

# Employment rate and economic growth: The case of transition countries\*<sup>1</sup>

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## Abstract

*This paper investigates the effects of the employment rate on economic growth during the transition process. We start with the mainstream growth econometrics approach that controls for convergence and, in order to control for heterogeneity of countries in our sample, we control our estimates for transition-specific indicators such as initial conditions (pre-transition history), governance quality, privatisation methods as well as various indicators of institutional development. We use a wide range of model specifications using fixed effects as well as Bayesian averaging to address the problem of model uncertainty in 24 countries during the 1995-2019 period. Contrary to the neoclassical growth model assumptions, we find that the employment rate is one of the most important growth factors even after three decades. Results also indicate that convergence (initial level of development) robustly explains a part of cross-country growth rate differentials, while the effects of the initial conditions (pre-transition history) are robust, but fade out after the first decade. We do not find evidence that physical capital and population growth explain the growth in our sample.*

**Key words:** transition, employment rate, convergence, Bayesian averaging, growth factors, initial conditions

**JEL classification:** P30, O43, E60

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## 1. Introduction

Most growth economists assume mean-reverting properties of employment rate (ratio of employment to working age population) and ignore it in the analysis of determinants of economic growth in the long run (Durlauf et al., 2005). On the other hand, empirical trends as well as economic theories – the hysteresis hypothesis (Blanchard and Summers, 1987) and the structuralist hypothesis (Phelps, 1995) quite clearly indicate that economic shocks can have long-run and extremely persistent effects on the share of the population that is employed and actively contributes to the generation of added value.

When it comes to transition literature, there is a consensus about the importance of institutional development and labor market policies (Roland, 2002; Turley and Luke, 2011). Nevertheless, empirical estimates mostly overlook the effects of persistent changes in the structure of the working age population and initial level of development.

The research objective of this paper is to estimate the importance of employment rate (demographic changes) and convergence for economic growth in 24 transition countries<sup>5</sup> during 1995-2019 using growth econometrics approach as defined by Durlauf et al. (2005).

Following the view of the fundamental importance of labor market in the transition process (Turley and Luke, 2011) and empirical evidence on the persistence of employment rates and demographic changes (ageing and migrations) during the last 30 years (see Figure 1c), and contrary to classical assumptions of the Solow (1957) model, we estimate the effect of changes in employment rate and inverted age dependency ratio (ratio of working age population to population) on the long-run economic growth.<sup>6</sup>

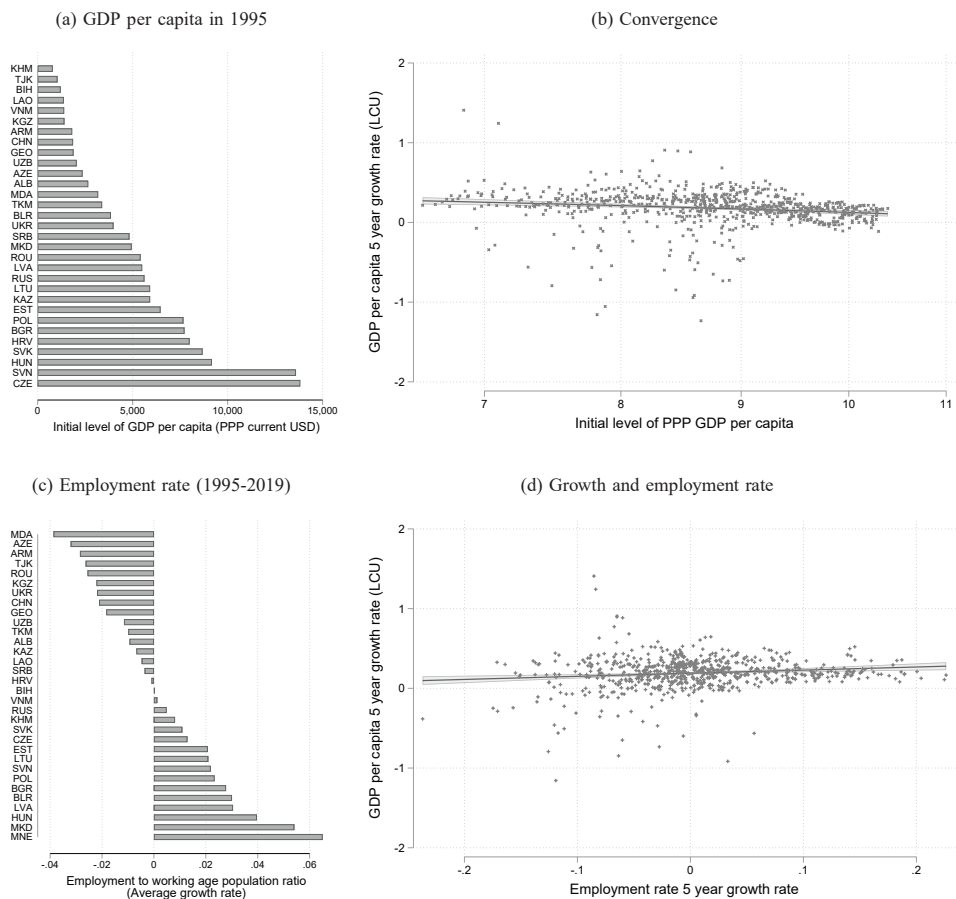
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<sup>5</sup> We define transition countries as former centrally planned or non-market-based economies that have started the process of moving towards a market economy during or before the analysed period. This definition is used because there is no agreement on when transition ends, as indicated by various sources (Allsopp and Kierzkowski, 1997; Brown, 1999; Cieřlik and Wciřlik, 2020; Ganic, 2020; Lavigne, 2000). Additionally, it should be noted that different definitions may only consider a portion of the sample as post-transition: Albania (ALB), Armenia (ARM), Bulgaria (GBR), China (CHN), Czechia (CZE), Estonia (EST), Croatia (HRV), Hungary (HUN), Kazakhstan (KAZ), Kyrgyz Rep. (KGZ), Cambodia (KHM), Lao PDR (LAO), Lithuania (LTU), Latvia (LAT), Moldova (MDA), Poland (POL), Romania (ROU), Russian Fed. (RUS), Serbia (SRB), Slovakia (SVK), Slovenia (SVN), Tajikistan (TJK), Ukraine (UKR) and Vietnam (VNM). See Table A.4 for the list of countries and availability of data.

<sup>6</sup> For example, China has only recently liberalised its *one-child policy*, while the EU *Lisbon strategy* focused on increasing the employment rate to 65%, and recently the target has been increased to 70%.

Transition countries were very heterogeneous in terms of GDP per capita at the beginning of the transition (Figure 1a). Therefore, it is reasonable to assume that a significant part of the growth rate differential between, for example, China as the fastest-growing country in our sample and Czechia as the most developed one at the beginning of the period can be attributed to the low starting point of China instead of only to divergent institutional development and/or shock vs. gradualism debate. Figure 1b for example shows that there is a negative correlation between the initial level of GDP per capita and GDP growth rate in subsequent periods.

Figure 1: Growth, employment and initial level of development



Source: Authors' elaboration

Up until now, a number of papers have addressed the determinants of economic growth in transition (see Turley and Luke (2011) for a survey), but empirical investigations of transition countries were limited in several dimensions. The 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. Primarily due to data limitations, it was impossible to control the empirical estimates for neoclassical growth factors (Solow, 1956, 1957). As a result, most of the estimates were not controlled for the initial level of development (Falcetti et al., 2002; Turley and Luke, 2011). The dichotomy between the shock therapy view and the more gradual institutional approach to transition has directed most of the research toward the relative importance of history, initial conditions and quality of institutions (Dewatripont and Roland, 1992; Litwack and Qian, 1998; de Melo et al., 2001)<sup>7</sup> while neglecting factors indicated by the neoclassical growth theory. Due to the widespread inefficient allocation of resources, in most of the early studies, it was assumed that growth in transition countries was not so much related to the changes in the standard growth determinants but had more to do with the improved allocation of resources (Turley and Luke, 2011).

