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Thirty Years After: Economic Growth in Transition Countries*

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Abstract

In this paper, we use a dynamic threshold panel model to investigate the impact of classical and transition specific growth factors on the economic growth of transition countries during 1989-2019. Following Durlauf, Johnson and Temple (2004) we use more than 40 potential "mainstream" growth factors and we augment the list of factors with transition specific indicators such as privatization methods and various indicators of institutional quality. Given the difficulty in quantifying the economic policies employed in various countries, we explore a wide list of potential threshold variables that can exogenously split the sample into fast and slow-growing countries. We use a range of model specifications and both fixed effects and system GMM estimators as well as Bayesian averaging in order to investigate the robustness of the results. In total more than 16 million estimates are analysed. Preliminary results suggest that the most robust results are for the initial level of development, long term effects of labor market reforms (employment rate), the share of investment, and the importance of the natural resources.

Key words: transition, socialist systems, Solow model, institutions, economic growth, threshold model

JEL Codes: P30, O43, E60

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1 Introduction

Most of the economists would agree that, at least in the first decade of transition, initial conditions, macroeconomic stabilisation and structural reforms were key determinants of growth in former socialist countries on their path to becoming a market economy. The consensus is much weaker about the particular design of institutional framework and neoclassical growth factors (Turley and Luke, 2011).

Most of the research papers that have tried to estimate growth determinants of transition countries, due to practical and technical reasons (short time spans, availability and reliability of data) mostly focused on informal regressions that did not control for convergence (Solow, 1956) although some aspects of neoclassical models were accounted for (Ding and Knight, 2011). As a result, as Turley and Luke (2011) point out, these studies should be treated with caution not only due to problematic data and/or institutional proxies, but also due to misspecifications of estimated models.

The main problem was that early models were estimated in the mid-nineties or at the turn of the century (De Melo et al., 2001; Falcetti et al., 2002), with data covering a decade at best. Due to data limitations it was impossible to capture the effect of the initial level of GDP per capita on the convergence process (Solow, 1956).

Most of the empirical attention at the time was given to initial conditions of countries in an institutional way, for example how different were countries relative to market economy counterparts, as well as how long were the countries under the planned economy system. Due to objective reasons, the effect of decreasing returns to physical capital did not receive appropriate attention (Falcetti et al., 2002; Turley and Luke, 2011). Nevertheless, if we have in mind that GDP per capita of China and Czechia in 1990 was 687 and 12659 current international dollars respectively (The World Bank, 2020c), it becomes obvious that failure to control for convergence can result in biased results.

Therefore, in this paper we use the augmented Solow model (1992) in order to estimate the effects of macroeconomic stabilisation, structural reforms and institutional framework while controlling for neoclassical growth factors such as share of investment, human capital and the level of GDP per capita.

Furthermore, having in mind the crucial role of labor markets reforms in transition countries, we control our estimates for the changes in employment rate and inverted age dependency ratio. Conventional view is that in the long run ratio of employment to working age population as well as age dependency ratio experience only transitory shocks. The problem with that assumption is that empirical facts indicate that the employment rates and demographic changes (aging and migrations) were quite persistent during the last 30 years in the transition countries.¹

Following [Durlauf et al. \(2005\)](#) we estimate a linear and threshold dynamic model using a variety of estimators such as fixed effects, random effects, first-difference GMM and system GMM. Furthermore, in order to address the problem of model uncertainty, we use Bayesian averaging technique in order to estimate posterior inclusion probabilities for the variables that we use in the estimated models.

We regress the growth rate of real GDP per capita in local currency units on the neoclassical growth factors and a vector of control variables. These contain commonly used variables such as institutional indicators, but also less common variables such as employment rate, age dependency rate, dependency on rents from natural resources (the "Dutch disease"), interest paid on public debt and the effects of the initial real exchange rate appreciation.

Our results indicate that the ratio of employment to working age population is the most robust variable in explaining cross-country differences in GDP growth rates in transition countries. We find evidence that share of investment, growth of population as well as initial level of GDP per capita also have explanatory power in the majority of our estimates.

When it comes to other indicators, there is evidence of negative effects of natural resources, implying "resource curse" theory. Political stability is one of the most important institutional factors which only confirms earlier results that wars and civil unrest are detrimental to growth. Interest paid on public debt as an indicator of macroeconomic stability has a robust and negative effect in the estimated models.

The remainder of the paper is organized as follows. Section 2 summarizes the existent literature; Section 3 provides an overview of the methodology and discusses the data. In

¹China has only recently liberalised it's "one child policy", while EU "Lisabon strategy" focused on increasing employment rate to 65%, and recently the target has been increased to 70%.

Section 4 we present the empirical results, and Section 5 concludes.

2 Survey of Literature

We organise the literature review by addressing two of the three growth research questions put forward by [Pritchett \(2000\)](#). These two questions seem the most relevant in the context of transition, and in line with [Durlauf et al. \(2005\)](#) they can be summarized in the following way: (i) What are the initial, pre-transition conditions which are favorable for future growth, and which initial conditions set off sustained future decline? (ii) How do continuous changes in institutional and macroeconomic policies influence growth?

In theory, large initial macroeconomic and institutional distortions should be associated with lower subsequent growth since the adjustment process is more painful and there is more resistance regarding the transition to a market economy. This idea is confirmed by [De Melo et al. \(2001\)](#), who analyse the impact of initial conditions on subsequent growth and inflation rates in 28 transition economies. OLS and 2SLS results indicate that larger macroeconomic distortions, such as years under central planning and repressed inflation, result in lower growth and higher inflation in the following years. In a similar fashion, [Falcetti et al. \(2002\)](#) analyse the data for 25 countries during the first 8 years of transition. 3SLS results indicate that greater initial distortions have a strong negative effect on subsequent growth.

Though the literature confirms that the effect of higher initial distortions on growth is negative, this impact can be expected to fade over time. This is supported by the results of [Falcetti et al. \(2002\)](#), who use a methodology similar to [De Melo et al. \(2001\)](#) and find the negative effect to be declining over time. Their work slightly differs from [Eicher and Schreiber \(2010\)](#), who use 2SLS to analyse 26 countries during the 1991-2001 period and find that initial conditions are significant in explaining the entire 1991-2001 growth rate. Though their results indicate that the impact of initial conditions might be relatively long lasting, this might be due to the strong negative influence in the earlier years of the period they examine. For example, [The World Bank \(2002\)](#) analyses the performance of 25 transition countries from 1990 to 1999 and finds that initial conditions explain 51 percent of the variance in the average growth rate during the first five years, and a lower 41 percent of the average growth

rate variance during the whole decade. [Godoy and Stiglitz \(2006\)](#)'s results show that the impact of initial conditions is not statistically significant. Since they analyse the 1990-2001 period, this result can be interpreted as supportive towards the hypothesis of a decreasing impact of initial conditions on growth as transition progresses.

It's worth pointing out that the approach to measuring initial conditions used by [Eicher and Schreiber \(2010\)](#) differs from the ones used by the other aforementioned authors. Namely, they measure initial conditions using EBRD's transition indicators, which is an approach often found in the more recent literature. We take a similar approach in this paper since these indicators can be used as a measure of the ongoing institutional changes, or reforms. As a robustness check, we combine EBRD's transition indicators with WGI data, which serve a similar purpose.

Initial conditions do not impact growth only directly, but also indirectly, by influencing the pace of the subsequent reforms. [De Melo et al. \(2001\)](#) and [Falcetti et al. \(2002\)](#) find a negative connection between large initial macroeconomic distortions and the pace of the subsequent reforms.

When it comes to addressing the second research question (the importance of institutions and different macroeconomic variables in explaining growth), [Ding and Knight \(2011\)](#) and [Bonfond \(2014\)](#) identify two empirical approaches. The first one involves the estimation of some version of the neoclassical growth model, often the augmented Solow model in a form similar to the one found in [Mankiw et al. \(1992\)](#). The second approach is based on the estimation of *ad hoc*, informal regressions which allow for inclusion of a broader set of explanatory variables.

These two approaches are not very different from each other. Informal regressions frequently include regressors such as gross fixed capital formation and secondary school enrolment rates, which are often found among the core variables in the empirical estimations of the augmented Solow model. Similarly, the original version of the augmented Solow model can be expanded to include institutional variables, as suggested by [Polimeni et al. \(2007\)](#).

