How important are institutions for growth in transition countries?

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Abstract

Growth empirics with institutional measures is performed for 25 transition countries over the period 1990-95. Estimation results suggest that (particularly state) institutions are significant for growth and, especially, foreign direct investment (FDI), the latter in turn being important for the former. It is also found that the correlation between institutions and FDI is more likely to be a (direct) causation. Only inflation and war seem to have been relatively more important for growth performance in transition countries than institutions per se. This suggests that macroeconomic stabilization and peace should be the main policy priorities in transition, closely followed by institution building.

Keywords

Transition economics, growth empirics, institutions, policy reform

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1 Introduction

Institutions are strikingly absent from most economic *theory*, certainly from growth theory. In standard theory it is simply assumed that the needed institutional environment is there, within which economic agents can make their optimizing decisions. At the same time, in *descriptive* growth studies, particularly in economic history and most influentially in North (1990), the importance of good institutional contract enforcement has been emphasized for a long time. Good institutions guarantee property rights and minimize transaction costs, creating an environment conducive to economic growth. The considerable sunk costs of most investments create large

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disincentives against binding resources to projects in an uncertain institutional environment.

Until recently, *empirical* studies measuring just *how* important institutions are for growth and investment have been scarce. This has mainly been due to a lack of data concerning the quality of institutions. It is obviously impossible to find data which totally conforms to a most broad definition of institutions such as Schmieding's (1993, p. 233), stating that they '… encompass not only bureaucracies and administrations but also, and more importantly, the entire body of formal laws, rules and regulations as well as the informal conventions and patterns of behavior that constitute the non-budget constraints under which economic agents can pursue their own individual ends'. Nevertheless, there has increasingly been data around which at least describes specific aspects of this definition, which covers both 'rule of law' (enforced by the state), or '*formal*' institutions, and 'civil society' (enforced by convention), or '*informal*' institutions. These have been used to construct measures of the quality of institutions which have been used in (cross-country) growth empirics.

This paper empirically investigates the relationship between institutions, and investment and growth for the period 1990-95 for the 25 countries of Central and Eastern Europe (CEE) and the Former Soviet Union (FSU) with European Bank for Reconstruction and Development (EBRD) operations.[2] A special focus on transition

[2] These 25 are: Albania, Armenia, Azerbaijan, Belarus, Bulgaria, Croatia, Czech Republic, Estonia, FYR Macedonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russian Federation, Slovak Republic, Slovenia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan. Actually, there are 26 countries with EBRD operations, but Bosnia and Herzegovina is usually not included in the data, due to the fact that its economy is still divided into separate enclaves

countries is considered justifiable, mainly because the transition process seems to a large extent to be about institutional transformation. Furthermore, given the promising results of the to my knowledge *only two* such empirical studies which have been done, by Brunetti, Kisunko and Weder (henceforth BKW, 1997b and, particularly, 1997c), and the fruitful similar research done in the context of other countries, it seems worthwhile to do more.

The paper largely gets its inspiration from BKW (1997b and, particularly, 1997c), but adds some new aspects. Firstly, it provides a check of their results, because it works with institutional measures constructed from other sources. Secondly, while they look at formal institutions only, this paper also includes a measure for informal institutions. Thirdly, this paper performs a sensitivity analysis with many more control variables. For a clear policy perspective, these include variables for macroeconomic stabilization, liberalization (both widely looked at), and initial conditions (hardly looked at). While existing studies have mainly focused on one issue at the time, the real question is on the *relative* importance of these variables for growth and investment, which may also be different in different phases of the transition process. Finally, this paper addresses the possibility of reverse causation by constructing and using another instrumental variable for the quality of institutions in transition countries.

In section 2 the main problems in (cross-country) growth empirics are treated, showing as an important aside which (economic) variables have been found to be robustly related to growth and investment. Section 3 concisely evaluates the existing literature on growth empirics with institutional measures. The two studies which have,

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not conducive to a single overall assessment. In this paper, regarding choice and naming of countries,

in this context, specifically looked at transition countries are treated in section 4.[3] Section 5 starts the new application of growth empirics with institutional measures to transition countries by performing simple regressions of institutional variables on growth and (foreign direct) investment. These are subjected to sensitivity tests with control variables in section 6. Section 7 checks whether the correlations found suffer from a simultaneity problem, so that the possibility of reverse causation cannot be excluded. Section 8 concludes.

2 Main problems in growth empirics

In modern (cross-country) growth empirics average per person growth is explicitly related to determining factors proposed in the literature at large. Thus, the typical regression equation looks like:

$$Y = \alpha + \beta_i I + \beta_c C + \varepsilon$$

where Y is the average per person growth of gross domestic product (GDP), I is a set of variables of interest, possibly institutional, C is a set of control variables, chosen from a pool of explanatory variables identified by past studies as potentially important, and ε is the usual random error. Many studies also use the average share of investment in GDP as Y, recognizing investment as a major determinant of growth.

EBRD conventions are followed.

[3] These sections are based on Moers (1998), which contains a more extensive survey of growth empirics with institutional measures and its application to transition countries.

This approach has two main problems that are only rarely adequately dealt with. The first concerns the robustness of the estimated β_i to variations in C. A large majority of studies does not report whether the estimated β_i depends on the particular specification used. This problem is particularly pressing as, due to the lack of a consensus theoretical framework, in different studies different variables have been used as I and C. In this way growth and investment have been found to be significantly correlated with a very large number of variables.[4]

In an important study Levine and Renelt (1992) have provided a sobering sensitivity analysis of the potential determinants of growth and investment. They formally test the robustness of the estimated β_i to variations in C, using a large number of variables from previous studies and even new ones. They consider the relationship between Y and a particular I to be robust if the estimated β_i remains statistically significant and keeps the theoretically predicted sign under variations in C. The important finding is that variations in C overturn almost all past results: they are not robust, but fragile. Thus, there is not a reliable independent statistical relationship between Y and a wide variety of variables previously found to have a significant effect.

Levine and Renelt (1992) do find some robust results though. With regard to growth, they find a robust positive correlation with investment, legitimizing the additional focus the latter gets in many studies. Further, they find a robust negative correlation with the initial income level as long as the initial secondary school enrollment rate is also included. Thus they find evidence of convergence, *conditional on* this measure of human capital. With regards to investment, they find a robust positive correlation with the trade share, *either* measured as exports, imports *or* both.