Today, more than three decades since the start of the process, there is enough empirical evidence to estimate growth models for the group of transition countries. For example, the seminal paper by Mankiw et al. (1992) used 25 years of data spanning from 1960 to 1985 in order to empirically test the validity of the long-run growth model (Solow, 1957).

In order to close these methodological gaps in the growth literature, we devise an econometric strategy that encompasses growth factors as indicated by the mainstream growth econometrics literature (Mankiw et al., 1992; Durlauf et al., 2005) together with transition-specific factors of growth. Having in mind that it is very difficult to estimate the impact of convergence (for example, decreasing returns to capital) on the growth rate differentials unless we combine countries at different levels of development, we use data for Central and Eastern European (CEE) countries together with former Soviet Union (FSU) countries, China and Vietnam. Such a combination yields a very heterogeneous data sample in terms of initial conditions (economic history prior to transition), institutional development during the transition (shock vs. gradual structural reforms), macroeconomic policies as well as governance quality (accountability, rule of law, etc.).

This obviously raises the question of the consequences of including countries with such vast differences inside a single model. While this gives us the opportunity to test for the impact of the initial level of development on growth (convergence),

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<sup>7</sup> For example, how different were transition countries relative to their market economy counterparts, as well as how long were the countries under the planned economy system.

lumping largely different countries together risks that the differences in, for example, changes in the institutional settings in these countries will bias our results. Failure to control for these differences results in the omitted variable bias, therefore making it very important to (as much as it is possible and in line with the available data) control for them. In order to address the problem of heterogeneity of our sample we augment the standard growth econometrics approach by controlling our estimates for Worldwide Governance Indicators (The World Bank, 2020b) and transition indicators from EBRD (2020b). On top of that, we build on the previous body of literature on the relevance of initial conditions prior to the start of transition (de Melo et al., 2001) and introduce a methodological adjustment in order to investigate the effects of time-invariant pre-transition conditions through time. We estimate a battery of econometric models to identify the most important drivers of growth.

Following the traditional growth econometrics approach, we estimate a dynamic two-way fixed effects panel model (FE) in order to present our results in the most intuitive way, as well as to additionally control for the heterogeneity between these countries. In addition, we use a Bayesian model averaging (BMA) to address the problem of model uncertainty and estimate posterior inclusion probabilities for each regressor.

Thus, the paper formulates three research hypothesis:

*H1 – The employment rate and dependency ratio are important and robust determinants of economic growth in transition countries even after controlling for all other growth factors.*

*H2 – The effect of time-invariant initial (pre-transition) conditions on the GDP growth rate fades away after the first decade of the transition process.*

*H3 – Initial level of development explains part of the growth rate differentials between developed and less-developed countries during the transition process even after controlling for transition-specific factors of growth.*

Our results indicate that the ratio of employment to the working-age population and the initial level of development (convergence) are the most robust variables in explaining cross-country differences in GDP growth rates in transition countries and that the effects of initial pre-transition conditions fade away after a decade of the transition process.

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

## 2. Survey of literature and conceptual framework

Although the list of variables used to explain economic growth is wide in the growth as well as in transition literature, the impact of the labor market via the employment to working-age population ratio and age dependency ratio, which includes both the functioning of the labor market and demographic changes in the population structure, has been neglected. The literature is mainly based on the analysis of the efficiency and productivity of the labor market in the early and later stages of transition, the efficiency of state policies, reactions of the labor market to changes in production, the decrease in real wages, the increase in both the rate and the duration of unemployment, the restructuring of employment from the state to the private sector etc. (Cámara, 1997; Svejnar, 1999; Boeri and Terrell, 2002; Rutkowski, 2006).

We focus on demographic and labor market indicators to highlight the impact of persistent labor market shocks and demographic changes on the divergence between GDP per capita and GDP per worker. 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 ratio. Figure 1c shows the average growth rate of the employment to the working-age population ratio, and it is rather evident that trends in employment rate diverge across transition countries and that they are positively correlated with GDP per capita growth rate (Figure 1d).

Having that in mind, and following approach taken by Marattin and Salotti (2011); Maestas et al. (2023) we decompose GDP per capita into changes in GDP per worker, employment rate, and a quasi-inverted age dependency ratio:

$$\frac{GDP}{population} = \frac{GDP}{employment} \times \frac{employment}{work.age.pop.} \times \frac{work.age.pop.}{population} \quad (1)$$

where the right side of the equation collapses into the GDP per capita after all the fractions on the right side are cancelled. By decomposing GDP per capita into changes in GDP per worker, employment rate, and quasi-inverted age dependency ratio, we separate and empirically estimate the impact of different variables related to the labor market on economic growth. We aim to include the long-term impact of the labor market on economic growth. Accordingly, we formulate the first hypothesis:

*H1 – The employment rate and dependency ratio are important and robust determinants of economic growth in transition countries even after controlling for all other growth factors.*

From the beginning of the transition process research, a lot of attention was paid to initial conditions such as GDP per capita, the share of industry and agriculture in total GDP i.e. the structure of the economy, war conflicts, etc., which were generally considered to reflect an important determinant of the transition success. Different results in the literature can be found regarding the strength and duration of the influence of initial conditions on transition outcomes. One of the most influential papers on the role of initial conditions is the paper written by de Melo et al. (2001). The authors use principal component analysis to compress 11 initial conditions variables in two components which explain 70% of the variation in these 11 variables. We use their initial conditions variables in our own empirical analysis to control for the impact of time-invariant pre-transition initial conditions on the growth rates of transition countries.

In the early stages of transition, research emphasized the differences in success between the countries of Europe and the former Soviet Union due to different pre-transitional political arrangements such as the duration of the communist regime and the structure of the economy (Åslund et al., 1996; Selowsky and Martin, 1997). Although reforms and liberalization played an important role in the transition, especially in the early phase, liberalization can also be seen as an endogenous process strongly linked to initial conditions (Krueger and Ciolko, 1998). Depending on the particular initial conditions present in a specific country, it was more profitable for some countries to start the process of liberalization and reformation due to the favourable ratio of costs to benefits. On the other hand, it is also possible to assume that the role of the initial conditions is indirect, so instead of impacting growth directly, it influences growth through the policies of structural reforms, stabilization and liberalization (de Melo et al., 1996; Wolf, 1999; Fischer and Sahay, 2000).

Although not completely denying at least the partial importance of the initial conditions, some authors claim that initial conditions are less important than other determinants of growth and that they were not decisive for a successful transition process – or that only in combination with other factors and political decisions they resulted in vastly different outcomes in different countries (Havrylyshyn et al., 1998, 1999; Wolf, 1999). Since there are numerous papers which have included the initial conditions as a crucial determinant of a successful transition, we will single out only some of them – Brunetti et al. (1997); Hernández-Catá (1997); Sachs and Woo (1997); Heybey and Murrell (1999); Moers (1999); Abed and Davoodi (2000); Popov (2000); de Melo et al. (2001); Falcetti et al. (2002); Miller and Tenev (2007). The puzzle arises when we put the impact of initial conditions on a timeline – trying to separate their role in the initial transition shock and in all those processes that transition countries follow decades later. Numerous authors explain that the initial conditions have a limited influence, which is adverse only in the initial years of the transition, and which later loses its significance in explaining economic



performance (Berg et al., 1999; Havrylyshyn et al., 1999; Falcetti et al., 2006; Godoy and Stiglitz, 2006; Popov, 2007). Based on the existing research papers, we present the second hypothesis of this paper:

*H2 – The effect of time-invariant initial (pre-transition) conditions on the GDP growth rate fades away after the first decade of the transition process.*

After taking into account the negative but diminishing impact of initial conditions on economic growth, other factors become more important in explaining cross-country growth differences. In line with the assumptions of the neoclassical growth theory, we can expect a gradual convergence of transition countries, especially when the initial conditions specific to each country cease to play a major role in explaining subsequent economic growth.

