levels, literacy rates, etc. were similar across this group at the start of transition. The relative similarity of human capital stock or "initial level of human capital" allows us to examine for differences as they emerge across countries as transition progresses, particularly with respect to reforms of economic and political institutions.[2] It also provides an opportunity to distinguish the effect of institutions on growth from the effect of human capital.

Although many studies acknowledge that informal (or illegal) production accounts for a significant chunk of total production in transition countries, most base their analysis solely on official output growth figures. This is a huge omission. For example, Schneider (2004) estimates the unweighted average of the size of the shadow economy in transition economies during 2002–2003 equalled 40.1% of official GDP, implying that nearly 30% of total production in transition economies occurred underground. We attempt to correct for the omission by evaluating the growth of real GDP per worker, which is a measurement of productivity. By concentrating on those listed as employed in the formal economy, GDP per worker gives a sharper picture of average productivity and the growth potential of these nations.

We use yearly data from 1998 to 2005 to avoid possible breaks present in the early years of transition in these 25 economies, and control for endogeneity using the dynamic GMM method proposed by Arellano and Bond (1991). Applying a regression tree analysis, we test for regimes of growth (i.e. non-linearity) with respect to human capital or institutions. While testing for regimes of growth, we use a fairly rich set of variables in our growth model, for example, we recalculate the Human Development Index, excluding GDP per capita, to portray the evolution of human capital. Also following Fidrmuc and Tichit (2007), we calculate a weighted average of transition indicators to proxy the evolution of institutions. We test several interaction terms to allow for non-linearity in the growth model.

Our findings contain several notable insights. First, economic freedom contributes positively on growth in transition. Second, we find no regimes on growth; all countries surveyed obey the same model and laws of motion. This finding is robust when we drop resource-rich countries from the dataset. Third, increased government consumption (our measure of the size of the public sector) seems to have a positive impact on growth. Non-linearities are

[2] Åslund (2007) proposes that when the former communist block was reformed in early 1990s, liberal reformers won out in Central Europe and the Baltics, while rent-seekers came to dominate in CIS countries.

present as the interaction terms of economic freedom with investments and government consumption are significant. With increased economic freedom, government consumption tends to increase growth less. This is also true with investments, for which we, contrary to some other studies, find a positive impact on growth that becomes less positive with more economic freedom. Finally, our robustness analysis shows similar results when evaluating the real growth per capita, although investment and size of government seem to matter more for productivity growth than growth per capita.

Comparing previous estimations of growth in transition economies against our results vindicates a number of research claims. We confirm the results of Fidrmuc and Tichit (2007), who suggest that the countries surveyed adhered to a common growth model during the later years of transition. Contrary to some earlier findings, our results infer that different government policies affect growth in terms of forming institutions and setting the size of the government. How we measure institutions apparently makes a difference; our results change when we use Fidrmuc and Tichit's recalibrated index of economic reform. Moreover, when measuring productivity and economic well-being, it makes a difference whether one uses real GDP per capita or per worker. Our results indicate some of the contradictory results in the earlier literature may arise from the use of an inappropriate model.

The paper is structured as follows. Section 2 reviews the growth theory literature, particularly key empirical studies. Those familiar with the literature can skip the review and go straight to Section 3 for a presentation of the empirical results. Section 4 concludes.

2 Literature[3]

Soon after Barro (1990) published his frame-breaking work modelling public services in an endogenous growth setting, he was followed with an extension of the analysis to capture varieties of public goods (Barro and Sala-i-Martin, 1992). Devarajan et al. (1996) responded with a model postulating two types of government expenditure, productive and unproductive, to show how changes in the composition of public expenditure affect long-term economic growth rates.

Following a different track, Lucas (1988) and Mankiw et al. (1992) proposed that

[3] Our empirical task sits at the nexus of political economy and public economics. Here, we concentrate on empirical papers about these issues.

the human capital accumulation is essential for economic growth. Hall and Jones (1999) synthesized these perspective into a model in which social infrastructure influences growth via production inputs, while Ehrlich and Liu (1999) consider the effects of corruption on growth under alternative bureaucratic structures. Galor and Weil (2000) present the unified growth theory, whereby the fundamental driving forces that generate the transition from Malthusian stagnation to a state of sustained economic growth are evolution of population, technology, and investment in human capital.