[4] Surveyed in e.g. Barro and Sala-i-Martin (1995).

Note that this suggests a positive role of openness *in general*, not just of exports. Finally, and most interesting for this paper, they find a robust negative correlation between investment and the number of revolutions and coups per year, a variable which says something about the quality of institutions.

The second main problem that is only rarely adequately dealt with concerns the exogeneity of explanatory variables. In a lot of cases, e.g. with institutional variables, it is not hard to imagine the causation to run the other way, leading to a simultaneity problem in ordinary least squares estimation (OLS).[5] To check technically whether simultaneity is indeed a problem instrumental variable estimation (IV) should be used, and formal exogeneity tests could be run. In most studies, however, the potential simultaneity problem is not tackled at all. To a large extent this is due to the difficulty of finding adequate instruments.

For growth empirics in practice, the upshot of the above is firstly that a sensitivity test of the estimated β_i by varying in C is badly necessary. Secondly, the few robust results Levine and Renelt (1992) do find suggest to at least include the (domestic) investment share, the initial income level and the initial secondary school enrollment rate under C in the growth equation, and the trade share and the number of revolutions and coups per year in the investment equation, or some other variables capturing the same underlying theoretical ideas. Thirdly, exogeneity needs to be explicitly checked for, using IV, and performing formal exogeneity tests.

[5] Recall that under a simultaneity problem OLS no longer delivers the best linear unbiased estimator. See any econometrics textbook, like Johnston (1988) or Pindyck and Rubinfeld (1991).

3 Growth empirics with institutional measures

If the institutional environment is to be integrated into growth empirics, its quality needs to be measured. In the previous section an institutional variable, measuring the number of revolutions and coups, was found to have a robust correlation with investment (but not with growth directly). This institutional measure is *objective*, in the sense that it is universally observable, as has been the case for all institutional measures originally used in growth empirics, e.g. in the classic studies by Kormendi and Meguire (1985), Barro (1991) and Levine and Renelt (1992). More recently some studies have used surveys of the perception of institutions in growth empirics. From these surveys *subjective* institutional measures can be constructed, grasping the opinions of the economic agents who make growth-relevant decisions.

As section 2 showed to be the case for most other potential explanatory variables too, the robustness of most objective institutional measures as a determinant of growth and investment has turned out to be limited. This should not come as too big a surprise, since their 'economic content' is rather small, in the sense that they measure the quality of institutions only in a very crude and indirect way. Objective institutional measures can both concentrate on events that economic agents may not perceive as important and fail to capture uncertainties that economic agents perceive as crucial, as BKW (1997b) argue. Part of the problem is that they measure the instability and not the uncertainty in the quality of institutions. With regards to these measures, Levine and Renelt (1992) show that only the correlation between investment and the number of revolutions and coups already mentioned is robust. On this basis, there remains some evidence that institutions matter, as one of the few things which have been found to be robust in growth empirics.

Partially inspired by this, subjective institutional measures have come into use. Since they grasp relevant opinions, these measures are likely to reflect more closely and directly than objective institutional measures the concerns about the quality of institutions. Besides, they open up the possibility to draw more interesting conclusions about the mechanisms at work and the policies needed. Contrary to objective institutional measures they also do reflect uncertainty, which is subjectively perceived.

The main studies working with subjective institutional measures have constructed these from *experts'* evaluations of commercial international country risk agencies. The first was done by Mauro (1995), who constructs a measure of bureaucratic efficiency, finding a robust positive relationship with investment, but not with growth (directly). The other main study is Knack and Keefer (1995), who construct a measure of property rights security, finding robust positive relationships with both growth and investment. Interestingly, both Mauro (1995) and, particularly, Knack and Keefer (1995) show that objective institutional measures (including the number of revolutions and coups) are consistently 'outperformed' by subjective ones. Mauro (1995) also uses IV, indeed suggesting that good institutions cause investment and not the other way around.

Contrary to these two studies, a few others have constructed subjective institutional measures from surveys among *local economic agents themselves*. BKW (1997a) present the results of the to my knowledge *one and only* worldwide cross-country survey among local private entrepreneurs done so far, with the help of the World Bank. These they use in growth empirics in BKW (1997b), finding a robust positive relationship between their measure of institutional credibility and growth and, even more so, investment. Objective institutional measures are outperformed here too. Knack and Keefer (1997) present the to my knowledge strongest evidence to date on

the relevance of informal institutions, using survey results on interpersonal trust and civic norms. They find a robust positive relationship with both growth and investment, also confirming the former with IV.

In short, the a priori case for the use of subjective institutional measures in growth empirics, instead of objective institutional measures, is quite consistently verified. Subjective institutional measures prove to be robustly correlated with growth and, particularly, with investment. IV by Mauro (1995) and Knack and Keefer (1997) further shows that it is likely that better institutions are indeed a cause of higher investment and growth respectively. Especially given the rarity of finding robust correlations, let alone causations, in growth empirics at all, using subjective institutional measures seems to be a promising research avenue.

4 Applications to transition countries

If there is one subset of countries for which institutions can be reasonably expected to be most important, it is the transition countries. As argued by e.g. Schmieding (1993), transition countries are going through a period of pervasive institutional transformation, the main problem being that the necessary new institutional (market) environment has not been put in order, while the old institutional (plan) environment has already been destroyed, leaving a vacuum. However, practically all studies to date which apply growth empirics to transition countries have focused on macroeconomic stabilization or liberalization, confirming the importance of both, most influentially in Fischer, Sahay and Vegh (1996) and De Melo, Denizer and Gelb (1996) respectively. All the empirical results mentioned in the previous sections exclude transition

countries. As the to my knowledge only ones so far, BKW (1997b and, particularly, 1997c) do give attention to transition countries in growth empirics with (subjective) institutional measures.