Outside the growth literature, we find confirmation for the hypothesis of convergence between transition countries in a small number of papers. Kočenda (2001) finds evidence for the conditional convergence of similar transition countries when it comes to economic growth (approximated by industrial production). There are other papers that include the discussion of the convergence of countries or groups of countries and thus use the initial levels of development in empirical analysis (Campos and Coricelli, 2002; Polanec, 2004; Pipień and Roszkowska, 2019). However, the influence of the initial level of development is still much more widely covered in the growth econometrics literature (Mankiw et al., 1992; Barro and Sala-i Martin, 1997; Johnson and Papageorgiou, 2020). Thus we formulate our third hypothesis:

*H3 – Initial level of development explains part of the growth rate differentials between developed and less-developed countries during the transition process even after controlling for transition-specific factors of growth.*

### **3. Methodology**

In line with Caselli et al. (1996) and Hoeffler (2002), the starting point of our analysis is the human capital augmented version of the Solow growth model. This version of the Solow model predicts that the output per capita growth rate is an increasing function of investments in physical and human capital and the state of technology from the previous period, and a decreasing function of population growth, technology growth, depreciation rate and initial level of income per capita at the beginning of the period (the convergence effect).

Following Durlauf et al. (2005) we estimate equation 2 and use a wide list of additional variables identified in the literature to capture additional growth factors that can either proxy for the state of technology (often used as a measure of the



level of total factor productivity) and/or explain the accumulation of other growth factors (for example, institutional factors).<sup>8</sup> We use the FE estimator to estimate the following equation:

$$\Delta y_{i,t} = \alpha_i + \mu_t + \beta_1 y_{i,t=0} + \psi X_{i,t} + \pi Z_{i,t} + \theta_1 C_i + \theta_2 D_i + \epsilon_{i,t} \quad (2)$$

where  $y_{i,t}$  is GDP per capita, parameters  $\alpha_i$  and  $\mu_t$  are country and time fixed effects,  $y_{i,t=0}$  is the initial level of GDP per capita (a proxy for convergence),  $X_{i,t}$  is the vector of growth factors implied by Caselli et al. (1996) and Hoeffler (2002) and  $Z_{i,t}$  represents growth factors that aren't included in the human capital augmented Solow model (1956; 1957). The variable  $C_i$  represents a time-invariant principal component of the initial conditions for each transition country as defined by de Melo et al. (2001) and  $D_i$  represent a time-invariant dummy variable for the implemented privatisation model. Small letters denote logs of variables  $x_t = \log(X_t)$ . Following Bai (2009) we use interactive effects terms of initial conditions  $C_i$  and time fixed effects, and privatisation models  $D_i$  and time fixed effects in order to estimate the persistence of the effect of initial conditions and chosen privatisation models on the long-run growth.<sup>9</sup>

The choice of econometric methods in this paper is based on estimating fixed effects using the overlapping sample to increase the number of observations and on robustness control of fixed effects using Bayesian model averaging.

Keeping in mind the significant differences in the initial levels of development of transition countries (Figure 1a), we control our estimates for the initial level of GDP per capita in order to control for convergence. To avoid our panel from collapsing into a cross-section dataset, we divide our data into overlapping five-year periods and regress the five-year average growth rate on the initial level of GDP per capita in each five-year period. Therefore, the 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.<sup>10</sup> The difference between the five-year overlapping sample and the

<sup>8</sup> All models are estimated using estimators that use variance-covariance matrix (VCE) in order to correct estimated errors for misspecification to obtain results robust to heteroskedasticity of the errors. Clustering on the panel variable produces a consistent VCE estimator when the disturbances are not identically distributed over the panels or there is serial correlation in errors.

<sup>9</sup> Bai (2009) proposed large T and large N panel data models with observable multiple interactive effects.

<sup>10</sup> Due to data limitations and a small number of countries in the sample, most of the results are presented for the overlapping sample.

non-overlapping sample is in the large number of observations. A five-year average (1995-2019 period) results in 4 periods for the non-overlapping sample and 23 periods for the overlapping sample. Therefore, the former converts the dataset into a panel with less than 100 observations, and the latter into a panel in which the number of observations is preserved at over 400 observations for the same model. Both overlapping samples (Islam, 1995; Caselli et al., 1996; Durlauf et al., 2005) and non-overlapping samples (Loayza and DEC, 1994; Égert, 2012; Woo and Kumar, 2015) are used in the growth econometrics panel data analysis in the literature. We proceed with the former to maximise the number of observations, but we control our estimates with the latter approach to control for autocorrelation in a more robust way. Non-overlapping sample is very wide ( $N > T$ ) and by definitions controls for autocorrelation.

In order to check for the robustness of our model, we estimate a wide range of FE models with alternative combinations of variables in vector  $X_{i,t}$  and interaction terms for initial conditions and privatisation models. To address the issue of model uncertainty, we employ the Bayesian averaging technique. Following (Fernandez et al., 2001) we use birth-death MCMC sampler with uniform model size prior and Zellner's  $g$  prior mechanism that posterior model probability (PMP) asymptotically behaves like Bayesian information criterion ( $g$  equal to the number of observations) or the risk inflation criterion ( $g$  equal to the number of regressors squared).<sup>11</sup> In total, we average over 2.2 billion estimated regressions in the model with 23 variables, 22 time and 19 cross-section fixed effects<sup>12</sup>. We estimate a model without and with uncertainty in fixed effects. Keeping in mind that transition countries had quite different initial conditions and that there were significant differences in the privatisation models used in transition countries, we also investigate the effects of these initial reforms on the long-term growth trajectory.

In the FE estimate, we use two dummy variables (Pvoucher and Pdirsales) for three general types of privatisation models (voucher privatisation, direct sales, and management buyout). Both of the dummy variables are added into the model as interaction terms with time fixed effects to investigate the long-run consequences of privatisation model choices. A similar estimation strategy is employed for the initial conditions. We use de Melo et al. (2001) initial conditions dataset in order to estimate the principal component that is used as an interaction term with fixed effects in the model. The goal is to explore the strength that initial conditions had on the growth patterns of transition countries.

Following Mankiw et al. (1992) we use the share of gross fixed capital formation in GDP  $mlgfcf$ , population growth rate  $dlpop$  and human capital  $mlhc$  in the vector  $X_{i,t}$ .

<sup>11</sup> See Zeugner and Feldkircher (2015) for more information on BMA estimation and model selection.

<sup>12</sup> FE models were estimated in *Stata*, while the Bayesian averaging model was estimated in *R*.

Furthermore, in order to account for population ageing and quite persistent labor market disturbances during the transition process, we enlarge the vector  $X_{i,t}$  with employment to working-age population ratio  $dlemp$  and working-age population to total population ratio  $dlrss$ .

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 proxied by EBRD's transition indicators and the World Bank's Worldwide Governance Indicators. We augment the growth factors with interest paid on public debt  $mlintpaid$  following Reinhart and Rogoff (2010) and investigate the role that the surge in foreign direct investment  $mFDI$  had on economic growth during the transition process. The estimates are controlled for openness  $mlopen$  and financial development  $mlfindev$  following Levine and Renelt (1992).

In order to investigate the long-term effects of the quite strong initial real exchange rate appreciation in the majority of transition countries (Dollar, 1992; Égert et al., 2004), we control our estimates for the appreciation of absolute real exchange rate and gross wages<sup>13</sup>, as well as for the changes in terms of trade  $mltot$  in order to capture the change in the quality of exports and product complexity (Égert et al., 2004). 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 of (de)industrialization and/or *resource curse* on growth trajectories of transition countries (Venables, 2016). We also use the share of government expenditure in GDP to proxy for the level of involvement of the public sector in the economy.

## 4. Empirical data and analysis

In this section we present data and the empirical analysis that we carried out.