As the importance of initial conditions fades, structural reforms start playing a more important role in determining growth, as shown in the [The World Bank \(2002\)](#) research. Using system GMM with robust estimates, [Josifidis et al. \(2012\)](#) show that one period lags

of structural reforms have a positive impact on growth. Their measure of structural reforms is based on the EBRD transition indicators and its' impact is robust across different model specifications. [Iradian \(2009\)](#) uses system GMM and finds that improvements in macroeconomic policies and market reforms have a positive impact on growth and explain about 50% of the total growth in 26 transition countries he investigated during the 1991-2006 period.

When it comes to the importance of key macroeconomic variables in determining growth, we can expect higher FDI to be linked with faster developing transition countries. FDI not only boosts the economic activity but also enhances the transfer of knowledge from more developed countries. Unsurprisingly, many papers (though not all of them, as, for example, [Curwin and Mahutga \(2014\)](#)) find that the impact of FDI on growth is positive ([Bongini et al. \(2017\)](#) and [Josifidis et al. \(2012\)](#)).

A higher share of general government consumption in GDP is often found to have a negative impact on growth, as is the case in the papers of [Iradian \(2009\)](#) and [Bongini et al. \(2017\)](#). From a theoretical perspective, these results can be supported by viewing higher general government consumption as an indicator of a less reformed and a less efficient system.

The impact of fiscal balance on growth is somewhat ambiguous in the sense that fiscal deficits stimulate growth when financed by external borrowing, which was very often the case in transition countries, since new funds become available for spending in the domestic economy. Fiscal deficits, however, might also be a reflection of poor public finance management, inefficient government investments, and reform avoidance. The empirical research points towards the second explanation, with [Iradian \(2009\)](#) and [Josifidis et al. \(2012\)](#) obtaining the result that higher fiscal surpluses have a positive impact on growth. In a similar fashion, [Çiftçioğlu and Sokhanvar \(2018\)](#) conclude that higher external debt levels have a negative impact on growth.

In line with [Caselli et al. \(1996\)](#) and [Hoeffler \(2002\)](#), the basic Solow growth model has the following functional form:

$$\begin{aligned} \ln(y_{i,t}) - \ln(y_{i,t-\tau}) = & -(1 - e^{-\lambda t})\ln(y_{i,t-\tau}) + (1 - e^{-\lambda t})\ln(A_{i,t-\tau}) \\ & + gt + (1 - e^{-\lambda t})\frac{\alpha}{1 - \alpha}\ln(s) - (1 - e^{-\lambda t})\frac{\alpha}{1 - \alpha}\ln(n + g + \delta) \end{aligned} \quad (1)$$

Where $y_{i,t}$ represents output per worker in country i and period t , $y_{i,t-\tau}$ is output per worker in the previous period and $A_{i,t-\tau}$ is the level of technology in the previous period. The rate of technological progress is represented by g , s is the savings rate, n represents the growth rate of the workforce, δ is the depreciation rate, the share of capital in output is represented by α and the rate of convergence to the steady state is λ . τ is the length of the period.

The left-hand-side of the equation is the difference of logarithms of output per worker in two subsequent periods, which approximates the growth rate of output per worker. The basic Solow model predicts that a high savings rate will positively affect growth in output per worker, while higher labor force growth rate, enlarged by the sum of the rate of technological progress and the rate of depreciation, has a negative impact on the output per worker growth rate.

In the augmented version of the Solow model investment in human capital is included as an additional determinant of output per worker growth:

$$\begin{aligned} \ln y_{i,t} - \ln y_{i,t-\tau} = & -(1 - e^{-\phi t}) \ln(y_{i,t-\tau}) + (1 - e^{-\phi t}) \ln(A_{i,t-\tau}) \\ & + gt + (1 - e^{-\phi t}) \frac{\alpha}{1 - \alpha - \beta} \ln(s_k) + (1 - e^{-\phi t}) \frac{\beta}{1 - \alpha - \beta} \ln(s_h) \quad (2) \\ & - (1 - e^{-\phi t}) \frac{\alpha + \beta}{1 - \alpha - \beta} \ln(n + g + \delta) \end{aligned}$$

Where s_k denotes the portion of output invested in physical capital, and s_h is the portion of output invested in human capital. ϕ is the rate of convergence to the steady state.

3 Methodology and Data

3.1 Data

To empirically examine the relationship between various institutional and macroeconomic variables and economic growth we used annual data for the 1989-2019 period for 32 countries.

We use two different measures of institutional indicators, transition indicators published by [EBRD \(2020a\)](#) and Worldwide Governance Indicators (WGI) published by [The World](#)

[Bank \(2020d\)](#). Both transition indicators and WGI consist of 6 different indicators.

We use [The World Bank \(2020c\)](#) database to obtain the data on GDP per capita PPP (in both current and constant 2017 international dollars), GDP per capita in constant local currency unit, total population, FDI (net inflows, % of GDP), gross fixed capital formation (% of GDP), value added in manufacturing (% of GDP), total natural resources rents (% of GDP), the GDP share of exports plus imports of goods and services (openness proxy), and the price level ratio of PPP conversion factor (GDP) to the market exchange rate. From the same database we also calculate the percentage share of interest payments in GDP by dividing interest payments by GDP (both in current local currency units), and tourism receipts (% GDP) by dividing international tourism receipts by GDP (both in current US\$). The employment rate is calculated as the ratio of employment to working-age population (aged 15-64) and quasi inverted dependency rate as the ratio of working-age population to total population, both obtained from [The World Bank \(2020b\)](#).

The human capital index and terms of trade (price level of exports divided by the price level of imports) were obtained from [Feenstra et al. \(2015\)](#). We approximate financial sector development by using the stock market capitalization to GDP ratio, obtained from [The World Bank \(2020a\)](#)'s Global Financial Development Database.

General government expenditure data was retrieved from [EBRD \(2020b\)](#)'s Transition reports. Data on methods of privatization of medium-sized and large enterprises is from the study published by [The World Bank \(2002\)](#) titled "Transition, The First Ten Years". This study lists three different privatization methods, direct sales, vouchers, and management-employee buyout. For a particular country, each method was labeled as "Primary", "Secondary" or "n.a." based on which of the three methods was a primary strategy for privatization, which method was a secondary privatization strategy, and which method was not used in a particular country.

The complete list of countries in our sample and the availability of all the aforementioned variables for each particular country is shown in table [1](#).

3.2 Methodology

We estimate a linear and threshold dynamic model using the following relation:

$$\Delta y_{i,t} = \alpha_i + \mu_t + \beta_1 y_{i,t=0} + \psi X_{i,t} + \pi Z_{i,t} + \epsilon_{i,t} \quad (3)$$

where $y_{i,t}$ is GDP per capita, $y_{i,t=0}$ is the initial level of GDP per capita (proxy for convergence), $X_{i,t}$ is the vector of growth factors implied by Solow model (Solow, 1957; Mankiw et al., 1992) and $Z_{i,t}$ represents growth determinants that lie outside of the original Solow theory. Parameters α_i and μ_t are country and time fixed effects, and small letters denotes logs of variables $x_t = \log(X_t)$.

We distinguish $y_{i,t=0}$ from other Solow determinants in order to control for convergence. Having in mind that we are working with panel data, in order to prevent our panel from collapsing into a cross-section dataset we divide our data into five year periods. Therefore, variable $y_{i,t=0}$ represents the initial level of GDP per capita in each five year period.

Accordingly, we use five-year averages for all variables that appear as log-levels $x_{i,t} = 1/5 \times \sum_{n=0}^4 x_{i,t-n}$ in the estimation and we calculate five-year growth rates for all variables that are used as log-differences in the estimation $\Delta x_{i,t} = \log(X_{i,t}) - \log(X_{i,t-4})$.

In the estimation we use both the overlapping sample and non-overlapping five-year frequency.²

In order to address model uncertainty, we estimate all models using $X_{i,t}$ vector of variables and we distinguish models by alternative combinations of 2 to 24 alternative choices of variables in the vector $Z_{i,t}$ (Durlauf et al., 2005).

When it comes to estimators we use the Arellano and Bond (1991) GMM estimation method which uses moment conditions after first differencing the variables in equation (3) and the system GMM estimator (SYS-GMM) of Arellano and Bover (1995). Given that the bias in the longer sample will be relatively mild, we also use the usual fixed effects panel estimator (FE). Furthermore, in order to address the issue of model uncertainty, we also employ the Bayesian averaging technique (Magnus et al., 2010).