In addition to the results mentioned in the previous section, BKW (1997b) also present some preliminary results for a larger sample of countries, including 18 transition countries, and for a sample consisting of these transition countries only, for the period 1990-95. The results for the full sample still show a robust positive relationship between institutional credibility and growth. Interestingly, its coefficient is much larger than in the sample without transition countries, indeed suggesting that institutional issues are of particular importance here. However, the results for the transition countries only do not show a robust relationship. In particular, if inflation is controlled for, which shows to be significantly and negatively correlated with growth, institutional credibility becomes insignificant. Note that this suggests some support for stressing the initial need for macroeconomic stabilization. This finding appears to be associated with the initial problem of the monetary overhang. When BKW (1997b) only look at 1993-95, inflation stays significantly negative for growth, but institutional credibility becomes more closely (though not significantly) correlated with growth again.

BKW (1997c) explicitly focus on 20 transition countries, using the same survey of local private entrepreneurs. They estimate growth and FDI equations for the period 1993-95. FDI is used because it is widely recognized to be among the more reliable data available for transition countries and it can also be interpreted as an overall indicator of economic performance. The focus is on 1993-95 in order to avoid the most severe initial shocks that the transition process involved. For this period BKW (1997c) do find a robust positive relationship between institutional credibility and

growth and, especially, FDI. With an IV for growth, using the so called 'Gastil index' of political rights as an instrument for institutional credibility, they try to illustrate that this correlation is likely to be a causation. However, this instrument does not seem adequate. Although it may be likely that political rights are related to the quality of institutions (they report high and positive correlations), they may still be plausibly caused by growth too, e.g. because it generally leads to a more educated population, *demanding* more political rights. Control variables are generally mostly insignificant, the exception being that inflation is mostly significant (and negative) in the growth equation, as in their previous study. Unlike there however, adding an inflation variable to the growth equation does not render institutional credibility insignificant, but only less significant. Nevertheless, this again suggests that macroeconomic stabilization is very important for growth as well.

The results above are indeed suggestive of the importance of institutions in transition countries. The mentioned IV, showing that the correlation between institutions and growth is likely to be a causality, does not seem adequate however. Of the control variables used in the above studies, only inflation turns out to be rivaling institutions in significance for growth. However, on the basis of these studies, it seems that once a certain degree of macroeconomic stabilization has been accomplished, institutions become the more important determinant of growth in transition countries.

5 Simple estimation results

Since it has been demonstrated that subjective are superior to objective institutional measures, this paper also uses the former. However, the sources of *institutional* data

used here are different from those used in the existing literature, enabling to cover all 25 transition countries with EBRD operations from experts' evaluations. From these, 4 measures are constructed, capturing specific aspects of the institutional environment, while partly overlapping. After having described these, this section makes a start with the new application of growth empirics with institutional measures to transition countries, by reporting the results of simple OLS estimations with the 4 institutional variables as only exogenous variable in turn (coefficient expected to be positive).

The first source of institutional data is The Wall Street Journal Europe's Central European Economic Review (CEER, 1995). Since 1995, CEER has published the results of an annual survey covering transition countries, including institutional factors. Transition countries are ranked on their attractiveness as a place to do business for the coming year on account of these factors. Specifically used are CEER's (1995) reported expectations for 1996 on 'legal safeguards' and 'corruption and crime'. These are taken as capturing different aspects of rule of law. Since they are highly correlated (with a correlation coefficient (r) of 0.98) and to create one institutional measure from CEER (1995), they are averaged into the variable RULE OF LAW.[6]

The second source is the EBRD (1995) Transition report, which gives the results of a survey on the extensiveness and effectiveness of *investment* laws in

[6] Regretfully, and contrary to the other surveys used, which are very extensive, the number of experts surveyed by CEER is usually not more than 10. However, they are always highly recognized specialists on the transition countries. Moreover, the EBRD (1997, p. 38) makes use of the data on corruption from CEER, reporting that 'Its assessments of corruption among the transition economies is highly correlated with other less comprehensive corruption ratings such as those from the DRI/McGraw-Hill Global Risk Service (r = 0.78) and the Economist Intelligence Unit Country Risk Service (r = 0.82)'.

transition countries, a more specific aspect of rule of law. The survey results on 'laws fostering investment' for 1995 by the EBRD (1995) are contained in the variable INVESTMENT LAW.

The third source is the Euromoney (several years) country risk assessment, published every March and September issue, which covers the whole world. Since September 1992 survey results on 'political risk' have been reported separately, being defined as 'the risk of non-payment or non-servicing of payment for goods or services, loans, trade-related finance and dividends and the risk of the non-repatriation of capital'. This can be also largely considered as a more specific aspect of rule of law, relating to property rights. Its average over 1992-95 is used as the variable PROPERTY RIGHTS.

In order to be able to look at *informal* institutions as well, Karatnycky, Motyl and Shor (1997) is used as a final source. This survey contains rankings on institutional factors for transition countries covering developments up to and including 1996. Specifically used are the survey results on 'civil society', in the variable given the same name. CIVIL SOCIETY does not directly relate to such things as trust or norms, but is nevertheless taken to represent informal institutions, because it develops much more spontaneously 'bottom up' than formal institutions, which develop much more 'top down'.[7]

[7] To make this explicit, the questions asked under the heading of civil society are listed here: '1. How many nongovernmental organizations have come into existence since 1988? How many charitable nonprofit organizations? 2. What forms of interest group participation in politics are legal? 3. Are there free trade unions? 4. What is the numerical/proportional membership of farmers' groups, small business associations, etc.?'.

The 4 institutional variables have been rescaled, so that they all are on a *0 to 10* scale and are representing *increasing* quality of institutions. The correlation between these 4 institutional variables from 4 different sources is rather high ($r \geq 0.71$). Ideally, these exogenous variables should concern the same period as the endogenous variable, 1990-95. However, the institutional variables are sometimes only available for a more recent period.[8] The period covered by the institutional data was chosen as to fit the period covered by the endogenous variable as close as possible under this restriction. Obviously, to the extent that these and other variables (the EBRD 'transition indicators', used in the next section) are not available for the full period under consideration, but only for a more recent period, the implicit assumption has to be made that the more recent figures also reflect the full period rather well or, alternatively, that they reflect expectations on which actual growth-determining decisions are made. This does not seem too restrictive.[9]

The endogenous variables used are respectively the average 1990-95 GDP growth per person (in %, GROWTH), net FDI inflow share (in % GDP, FDI), gross domestic investment share (in % GDP) and gross domestic fixed investment share (in % GDP). These *economic* data are taken from the CD-ROM version of the World Development Indicators (WDI) by the World Bank (1997a).