### 4.1. Data

Table A.1<sup>14</sup> lists all variables used in the empirical analysis, along with the description and the source for the variable. We use The World Bank (2020a) database to obtain the majority of data series. The human capital index  $mlhc$  and terms of trade  $mltot$  (price level of exports divided by the price level of imports) were obtained from Penn World Table 9.1 (Feenstra et al., 2015). The share of government expenditure in GDP  $Gexp$  was obtained from EBRD (2020b). We use

<sup>13</sup> We regress the price level and gross wages on PPP GDP per capita level and use the residuals as a proxy for the real exchange rate and unit labor cost appreciation respectively.

<sup>14</sup> Tables A.1-A.6 are available in online Appendix: <https://www.efri.uniri.hr/upload/ZBORNIAK%201%202023/Appendix.pdf>.

two different measures of institutional indicators, transition indicators published by EBRD (2020a) and Worldwide Governance Indicators (WGI) published by The World Bank (2020b). Both transition indicators and WGI consist of 6 different indicators, and the details are shown in Table A.1. A higher value of indicators denotes a better institutional score for both the WGI and transition indicators. Data on methods of privatisation of medium-sized and large enterprises are from the study published by The World Bank (2002) titled *Transition, The First Ten Years*. This study lists three different privatisation methods, direct sales, vouchers, and management-employee buyout. For a particular country, each method was labelled as *Primary*, *Secondary* or *n.a.* based on which of the three methods was a primary strategy for privatisation, which method was a secondary privatisation strategy, and which method was not used in a particular country.

We use de Melo et al. (2001) initial conditions data in order to capture the impact differing initial conditions, mostly different magnitudes of initial distortions, had on subsequent growth rates. For example, it makes sense to assume that countries with larger initial distortions such as higher repressed inflation, more years under central planning and larger trade dependence on other centrally planned economies before the fall of the Iron Curtain will go through a slower and more painful adjustment process, thereby resulting in lower growth rates. This is precisely the result de Melo et al. obtained back in 2001. Since we now have a much longer dataset than they had, we can also trace the impact of these initial conditions over time and see if their importance fades as the transition progresses. Since we use a total of 10 initial conditions variables to construct the principal components, the list of variables used along with variable definitions is provided in Table A.5. More information can also be found in the original paper by de Melo et al. (2001). Principal components and loadings related to each of the initial conditions variables are shown in Table A.6.

The result of combining all variables into one dataset is an unbalanced panel due to the large number of missing values that are differently distributed among the variables. To reduce the problem of the unavailability of certain variables for different countries, we form nine models with different variables. Table A.2 shows the descriptive statistics and availability of the variables used in the analysis. The largest sample is used in the first model, with a total of 431 observations, and the smallest sample in the ninth model with 286 observations. The correlation Table A.3 shows low correlation between the observed variables, with the exception being the correlation between *mlopen* (openness) and *mltot* (changes in terms of trade). The frequency of all the data is annual, and the data cover the 1995-2019 period for 24 countries.<sup>15</sup> The complete list of countries in our sample and the

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<sup>15</sup> The dataset starts from 1989 and 32 countries, but due to data unavailability, we lose 8 cross-sections and the first six years in estimated models.

availability of all of the aforementioned variables for each particular country is shown in Table A.4.

## **4.2. Empirical analysis**

We present the results in four different parts. First, we start with the results of the FE model for the overlapping and the non-overlapping sample in Tables 1 and 2. Second, we focus on the graphical analysis of estimated coefficients for interaction terms between time-fixed effects and initial conditions and interaction terms for privatisation models in Figure 2. After that, we focus on model uncertainty and BMA results presented in Figures 3 and Table 3. At the end of the result section we discuss the results of GMM estimators.

Table 1: Fixed effects estimates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dipop5	-0.304 (0.547)	0.086 (0.865)	-0.014 (0.966)	0.185 (0.607)	-0.075 (0.874)	-1.193* (0.068)	0.208 (0.664)	-1.393 (0.178)	0.254 (0.632)
mlgfcf	0.045 (0.372)	0.018 (0.709)	-0.016 (0.698)	-0.020 (0.691)	0.030 (0.716)	-0.026 (0.832)	-0.075 (0.177)	-0.009 (0.924)	-0.028 (0.342)
mlhc	-0.195 (0.620)	0.003 (0.994)	0.489 (0.103)	0.302 (0.400)	0.476 (0.245)	0.292 (0.547)	0.898*** (0.001)	-2.646** (0.031)	0.581 (0.277)
dlemp5	0.501*** (0.000)	0.539*** (0.000)	0.372*** (0.002)	0.339** (0.012)	0.293** (0.040)	0.334* (0.068)	0.371*** (0.002)	0.088 (0.619)	0.370*** (0.006)
dlrss5	0.377 (0.668)	-0.405 (0.613)	-1.110* (0.069)	-0.844 (0.207)	-0.664 (0.516)	-0.771 (0.619)	-0.932 (0.119)	6.223*** (0.001)	-1.280 (0.219)
ylag5	-0.432*** (0.000)	-0.464*** (0.000)	-0.538*** (0.000)	-0.463*** (0.000)	-0.642*** (0.000)	-0.383*** (0.000)	-0.483*** (0.000)	-0.240* (0.095)	-0.646*** (0.000)
mlopen		-0.047 (0.536)	0.022 (0.593)	0.099 (0.106)	-0.028 (0.574)	0.029 (0.664)	0.148*** (0.004)	0.030 (0.822)	-0.003 (0.973)
mltot		0.581 (0.118)	0.384 (0.254)	0.234 (0.468)	0.256 (0.453)	0.249 (0.583)	0.309 (0.288)	0.874* (0.062)	0.341 (0.323)
mlrent		-0.010 (0.558)	-0.025 (0.144)	-0.025 (0.156)	-0.056 (0.169)	-0.015 (0.337)	-0.017 (0.239)	-0.159*** (0.002)	-0.022 (0.422)
mlFDI		0.029 (0.202)	0.026* (0.082)	0.014 (0.276)	0.032* (0.081)	0.013 (0.476)	0.015 (0.296)	-0.008 (0.609)	0.038 (0.145)
mCorruptionControl			-0.090 (0.348)	-0.052 (0.641)	-0.090 (0.421)	0.126 (0.294)	-0.045 (0.657)	0.154*** (0.009)	-0.037 (0.760)
mGovEffectiveness			-0.014 (0.850)	-0.053 (0.548)	-0.011 (0.884)	-0.108 (0.423)	-0.036 (0.620)	0.518* (0.050)	0.137 (0.199)
mPolStability			0.130*** (0.001)	0.086** (0.034)	0.151*** (0.001)	0.119** (0.022)	0.073** (0.030)	0.168* (0.094)	0.135** (0.014)
mRegQuality			0.180*** (0.010)	0.135** (0.034)	0.279*** (0.004)	0.133 (0.292)	0.146** (0.037)	-0.090 (0.452)	0.098 (0.228)
mRuleLaw			-0.008 (0.933)	0.038 (0.725)	-0.067 (0.590)	-0.106 (0.644)	0.041 (0.663)	-0.541*** (0.000)	-0.161 (0.274)
mVoiceAccountability			-0.150** (0.011)	-0.139** (0.022)	-0.162*** (0.001)	-0.118 (0.183)	-0.134*** (0.001)	0.159 (0.115)	-0.115 (0.113)
mlCompetition				0.014 (0.829)					
mlGovernance				0.245 (0.211)					
mlLprivatisation				-0.140 (0.259)					
mlPliberalisation				0.321* (0.054)					
mlSprivatisation				0.262 (0.116)					
mlTFsystem				-0.037 (0.805)					
mlmanuf					0.110 (0.346)				
mlhbs						-0.002 (0.881)			
mlintpaid							-0.048*** (0.009)		
mlfindev								-0.030 (0.277)	
mlGexp									-0.145* (0.099)
_cons	3.890*** (0.000)	4.113*** (0.000)	3.888*** (0.000)	2.279* (0.059)	4.886*** (0.000)	3.230*** (0.004)	2.805*** (0.000)	5.831*** (0.009)	5.258*** (0.000)
N	431	431	419	412	367	312	360	201	286
N_g	19	19	19	19	18	19	19	11	19
aic	-1260	-1293	-1427	-1442	-1314	-1181	-1414	-1136	-1012