Following Mankiw et al. (1992) we use the share of gross fixed capital formation to GDP *mlgfcf*, population growth rate *dlpop* and human capital *mlhc* in the vector $X_{i,t}$. Furthermore, in order to account for population ageing and quite persistent labor market distur-

²Due to data limitations and a small number of countries in the sample, most of the results are presented for the overlapping sample.

bances during the transition process, we enlarge the vector $X_{i,t}$ with employment to working-age population changes $dtemp$ and working-age population to total population changes $dlrss$.

The main reason for this augmentation stems from the fact that GDP per capita and GDP per worker can deviate from each other in the case of permanent trends in employment rate and/or age dependency rate. Therefore, we decompose GDP per capita into changes in GDP per worker, employment rate, and a quasi inverted age dependency ratio:

$$\frac{GDP}{population} = \frac{GDP}{employment} \times \frac{employment}{work.age.pop.} \times \frac{work.age.pop.}{population} \quad (4)$$

In the vector $Z_{i,t}$ we employ alternative combinations of a wide range of additional variables that are usually used in growth regressions. We use institutional factors as proxied by EBRD's transition indicators and the World Bank's Worldwide Governance Indicators.

Having in mind that transition was initiated by stabilization and privatization reforms, we also investigate the effects of these initial reforms on the long term growth trajectory. We use two dummy variables (Pvoucher and Pdirsales) for three general types of privatization models (voucher, direct sales, and management buyout) and we use the share of general government expenditure in GDP $mlGexp$ in order to account for the size of the public sector in the economy.

We augment the growth factors with interest paid on public debt $mlintpaid$ following [Reinhart and Rogoff \(2010\)](#) and investigate the role that surge in FDI $mlFDI$ had on economic growth during transition process. Also, estimation is controlled for openness $mlopen$ and financial development $mlfindev$ following [Levine and Renelt \(1992\)](#).

In order to investigate long term effects of initial quite strong real exchange rate appreciation in the majority of transition countries ([Égert et al., 2004](#); [Dollar, 1992](#)), we control our estimates for the appreciation of absolute real exchange rate and gross wages³, as well as for the changes in terms of trade $mltot$.

In order to investigate structural differences between different transition growth models, we use the growth rate of manufacturing $dlmanuf5$, rents from natural resources $dlrent5$, and tourism receipts $dltourism5$. With these variables we are trying to capture the effects

³We regress the price level and gross wages on PPP GDP per capita level and use the predicted residuals as a proxy for the real exchange rate and unit labor cost appreciation respectively.

of (de)industrialization and/or "resource curse" effects on growth trajectories of transition countries (Venables, 2016).

4 Results

The results of all estimated models are presented in tables 4 through 12. Table 4 presents the results of 8 different models estimated with two way fixed effects estimator using the overlapping sample. Results for the initial level of PPP GDP per capita and growth rate of employment rate are significant in all models reflecting their robustness to model specification uncertainty.

The growth rate of the population is significant in models 5 and 7, gross fixed capital formation is significant in models 3 and 7, and human capital only in model 4. When it comes to the variables from vector $Z_{i,t}$, the growth rate of tourism receipts is positive and significant, as well as price liberalization, small firms privatization, political stability, and the rule of law.

In table 5 we present the data for the random effects estimator using the overlapping sample. We are aware that both the assumptions of no correlation between the random effects and explanatory variables and assumption of no autocorrelation need to be satisfied in order for random effects model to be consistent and efficient (along with all other assumptions related to the random effects model). However, we present the results in order to evaluate the effects of privatization models on the growth rate of transition economies.⁴

According to the random effects estimate, both voucher privatization and direct sale privatization had the same impact on the GDP growth rate as management buyouts (both coefficients are not statistically different from zero in model 5).

FD-GMM estimate is not consistent in the presence of autocorrelation, which is by construction present in the overlapping sample (Jung, 2005; Odularu and Alege, 2019). We use overlapping samples in order to address the issue of the low number of observations, which we believe to be more important compared with the autocorrelation issue which consequently arises. Though the time period we analyze is longer compared with the majority of the other

⁴We use dummy variables for voucher privatization and direct sales without within variation. The third type of privatization is management buyout.

empirical literature, enough data simply does not exist yet to allow for a comfortable application of non-overlapping samples. Table 6 shows results for the first-difference GMM model estimate in the overlapping sample. Our FD-GMM results are in line with the results of the two-way fixed effects model.

The estimated coefficients for the growth of employment rate and initial level of PPP GDP per capita are robust. Models 5 through 8 have robust results for the population growth rate as well. Gross fixed capital formation is significant only in model 3. Only political stability, regulatory quality, voice accountability, and negative contribution of rents from natural resources is significantly different from zero in the vector $Z_{i,t}$.

Taking into account the small sample size (our N is as low as 9 in models 7 and 8), Soto (2009) points out that system GMM has lower bias and higher efficiency compared with both first-difference GMM and fixed effects estimators. On the other hand and similarly to the first-difference GMM, system GMM with the overlapping sample results in inconsistent estimates, but we believe the higher number of observations obtained by using overlapping samples justifies this trade-off.

Table 7 presents the results for the system GMM estimator in the overlapping sample. Once we have taken into account the level and first difference estimate using GMM, results have changed in certain aspects. The initial level of GDP is significant again as well as the growth of the employment rate as in other models. The difference is the fact that the population growth rate is quite significant in all models and the gross fixed capital formation coefficient is robustly different from zero in models 1 through 5. Rents from natural resources have a negative effect as well as general government expenditure to GDP ratio. Out of institutional indicators, only political stability, price liberalization, and small scale privatization have an effect that is statistically different from zero.

In order to avoid the problem with autocorrelation in the overlapping samples, we have estimated the fixed effects model in the non-overlapping sample as well. Usually, with overlapping and non-overlapping samples there is a trade-off between ignoring the auto-correlation problem and working with a small number of observations.

Results for the fixed effect estimate are presented in table 10. The number of observations is small, between 125 in model 1 and 25 in model 8. In all models, the results are consistent

with previous estimates.⁵

Tables 8 and 9 present threshold fixed effect model results using the overlapping sample of data. Table 8 presents results for GDP per capita as threshold variable. The threshold value is exogenously selected at 15,000 PPP dollars in order to separate the results into developed and less developed economies. Unfortunately, the results are mostly driven by the lack of data. Models 1 and 2 with 190-333 observations indicate that our results are robust for more developed countries above the threshold, while under threshold only the initial level of GDP per capita is a significant indicator. Once we account for continuous variables from vector $Z_{i,t}$ (models 3-4), the results are much in line with the previous results. The employment rate and the initial GDP level are important below and above the threshold value, while rents from natural resources have a detrimental effect on GDP growth. Models 5-6 are problematic due to a small number of countries in the models 5-6 (Figure 1g) in general and results are only presented for comparison.

The threshold model with privatization as a threshold variable has three regimes: vouchers, direct sales, and management buyout (Table 9).

Due to the model uncertainty issues related to growth regressions as described in Leamer (1978), we proceed the analysis with the Bayesian model averaging approach (Magnus et al., 2010). Results of the Bayesian model averaging are presented in the tables 11 and 12. Table 11 presents the mean of the estimated coefficients together with their t statistics, while table 12 presents the results for Posterior inclusion probabilities in the two way least square dummy variable model.

We will focus our attention only on models 1 and 7, while other models are presented in order to be comparable to the remaining tables in the paper. We have used population growth rate, gross fixed capital formation, human capital, and initial level of GDP per capita as the core group of variables, while all other variables are treated as part of the auxiliary vector. We have moved growth of employment rate and the ratio of the working-age population into the auxiliary vector in Bayesian averaging in order to estimate posterior inclusion probabilities for these two variables as well. Having in mind that they are important in our model, although

⁵It was not possible to obtain FD-GMM and SYS-GMM estimates due to problems with a small number of observations.

they are not a part of the core model in the pure theoretical way, we find it interesting to estimate their contribution.

The results in table 11 highlight the robustness in the importance of employment rate and initial level of GDP per capita as well as other core variables in our model. Even human capital, as well as gross fixed capital formation and population growth, have quite robust results once we iterate through the entire model space. Out of auxiliary variables, the negative contribution of rents from natural resources and share of government expenditure is present in the data, as well as the negative contribution of large scale privatizations. Other institutional factors with positive effects are political stability and corruption control. The only counter-intuitive result is the negative effect of the rule of law.