In table 1 OLS regression results for *growth* are reported. All coefficients are of the expected sign and the ones for formal institutions are significant also (at the 5% level or better). The insignificance of CIVIL SOCIETY suggests that informal institutions play less of a role than formal institutions in stimulating growth. At the

[8] As an aside, partly this problem can be considered a reflection of the fact that institutional issues only gained proper recognition after the transition had already been going on for quite some time.

same time, this suggests that even without a favorable quality of informal institutions the state *can* make a difference. Although all 4 institutional variables have been brought to a similar scale, there remains a problem in comparing the sizes of their coefficients in as far as some of these variables have different standard deviations (s). More specifically, the coefficient of PROPERTY RIGHTS is relatively inflated, because this institutional variable has a low s relative to the others (which have more or less the same s). Standardizing results in coefficients of 0.60, 0.52, 0.53 and 0.31 for RULE OF LAW, INVESTMENT LAW, PROPERTY RIGHTS and CIVIL SOCIETY respectively.[10] Thus, and intuitively, the most general measure of formal institutions also has the strongest effect on growth, but the more specific measures of formal institutions come close. Therefore, it seems that if the aim is to increase growth by improving institutions, improving these specific aspects may be a good start. Generally, the significant results suggest that some 25 to 30% of the variation in growth across transition countries can be explained from variation in (formal) institutions.

[9] All 4 institutional variables are highly autocorrelated for the periods available, in any case.

[10] Done by adjusting the original coefficient by the ratio of s of the exogenous variable to s of the endogenous variable, and giving the effect of a 1 s change in the exogenous variable on the endogenous variable, also measured in s (e.g. Pindyck and Rubinfeld, 1991, p. 85).

Table 1: OLS regressions with GROWTH as an endogenous variable and the institutional variables as an exogenous variable

	(1)	(2)	(3)	(4)
C	-14.74* (0.000)	-12.43* (0.000)	-14.46* (0.000)	-11.50* (0.001)
RULE OF LAW	1.51* (0.004)			
INVESTMENT LAW		1.25* (0.01)		
PROPERTY RIGHTS			2.23* (0.01)	
CIVIL SOCIETY				0.74 (0.15)
N[11]	21	21	21	21
Adjusted R^2	0.33* (0.004)	0.26* (0.01)	0.24* (0.01)	0.06 (0.15)

P value in parenthesis; * = Significant at 5% level

Table 2 gives results for *FDI*, as in BKW (1997c). Again all institutional variables have coefficients of the expected sign and, this time, all of them are significant, including the measure of informal institutions.[12] Standardizing results in coefficients of 0.11, 0.12, 0.11 and 0.11 for RULE OF LAW, INVESTMENT LAW, PROPERTY RIGHTS and CIVIL SOCIETY respectively. Thus, the specific institutions focusing on investment

[11] The sample size is 21 instead of 25 here, because growth is not available in WDI for Croatia, FYR Macedonia, Moldova and Slovenia.

[12] Note that some extra care should be taken in interpreting significance levels regarding the FDI equations reported in this paper, since normality of residuals is frequently rejected here.

indeed have the stronger effect on FDI, but differences are small. Generally, the results suggest that some 35 to 40% of the variation in FDI across transition countries can be explained from variation in (both formal and informal) institutions.

Table 2: OLS regressions with FDI as an endogenous variable and the institutional variables as an exogenous variable

	(1)	(2)	(3)	(4)
C	-0.64 (0.12)	-0.31 (0.34)	-0.62 (0.14)	-0.63 (0.15)
RULE OF LAW	0.29* (0.001)			
INVESTMENT LAW		0.28* (0.000)		
PROPERTY RIGHTS			0.48* (0.001)	
CIVIL SOCIETY				0.27* (0.001)
N[13]	25	25	25	25
Adjusted R^2	0.39* (0.001)	0.40* (0.000)	0.37* (0.001)	0.35* (0.001)

P value in parenthesis; * = Significant at 5% level

[13] All regressions reported in this paper which made use of the standard sample size of 25 were also done with the sample size of 21 (see footnote 11). More general, in all cases where the samples of growth and FDI regressions differed, they were also performed for identical samples. This generally produced results similar to the original ones, so that any differences between the estimation results for growth and FDI are not attributable to different samples.

The same regression analysis with domestic investment as an endogenous variable resulted in coefficients of the institutional variables which were mostly of the wrong sign and were never significant. BKW (1997c, p. 24-25) also report generally insignificant results for domestic investment and admit that 'It is not obvious why results for FDI and total investment should differ so much. Major data problems in the total investment figures for transition economies could be the culprit. In many cases this data is mainly reflecting the traditional sector's activity - the problems of capturing the activity of the emerging private sector are notorious. Another explanation could be that the share of investment is not really a good indicator of performance in transition because the countries that lag in the transition process are still investing larger amounts into unproductive ventures'. A regression of domestic investment on growth, performed here, indeed shows that its coefficient is insignificant (though of the expected sign), while the one of FDI is significant (P value = 0.02, and of the expected sign) under the same specification. The latter of the two explanations mentioned by BKW (1997c) seems more likely to blame for this than the former, for if 'undercoverage' were the main problem then this should have affected the results with growth in a similar way as the results with domestic investment.

A well-known specific problem with the domestic investment data concerns the recording of inventory adjustment (e.g. EBRD, 1994 and De Melo, Denizer and Gelb, 1996). To check whether this is the main explanation for the bad results with domestic investment, the same regressions were also performed with domestic *fixed* investment as an endogenous variable. This at least always produced coefficients with the expected sign, but with significance still only in the case of PROPERTY RIGHTS (P value = 0.03). This indicates that part of the explanation may be in the inventory-adjustment data, but the differences with the results with FDI are judged to be still too

large to have sufficient confidence in the domestic (fixed) investment data. Therefore, regression analysis with the latter data was discontinued.