Notes: *p*-values for estimated coefficients are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at 10%, 5% and 1% levels respectively. Prefixes *dl*, *ml* and *m* indicate five year log difference, log moving average and moving average of the variable respectively. Variables are: five year GDP growth rate *y5*, population *pop5*, gross fixed capital formation *gfcf*, human capital *hc*, ratio of employment to working age population *emp*, working age to total population ratio *rss*, initial level of GDP *ylag5*, openness *open*, terms of trade *tot*, ratio of rents to GDP *rent*, foreign direct investment *FDI*, share of manufacturing in GDP *manuf*, price level deviation from the fitted HBS trend *hbs*, interest paid on public debt *inpaid*, financial development *findev*, share of government expenditure in GDP *Gexp*, and institutional indicators: Control of Corruption *mCorruptionControl*, Government Effectiveness *mGovEffectiveness*, Political Stability and Absence of Violence/Terrorism *mStability*, Regulatory Quality *mRegQuality*, Rule of Law *mRuleLow*, Voice and Accountability *mVoiceAccountability*, competition policy *mlCompetition*, governance and enterprise restructuring *mlGovernance*, large scale privatisation *mlLPrivatisation*, price liberalisation *mlPliberalisation*, small scale privatisation *mlSprivatisation* and trade and foreign exchange system *mlTFsystem*. Institutional indicators variables with the prefix *m* represent six WGI indicators, and those with the prefix *ml* represent six transitional indicators. A higher value of an indicator denotes a better institutional score. This holds for all institutional indicators. Coefficients for the interaction terms are omitted from the table and presented in Figure 2.

Source: Authors' calculation

Table 2: Fixed effects estimates in the not-overlapping sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5	dly5
dipop5	-0.548 (0.315)	-0.294 (0.588)	-0.421 (0.316)	-0.441 (0.476)	-0.629 (0.249)	-0.705 (0.469)	-0.443 (0.532)	-0.893*** (0.000)	-1.018 (0.160)
mlgfcf	0.034 (0.467)	0.022 (0.638)	-0.007 (0.892)	0.016 (0.837)	0.092 (0.425)	-0.069 (0.474)	-0.179*** (0.004)	0.234*** (0.000)	-0.071 (0.183)
mlhc	-0.088 (0.834)	0.239 (0.481)	0.368 (0.320)	0.413 (0.351)	0.313 (0.530)	0.706 (0.244)	0.827** (0.010)	3.339*** (0.000)	0.303 (0.413)
dlemp5	0.444*** (0.001)	0.557*** (0.000)	0.413** (0.012)	0.317* (0.059)	0.380 (0.121)	0.572** (0.018)	0.413** (0.040)	1.283*** (0.000)	0.530*** (0.000)
dlrss5	0.430 (0.576)	-0.168 (0.796)	-0.364 (0.567)	-0.018 (0.985)	0.240 (0.815)	-1.275 (0.462)	-1.219 (0.348)	-0.213*** (0.000)	-0.832 (0.255)
lylag5	-0.332*** (0.001)	-0.370*** (0.001)	-0.452*** (0.000)	-0.374*** (0.003)	-0.555*** (0.000)	-0.442** (0.039)	-0.448*** (0.008)	-0.387*** (0.000)	-0.360*** (0.013)
mlopen		-0.147* (0.081)	-0.068 (0.286)	0.109 (0.121)	-0.096 (0.262)	-0.047 (0.685)	0.112 (0.385)	-0.092*** (0.000)	-0.017 (0.782)
mltot		0.168 (0.569)	0.027 (0.938)	-0.220 (0.597)	-0.184 (0.703)	0.029 (0.946)	0.085 (0.812)	-0.782*** (0.000)	-0.383 (0.182)
mlrent		-0.013 (0.346)	-0.020 (0.207)	-0.008 (0.657)	-0.065 (0.275)	-0.014 (0.389)	-0.025 (0.146)	-0.190*** (0.000)	-0.055*** (0.006)
mlFDI		0.031 (0.157)	0.028 (0.122)	0.016 (0.381)	0.023 (0.398)	0.018 (0.363)	0.018 (0.270)	0.081*** (0.000)	0.012 (0.618)
mCorruptionControl			-0.018 (0.868)	0.070 (0.535)	-0.071 (0.663)	0.126 (0.234)	-0.013 (0.919)	0.402*** (0.000)	0.052 (0.659)
mGovEffectiveness			-0.070 (0.500)	-0.104 (0.380)	-0.036 (0.738)	-0.316*** (0.001)	-0.115 (0.396)	0.642*** (0.000)	0.191 (0.172)
mPolStability			0.099** (0.041)	0.037 (0.252)	0.126* (0.076)	0.032 (0.413)	0.048 (0.104)	0.237*** (0.000)	0.090 (0.232)
mRegQuality			0.081 (0.489)	0.040 (0.648)	0.127 (0.382)	0.062 (0.636)	0.148 (0.184)	-0.723*** (0.000)	0.201 (0.150)
mRuleLaw			0.052 (0.634)	0.105 (0.399)	0.012 (0.928)	0.235 (0.229)	0.053 (0.635)	-1.033*** (0.000)	-0.261 (0.120)
mVoiceAccountability			-0.098 (0.120)	-0.118 (0.122)	-0.068 (0.321)	-0.218 (0.194)	-0.188* (0.058)	0.642*** (0.000)	-0.076 (0.420)
mlCompetition				0.024 (0.894)					
mlGovernance				0.655*** (0.001)					
mlPrivatisation				-0.248 (0.194)					
mlPliberalisation				0.073 (0.843)					
mlSprivatisation				0.539** (0.040)					
mlTFsystem				-0.176 (0.197)					
mlmanuf					0.142 (0.427)				
mlhbs						0.000 (0.988)			
mlintpaid							-0.050* (0.054)		
mlfindev								0.010*** (0.000)	
mlGexp									0.189 (0.284)
_cons	3.148*** (0.003)	3.766*** (0.002)	4.040*** (0.000)	1.452 (0.300)	4.644*** (0.000)	3.774** (0.014)	3.358*** (0.001)	-0.441*** (0.000)	2.419 (0.111)
N	89	89	89	88	79	75	77	45	70
N_g	19	19	19	19	18	19	19	11	19
aic	-272	-281	-299	-342	-268	-295	-305	.	-264

Notes: *p*-values for estimated coefficients are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at 10%, 5% and 1% levels respectively. Variable abbreviations are explained in the notes of Table 1.

Source: Authors' calculation

Tables 1 and 2 present the estimates of 9 different models.<sup>16</sup> In Model 1, we use only classical growth factors, employment rate and inverted dependency rate as regressors. In Model 2, we add openness, terms of trade, the share of rents from natural resources and the share of FDI in GDP to the list of regressors. In Model 3, the Worldwide Governance Indicators are added to the list of regressors, and finally, in Model 4, we add EBRD's transition progress indicators.

<sup>16</sup> The results that include dummy variables for EU and EMU membership are available upon request. Both variables show statistically insignificant coefficients when added to the estimated equations.



Model 1 is nested within Model 2, Model 2 within Model 3 and Model 3 within Model 4. Expansion of the list of regressors between models 1 and 4 did not result in a significant loss in the sample size of the estimated models. The inclusion of the share of manufacturing and government expenditures in GDP, real exchange rate appreciation, interest paid on public debt and financial development significantly reduces the number of observations. Therefore, we add these variables to the list of regressors one by one in models 5 through 9. Contrary to the theoretical expectations of the growth model (Solow, 1957) and the results obtained in seminal empirical papers (Mankiw et al., 1992), we do not find evidence that investment rate or population growth played a significant role in the transition.