When it comes to posterior inclusion probabilities (pip), table 12 presents the results for variables in the auxiliary vector. The employment rate has the highest marginal contribution to the goodness of fit of the regression model across all models. If we focus only on model 1 with all continuous variables, the pip value of 1.00 is estimated for rents from natural resources and share of general government expenditure, while 0.99 is estimated for interest paid on public debt and tourism receipts. High pip (above 0.7) is estimated for openness as well. In the model 7 with all variables that we used in our estimate, results are similar, political stability and employment rate have the highest marginal contribution.

5 Conclusion

This paper examines growth drivers in transition countries. We employ a variety of methods and data sets to estimate growth factors that can explain cross-country variations in the growth rates. Our results indicate that initial level of development, employment rate, political stability and investment rate the most important growth factors.

The biggest contribution of the paper is the fact that changes in employment rates are one of the most important and most robust variables in explaining growth rate variations in transition countries. Usually, basic Solow model assumes that the labor market variations are neutral in the long run, but when it comes to transition countries it is more than obvious that employment to working age population ratio changes were quite significant, especially

in the earlier years of transition.

Although the existing literature includes many empirical investigations of the determinants of growth rates in transition countries, the analysis of ongoing changes is focused mostly on institutions and macroeconomic variables among which the employment rate was not included in any of the papers we've surveyed. While it is true that institutional changes are interconnected with the changes in employment, excluding changes in employment from the model specification leads to biased results, with the institutional indicators often taking the credit for the growth rate changes which were actually driven by the changes in employment rates.

This does not imply that institutional changes didn't play a significant role in determining transition dynamics. This is also confirmed by the significant positive impact of indicators such as political stability on growth in some, but not all of our models. Moreover, while our results point towards the conclusion that the most dominant determinant of GDP changes were the changes in employment, this opens up a new question - what determined these changes in employment? It might indeed be the case that ongoing institutional changes were driving GDP growth rates, but this effect is indirect and comes through the impact of institutions on the labor market and employment.

When it comes to classical growth factors, the impacts of initial level of development, population growth and ratio of investment to GDP are robust and have theoretically expected signs in the majority of estimates. The only exception is human capital which is significant in only a minority of estimates.

Natural resources effect was less robust, but negative effect of the importance of rents from natural resources on the growth rates was present in several results and methodologies. Having in mind the estimated effect of natural resources, exploration of the structure of gross fixed capital formation (real estate vs. vehicles and equipment) might shed additional light on the differences in the performances of transition countries.

The most important limitation of our research is a lack of available data. In most of the estimates we used overlapping sample in order to maximise the number of observations per country while controlling for diminishing returns on physical capital. As a results of our methodological choice, we have ignored autocorrelation issues in most of out estimates in

over-lapping samples.

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Appendix

Table 1: Data availability by country and by data source

COUNTRY	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Albania	+	+	+	+		+	+	+
Armenia	+	+	+	+	+	+	+	+
Azerbaijan	+	+	+	+	+	+	+	+**
Belarus	+	+	+	+		+	+	+**
Bosnia and Herzegovina		+		+	+	+	+	+**
Bulgaria	+	+	+	+	+	+	+	+
Cambodia			+	+			+	+
China			+	+	+		+	+
Croatia	+	+	+	+	+	+	+	+
Czech Republic	+	+	+	+	+	+	+	+
Estonia	+	+	+	+	+	+	+	+
Georgia	+	+	+	+	+	+	+	+**
Germany				+	+		+	+
Hungary	+	+	+	+	+	+	+	+
Kazakhstan	+	+	+	+	+	+	+	+
Kyrgyz Republic	+	+	+	+	+	+	+	+
Lao PDR			+	+			+	+
Latvia	+	+	+	+	+	+	+	+
Lithuania	+	+	+	+	+	+	+	+
Moldova	+	+	+	+	+	+	+	+
Montenegro	+		+	+	+		+	+**
North Macedonia		+		+	+	+	+	+**
Poland	+	+	+	+	+	+	+	+
Romania	+	+	+	+	+	+	+	+
Russia	+	+	+	+	+	+	+	+
Serbia	+		+	+	+		+	+
Slovakia	+	+	+	+	+	+	+	+
Slovenia	+	+	+	+	+	+	+	+
Tajikistan	+	+	+	+		+	+	+
Turkmenistan	+	+	+	+		+	+	+**
Ukraine	+	+	+	+	+	+	+	+
Uzbekistan	+	+	+	+		+	+	+**
Vietnam			+	+	+		+	+

+ indicates data is available regarding the specific country and the specific data source. Data sources 1-9 are as follows: (1) EBRD - Transition indicators, (2) EBRD - Transition reports, (3) World Bank - Worldwide Governance Indicators, (4) World Bank - Open Data, (5) World Bank - The Global Financial Development Database, (6) World Bank - Transition, The First Ten Years, (7) World Bank - Data Catalog, (8) Penn World Table 9.1. * marks those countries for which all the variables from the World Bank Open Data are available except the percentage share of interest payments in GDP. ** marks those countries for which terms of trade data is and human capital data isn't available

Table 2: Descriptive statistics

(1)					
	count	mean	sd	min	max
dlpop5	799	.0073022	.0522305	-.1532992	.1716266
mlgfcf	859	3.119973	.2870145	1.840369	3.917758
mlhc	705	1.027402	.2116568	.3555759	1.322701
dlemp5	736	.004328	.0671688	-.2618872	.2247642
dlrss5	799	.0129248	.0274896	-.0571941	.1112796
mlintpaid	558	.0062834	1.067755	-3.651931	2.3855
mlhbs	594	-3.066352	1.059917	-7.5604	-1.156995
dlmanuf5	576	-.0556438	.2447119	-1.356	1.211427
dlrent5	686	.0270904	.7226548	-2.221039	2.930129
dltourism5	541	.1278441	.5370381	-1.480731	2.260358
mlopen	872	4.45388	.3715312	3.144847	5.23541
mlfindev	486	2.015337	1.54303	-4.386758	4.461826
mltot	937	.019036	.1103428	-.9251207	.3012387
mlFDI	823	.9787631	1.478595	-14.97883	3.613476
mlGexp	530	3.574601	.2871046	2.797992	4.12552
Pvouchers	744	.3333333	.4717216	0	1
Pdirsales	744	.3333333	.4717216	0	1
mlCompetition	833	.6018197	.4150456	0	1.300192
mlGovernance	833	.6216807	.4220288	0	1.300192
mlLprivatisation	833	.8129571	.5059259	0	1.386294
mlPliberalisation	833	1.18006	.4164345	0	1.465568
mlSprivatisation	833	1.081646	.464781	0	1.465568
mlTFsystem	833	1.042601	.5199054	0	1.465568
mlCorruptionControl	224	-1.059227	.8696381	-3.974149	.2780141
mlGovEffectiveness	290	-.948797	1.093102	-5.810862	.0897265
mlPolStability	430	-1.18608	1.181433	-7.120241	.2704797
mlRegQuality	320	-.6707374	1.027562	-3.938938	.500183
mlRuleLaw	238	-.8247187	1.01778	-3.747013	.2543054
mlVoiceAccountability	352	-.9733564	1.368118	-7.425021	.2432228

Table 3: Correlation matrix

	dly5	dlpop5	mlgfcf	mlhc	dlemp5	dlrss5	mintpaid	mlhbs	dlmanuf5	dlrent5	dltourism5	mlopen	mlfindev	mltot	mlFDI	mlGexp
dly5	1.0															
dlpop5	-0.3	1.0														
mlgfcf	-0.0	0.1	1.0													
mlhc	-0.3	0.6	0.4	1.0												
dlemp5	0.6	0.1	0.0	0.0	1.0											
dlrss5	0.5	0.0	-0.2	-0.1	0.0	1.0										
mintpaid	-0.1	0.2	-0.4	-0.3	-0.0	0.3	1.0									
mlhbs	-0.3	-0.1	0.2	0.1	-0.1	-0.2	0.1	1.0								
dlmanuf5	-0.1	0.0	0.1	0.1	-0.1	0.1	0.2	0.1	1.0							
dlrent5	-0.4	0.3	-0.2	0.2	-0.2	-0.2	0.1	0.2	0.2	1.0						
dltourism5	0.0	-0.0	-0.1	-0.0	0.1	-0.2	0.1	-0.0	0.1	0.1	1.0					
mlopen	-0.1	0.1	0.5	0.5	0.1	-0.2	-0.1	0.3	0.1	0.0	0.1	1.0				
mlfindev	-0.2	0.2	-0.2	0.1	0.2	-0.4	-0.2	-0.2	-0.2	0.1	-0.3	-0.1	1.0			
mltot	-0.2	-0.1	0.4	0.2	0.0	-0.3	0.2	0.6	0.3	0.1	0.2	0.7	-0.2	1.0		
mlFDI	-0.1	-0.1	0.1	0.0	0.1	-0.2	-0.2	-0.1	-0.0	0.1	-0.1	0.4	0.2	0.2	1.0	
mlGexp	-0.3	0.3	-0.1	-0.0	-0.2	0.1	0.5	0.1	0.1	0.2	0.1	0.0	-0.1	0.0	-0.2	1.0