In short, the simple estimation results reported in this section suggest that the quality of institutions is a significant determinant of *growth* and, particularly, *FDI*, generally corroborating the findings by BKW (1997c). Besides, FDI shows up as important for growth. Informal institutions are significant for FDI, but not for growth (directly). This may be because informal institutions are simply harder to grasp by foreign investors than by domestic economic agents. Generally, the more significant results for FDI than for growth may be explained by a quote from BKW (1997c, p. 18), who note that '… foreign investors are likely to be particularly sensitive to institutional problems. These investors are outsiders in the political process. They are not familiar with the local bureaucracy, are more familiar with market economies, and are not always welcomed locally'. To this should be added that, unlike most domestic economic agents, foreign investors are also in the position to *act* on their perception of institutions (by going to another country).

6 Sensitivity tests

As can be inferred from section 2, it is necessary in growth empirics to perform a sensitivity analysis of simple results, by adding varying control variables which have been suggested as important in the literature to the above regression equations. Here, the same problem BKW (1997c) are confronted with arises, and it is dealt with in the same way too: because of the small sample size control variables are not included simultaneously, but one by one. Multicollinearity is reported as a problem if a

correlation coefficient between two exogenous variables is bigger (in absolute value) than R^2.[14] If so, P values are already inflated for this reason, so the sensitivity test cannot be properly interpreted as (dis)qualifying the institutional variable. The 5 control variables BKW (1997c) use include the variables found robust by Levine and Renelt (1992), and form a subset of the 15 used in this paper.[15] The latter include variables for macroeconomic stabilization, liberalization and initial conditions, so that their importance relative to the quality of institutions can be judged.

In accordance with BKW (1997c), the gross national product per person in the initial year (in Dollars)[16], the gross secondary school enrollment rate in the initial year (in % population, 2SCHOOL)[17], the average (1990-95) trade share (in % GDP), the average government consumption share (in % GDP) and the average inflation rate (change of consumer price index in %, INFLATION) are controlled for. These control variables are standard in growth empirics and can all be more or less justified by theory. Initial income is included because of the (conditional) convergence effect

[14] This procedure roughly follows e.g. Harnett (1982, p. 563), who nicely states its intuition: 'In other words, if the strength of the association among any of the independent variables is approximately as great as the strength of their combined linear association with the dependent variable, then the amount of overlapping influence may be substantial enough to make the interpretation of the separate influences difficult and imprecise'.

[15] Of the variables found robust by Levine and Renelt (1992), domestic investment is not used as a control variable only, because of its special data problems for transition countries, noted in the previous section.

[16] Or, more exactly, the last year 'pre-transition': 1989. This variable is converted to Dollars using the World Bank 'Atlas' method, which tries to smooth the effect of transitory exchange rate fluctuations.

[17] Instead of 1989, with schooling 1990 is picked, because the use of 1989 would have implied losing too large a part of the sample.

(coefficient expected to be negative). Initial secondary schooling is a measure of human capital, boosting productivity (coefficient expected to be positive). Trade, government consumption and inflation proxy policy distortions of allocative efficiency (coefficient expected to be positive for the first and negative for the second and third respectively).

Some other control variables which may be a priori expected to matter for the behavior of growth and FDI in transition countries are added to this list here. The initial gross tertiary school enrollment rate (in % population, 3SCHOOL) also represents human capital (coefficient expected to be positive). As alternative proxies for openness, the average export and import share (in % GDP) are also tried (coefficients expected to be positive), to check whether they have different effects. The initial share of value added in industry (in % GDP, INDUSTRY) is included among the control variables because most transition countries were initially overindustrialized by the preceding communist policies (coefficient expected to be negative). Like the endogenous *economic* variables, the above are all from World Bank (1997a) too, but some control variables had to come from other sources, because WDI does not include them. The first is exports to countries of the Council for Mutual Economic Assistance in 1990, the year before its collapse (in % GDP, CMEA, coefficient expected to be negative), taken from Fischer, Sahay and Vegh (1996).[18] The second is a dummy for the transition countries which suffered from major and persistent internal conflicts or

[18] This regional trading arrangement comprised FSU and nine other formerly socialist countries. In the absence of data on CMEA exports for countries of FSU, exports within FSU are used for these countries. It should be noted that prices within the CMEA were in principle based on average world-market prices of the preceding five years, and thus lagged these. For more on this see e.g. Biessen (1995).

conflict-related blockades during 1989-94 (one if so, WAR, coefficient expected to be negative), taken from De Melo, Denizer and Gelb (1996).[19] Finally, to capture the effect of *liberalization* in transition countries, the data in De Melo, Denizer and Gelb (1996) and EBRD (1994 and 1995) are the most natural to use (all coefficients expected to be positive here).

The latter deserve some more scrutiny. De Melo, Denizer and Gelb (1996) construct an annual liberalization index for 1989-94. Here, the annual indices are averaged over 1989-94 per transition country, representing their extent of liberalization.[20] The annual index is the weighted average (with weights of 0.3, 0.3, and 0.4 respectively) of liberalization in three areas: internal markets (liberalization of domestic prices and abolition of state trading monopolies), external markets (liberalization of the foreign trade regime, currency convertibility), and private sector entry (privatization of small-scale and large-scale enterprises, banking reform). Interestingly, with respect to the latter De Melo, Denizer and Gelb (1996, endnote 17) remark: 'They do not capture the overall quality of the legal and regulatory framework or the effectiveness of government in institution-building or in the implementation of reforms…'. For the purpose of this paper, this 'lack of coverage' is actually quite welcome, for it intends to separate clearly the effects of 'pure' liberalization from the effects of institutions.

[19] The former are Croatia, Georgia, Azerbaijan and Tajikistan, the latter are Armenia and FYR Macedonia.

[20] Note that it is thus the *level* of liberalization which is considered, not its *change* (speed). For more on this see Heybey and Murrell (1997). The fact that the time period covered lags one year to the endogenous variables here should not constitute a problem. In any case, the annual indices are highly autocorrelated.