Throughout the literature, there seems to be a common acceptance of the notion that bad economic policies harm development. The political economy view, emphasizes the role of the market reforms and controlling against opportunities for rent-seeking and corruption. Vested interests for government officials can halt the reform process, create incentives for the underground production, and slow progress in the official economy (Harstad and Svensson, 2006).[4] Reynolds (1983) reviews the historical experience of large third world countries and proposes that the most important explainers of differences in economic progress are political organizations and the administrative competence of government. The turning point of an economy seems to be associated with a significant political event such as transfer of power within the country from a less progressive to a more progressive regime (e.g. the collapse of the Ottoman Empire and the emergence of Ataturk as ruler of Turkey).[5]

Przeworski and Limongi (1993) suggest that merely characterizing "regimes" as democratic or authoritarian does not capture relevant differences. Barro (1996) analyzes a panel of 100 countries and suggests a non-linear relationship in which greater democracy enhances growth at low levels of political freedom and depresses growth once a moderate level of freedom has been attained. Assuming the present political makeup is a legacy from previous years, Comeau (2003) finds non-linearity between growth and regime type.[6]

[4] See also Frye and Shleifer (1997) and their grabbing-hand model. For further discussion, see La Porta et al. (1999).

[5] For an excellent debate and theoretical analysis, see Acemoglu (2008), who contrasts the oligarchic and democratic societies and studies the entry barriers in place. Under oligarchic regimes, the elite withhold the monopoly position. In democracies, taxes create distortions.

[6] Alesina et al. (1996) determine that political instability reduces growth and low growth increases the likelihood of government turnover. Persson and Tabellini (2007) argue that the growth effects of democracy have been underestimated. In particular, they identify a substantial negative effect on growth for *leaving* democracy. Lastly, Mulligan et al. (2004) find no evidence that democracies have different public policies than non-democracies.

Glaeser et al. (2004) contend democratization and constraints on government need to come first to secure property rights and stabilize economic development. Giavazzi and Tabellini (2005) review a number of economic and political liberalizations and find that the sequence of reforms matters: countries that liberalize their economy before implementing broad democratic reforms perform much better than those pursuing the opposite sequence.

Institutions and growth might be jointly determined, whereby an exogenous proxy for institutions is needed. According to Acemoglu et al. (2001, 2002), incomes improved in colonies where Europeans developed institutions.[7] The institutions hypothesis has also gained empirical support from Easterly and Levine (2003), who find that institutions drive economic development, rather than such factors as geographic endowment, ecological conditions shaping disease vectors, or opportunities to grow cash crops. Esfahani and Ramirez (2003) contend that institutions that improve contract enforcement help raise the level of per capita income, while Djankov et al. (2006) find that countries with better business regulations grow faster.[8] Acemoglu and Johnson (2003a) note evidence that supports the hypothesis that property rights affect long-run economic growth, investment, and financial development, while contracting institutions only influence forms of financial intermediation (see also Brunt, 2007).

It is often suggested that public goods are a vital part of the private production due to *strategic compelementarity*. Munnell (1992) reviews the early work on the relationship between public capital and productivity, criticizing spending advocates for their failure to recognize common trends in the variables and the lack of robust analysis. Devarajan et al. (1996) find that the share of current expenditure has a positive effect on growth, while an increase in the capital component of public expenditure has a negative growth effect. They characterize this as the "too much of a good thing" effect of capital expenditure, i.e. excessive spending in developing countries renders them unproductive at the margin.

[7] This view is further elaborated by Acemoglu et al. (2003b), who show that distortionary macroeconomic policies are more likely to be symptoms of underlying institutional problems. Fogli (2003) presents a critical view, proposing that technological adoption is significantly linked to institutional variables and that its omission is not neutral to the analysis.

[8] Along these lines, Dollar and Kraay (2003) find suggestive evidence of a joint role for both trade and institutions in the very long run, but a relatively larger role for trade for shorter horizons. Acemoglu et al. (2005) argue that, in the case of Europe, trade and associated colonialism affected growth both directly and indirectly by inducing institutional change. This helped merchants obtain changes in institutions to protect property rights.

Aschauer (2000) argues that the relationship between public capital and economic growth is non-linear; permanent changes in public capital are associated with permanent changes in economic growth. Fölster and Henrekson (2001) find a negative relationship between government expenditure and growth in rich countries.[9] Blankenau et al. (2007), however, find a positive relationship between public education expenditures and long-term growth after controlling for government budget constraints.