Table 4: Fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dlpop5	0.455 (0.473)	-0.425 (0.436)	-0.668 (0.197)	-0.449 (0.622)	1.123* (0.051)	0.836* (0.079)	-0.601 (0.130)	-1.286* (0.053)
mlgfcf	0.095 (0.127)	0.128 (0.119)	0.185*** (0.002)	-0.033 (0.716)	0.081 (0.241)	0.053 (0.292)	-0.203** (0.038)	-0.169 (0.327)
mlhc	0.425 (0.240)	0.608 (0.285)	0.824* (0.052)	1.854** (0.014)	-0.044 (0.942)	-0.002 (0.995)	0.712 (0.103)	1.868 (0.186)
dlemp5	0.446** (0.017)	0.472*** (0.003)	0.459*** (0.004)	0.466** (0.019)	0.605*** (0.002)	0.543*** (0.002)	0.566*** (0.000)	0.616*** (0.003)
dlrss5	1.479 (0.119)	-0.600 (0.491)	-0.013 (0.988)	-2.104 (0.158)	1.801* (0.100)	1.023 (0.211)	0.380 (0.662)	1.679 (0.252)
lylag5	-0.563*** (0.000)	-0.361*** (0.000)	-0.397*** (0.000)	-0.472*** (0.002)	-0.629*** (0.000)	-0.480*** (0.000)	-0.341*** (0.000)	-0.443*** (0.007)
mlintpaid		-0.035 (0.105)						0.012 (0.843)
mlhbs		-0.007 (0.490)						-0.044 (0.184)
dlmanuf5			-0.011 (0.817)					-0.111 (0.386)
dlrent5			-0.016 (0.172)					-0.025** (0.049)
dltourism5			0.040** (0.041)					-0.007 (0.673)
mlopen				-0.126 (0.221)				-0.270 (0.120)
mlfindev				0.041* (0.061)				-0.010 (0.728)
mltot				-0.266 (0.544)				0.379 (0.697)
mlFDI				-0.003 (0.890)				-0.062** (0.013)
mlGexp				-0.068 (0.706)				0.181 (0.602)
Pvouchers					0.000 (.)			0.000 (.)
Pdirsales					0.000 (.)			0.000 (.)
mlCompetition						0.021 (0.827)		-0.256 (0.500)
mlGovernance						0.027 (0.834)		0.100 (0.734)
mlLprivatisation						-0.254* (0.100)		-0.391 (0.432)
mlPliberalisation						0.482*** (0.002)		1.739 (0.133)
mlSprivatisation						0.311** (0.021)		1.284 (0.196)
mlTFsystem						0.086 (0.622)		-0.713 (0.425)
mlCorruptionControl							0.028* (0.094)	0.051 (0.110)
mlGovEffectiveness							0.012 (0.709)	-0.071 (0.248)
mlPolStability							0.119*** (0.000)	0.097** (0.013)
mlRegQuality							0.089** (0.021)	-0.076 (0.652)
mlRuleLaw							-0.046** (0.048)	-0.002 (0.931)
mlVoiceAccountability							-0.115 (0.244)	0.111 (0.610)
_cons	3.888*** (0.001)	2.260*** (0.002)	2.133*** (0.002)	3.182* (0.086)	5.078*** (0.001)	3.069** (0.017)	3.150*** (0.000)	0.505 (0.881)
N	523	313	366	243	419	432	186	104
N_g	24	22	24	17	19	20	9	9
aic	-1035	-969	-1079	-679	-890	-1041	-806	-539

Table 5: Random effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dlpop5	-0.406 (0.537)	-0.598*** (0.006)	-0.993*** (0.005)	-0.791* (0.055)	-0.105 (0.872)	-0.311 (0.540)	-1.161** (0.017)	-1.522*** (0.000)
mlgfcf	0.098* (0.054)	0.180*** (0.009)	0.197*** (0.000)	0.044 (0.623)	0.070 (0.289)	0.025 (0.700)	-0.055 (0.596)	-0.100 (0.402)
mlhc	0.323* (0.093)	-0.132 (0.146)	0.161 (0.254)	0.476 (0.177)	0.375 (0.563)	0.328 (0.325)	0.597* (0.069)	0.858*** (0.003)
dlemp5	0.704*** (0.001)	0.562*** (0.000)	0.523*** (0.001)	0.830*** (0.001)	0.784*** (0.000)	0.587*** (0.000)	0.693*** (0.000)	0.539*** (0.000)
dlrss5	0.847 (0.352)	0.714 (0.161)	-0.158 (0.813)	-0.915 (0.439)	1.143 (0.338)	0.492 (0.385)	-0.184 (0.699)	-0.062 (0.933)
lylag5	-0.218*** (0.000)	-0.048*** (0.005)	-0.166*** (0.000)	-0.061*** (0.007)	-0.246*** (0.000)	-0.149*** (0.001)	-0.300*** (0.000)	-0.354*** (0.000)
mlintpaid		-0.022* (0.092)						0.003 (0.834)
mlhbs		-0.009 (0.254)						-0.045 (0.168)
dlmanuf5			0.008 (0.870)					-0.115 (0.197)
dlrent5			-0.025** (0.026)					-0.034** (0.031)
dltourism5			0.026 (0.177)					0.007 (0.388)
mlopen				-0.061 (0.342)				0.029 (0.494)
mlfindev				0.014 (0.404)				-0.026 (0.203)
mltot				0.006 (0.980)				-0.240 (0.714)
mlFDI				0.034 (0.137)				-0.048** (0.014)
mlGexp				-0.243*** (0.004)				0.029 (0.836)
Pvouchers					-0.087 (0.399)			-0.099 (0.487)
Pdirsales					0.012 (0.890)			-0.121 (0.379)
mlCompetition						-0.160* (0.077)		-0.059 (0.707)
mlGovernance						0.143 (0.163)		0.227 (0.327)
mlLprivatisation						-0.284*** (0.001)		-0.134 (0.564)
mlPliberalisation						0.582*** (0.000)		1.038 (0.191)
mlSprivatisation						0.504*** (0.001)		0.313 (0.712)
mlTFsystem						0.123 (0.549)		-0.622 (0.439)
mlCorruptionControl							-0.001 (0.967)	0.021 (0.330)
mlGovEffectiveness							-0.032 (0.391)	-0.053 (0.219)
mlPolStability							0.063** (0.031)	0.090*** (0.003)
mlRegQuality							-0.018 (0.821)	0.013 (0.860)
mlRuleLaw							-0.004 (0.738)	0.010 (0.481)
mlVoiceAccountability							0.097 (0.465)	-0.036 (0.776)
_cons	1.117*** (0.003)	0.174 (0.447)	0.825*** (0.002)	1.169* (0.099)	1.372** (0.035)	-0.319 (0.558)	2.427*** (0.000)	1.615 (0.542)
N	523	313	366	243	419	432	186	104
N_g	24	22	24	17	19	20	9	9