Contrary to this, the liberalization index from the EBRD (1994 and 1995), which is contained in its transition indicators, first published in 1994, is 'contaminated' with some aspects of institution building. Nevertheless, this 'broader' index is also used, to be able to compare the effects of the two authoritative liberalization indices. The separate available transition indicators are first averaged per year and then over 1994-95. The separate areas covered in this average are: large-scale privatization, small-scale privatization, governance and restructuring, price liberalization, competition policy, trade and foreign exchange system, banking reform and interest rate liberalization, and, finally, securities markets and non-bank financial institutions. The private sector share, also reported among the transition indicators by the EBRD (1994 and 1995), averaged over the same years (in % GDP), is used in separate estimations, to get a grip on the effects of privatization per se.

All 15 control variables were first used in simple regression equations on their own in turn. This showed for growth that inflation, the CMEA shock, war, the liberalization indices and the private sector share were significant and with the expected sign. From a policy perspective, this indeed suggests that macroeconomic stabilization and liberalization are both important for growth in transition countries on their own. Furthermore, the disruptive effects on growth of the collapse of the CMEA and the influence of war are confirmed. For FDI the same group of control variables turned out to be significant and with the expected sign, with the exception of the CMEA shock and war, which showed up with the right sign, but not with significance (though the latter comes close to the 10% level). The former exception does not seem strange; after all, foreign investors are going to new markets anyway, so they do not

'suffer' quite as much as domestic economic agents from the disruption of the traditional trade links. The latter exception cannot be explained that easily, however.[21]

For reasons of space the tables below only explicitly report the results of the sensitivity tests which showed institutional variables to be not robust (robust being: to keep a 5% significant coefficient of the 'right' sign) and contained no multicollinearity problem. The latter pervasively occurred in the equations including a liberalization index and privatization per se. Therefore, regretfully, it is impossible to judge their importance for growth relative to that of institutions. The high (positive) correlation between liberalization and institutional variables is interesting in its own right, however, since it suggests that, in practice, liberalization and institution building generally go hand in hand. To a lesser extent, a multicollinearity problem also showed up in the equations including CMEA. Interestingly, the rather high (negative) correlation between CMEA and institutional variables suggests some support for interpreting the CMEA shock not just as a trade shock, but as an institutional one, as argued by e.g. Schmieding (1993).

Table 3 gives the results of the sensitivity tests on the regression equation of RULE OF LAW on *growth*. Several control variables make this institutional measure insignificant, although it always keeps the right sign. In standardized terms the

[21] In WDI, FDI is net flows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor, so that an explanation is e.g. *not* in inclusion in FDI of war-related sales of weaponry or financial help. *Neither* is an explanation in the fact that, among the 6 transition countries which suffered the influence of war, Azerbaijan is included, which nevertheless does relatively well in attracting FDI because of its richness of oil (a simple regression excluding Azerbaijan from the sample produced similar results as the one for the whole sample).

coefficients of 2SCHOOL, INFLATION, WAR and RULE OF LAW are -0.60, -0.55, -0.61 and between 0.21 and 0.31 respectively. The initial extent of secondary schooling has the 'wrong' sign, and although it is insignificant itself, it does make RULE OF LAW insignificant too. In their regressions using data for transition countries, BKW (1997b) find the schooling variable consistently getting a (sometimes significant) negative sign too. One reason may be that it is inappropriate to consider communist schooling as a proxy for human capital, for it did not teach the skills needed for a market economy. Furthermore, the particularly low number of observations may be problematic here. Inflation is significant and negative for growth, and is more important than RULE OF LAW. This gives some further support for the initial stress on the need for macroeconomic stabilization in transition countries. When the same equation was estimated over 1993-95, RULE OF LAW regained its significance, while inflation lost its. Recall that BKW (1997b, p. 32) report similar findings, leading them to conclude that: 'It may be that institutional uncertainties become more important as the transition is ending and these countries slowly approach more 'normal times' and private sector development becomes central'. As expected, WAR is significant and negative, and in standardized terms it has the strongest effect. However, RULE OF LAW stays significant at the 10% level, indicating that it is not just a simple reflection of the influence of war. The equations including INFLATION or WAR explain some 55% of the variation in growth across transition countries.

Table 3: OLS regressions with GROWTH as an endogenous variable and RULE OF LAW and control variables as exogenous variables

	(1)	(2)	(3)
C	17.41 (0.55)	-7.06* (0.03)	-9.71* (0.001)
2SCHOOL	-0.29 (0.35)		
INFLATION		-0.004* (0.004)	
WAR			-8.62* (0.005)
RULE OF LAW	0.57 (0.59)	0.52 (0.30)	0.79 (0.09)
N	16	21	21
Adjusted R^2	0.17 (0.27)	0.55* (0.000)	0.55* (0.000)

P value in parenthesis; * = Significant at 5% level

Table 4 gives the results of the sensitivity tests on the regression equation of INVESTMENT LAW on growth. They are rather similar to the results described above, with the exception that this institutional variable gets the wrong sign in the equation with 2SCHOOL, but it suffers from first-order serial correlation (DW = 0.99). In standardized terms the coefficients of 2SCHOOL, INFLATION, WAR and INVESTMENT LAW are -0.86, -0.55, -0.64 and between -0.07 and 0.27 respectively. When the equation including INFLATION was again estimated over 1993-95, INVESTMENT LAW regained its significance, and this time inflation stayed significant too.

Table 4: OLS regressions with GROWTH as an endogenous variable and INVESTMENT LAW and control variables as exogenous variables

	(1)	(2)	(3)
C	32.51 (0.29)	-7.01* (0.002)	-8.41* (0.001)
2SCHOOL	-0.42 (0.20)		
INFLATION		-0.004* (0.001)	
WAR			-9.15* (0.002)
INVESTMENT LAW	-0.16 (0.90)	0.64 (0.09)	0.66 (0.10)
N	8	21	21
Adjusted R^2	0.12 (0.31)	0.59* (0.000)	0.54* (0.000)

P value in parenthesis; * = Significant at 5% level

Table 5 gives the results of the sensitivity tests on the regression equation of PROPERTY RIGHTS on growth. They are again rather similar to the results above. However, next to the other proxy for human capital, the initial extent of tertiary schooling now also shows up, also with the wrong sign. In standardized terms the coefficients of 2SCHOOL, INFLATION, 3SCHOOL, WAR and INVESTMENT LAW are -0.78, -0.55, -0.36, -0.66 and between 0.03 and 0.41 respectively. The (negative) effect of inflation now even remains dominating the (positive) effect of the institutional variable when this equation is re-estimated over 1993-95, though both the former (P value = 0.06) and the latter variable (P value = 0.15) fail to reach significance in this case.

