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The Impact of Privatization on Labor Productivity in Transition Economies and the Turkic Republics*

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Abstract

We examine the relationship between various indicators of privatization and labor productivity. By exploiting a panel data set covering the years between 1989 and 2008 and 19 transition economies and using three labor productivity and six privatization indicators, we test the hypothesis that privatization contributes to increase in productivity in transition economies. We identified a statistically significant positive correlation between privatization and labor productivity. Our results suggest that privatization positively affects productivity in transition economies. The results also suggest that private sector development has a positive impact on labor productivity through privatization of state-owned firms rather than the entry of new private firms.

Keywords

Labor Productivity, Privatization, Efficiency, Transition Economies, the Turkic Republics

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Introduction

Privatization has become an integral element of short term stabilization and long term structural adjustment policies implemented by many developing and transition countries since 1990's. One of the aims of privatization was to improve economic efficiency and productivity by reducing the role of the state. Privatized firms are expected to inject new capital, make investment and lay off surplus labor whereby labor productivity and total factor productivity will improve. However, theoretically the relationship between privatization and productivity is ambiguous. This study is motivated by the ongoing debate among economists and policy makers about the effects of privatization. The goal of this study is to empirically examine the relationship between privatization and labor productivity in the context of transition economies.

The main contributions of this study are the following: the study analyzes transition economies separately and uses long time series and the most comprehensive indicators of privatization. The sample including only transition countries enable us to address question of whether privatization boost productivity in a much more precise way since these countries started their privatization process with high levels of state ownership, private sector was non-existent or negligible when privatization process begins, privatizations were implemented around the same time, and economic design of the transition policies were similar to some extent. Earlier productivity analyses on transition economies are typically firm-level studies, rely on cross-section data or very short panels from a wide variety of sources, focus on the impact on company performance of different types of owners, and use different econometric methods from one another. Thus, they offer mixed evidence and do not offer an analysis based on sufficient long-time series. Recently, EBRD have started publishing Structural Change Indicators covering the period between 1989 and 2008 which provides us with five different privatization indicators. This data enables us to analyze the productivity effects of privatization using country-level variables, more privatization indicators, much longer time series, and more comprehensive coverage of countries than those available in earlier studies. Much longer time series may allow us to find stronger and more uniform finding since "privatization takes several years to have an effect as strong owners take control and markets start to function" as stated by Estrin et al. (2009: 714).

The hypothesis that privatization contributes to increase in labor productivity in transition economies is tested by using three labor productivity and six privatization indicators. A positive and statistically significant correlation between privatization and labor productivity is identified. The hypothesis is also tested for the Turkic Republics sub-sample of transition economies.

The rest of this paper proceeds as follows. Section 2 provides related literature. Empirical framework is given in section 3. Section 4 presents estimation results. Robustness tests are reported in section 5. Section 6 concludes.

Literature Review

Theoretical Literature

There are two conflicting views on the impact of privatization on productivity: The Management View and the Institutional View. The Management View points out that objective and monitoring problems cause inefficiencies as a result of public ownership since managers of state-owned enterprises are poorly monitored and pursue objectives in conflict with profit maximization (Boardman et al. 1989, Shleifer et al. 1994, Boycko et al. 1996, Sheshinski et al. 2003). Shleifer et al. (1994: 995) stress that political interference in the state-owned enterprises results in distorted objectives for public managers. While the managers of publicly owned companies may run their company according to political goals since they are accountable to politicians, managers of privately owned companies run their companies according to economic goals since they are responsible to their share holders. For instance, the central governments may require public managers to keep prices low or avoid layoffs even in times of financial distress. The managers of state-owned enterprises are also imperfectly monitored because bankruptcy is not a plausible threat to public managers. The threat of take-over when the firm performs poorly is removed since the central government's own interest to bail public managers out in moments of economic downturn (Sheshinski et al. 2003: 429). Moreover, public companies and firms would not be as productive as private firms due to corruption, political influence, and the lack of financing, capital, and market discipline (Dessy et al. 2004, Gronblom et al. 2008). Thus, management view suggests that privatization can lead to increased competition and thus productivity due to improved entry of private enterprises into the economy (Brown et al. 2004).