As to the human capital, Durlauf and Johnson (1995) find that countries obey different laws of motion. Kalaitzidakis et al. (2001) find no relationship between human capital and growth for high-income/human-capital countries, but do find evidence of beneficial growth effects from human capital at post- primary levels as new technologies are absorbed. As noted by Hanushek and Woessmann (2008), education and skills may not have the desired impact on economic outcomes in the absence of proper institutions.

Besides those already mentioned there have been other attempts to define the determinants of growth. Durlauf et al. (2005) list 145 potential explanatory variables in growth regressions. Magnus et al. (2008) attempt to reduce model uncertainty and determine the "focus" and "auxiliary" regressors for growth. They find that constant, initial GDP per capita, real equipment investment share of GDP, initial total gross enrollment ratio for primary education, and life expectancy at age 0 are the focus variables. Thereafter, average growth rate of population, rule of law, tropical land area, ethnolinguistic fragmentation, and fraction of Confucian population (as a proxy for religion or culture) are found to be focus or auxiliary variables depending on the model. Minier (2007) tests the non-linearities of growth model and shows that either squared terms or interaction terms of fiscal variables should be present in the model. Allowing for non-linearities, the following fiscal variables become robust: the ratio of total government expenditure to GDP, the ratio of government educational expenditure to GDP, the share of central-government individual income tax revenue to GDP, the ratio of central-government tax revenue to GDP, and the ratio of total trade to GDP.

Lastly, many empirical papers seek to determine the effect of institutions on growth in transition. Fidrmuc and Tichit (2007) suggest that the data is vulnerable to structural

[9] Shioji (2001) examines the regional growth effect of disaggregated public capital in the United States and Japan. The main finding is that the infrastructure component of public capital has a significant and positive effect on long-run output in both countries.

breaks across time and/or countries. They note that the pattern of growth in transition has changed at least twice; yielding three different models of growth associated with different stages of reform. Accordingly, with the exception of Turkmenistan, countries entered the third regime in stages, but all well before 1995. Iradian (2007) finds that growth in CIS has been higher because of the recovery of lost output, progress in macroeconomic stabilization and market reforms, and favorable external conditions. Babetskii and Campos (2007) review studies that investigate the effect of institutional reform to growth. They find that approximately a third of papers find a positive and significant relationship, another third finds a negative and significant relationship, and a third find no significant relationship between reform and growth. Notably, no study attempts to deal with the problem of measurement errors in GDP caused by large informal sectors.

3 The Growth in Transition

3.1 Measurement

When measuring the income of nations, standard real GDP per capita can be misleading. As the output of the informal sector is not directly measurable, the official GDP per capita figure likely underestimates the true prosperity of a country with a sizeable informal sector. For example, Schneider (2004) finds that the estimated size of the shadow economy in transition economies during 2002–2003 ranged from 20.1 in the Czech Republic to 68.0 in Georgia. In terms of total production (legal plus illegal), this means that "non-observed" production ranged from 16.7% to 40.5% of the total. Thus, welfare comparisons and productivity growth estimates may be misleading if we concentrate solely on measured production.

One possible way to correct for this measurement error is to use GDP per worker instead of GDP per capita. As those who are not part of official employment are likely to make their living outside the formal economy, the real GDP per worker proxies total productivity much better.[10] Hence, the evolution of real GDP per worker should offer insight into actual

[10] Using GDP per worker has anadditional benefit. It is a closer measure of standards of living as it corrects for home production and leisure.

wealth and growth potential of these nations. We illustrate this as

$$\frac{Y}{POP} = \frac{Y}{L} \cdot \frac{L}{POP}, \tag{1}$$

where Y is the real income, L is the labor force and POP is the population. Equation (1) suggests that real GDP per capita can rise either from growth in labor productivity or because labor force participation increases. Here, we concentrate on the former.

To estimate the relationship between the real GDP per worker and institutions, the following model is proposed

$$y_{t,i} = \rho y_{t-1,i} + \gamma INS_{t,i} + \beta X_{t,i} + \varepsilon_{t,i}, \tag{2}$$

where $y_{t,i}$ is the log of real GDP per worker, $INS_{t,i}$ is the measure of the quality of the institutions and $X_{t,i}$ are the control variables. Since $y_{t-1,i}$ is correlated with $\varepsilon_{t,i}$, the use of an instrumental variables approach is preferred. Here, we use Arellano and Bond's dynamic GMM. Subtracting the lagged version of (2) from $y_{t,i}$ we obtain

$$y_{t,i} - y_{t-1,i} = \rho\left(y_{t-1,i} - y_{t-2,i}\right) + \gamma\left(INS_{t,i} - INS_{t-1,i}\right) + \beta\left(X_{t,i} - X_{t-1,i}\right) + \left(\varepsilon_{t,i} - \varepsilon_{t-1,i}\right), \tag{3}$$

where the lagged levels of the dependent variable, predetermined variables and differences of strictly exogenous variables can be used to instrument for lagged growth.