Table 5: OLS regressions with GROWTH as an endogenous variable and PROPERTY RIGHTS and control variables as exogenous variables

	(1)	(2)	(3)	(4)
C	28.14 (0.24)	-6.63* (0.04)	-7.35 (0.14)	-8.34* (0.01)
2SCHOOL	-0.38 (0.16)			
INFLATION		-0.004* (0.002)		
3SCHOOL			-0.18 (0.09)	
WAR				-9.43* (0.005)
PROPERTY RIGHTS	0.11 (0.93)	0.72 (0.36)	1.71 (0.07)	0.82 (0.32)
N	8	21	19	21
Adjusted R^2	0.12 (0.31)	0.55* (0.000)	0.29* (0.03)	0.50* (0.001)

P value in parenthesis; * = Significant at 5% level

As for *FDI*, the sensitivity tests on the regression equation including RULE OF LAW show no control variable properly overturning its robustness. Of the 15 control variables only the initial level of industrialization is significant for FDI (P value = 0.01), with the expected sign ((standardized) coefficient = -0.06 (-0.48)), but it does not overturn the robustness of RULE OF LAW (P value = 0.000; (standardized) coefficient = 0.45 (0.99)), nor has it a stronger effect. These two variables explain some 65% of the variation in FDI across transition countries. Recall that the initial level of industrialization was not significant for growth. Thus it seems that foreign investors are relatively sensitive to the communist overindustrialization with outdated capital in transition countries.

Table 6 gives the results of the sensitivity tests on the regression equation of INVESTMENT LAW on FDI. They are rather similar to the results above. Now only the initial extent of secondary schooling overturns the robustness of INVESTMENT LAW, but only just.

Table 6: OLS regressions with FDI as an endogenous variable and INVESTMENT LAW and control variables as exogenous variables

	(1)
C	-1.07 (0.73)
2SCHOOL	0.004 (0.92)
INVESTMENT LAW	0.37 (0.06)
N	10
Adjusted R^2	0.25 (0.15)

P value in parenthesis; * = Significant at 5% level

In the sensitivity tests on the regression equation of PROPERTY RIGHTS on FDI, there is again no control variable properly overturning the robustness of the institutional variable.

Finally, even the results of the sensitivity tests on the regression equation of the informal institutional variable on FDI again point into the same directions as above.

All in all, for *growth* the institutional measures do not seem *totally* robust. Nevertheless, out of the 15 control variables used, only INFLATION and WAR show up with significance, stressing their negative effects on growth. Both seem to have been relatively more important for growth performance in transition countries than

institutions per se, though the latter again gain some importance on inflation over the later period, 1993-95. This suggests that macroeconomic stabilization and peace should be the main policy priorities, after which institution building should quickly commence. *None* of the 15 control variables properly disqualifies the quality of institutions as a robust determinant of *FDI*, and it is consistently the major one. Thus, the more significant effects of institutions on FDI than on growth, noted in the previous section, are confirmed, although FDI of course remains significant and positive for growth in turn. Interestingly, the initial extent of (over)industrialization seems to be the main factor competing with institutions in importance for FDI. Finally, note that the general frequent occurrence of a schooling variable with a (sometimes significant) negative sign (and its insignificance in other cases) seems to invalidate optimistic expectations for growth and FDI in transition countries, relative to 'other' developing countries, inferred from the fact that their population was at least extensively schooled by the communists.[22] As far as they cover the same variables, roughly, the above resembles the results for the transition countries by BKW (1997b and 1997c).

[22] This optimism also overlooks the real crisis which manifested itself in the educational system of and the 'brain drain' from most transition countries since the start of reforms, which could both be partly responsible for this finding as well.

7 Simultaneity checks

Another thing which can be inferred from section 2 is that exogeneity of the institutional variables needs to be explicitly checked for, using IV and performing formal exogeneity tests.

As noted in section 4, the instrument BKW (1997c) use does not seem adequate. Utilizing Karatnycky, Motyl and Shor (1997) as source for the Gastil index of political rights, taking its average over 1992-95 (GASTIL), and regressing this on growth and FDI, this is confirmed. In these OLS estimations GASTIL turns out to be correlated with the right sign with GROWTH at 10% significance, and with FDI at 5% significance. Coupled with the fact that, a priori, we cannot exclude the possibility of reverse causation here, this seems sufficient ground to look for another instrument than GASTIL.

Following Mauro (1995), ethnolinguistic fractionalization is used as an instrument for the quality of institutions in this paper. Since Mauro's (1995) original source, the Department of Geodesy and Cartography of the State Geological Committee of the USSR (1964), only contains these data for 5 transition countries, the measure is calculated from similar data from Karatnycky, Motyl and Shor (1997).[23] For this, Mauro's (1995, p. 692) formula is used:

$$\text{FRACTION} = 1 - \sum_{i=1}^{I} (n_i/N)^2$$

[23] However, the correlation between the data which *are* contained in the Department of Geodesy and Cartography of the State Geological Committee of the USSR (1964), taken from Kurian (1991), and the data used below is high (r = 0.97).

where n_i is the number of people in the i^{th} group, N is total population, and I is the number of ethnolinguistic groups in the transition country. FRACTION (in %) measures the probability that two randomly selected persons from a given country will *not* belong to the same ethnolinguistic group. Therefore, the higher FRACTION, the more fragmented the transition country, and the lower a quality of institutions is expected, e.g. because it leads to more rent-seeking behavior. This is born out by regressions of FRACTION on the 4 institutional variables, which consistently result in significant and negative coefficients. Even more so than GASTIL, in OLS estimations FRACTION is also significant with the expected sign for growth and FDI, but contrary to the former, reverse causation is very unlikely in the latter case. Considering the above, FRACTION is to be preferred to GASTIL as an instrument for the quality of institutions.