Table 6: FDGMM estimate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dlpop5	1.047** (0.039)	0.295 (0.542)	0.252 (0.613)	0.419 (0.672)	1.592** (0.017)	1.235** (0.038)	-0.866* (0.063)	-1.286 (0.111)
mlgfcf	-0.020 (0.625)	0.152** (0.045)	0.026 (0.589)	0.159 (0.238)	0.026 (0.623)	0.045 (0.403)	-0.145 (0.198)	-0.169 (0.437)
mlhc	0.496 (0.160)	0.678 (0.184)	0.868* (0.054)	1.385* (0.063)	0.090 (0.850)	0.275 (0.558)	0.259 (0.659)	1.868 (0.288)
dlemp5	0.297*** (0.005)	0.419*** (0.007)	0.391** (0.016)	0.301 (0.144)	0.344*** (0.004)	0.358*** (0.004)	0.475** (0.011)	0.616** (0.010)
dlrss5	0.761 (0.218)	-1.308 (0.198)	-0.737 (0.386)	-2.068 (0.165)	1.356* (0.096)	0.710 (0.443)	0.340 (0.772)	1.679 (0.361)
lylag5	-0.815*** (0.000)	-0.620*** (0.001)	-0.652*** (0.000)	-0.780*** (0.000)	-0.895*** (0.000)	-0.864*** (0.000)	-0.431*** (0.000)	-0.443** (0.020)
mlintpaid		-0.005 (0.813)						0.012 (0.877)
mlhbs		-0.015 (0.181)						-0.044 (0.286)
dlmanuf5			0.051 (0.108)					-0.111 (0.493)
dlrent5			-0.022*** (0.005)					-0.025 (0.103)
dltourism5			-0.005 (0.682)					-0.007 (0.741)
mlopen				-0.174 (0.117)				-0.270 (0.207)
mlfindev				0.018 (0.234)				-0.010 (0.785)
mltot				-0.231 (0.599)				0.379 (0.760)
mlFDI				-0.001 (0.983)				-0.062** (0.035)
mlGexp				-0.163 (0.304)				0.181 (0.682)
Pvouchers					0.000 (.)			0.000 (.)
Pdirsales					0.000 (.)			0.000 (.)
mlCompetition						0.130 (0.181)		-0.256 (0.595)
mlGovernance						-0.056 (0.491)		0.100 (0.790)
mlPrivatisation						-0.050 (0.733)		-0.391 (0.535)
mlPliberalisation						-0.060 (0.525)		1.739 (0.224)
mlSprivatisation						0.353*** (0.005)		1.284 (0.300)
mlTFsystem						0.126 (0.302)		-0.713 (0.528)
mlCorruptionControl							0.038 (0.142)	0.051 (0.195)
mlGovEffectiveness							-0.038 (0.423)	-0.071 (0.357)
mlPolStability							0.124*** (0.002)	0.097** (0.034)
mlRegQuality							0.155** (0.016)	-0.076 (0.723)
mlRuleLaw							-0.011 (0.572)	-0.002 (0.946)
mlVoiceAccountability							-0.217** (0.018)	0.111 (0.689)
N	499	288	342	226	400	412	177	95
N_g	24	22	23	17	19	20	9	9
sargan	795	304	331	319	559	393	270	112

Table 7: SYS-GMM estimate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dlpop5	-0.969** (0.030)	-0.581** (0.017)	-0.616* (0.093)	-0.785* (0.090)	-1.092** (0.026)	-1.059** (0.018)	-1.136* (0.056)	-1.522*** (0.002)
mlgfcf	0.195*** (0.002)	0.180** (0.016)	0.194*** (0.002)	0.039 (0.667)	0.122** (0.012)	0.007 (0.914)	-0.060 (0.593)	-0.100 (0.502)
mlhc	-0.075 (0.322)	-0.137 (0.169)	-0.060 (0.625)	0.517 (0.204)	0.132 (0.646)	0.256 (0.265)	0.638 (0.107)	0.858** (0.037)
dlemp5	0.924*** (0.001)	0.579*** (0.001)	0.643*** (0.001)	0.815*** (0.005)	0.941*** (0.003)	0.693*** (0.002)	0.672*** (0.000)	0.539*** (0.000)
dlrss5	0.271 (0.805)	0.705 (0.239)	-0.555 (0.400)	-0.991 (0.468)	1.080 (0.403)	0.628 (0.423)	-0.292 (0.624)	-0.063 (0.945)
lylag5	-0.095*** (0.002)	-0.047** (0.044)	-0.101*** (0.007)	-0.069* (0.058)	-0.072* (0.082)	-0.048 (0.119)	-0.323*** (0.001)	-0.354*** (0.007)
mlintpaid		-0.022 (0.114)						0.003 (0.864)
mlhbs		-0.008 (0.287)						-0.045 (0.281)
dlmanuf5			0.020 (0.629)					-0.115 (0.310)
dlrent5			-0.030*** (0.008)					-0.034 (0.108)
dltourism5			-0.001 (0.951)					0.007 (0.489)
mlopen				-0.064 (0.363)				0.029 (0.582)
mlfindev				0.015 (0.389)				-0.026 (0.316)
mltot				0.008 (0.975)				-0.240 (0.767)
mlFDI				0.036 (0.161)				-0.048* (0.072)
mlGexp				-0.236** (0.016)				0.029 (0.867)
Pvouchers					0.004 (0.924)			-0.099 (0.576)
Pdirsales					0.031 (0.419)			-0.121 (0.482)
mlCompetition						-0.237*** (0.000)		-0.059 (0.760)
mlGovernance						0.046 (0.576)		0.227 (0.434)
mlPrivatisation						-0.193 (0.142)		-0.134 (0.641)
mlPliberalisation						0.664*** (0.000)		1.037 (0.304)
mlSprivatisation						0.386** (0.022)		0.312 (0.765)
mlTFsystem						0.129 (0.381)		-0.623 (0.534)
mlCorruptionControl							0.001 (0.971)	0.021 (0.437)
mlGovEffectiveness							-0.030 (0.464)	-0.053 (0.332)
mlPolStability							0.066* (0.065)	0.090** (0.036)
mlRegQuality							-0.020 (0.813)	0.013 (0.886)
mlRuleLaw							-0.004 (0.819)	0.010 (0.570)
mlVoiceAccountability							0.091 (0.536)	-0.036 (0.817)
_cons	0.208 (0.435)	0.000 (.)	0.000 (.)	1.193 (0.128)	-0.077 (0.827)	0.000 (.)	2.775*** (0.000)	0.000 (.)
N	523	313	366	243	419	432	186	104
N_g	24	22	24	17	19	20	9	9
sargan	3052	1167	1069	1079	3294	1879	883	116

Table 8: Threshold fixed effect model (GDP PPP as threshold variable)

	(1)	(2)	(3)	(4)	(5)	(6)
	$\hat{\mu}$ threshold	$\hat{\mu}$ threshold	$\hat{\mu}$ threshold	$\hat{\mu}$ threshold	$\hat{\mu}$ threshold	$\hat{\mu}$ threshold
dlpop5	0.349 (0.695)	1.825*** (0.003)	-3.464 (0.245)	-0.774 (0.370)	-6.553*** (0.000)	-0.985 (0.236)
mlgfcf	-0.036 (0.673)	0.027 (0.811)	0.126 (0.759)	-0.009 (0.958)	-0.733*** (0.000)	-0.131 (0.361)
mlhc	0.119 (0.762)	1.482*** (0.000)	5.284 (0.221)	3.197 (0.109)	7.657*** (0.000)	5.887*** (0.003)
dlemp5	0.322 (0.143)	0.651*** (0.000)	0.781* (0.050)	0.705*** (0.000)	0.564*** (0.000)	0.427* (0.075)
dlrss5	1.110 (0.157)	-0.684 (0.192)	-3.378 (0.541)	-0.536 (0.586)	13.411*** (0.000)	-1.196 (0.681)
lylag5	-0.657*** (0.000)	-0.450*** (0.000)	-0.753* (0.070)	-0.210** (0.026)	0.000 (.)	-0.372** (0.042)
mlintpaid			0.077 (0.442)	-0.060 (0.187)	0.212*** (0.000)	0.028 (0.656)
mlhbs			-0.148 (0.374)	-0.026 (0.265)	0.134*** (0.000)	0.065 (0.185)
dlmanuf5			-0.204 (0.518)	-0.034 (0.751)	-0.153*** (0.000)	0.029 (0.749)
dlrent5			-0.026 (0.380)	-0.038** (0.013)	0.016*** (0.000)	-0.026 (0.168)
dltourism5			0.016 (0.165)	0.023 (0.275)	-0.055*** (0.000)	-0.051* (0.052)
mlopen			0.186 (0.456)	0.341* (0.093)	-0.164*** (0.000)	0.501 (0.230)
mlfindev			-0.162 (0.251)	0.029 (0.323)	-0.273*** (0.000)	-0.078** (0.033)
mltot			-0.277 (0.881)	-0.871 (0.176)	-0.614*** (0.000)	2.648** (0.049)
mlFDI			-0.164 (0.306)	-0.095** (0.031)	-0.247*** (0.000)	-0.051 (0.234)
mlGexp			-0.156 (0.725)	0.442 (0.214)	-0.451*** (0.000)	0.417 (0.184)
Pvouchers					0.000 (.)	0.000 (.)
Pdirsales					0.000 (.)	0.000 (.)
mlCompetition					0.606*** (0.000)	-0.912** (0.025)
mlGovernance					-0.791*** (0.000)	0.757 (0.107)
mlLprivatisation					-0.913*** (0.000)	-1.119** (0.034)
mlPliberalisation					1.878*** (0.000)	-1.077 (0.601)
mlSprivatisation					3.467*** (0.000)	-14.210 (0.503)
mlTFsystem					0.000 (.)	0.000 (.)
mlCorruptionControl					0.000 (.)	0.006 (0.910)
mlGovEffectiveness					0.000 (.)	0.299** (0.021)
mlPolStability					0.000 (.)	0.185*** (0.004)
mlRegQuality					0.000 (.)	-0.224* (0.097)
mlRuleLaw					0.000 (.)	-0.005 (0.862)
mlVoiceAccountability					0.000 (.)	-0.325 (0.408)
_cons	5.081*** (0.000)	2.599*** (0.000)	0.687 (0.927)	-4.548 (0.259)	-8.989*** (0.000)	17.319 (0.537)
N	333	190	38	91	27	77
N_g	24	15	9	13	7	9
aic	-687	-759	-254	-438	.	-440