Results of the FE estimates in the Table 1 indicate that the ratio of employment to working-age population, together with the initial level of development and political stability, explain economic growth in transition countries in the most robust way. Coefficients for the employment rate and political stability are positive and significant, and coefficients for the initial level of GDP are negative and significant, indicating that the effects of political stability, labor market reforms and convergence dominate other determinants of long-run economic growth. The results for two institutional indicators, Regulatory Quality and Voice and Accountability, are slightly less robust. In models 4 through 9, the estimated coefficients for price liberalisation, interest paid on public debt and share of government expenditures in GDP are statistically different from zero and have the theoretically expected sign. The FE estimates for the non-overlapping sample (Table 2) confirm the results for the employment rate and the initial level of GDP, while the results for institutional indicators are less robust due to a smaller number of observations.

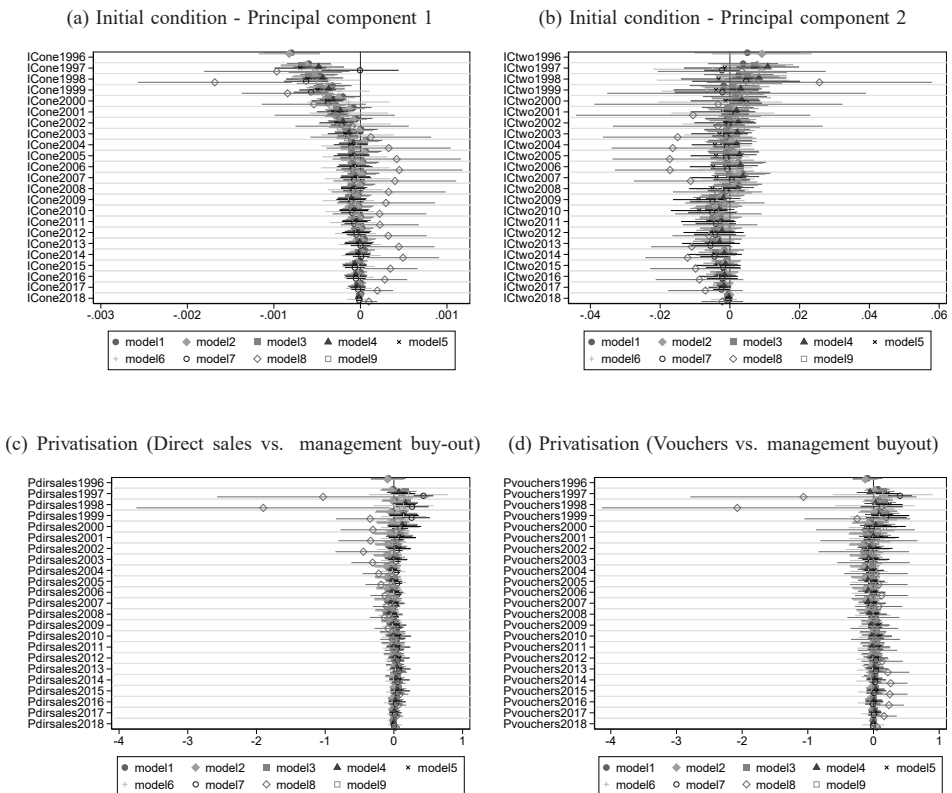
Vectors of estimated coefficients for the interaction terms between initial conditions and time dummies  $\theta_1$  and privatisation models and time dummies  $\theta_2$  are presented in Figure 2. Figures show point estimates and confidence intervals through time for each estimated FE model presented in Table 1.

Figure 2a presents estimated coefficients for the interaction term between fixed effects and the first principal component. The results imply that initial conditions had a statistically significant impact on the growth rate until the end of the first decade of transition. After 2000 the effect of interaction terms is not statistically different from zero. Interaction terms for the second principal component in Figure 2b are not different from zero throughout the entire period. When it comes to interaction terms for privatisation model dummies in Figures 2c and 2d, we do not find evidence that the choice of either the direct sales model or the voucher privatisation model had a statistically different long-run impact on growth vis á vis the management buyout privatisation model.

Keeping in mind the problems related to the model uncertainty in growth econometrics, we proceed with the Bayesian averaging approach to estimation.

We use a birth-death MCMC sampler to estimate 2.2 billion models with different combinations of covariates in order to endogenously choose proper regressors and simultaneously estimate their average estimated sign as well as statistical significance. Table 3 presents estimated posterior inclusion (PIP) probabilities of used regressors, averaged coefficients over all models (Post mean), posterior standard deviation (Post SD) and posterior probability of a positive coefficient (Cond.Pos.Sign).

Figure 2: Impact of initial conditions and inflation through time



Source: Authors' calculation

We have forced all estimates to include country and time fixed dummies, and therefore all fixed effects have PIP at 1 (maximum level).<sup>17</sup> Employment rate, initial level of development, small-scale privatisation and Voice and Accountability indicator are the variables with maximum levels of PIP in the model. A posterior inclusion probability higher than .9 is also estimated for human capital, Political Stability, Control of Corruption, Rule of Law, and price liberalisation indicators. The initial level of development has zero posterior probability of having a positive estimated sign, while the employment rate, small-scale privatisation, human capital and price liberalisation have maximal probabilities of having a positive estimated sign. Probabilities of estimated signs for the Rule of Law and Voice and Accountability are counter-intuitive in our estimates.

Figure 3 presents the data from Table 3 together with the cumulative probability of estimated models (horizontal axis). Results indicate that the models with the biggest weights are based on the employment rate, human capital, the initial level of development (convergence) and a set of institutional indicators such as small-scale privatisation, Political Stability, and Control of Corruption in the huge majority of the best models. Gross fixed capital formation and population growth are excluded from the best models, as well as auxiliary growth regressors such as openness, terms of trade, the share of rents from natural resources and FDI. In addition, there are also institutional transition progress indicators that do not seem to have a statistically significant effect on long-run growth. These are competition policy, Regulatory Quality, large-scale privatisation and Government Effectiveness.

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<sup>17</sup> The results for BMA estimates with uncertainty in fixed effects are available upon request.

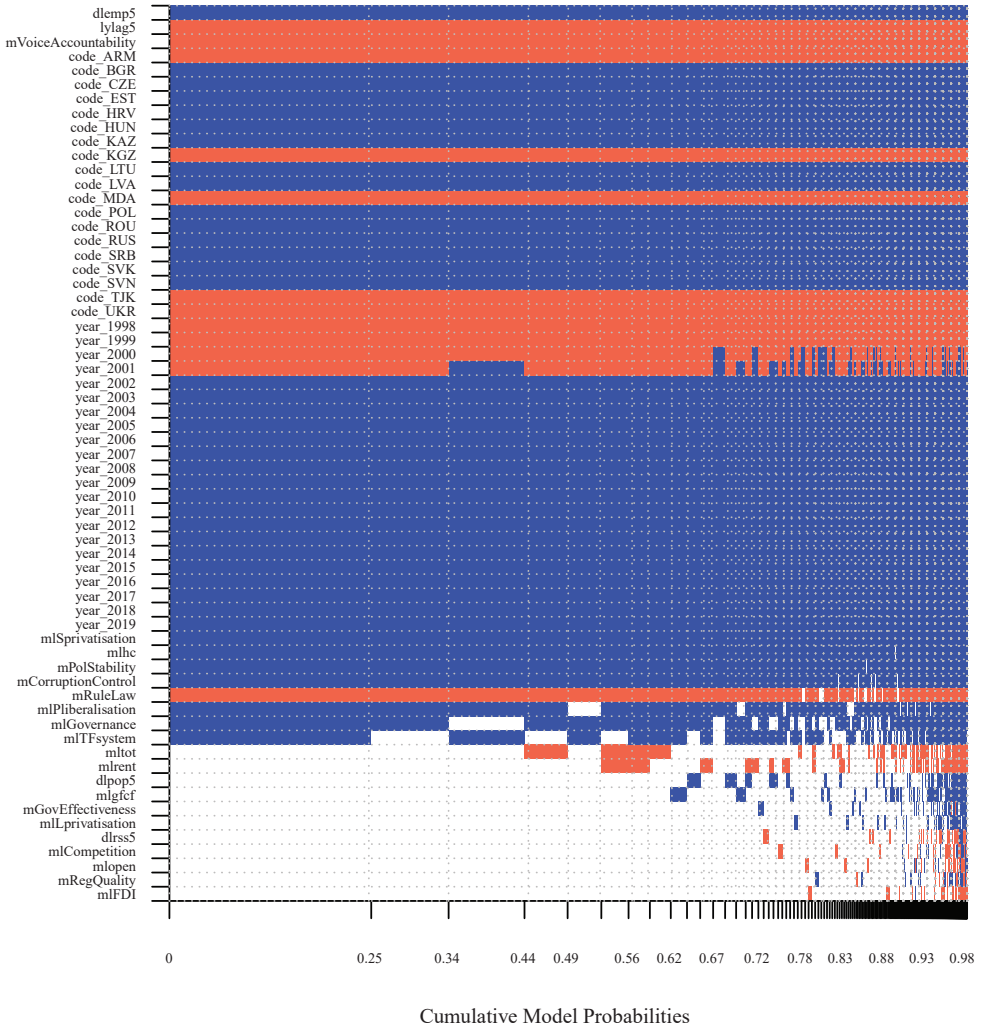
Table 3: Bayesian averaging least squares dummy variables model