The annual data for 25 transition economies is drawn from Penn World Tables (version 6.2) and World Bank World Development Indicators (see Appendix A). Data on real GDP per worker, gross fixed capital formation, and government expenditure are presented in the World Bank's WDI data for 1992-2005. The Penn World Tables provide data on the share of government spending and investments relative to GDP. This data is available from 1994-2004. There are various sources for human capital and institutions data.

The two key hypotheses that we test are that there are no non-linearities in growth either with regard to initial human capital or institutions, yet the evolution of institutions affect growth. We seek to test the first hypothesis in two ways. Following Durlauf and Johnson (1995), we split the data into clubs using a regression tree method. In doing so, we calculate the average growth of real GDP per worker (1995-2005), and then use indicators on the initial human capital and institutions as well as their changes to see whether we may split this data accordingly. We calculate both the re-scaled human development index (HD) and the weighted average of transition indicators (EBRD). The former is simply an

average of the life expectancy index and education index as reported in the UN's Human Development Report. It can be seen as a broad measure of the human capital accumulation (see Kalaitzidakis et al. (2001)). The latter is calculated using weights proposed by Fidrmuc and Tichit (2007), i.e. our measure of transition is the composite of the seven indicators reported by the EBRD. To make sure that our results are not completely driven by the use of these two indicators, we also test the index of economic freedom (EFI), fertility rate, gini coefficients and overall upper secondary enrollment rates.[11] For the latter two we only have the initial values; for the others, we can also compute growth rates. Thus, we have data to control for the initial level of human capital and institutions/economic freedom and their growth rates. While the initial values of control variables are fully exogenous to the current rates of growth, this might not be the case with their growth rates. The use of initial values is therefore prefered.

The regression tree method seeks to identify the optimal split, if available, to reduce the deviation in the growth rates.[12] The aim is to reduce the heterogeneity in the data by partitioning it into groups. If an efficient split is identified, we are able to reduce the (observed) heterogeneity of the growth that draws from the splitting variable. Then as the countries are grouped according to this indicator, the remaining heterogeneity in the evolution of the real GDP per worker is due to other factors.

We find that the regression tree method cannot identify any efficient split with regard to any of aforementioned variables. This finding suggests that these countries obey either the same laws of motion, or at least relatively similar growth models as proposed by Fidrmuc and Tichit (2007). Moreover, this finding confirms our initial assumption that, in terms of human capital, post-communist countries were relatively homogenous at the beginning of transition.

[11] The Quality of Government Institute in Göteborg University has collected indicators on such aspects as Human rights, (Economic) Freedom, Property Rights, Polity, Corruption, Democratization, Governance, Ethnolinguistic Fractionalization, and Values. All are commonly used in growth studies as proxies for institutions. These indices are highly correlated among themselves, which suggests that they are in fact caused by one common factor, i.e. they are different measurements of the same phenomena.

[12] We introduced the following stopping criteria. The number of observations in each node should be at least 3 and the minimum improvement in the deviance should be at least 0.2.

3.2 Dynamic GMM

The second step is to estimate the dynamic growth regression by GMM using the method proposed by Arellano and Bond (1991). In general the panel unit root tests suggest that the growth of real GDP per worker is stationary. The proposed explanatory variables are share of investment, share of government consumption, and control for the institutions, i.e. the Heritage Foundation's index of economic freedom. Testing simple Granger causality proposes that all these variables are caused by economic growth, i.e. strong exogeneity is clearly violated, so the use of GMM is well justified. To obtain consistent estimators the lagged differences of the proposed explanatory variables may be used as long as they are correlated with the variable they are supposed to instrument. Evaluating the correlation with x_t and Δx_{t-p}, $p = 1, 2, 3$ shows that all the explanatory variables correlate up to at least their third lagged difference.

The results vary quite a bit according to the model specification used. The Sargan test-statistics are generally insignificant, i.e. instruments are valid.

The results of the baseline model,[13] where growth is explained by its own lag as well as by investment and government consumption, show that all are statistically significant when no other estimators are present. The coefficient for lagged growth is 0.309 and highly significant (1% level of significance), while the coefficient for the investment is 0.007 significant at the 5% level and the coefficient for government consumption is a highly significant 0.010. The Sargan test-statistics is 5.43 and insignificant (0.62), indicating the instruments are valid.