Table 9: Threshold fixed effect model (Privatisation model as threshold variable)

	(1)	(2)	(3)	(4)	(5)	(6)
	Buyout	Dir.Sale	Vouchers	Buyout	Dir.Sale	Vouchers
dlpop5	-0.242 (0.825)	0.833 (0.340)	0.271*** (0.003)	-2.064** (0.023)	-0.193 (0.891)	-10.234 (.)
mlgfcf	0.499 (0.518)	0.208 (0.102)	-1.652*** (0.000)	-1.383*** (0.010)	0.243 (0.372)	0.428 (.)
mlhc	2.882 (0.425)	-0.134 (0.891)	14.298*** (0.000)	0.671 (0.385)	1.940 (0.583)	-30.899 (.)
dlemp5	0.148 (0.556)	0.601*** (0.001)	1.174*** (0.000)	1.316** (0.034)	0.937** (0.013)	0.352 (.)
dlrss5	-3.914* (0.063)	-0.759 (0.553)	-1.588*** (0.000)	34.651*** (0.000)	1.724 (0.436)	28.194 (.)
mlintpaid	0.137* (0.062)	0.019 (0.694)	0.100*** (0.000)	-1.375** (0.012)	0.009 (0.930)	1.408 (.)
mlhbs	0.020 (0.785)	0.029 (0.227)	0.031*** (0.000)	0.312** (0.018)	0.068 (0.267)	0.228 (.)
dlmanuf5	-0.218 (0.345)	-0.167 (0.150)	-0.577*** (0.000)	0.853*** (0.003)	-0.212 (0.288)	0.695 (.)
dlrent5	-0.013 (0.773)	-0.051*** (0.001)	-0.041*** (0.000)	-0.080** (0.038)	-0.015 (0.529)	-0.016 (.)
dltourism5	0.145 (0.273)	0.040* (0.079)	-0.102*** (0.000)	-0.308** (0.013)	0.044 (0.359)	-0.401 (.)
mlopen	0.059 (0.963)	0.141 (0.359)	-1.196*** (0.000)	-1.254** (0.050)	0.250 (0.789)	1.902 (.)
mlfindev	-0.064 (0.771)	-0.065 (0.102)	0.096*** (0.000)	0.269** (0.010)	-0.070 (0.460)	0.797 (.)
mltot	-0.680 (0.747)	-0.088 (0.843)	-2.664*** (0.000)	8.849*** (0.005)	-1.479 (0.374)	4.958 (.)
mlFDI	0.005 (0.973)	-0.080*** (0.002)	0.066*** (0.000)	-0.247** (0.014)	-0.126* (0.081)	-0.304 (.)
mlGexp	0.485 (0.331)	-0.500*** (0.002)	-0.973*** (0.000)	0.274 (0.127)	-0.267 (0.622)	0.000 (.)
lylag5	-0.598 (0.498)	-0.450*** (0.003)	-0.508*** (0.000)	0.000 (.)	-0.290 (0.286)	0.000 (.)
Pvouchers				0.000 (.)	0.000 (.)	0.000 (.)
Pdirsales				0.000 (.)	0.000 (.)	0.000 (.)
mlCompetition				-0.673** (0.047)	0.073 (0.893)	0.000 (.)
mlGovernance				-1.894** (0.014)	-0.134 (0.786)	0.000 (.)
mlLprivatisation				-2.745** (0.028)	0.621 (0.396)	0.000 (.)
mlPliberalisation				14.682** (0.029)	1.007 (0.489)	0.000 (.)
mlSprivatisation				-4.845** (0.016)	-0.184 (0.940)	0.000 (.)
mlTFsystem				3.702*** (0.001)	0.155 (0.973)	0.000 (.)
mlCorruptionControl				0.000 (.)	0.010 (0.910)	0.000 (.)
mlGovEffectiveness				0.000 (.)	-0.056 (0.672)	0.000 (.)
mlPolStability				0.000 (.)	0.028 (0.561)	0.000 (.)
mlRegQuality				0.000 (.)	-0.022 (0.974)	0.000 (.)
mlRuleLaw				0.000 (.)	-0.072 (0.816)	0.000 (.)
mlVoiceAccountability				0.000 (.)	0.400 (0.665)	0.000 (.)
_cons	-1.073 (0.935)	5.335*** (0.007)	1.839*** (0.000)	-4.045 (0.121)	-1.859 (0.909)	24.893 (.)
N	36	71	22	23	65	16
N_g	4	7	3	2	5	2
aic	-258	-387	.	.	-388	.

Table 10: Fixed effects in the non-overlapping sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dlpop5	0.104 (0.852)	-1.177 (0.149)	-1.090* (0.069)	-0.466 (0.676)	0.644 (0.296)	-0.127 (0.743)	-1.725 (0.115)	-0.077*** (0.000)
mlgfcf	0.121** (0.030)	0.169 (0.166)	0.218*** (0.004)	0.088 (0.432)	0.101 (0.107)	0.054 (0.333)	0.252 (0.212)	0.248*** (0.000)
mlhc	0.468 (0.202)	0.644 (0.462)	0.795 (0.132)	2.415** (0.020)	0.049 (0.941)	0.268 (0.516)	3.238 (0.105)	-1.207*** (0.000)
dlemp5	0.660*** (0.002)	0.615*** (0.003)	0.594*** (0.001)	0.604** (0.021)	0.744*** (0.000)	0.561*** (0.002)	0.812*** (0.001)	1.303*** (0.000)
dlr55	0.229 (0.830)	-0.975 (0.410)	-0.435 (0.529)	-3.786* (0.091)	0.193 (0.881)	-0.487 (0.607)	-2.603* (0.061)	2.824*** (0.000)
lylag5	-0.375*** (0.006)	-0.334** (0.017)	-0.364*** (0.000)	-0.521** (0.040)	-0.448*** (0.002)	-0.295*** (0.003)	-0.750** (0.011)	0.000 (.)
mlintpaid		-0.016 (0.561)						-0.509*** (0.000)
mlhbs		-0.002 (0.824)						-0.119*** (0.000)
dlmanuf5			-0.057 (0.404)					0.389*** (0.000)
dlrent5			-0.012 (0.456)					-0.100*** (0.000)
dltourism5			0.048* (0.099)					-0.256*** (0.000)
mlopen				-0.166 (0.396)				-0.080*** (0.000)
mlfindev				0.019 (0.474)				-0.000*** (0.000)
mltot				-0.232 (0.637)				4.177*** (0.000)
mlFDI				-0.004 (0.867)				0.195*** (0.000)
mlGexp				-0.064 (0.773)				0.205*** (0.000)
Pvouchers					0.000 (.)			0.000 (.)
Pdirsales					0.000 (.)			0.000 (.)
mlCompetition						-0.043 (0.726)		-1.801*** (0.000)
mlGovernance						0.254 (0.129)		0.000 (.)
mlLprivatisation						-0.220 (0.166)		0.000 (.)
mlPliberalisation						0.552** (0.011)		0.000 (.)
mlSprivatisation						0.295** (0.040)		0.000 (.)
mlTFsystem						-0.047 (0.762)		0.000 (.)
mlCorruptionControl							0.016 (0.723)	0.000 (.)
mlGovEffectiveness							0.022 (0.746)	0.000 (.)
mlPolStability							0.001 (0.979)	0.000 (.)
mlRegQuality							-0.127 (0.561)	0.000 (.)
mlRuleLaw							-0.009 (0.850)	0.000 (.)
mlVoiceAccountability							0.264 (0.473)	0.000 (.)
_cons	2.417* (0.059)	1.907** (0.025)	1.903** (0.016)	2.819 (0.328)	3.581** (0.040)	1.251 (0.197)	2.638** (0.035)	1.490*** (0.000)
N	115	71	82	61	92	96	43	25
N_g	24	21	22	17	19	20	9	9
aic	-261	-198	-257	-150	-216	-251	-163	.