	PIP	Post Mean	Post SD	Cond.Pos.Sign	Idx
lylag5	1	-0.456	0.029	0	6
code_ARM	1	-0.137	0.031	0.00000	23
code_BGR	1	0.179	0.036	1	24
code_CZE	1	0.278	0.083	1	25
code_EST	1	0.170	0.074	1.000	26
code_HRV	1	0.152	0.054	1	27
code_HUN	1	0.216	0.065	1	28
code_KAZ	1	0.167	0.050	1	29
code_KGZ	1	-0.617	0.034	0	30
code_LTU	1	0.335	0.049	1	31
code_LVA	1	0.308	0.049	1	32
code_MDA	1	-0.082	0.029	0	33
code_POL	1	0.227	0.066	1	34
code_ROU	1	0.237	0.032	1	35
code_RUS	1	0.132	0.059	0.998	36
code_SRB	1	0.136	0.032	1	37
code_SVK	1	0.189	0.074	1	38
code_SVN	1	0.320	0.068	1	39
code_TJK	1	-0.685	0.055	0	40
code_UKR	1	-0.077	0.032	0.001	41
year_1998	1	-0.036	0.024	0.00000	42
year_1999	1	-0.045	0.028	0.001	43
year_2000	1	-0.025	0.031	0.081	44
year_2001	1	-0.002	0.034	0.251	45
year_2002	1	0.034	0.036	0.997	46
year_2003	1	0.070	0.038	1.000	47
year_2004	1	0.111	0.040	1	48
year_2005	1	0.139	0.042	1	49
year_2006	1	0.171	0.045	1	50
year_2007	1	0.207	0.048	1	51
year_2008	1	0.214	0.050	1	52
year_2009	1	0.129	0.053	1	53
year_2010	1	0.127	0.056	1	54
year_2011	1	0.147	0.059	1	55
year_2012	1	0.143	0.062	1	56
year_2013	1	0.170	0.065	1	57
year_2014	1	0.220	0.065	1	58
year_2015	1	0.226	0.067	1	59
year_2016	1	0.243	0.069	1	60
year_2017	1	0.282	0.070	1	61
year_2018	1	0.320	0.072	1	62
year_2019	1	0.348	0.073	1	63
mVoiceAccountability	1.000	-0.154	0.023	0	16
dlemp5	1.000	0.316	0.062	1	4
mlSprivatisation	0.999	0.354	0.078	1	21
mlhc	0.996	0.803	0.191	1	3
mPolStability	0.988	0.066	0.017	1	13
mCorruptionControl	0.979	0.167	0.046	1	11
mRuleLaw	0.940	-0.139	0.051	0.00003	15
mlPliberalisation	0.906	0.305	0.135	1	20
mlGovernance	0.787	0.186	0.116	1	18
mlTFsystem	0.686	0.121	0.095	1	22
mltot	0.215	-0.057	0.121	0.00000	8
mlrent	0.158	-0.003	0.009	0.0004	9
dlpop5	0.085	0.033	0.125	0.999	1
mlgfcf	0.084	0.003	0.013	1.000	2
mGovEffectiveness	0.028	0.001	0.010	0.955	12
mlLprivatisation	0.026	0.001	0.012	0.999	19
dlrss5	0.021	-0.004	0.054	0.121	5
mlCompetition	0.021	-0.0003	0.006	0.237	17
mlopen	0.020	-0.0001	0.004	0.281	7
mRegQuality	0.019	0.0001	0.005	0.751	14
mlFDI	0.017	-0.00004	0.001	0.101	10

Notes:  $p$ -values for estimated coefficients are in parentheses. \*, \*\* and \*\*\* indicate statistical significance at 10%, 5% and 1% levels respectively. Variable abbreviations are explained in the notes of Table 1.

Source: Authors' calculation

Figure 3: Cumulative model probabilities and estimated coefficient signs



Note: The blue colour represents the positive, and the red colour the negative estimated coefficients. The white colour indicates that the variable in not included in the model.

Source: Authors' calculation

In the end, the robustness of the results for nine models estimated by FE was additionally checked with the first difference GMM and system GMM estimators. We use first difference GMM and system GMM to control for endogeneity issues and feedback effects in our estimates. These results confirm FE results in terms of the expected signs as well as the statistical significance.<sup>18</sup>

## 5. Results and discussion

Our results confirm the prevailing consensus about the importance of institutions and transition-specific reforms for long-run growth. Contrary to the standard assumptions of the growth model, we allow the changes in population structure to affect growth. We control our estimates for changes in employment to working-age population ratio as well as for changes in dependency rate. Results indicate that the employment rate is crucial for understanding economic growth in transition countries, even in the long run, contradicting the long-run labor market neutrality assumption usually employed. This result can be explained by a combination of the hysteresis hypothesis (Blanchard and Summers, 1987) and the structuralist hypothesis (Phelps, 1995). Large negative developments in the early years of the transition resulted in sharp GDP decreases, coupled with decreases in employment and soaring unemployment. According to the hysteresis hypothesis, and in the context of transition, it is likely that these negative developments were not simply temporary and therefore negligible deviations from a fixed long-run employment rate. Our results support this view – some countries managed to recover from these strong initial negative shocks, while others did not. Failure to increase the employment rate after the negative shocks during the transition had dire consequences on future economic growth. Hysteresis effects resulting in permanently lower employment rates also resulted in lower future growth rates since production (both aggregate and per capita) is a function of employment. A typical explanation of hysteresis effects is that long periods of unemployment can result in a deterioration of worker's skills, which makes them less employable in the future when the economy recovers and more job opportunities arise. Workers unemployed for longer periods of time also might face stigma, which makes them less desirable compared to workers who did not spend extended periods of time in unemployment. On the other hand, countries that did manage to successfully recover from the negative labour market shocks were rewarded by higher growth, which is a natural consequence of employment growth.

Phelp's structuralist theory of employment can provide us with a similar explanation – employment rates in some countries didn't decrease only temporarily, but rather

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<sup>18</sup> Results are available upon request.

witnessed a structural (permanent) decrease without a subsequent recovery. In other words, macroeconomic disturbances lead to a structural and long-lasting decrease in the equilibrium employment rate. Notice that, while our sample starts from 1995 and doesn't include the earlier years of transition in which the majority of negative labour market shocks occurred, the years in which most of the recovery phase (depending on the country) took place are included in our sample and we therefore still capture this effect of increasing employment rate on growth. Our results imply that labour market shocks are not transitory in the long run. Policies, reforms, and institutional settings that encourage the activation of the working age population appear to be one of the most important characteristics that set apart success from failure in transition countries. Our findings support the view of the fundamental importance of labour markets in the transition process (Turley and Luke, 2011). Furthermore, these results may be important in the realm of growth econometrics in general since the majority of growth papers explore the effects of demographic changes only sporadically (Bloom et al., 1998) and assume the neutrality of the labour market in the long run.