Table 1 presents the estimation results for the economic growth with different model specifications. The second model brings the measure of the economic freedom to the estimated model, which changes the results compared to our baseline model. Economic freedom is insignificant, as is lagged growth. Following Minier (2007), we also test several interaction terms. In particular, we introduce the interactions of economic freedom with other variables into our model. We first test the interaction between economic freedom and growth in the third model. There are some notable changes: the coefficient of growth becomes negative and weakly significant, while the economic freedom appears to have a negative and significant impact on growth. The most interesting result is that the interaction term is positive and significant, i.e. in the presence of greater economic freedom, previous growth tends to

[13] These results are not reported in Table 1 due to lack of space.

have a positive effect.

Variables	All countries, growth of real GDP per worker 1998-2005							
(first lags)	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Growth	.108	.18	-.339	.24	-1.613*	.50	-.575	.91
Investments	.009**	.01	.008*	.00	.039*	.01	.069*	.02
Gov't Cons.	.007'	.00	.008*	.00	.005*	.00	.029**	.01
EFI	-.004	.01	-.002*	.00	.005**	.00	.028*	.01
EFI*Growth	-	-	.009'	.01	.031*	.01	.013	.02
EFI*Investment	-	-	-	-	$-6.1e^{-4}$*	$-1.8e^{-4}$	$-1.1e^{-3}$*	.00
EFI*Gov't Cons.	-	-	-	-	-	-	$-4.2e^{-4}$*	.00
Sargan J-statistic	6.65	.47	12.71	.55	11.48	.65	10.40	.73

Table 1: Estimation results with Arellano and Bond GMM. (*) and (**) and (') indicate that the coefficient is significant at 1, 5 and 10 % level of significance.

In the fourth model we introduce an interaction of economic freedom and investment, which introduces several parameter changes. The effect of lagged growth is now (more) negative suggesting growth convergence. The positive impact of investments on growth is magnified, while the impact of economic freedom alone is positive and significant. The interaction between investments and economic freedom is negative; in the presence of more economic freedom the investments seem to have negative impact on growth. In the last model, which is our preferred model,[14] we introduce the interaction between economic freedom and government consumption. Now, previous growth is insignificant, indicating no tendency of growth convergence. The role of investments is magnified as is the role of government consumption; the size of the public sector increases the growth. With more economic freedom present the government consumption, however, tends to increase growth less.

In summary, the key finding here is that economic freedom, investment, and the size of the government all impact positively on growth. However, there also seems to be a "too much of a good thing" phenomenon at work;[15] increases in the size of the government,

[14] We tested the residuals of this model for the presence of autocorrelation up to four lags and found no autocorrelation.

[15] We tested this idea also by including the square of the government consumption, which turned out to be

investments and economic freedom are good as long as one does not overdo them. In particular, since the interaction between economic freedom and investment (government consumption) is negative, it appears that increasing them both at the same time has a detrimental effect on growth. As noted by some previous authors, there is non-linearity in the growth model.

3.3 Robustness Check

We perform three different tests to check how robust the results are to the changes in the model and variables (Table 2). The first check is to drop the resource-rich countries from the data,[16] and redo the analysis concentrating on non-oil economies. Surprisingly, there is little change in the results when we concentrate on non-oil economies. Next, we use the recalculated index of economic reform as in Fidrmuc and Tichit (2007). For non-oil countries, the economic reform has strong, positive impact on growth. Investment is now insignificant, as are the interactions between economic reform and growth and economic reform and investment. The only significant term is the interaction between economic reform and government consumption. Turning to growth per capita estimates, we see that they appear very similar to those for growth per worker, but there are differences in the magnitudes of the coefficients. For example, the estimator for the investments has decreased from 0.069 to 0.036, or is about half of its previous size. On the other hand, the direct effect of economic freedom decreased relatively little, while the interaction terms have now smaller effects than they used to be. It appears as all the variables have smaller effect on measured production than on total production.

These results are in line with Fidrmuc and Tichit (2007), who find a positive relationship between growth and institutions in their third growth regime. Our results also follow the findings of Iradian (2007), who concludes that the growth impetus associated with market reforms in CIS has been substantial due to its effect on overall productivity. Finally, these results speak to the question on errors-in-variables in the measure of total productivity and reform posed by Babetskii and Campos (2007). We find how economic performance is measured makes a difference, even if total productivity grows very much in line with real GDP per capita. When using the composite index of economic freedom as a proxy

insignificant. We also tested the role of FDI in the first model and found it to be statistically insignificant.