Table 11: Bayesian averaging least square dummy variable model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dlpop5	-0.910** (-2.26)	-0.474 (-1.54)	-0.573** (-2.43)	-0.255 (-0.80)	0.882*** (4.01)	-0.589** (-2.58)	-1.858*** (-4.80)
mlgfcf	0.151** (2.22)	0.113*** (3.04)	0.188*** (7.56)	-0.051 (-1.36)	0.042* (1.69)	-0.186*** (-3.79)	-0.207*** (-3.11)
mlhc	-0.353 (-0.63)	0.501** (2.21)	0.805*** (4.12)	1.944*** (4.76)	-0.009 (-0.04)	0.950*** (3.07)	1.118** (2.46)
lylag5	-0.368*** (-4.59)	-0.348*** (-8.35)	-0.401*** (-11.85)	-0.468*** (-8.57)	-0.474*** (-15.21)	-0.343*** (-9.04)	-0.486*** (-5.96)
dlemp5	0.570*** (8.90)	0.477*** (8.01)	0.463*** (7.96)	0.457*** (4.94)	0.537*** (7.63)	0.569*** (10.11)	0.556*** (7.31)
dlrss5	-0.017 (-0.06)	-0.079 (-0.33)	-0.001 (-0.01)	-1.450 (-1.56)	0.920* (1.77)	0.058 (0.29)	0.023 (0.07)
mlintpaid	-0.076*** (-3.81)	-0.041*** (-3.70)					-0.008 (-0.36)
mlhbs	-0.010 (-0.60)	-0.000 (-0.19)					-0.002 (-0.21)
dlmanuf5	-0.024 (-0.52)		-0.001 (-0.13)				-0.190*** (-3.00)
dlrent5	-0.040*** (-3.94)		-0.006 (-0.70)				-0.004 (-0.43)
dltourism5	0.052*** (3.67)		0.039*** (4.25)				-0.000 (-0.07)
mlopen	0.130 (1.36)			-0.077 (-1.12)			0.003 (0.11)
mlfindev	0.005 (0.43)			0.044*** (4.58)			-0.000 (-0.04)
mltot	-0.020 (-0.19)			-0.036 (-0.31)			0.003 (0.03)
mlFDI	-0.008 (-0.54)			-0.000 (-0.03)			-0.041** (-2.31)
mlGexp	-0.417*** (-4.23)			-0.003 (-0.13)			-0.014 (-0.23)
mlCompetition					0.001 (0.12)		-0.008 (-0.18)
mlGovernance					0.006 (0.21)		0.014 (0.18)
mlPrivatisation					-0.206*** (-3.44)		-0.003 (-0.08)
mlPliberalisation					0.543*** (5.95)		0.047 (0.24)
mlSprivatisation					0.335*** (5.18)		-0.001 (-0.01)
mlTFsystem					0.025 (0.50)		-0.335 (-0.61)
mlCorruptionControl						0.024** (2.37)	0.010 (0.73)
mlGovEffectiveness						0.002 (0.20)	-0.013 (-0.49)
mlPolStability						0.119*** (8.59)	0.094*** (5.88)
mlRegQuality						0.041 (0.92)	-0.001 (-0.05)
mlRuleLaw						-0.046*** (-2.91)	-0.001 (-0.10)
mlVoiceAccountability						-0.049 (-0.70)	0.001 (0.04)
_cons	4.169*** (2.92)	2.473*** (6.15)	2.290*** (6.13)	2.333*** (3.12)	3.371*** (7.88)	3.042*** (7.07)	4.772*** (4.62)
N	129	313	366	243	432	186	104

Table 12: Posterior inclusion probabilities in the least square dummy variable model

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5
	pip	pip	pip	pip	pip	pip	pip
dlemp5	1.00	1.00	1.00	1.00	1.00	1.00	1.00
dlrss5	0.09	0.14	0.05	0.80	0.84	0.13	0.07
mlintpaid	0.99	0.99					0.17
mlhbs	0.34	0.08					0.08
dlmanuf5	0.29		0.06				0.94
dlrent5	1.00		0.40				0.20
dltourism5	0.99		1.00				0.05
mlopen	0.74			0.64			0.06
mlfindev	0.22			1.00			0.05
mltot	0.11			0.14			0.05
mlFDI	0.31			0.06			0.90
mlGexp	1.00			0.08			0.10
mlCompetition					0.06		0.07
mlGovernance					0.08		0.07
mlPrivatisation					0.99		0.05
mlPliberalisation					1.00		0.09
mlSprivatisation					1.00		0.04
mlTFsystem					0.25		0.33
mlCorruptionControl						0.93	0.42
mlGovEffectiveness						0.10	0.24
mlPolStability						1.00	1.00
mlRegQuality						0.55	0.06
mlRuleLaw						0.97	0.06
mlVoiceAccountability						0.41	0.06
<i>N</i>	129	313	366	243	432	186	104

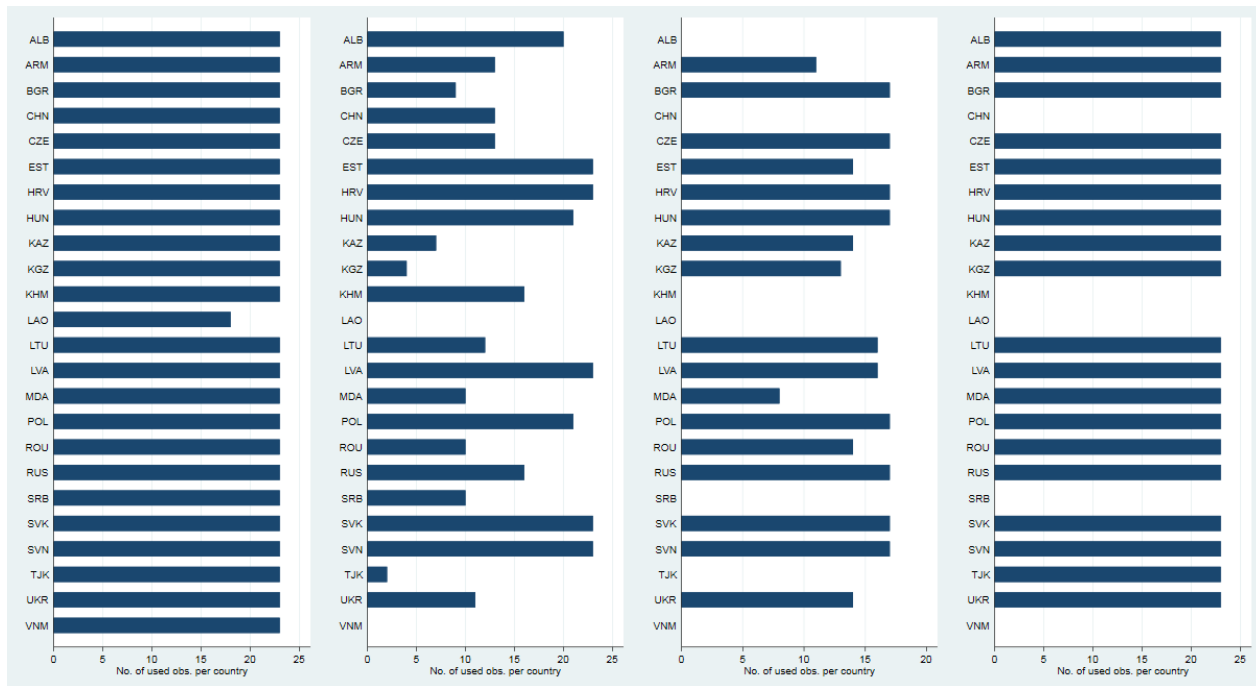
Figure 1: Number of observations per country in the analysis

(a) Model 1 & 3

(b) Model 2

(c) Model 4

(d) Model 5



(e) Model 6

(f) Model 7

(g) Model 8