Below, the results are reported of two stage least squares estimation (TSLS) of the institutional variables on growth and FDI, using FRACTION as an instrumental variable. Furthermore, the Hausman test for exogeneity is applied in all these cases. Most likely to suffer from simultaneity are the *growth* equations, checked with TSLS in table 7. Comparing with table 1, it shows that the coefficients of formal institutions are larger and somewhat less significant here, while the coefficient of informal institutions is larger and somewhat more significant. In any case, strong effects of the quality of (formal) institutions on growth remain. However, since only RULE OF LAW and INVESTMENT LAW remain significant with TSLS, it seems that only for these two institutional variables the correlation may be surely interpreted as a causation. The Hausman test confirms this, since it rejects exogeneity for PROPERTY RIGHTS and CIVIL SOCIETY, but not for the other 2 institutional variables, though at 10% significance it would have done so.

Table 7: TSLS regressions with GROWTH as an endogenous variable, institutional variables as an exogenous variable, using FRACTION as an instrumental variable

	(1)	(2)	(3)	(4)
C	-20.99* (0.001)	-16.92* (0.000)	-28.20* (0.02)	-21.54* (0.009)
RULE OF LAW	2.83* (0.02)			
INVESTMENT LAW		2.41* (0.02)		
PROPERTY RIGHTS			6.70 (0.09)	
CIVIL SOCIETY				2.65 (0.07)
N	21	21	21	21
Adjusted R^2	0.03* (0.02)	-0.01* (0.02)	-0.95 (0.09)	-0.68 (0.07)

P value in parenthesis; * = Significant at 5% level

Less likely to suffer from simultaneity are the *FDI* equations, which is indeed the message of table 8. Comparing with table 2, it shows that all coefficients of institutional variables are larger and somewhat less significant here. All 4 institutional variables remain significant with TSLS though, illustrating their importance in causing FDI. The Hausman test consistently confirms that exogeneity of the institutional variables for FDI cannot be rejected.

Table 8: TSLS regressions with FDI as an endogenous variable, institutional variables as an exogenous variable, using FRACTION as an instrumental variable

	(1)	(2)	(3)	(4)
C	-1.01 (0.18)	-0.51 (0.35)	-1.34 (0.16)	-1.20 (0.17)
RULE OF LAW	0.37* (0.02)			
INVESTMENT LAW		0.33* (0.02)		
PROPERTY RIGHTS			0.72* (0.03)	
CIVIL SOCIETY				0.37* (0.02)
N	25	25	25	25
Adjusted R^2	0.36* (0.02)	0.39* (0.02)	0.27* (0.03)	0.29* (0.02)

P value in parenthesis; * = Significant at 5% level

In short, the more significant correlations found between institutions and *FDI* are also more likely to be (direct) causations than those between institutions and *growth*. In the former case absence of simultaneity and exogeneity of the institutional variables is *never* rejected. In the latter case, *only* RULE OF LAW and INVESTMENT LAW may be surely interpreted as causing growth. Contrary to what BKW (1997c, p. 31) find with a less adequate instrumental variable, in the regressions of institutions on growth it does not seem legitimate to conclude that 'The results suggest that reverse causality may not be a major problem'.

8 Conclusion

Recent literature on growth empirics shows that, as one of the few variables found to do so, the quality of institutions matters robustly for growth and, particularly, investment. This is mainly so when using subjective institutional measures, which capture the relevant uncertainties in the most close and direct way. IV indicates that the relationship is likely to be from better institutions to growth and not the other way around. BKW (1997b and, particularly, 1997c), the to my knowledge only ones who have so far applied growth empirics with (subjective) institutional measures to transition countries, which are going through a period of pervasive institutional transformation, suggest that once a certain degree of macroeconomic stabilization has been accomplished, institutions become the more important determinant of growth here.

Clearly, both existing and current findings reported for the transition countries have to be interpreted with extra care, mainly because of data limitations, short observed time period, as well as the fact that these countries are going through such a major structural break. Current findings furthermore suggest that economic growth and institution building are more of a two-way process in transition countries than that one seems distinctively causing the other, which is the only result in this paper which really differs from BKW (1997b and, particularly, 1997c). Keeping this in mind, current findings do suggest that the quality of (particularly formal) institutions is significant for growth and, particularly, FDI, the latter itself being important for the former. The correlation between the quality of institutions and FDI is also more likely to be a (direct) causation.

Current estimation results moreover indicate that the quality of institutions is *more* important than a host of variables which are generally considered to have a strong effect on growth and investment. Out of 15 control variables only inflation and war seem to have been relatively more important for growth performance in transition countries than institutions per se, with the latter again gaining some importance on inflation over the more recent period. This suggests that macroeconomic stabilization and peace should be the main policy priorities in transition, closely followed by institution building. The correlation between institutions and FDI turns out to be totally robust.

Regretfully, multicollinearity between institutional and liberalization variables makes it impossible to judge their relative importance. At the same time, this multicollinearity problem suggests that a high extent of liberalization and quality of institutions in practice generally go together. The same problem with respect to institutional and CMEA variables, though to a lesser extent, suggests interpreting the CMEA shock not just as a trade shock, but also as an institutional one.

The above gives support to those (relatively few) who early-on in the transition process stressed the need for institution building (e.g. Litwack, 1991). Only recently institutional issues have gained broader recognition, also in policy circles (e.g. World Bank, 1997b). At the same time, the above also warrants the stress put on the need for macroeconomic stabilization in transition countries. Thus, it seems not so much the case that the policies of the 'Washington consensus' are wrong, but rather they are incomplete, or at the least not 'balanced' enough. The general field of economic development seems to be rightfully moving towards a more balanced 'post-Washington consensus' (Stiglitz, 1998).

Given the preeminent policy relevance of economic growth, and the limited success in explaining it so far, more empirical studies working with (subjective) institutional measures would seem welcome, particularly for the transition countries. Extending previous sensitivity analysis with other control variables could be a start. Further investigation of the direction of the causation between the quality of institutions and growth and investment seems also needed, possibly with different instrumental variables, admittedly difficult to find. Finally, as recently stressed by Temple (1999), using a panel-data approach may be the best way forward for many questions of interest concerning economic growth. In the present context, it could e.g. tell more about the *dynamic* effects of institutional *change*, which may even be large in the short run (e.g. through capital flows).

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