[16] Azerbaijan, Kazakhstan and Russia.

Variables	Non-oil		EBRD		Growth per capita	
(first lags)	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Growth	.167	.83	.194	.17	-.046	.43
Investments	.066*	.02	-.002	.00	.036*	.01
Gov't Cons.	.037*	.01	.024*	.01	.016**	.01
EFI	.033*	.01	.384**	.17	.020*	.00
EFI*Growth	.003	.02	-.016	.07	.003	.01
EFI*Investment	-.001*	.00	-.002	.00	-6.7e^{-4}*	.00
EFI*Gov't Cons.	-5.0e^{-4}*	.00	-.007**	.00	-2.6e^{-4}*	.00
Sargan J-statistic	9.75	.78	11.07	.68	17.42	.23

Table 2: Estimation results with Arellano and Bond GMM. (*) and (**) and (') indicate that the coefficient is significant at 1, 5 and 10 % level of significance.

for institutions, it seems to make relatively little difference whether we include the oil-rich countries in the dataset.

Policymakers can glean several conclusions from this study. First, in the presence of a high level of human capital as characterizes these transition economies, economic freedom and institutions do promote growth. Moreover, education and skills may not have the desired impact on economic outcomes if, as Hanushek and Woessmann (2008) noted, there is a lack of proper institutions. Our results indicate that human capital may have been underutilized, i.e. relative to the level of capital, there had previously been over-investment in human capital. Increasing investments and economic freedom thus allows for more productive use of human capital due to complementarity of skills and capital, and by giving highly skilled labor greater work opportunities in the market economies as e.g. they become self-employed.

4 Conclusions

We considered here whether growth is driven more by human capital or institutions, concentrating on the recent experiences of the transition economies of the former Soviet Union and Eastern Europe. These countries all experienced the upheaval of moving from a planned

economy to a market economy, and they all started the transition process with fairly similar human capital endowments. We conclude that as long as there are insufficient institutions or public capital, human capital is likely to be underutilized. Over short run, however, it appears the level of human capital is not the prime factor for institutions.

Our main conclusion is that healthy institutions are key to fostering the economic freedom essential for economic growth. With a relatively skilled labor pool, investment and government consumption tend to boost productivity growth. As economic freedom increases, however, greater investment and larger government appear to have a detrimental impact on growth, suggesting a "too much of a good thing" phenomenon in transition economies. Contrary to some earlier findings, our results suggest growth is influenced by government policies on shaping institutions and setting the size of the government.

A useful observation is that growth researchers should use care in selecting indicators for measurement of economic well-being. We show that non-linearities are present in the growth model, since several interaction terms are significant. Our results indicate that the somewhat contradictory results in the earlier literature, e.g. that institutions do not matter for growth or that investments have a *negative* impact on growth in transition, might be due to use of a inappropriate model. The main policy implication is that human capital in transition countries might have previously been underutilized.

A Data

Table 3 lists the countries in our data set. The first 22 are not oil producers; the last three are.

Non-oil	Hungary	Slovenia
Albania	Kyrgyz Republic	Tajikistan
Armenia	Latvia	Turkmenistan
Belarus	Lithuania	Ukraine
Bulgaria	Moldova	Uzbekistan
Croatia	Poland	Oil
Czech Republic	Republic of Macedonia	Azerbaijan
Estonia	Romania	Kazakhstan
Georgia	Slovakia	Russia

Table 3: List of countries.

Table 4 lists the variables, their sources and their scales.

Variable	Scale	Source
Growth	Real GDP per Worker	World Bank WDI
Investments	Share of the GDP	NBER PWT 6.2
Gross Fixed Capital Formation	Share of the GDP	World Bank WDI
Government Consumption	Share of the GDP	NBER PWT 6.2
Final Government Expenditure	Share of the GDP	World Bank WDI
Human Development Indicator	From 0 to 1	UN / Human Development Report
Transition Index	From 0 to 4+	EBRD / Transition indicators
Economic Freedom	From 0-100	Quality of Government Institute
Fertility Rate	From 0-	UN / Human Development Report
Gini Coefficients	From 0-1	Wider Institute / Multiple data sets
Upper Secondary Enrollment rates	From 0-100	World Bank WDI

Table 4: List of variables and their sources.

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