The impact and significance of initial economic conditions was a very important theoretical issue during the early stages of transition (de Melo et al., 2001; Godoy and Stiglitz, 2006). Our results suggest that history and initial conditions mattered for growth during the first decade, while institutional reforms, labour market policies and convergence were more important in the long run. This result fits very well into the existing literature. It confirms the results of de Melo et al. (2001) and The World Bank (2002), as well as the results of numerous older empirical studies done in the 90s such as Fischer et al. (1996), Havrylyshyn et al. (1998), Havrylyshyn et al. (1999), Heybey and Murrell (1999), Fischer and Sahay (2000), Abed and Davoodi (2000), Katchanovski (2000) and Popov (2000).

Fading of the impact of initial conditions also provides an explanation why studies such as Godoy and Stiglitz (2006), which use a longer time span of data, conclude that the impact of initial conditions is not significant. Since the impact of initial conditions gradually decreases as the transition progresses and fades after 2000 (in our estimates), it is likely that using longer data sets (as well as different models and estimation methods) results in the overall impact being insignificant. Since we use a much longer data set compared to the existing literature, our results support the conclusion that the impact of initial conditions was important in the first decade of the transition, but also that this impact is not long-lasting. Fading impact of initial conditions is in line with the results of Falcetti et al. (2002) and Falcetti et al. (2006).

When it comes to the classical growth factors, we do not find evidence that gross fixed capital formation and population growth have an important role in explaining long-run growth. This result implies that the effect of improved resource allocation dominates over the effect of the expansion in physical capital and population size



even in the long run. Furthermore, the central role that labour market reforms had during the transition process, as well as demographic changes, might have created a setting in which the effect of population composition dominates over the effect of population growth. The effect of human capital is mostly insignificant in our FE models, but results change once we control for model uncertainty in BMA estimates. These findings suggest that even after three decades, improvements in the allocation of resources dominate over the effects of resource accumulation. This is both expected but also somewhat surprising. Turley and Luke (2011) point this out as well, stating that growth in transition economies is unlikely to be associated with the standard determinants of growth and has more to do with improved resource allocation instead of resource expansion. They say that investment (gross fixed capital formation) was not a significant variable in explaining growth in the early years of transition, and logically conclude that this is likely to change over time. It is interesting that this empirical result still holds using a much longer time span of data.

Out of the institutional indicators, we find that Political Stability, Control of Corruption and small-scale privatisation have the expected signs, and the results are the most robust. The result for Political Stability is in line with the findings of one of the early studies done by Brunetti et al. (1997), who find that political stability was an important determinant of growth in the 1993-1995 period. Our result for small-scale privatisation is also supported by Staehr (2005), whose results show that small-scale privatisation done after the implementation of liberalisation policies is good for growth. In addition, the impact of price liberalisation, governance quality and trade and foreign exchange systems on growth is slightly less robust but also positive. With the exception of the employment rate and initial conditions, the impact of institutional elements dominates the impact of all the other growth factors.

Divergent results between small-scale and large-scale privatisation indicators partly fit the counter-intuitive (negative) results obtained by Godoy and Stiglitz (2006), but they can also be connected with the fact that most of the large-scale privatisations were often associated with corruption scandals and certain controversial aspects of FDI (Mencinger, 2003). Staehr (2005) for example finds that small-scale privatisation is beneficial for growth, while large-scale privatisation not accompanied by other reforms has a negative impact on growth.

The most important limitation of our research is the lack of available data. In most of the estimates, we used an overlapping sample to maximize the number of observations per country while controlling for diminishing returns to physical capital. As a result of our methodological choice, we have ignored autocorrelation issues in most of our estimates using overlapping samples. In terms of the model, the major limitation is that we partially control the informal institutions. Furthermore, we do not have good enough data for the early nineties, and therefore we do not control our estimates for the pre-nadir part of the transition process.

Therefore, our results should be interpreted in terms of the long-run growth. Furthermore, our study focuses on initial economic conditions while omitting political and sociological variables. We do not estimate the effects of non-economic initial conditions on the initial choice of institutions and policies as Roland (2002) suggested. Also, we do not endogenise the development of institutions as suggested by de Melo et al. (2001).

## 6. Conclusion

This paper focuses on the effects of employment rate, initial conditions, and convergence on economic growth in transition countries. We frame our analysis within the classical growth regression approach but control our estimates for a wide range of transition-specific indicators that quantify initial conditions, institutional quality, and economic reforms. We relax the long-run growth model's assumptions and allow labor market and demographic changes to have non-transitory effects in the long run, which was not done previously within the growth literature concerning transition countries.

One of our most robust findings is that the employment rate, an overlooked variable in the literature on transition, had a statistically significant impact on growth. The employment rate result is important for policymaking in transition countries, but it also has implications for economic theory. A significant divergence between transition countries in terms of the employment rate and its relevance for long-run growth suggests the relative importance of hysteresis and structuralist hypotheses in transition economies.

We find strong evidence of conditional convergence within the analysed group of transition countries. The initial level of GDP per capita is one of the most robust indicators in our analysis, and fixed effects for cross-country heterogeneity imply the existence of conditional convergence within our sample. The most important implication of that result is that a part of the disappointing/impressive results of transition countries can be attributed to these countries' initial level of development, and not to the specific economic policies pursued during and after the transition. Most of the early studies do not analyse this issue due to technical reasons (short time horizons).

Finally, we investigate the importance of initial conditions for long-run economic growth. We assume that the effects of initial conditions should fade away in the long run. Therefore, we use interaction terms of the initial conditions and time fixed effects to analyse their importance as the transition progresses. Our results suggest that initial conditions affected growth during the first decade of transition, but their impact faded afterwards. In the period after 2000, the coefficients are

not statistically different from zero in our estimates. When it comes to different privatisation models, we do not find differences in the impact on growth between the three analysed privatisation models.

In terms of future avenues of research, it might be interesting to investigate the relevancy of the structure of physical capital for economic growth as well as the potential of endogenous theories to explain club convergence of transition countries. Product complexity, product quality, R&D expenditure and backward/forward position in global value chains might be interesting avenues of future research as well. Furthermore, it might be interesting to explore the interaction terms between FDI, large-scale privatisation and/or corruption control indicators to explore further divergence in the importance of small-scale privatisation relative to large-scale privatisation in transition countries.

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## Stopa zaposlenosti i ekonomski rast: slučaj zemalja u tranziciji<sup>1</sup>

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### Sažetak

U ovom radu istražuju se učinci promjena stope zaposlenosti na ekonomski rast u procesu tranzicije. U radu se kreće od ortodoksnog ekonometrijskog pristupa ekonomskom rastu koji kontrolira za konvergenciju. Da bi se kontrolirala heterogenost zemalja u uzorku, koriste se indikatori specifični za proces tranzicije, kao što su početni uvjeti (pred-tranzicijska povijest), kvaliteta upravljanja, privatizacijske metode, kao i razni indikatori institucionalne razvijenosti. U radu se razvijaju i procjenjuju razne specifikacije modela koristeći fiksne učinke kao i Bayesevo uprosječivanje, a s ciljem adresiranja problema modelske nesigurnosti za 24 zemlje u razdoblju od 1995. do 2019. godine. Suprotno pretpostavkama neoklasičnog modela rasta, rezultati pokazuju da je stopa zaposlenosti jedan od najvažnijih faktora ekonomskog rasta, čak i nakon tri desetljeća. Rezultati također pokazuju da konvergencija (početna razina razvijenosti) robustno objašnjava jedan dio razlika u stopama rasta između zemalja, dok su učinci početnih uvjeta (predtranzicijski period) robusni, ali nestaju nakon prvog desetljeća. Za korišteni uzorak analize, rezultati ne ukazuju da fizički kapital i rast populacije imaju utjecaj na ekonomski rast.

**Cljučne riječi:** tranzicija, stopa zaposlenosti, konvergencija, Bayesevo uprosječivanje, faktori rasta, početni uvjeti

**JEL klasifikacija:** P30, O43, E60

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