On the other hand, according to the Institutional View, privatization does not necessarily cause increased competition and productivity (Kaufmann et al. 1997, Ades et al. 1999, Stiglitz 2002, Bjorvatn et al. 2005). In this view, political preferences, privatization strategies, and the degree of corruption at the government level affect the outcome of privatization. The government officials may design privatization process to maximize their benefit instead of the efficiency of the economy. Privatization under a corrupt regime may result in a highly concentrated industry structure and therefore reduced economic efficiency and productivity. Bjorvatn et al. (2005: 905) report that privatization process in Russia in the 1990s and many cases of privatization in South America resulted in monopolistic tendencies and very limited improvements in productivity. Economic performance of the privatized firm depends on the personal commitment of the new owner to the efficient management of a privatized enterprise. Kaufmann et al. (1997: 443) argue that some forms of privatization may require the new owner to maintain certain levels of employment and/or to make specified investments in the privatized enterprise whereby the goals of privatization are to stimulate investment and to preserve employment. Under these conditions, privatization may be associated with lower productivity.

Empirical Literature

There are several studies examining the impact of privatization on firm productivity in transition countries. Djankov et al. (2002) and Estrin et al. (2009) reviewed the previous studies on the impact of privatization in transition economies. Djankov et al. (2002: 741) reviewed the previous 23 studies in transition economies and concluded that increased competition as a result of privatization is associated with raised efficiency in Eastern Europe (CCE) but not in the former Soviet Union (CIS). Brown et al. (2004) analyzed the impact of privatization on multifactor productivity (MFP) by using firm level data for initially state-owned manufacturing firms in Romania, Hungary, Ukraine and Russia. They estimated that majority privatization raises MFP about 28% in Romania, 22% in Hungary, and 3% in Ukraine while in Russia it lowers it about 4%. More recent studies report productivity gains for Russia as well. For example, in their recent study Brown et al. (2016) used panel data for 70,000 firms in five East European Economies (Hungary, Romania, Ukraine, Russia and Lithuania) and estimated that privatization raises pro-

ductivity by about 5-12% on average with substantial variation across countries and time periods between 1990 and 2010.

Recent firm level studies also keep reporting the positive impact of privatization on firm productivity in transition countries. By analyzing data set of the Czech firms for the period 1996-2005, Kocenda et al. (2012) concluded that productivity is likely affected by the change in ownership. Vuksic (2016) investigated the determinants of labor productivity dynamics in Croatia by using data from manufacturing industries and concluded that unfinished privatization is a stronger obstacle to stronger productivity gains.

Although literature review of Estrin et al. (2009: 701-703) conclude that the effect of private ownership on the labor productivity is mostly insignificant in China, recent studies provide the opposite evidence. Bai et al. (2009) investigated the impact of privatization of China's state-owned enterprises on labor productivity and pointed out that it led to higher labor productivity. Similarly, Shi et al. (2016) found that privatization results in increased labor productivity in listed privatized state-owned enterprises between 2001 and 2010. Thus firm level studies on the impact of privatization on productivity indicate that it takes a long time for privatization to have an effect as we observe on the case of Russia and China.

We don't detect any past multi-country studies using country-level data on the relationship between privatization and labor productivity. On the other hand, we identify four multi-country empirical studies on the relationship between privatization and economic growth focusing on transition economies separately. Since growth and productivity are closely related, it may be useful to mention them in this section.

Zinnes et al. (2001) examined the relationship between privatization indicators (large-scale and small-scale privatization indices), the private sector share of GDP, the percentage of firms privatized, and the private sector share of employment) and macroeconomic performance measures (real GDP per capita, foreign direct investment (FDI) per capita, FDI per unit GDP in 1989, and exports per unit GDP in 1989) in twenty-five transition countries. They found that privatization does not by itself but with interaction with institutional reforms lead to increase in GDP growth. Bennett et al. (2004) investigated the impact of different privatization methods on

national economic performance in transition economies by using dynamic panel data methods and a growth equation covering the years between 1990 and 2001 for 23 countries. They found that mass privatization has significant positive effect on growth especially after 1995, i.e., once the period of early transition and recession was over. They also found that GDP growth is significantly influenced by investment, employment growth and the growth of labor quality. Bennett et al. (2007) examined the relationship between methods of privatization and economic growth in twenty-six transition economies by using GMM estimation method. They found that only voucher privatization to have been significantly associated with faster growth for 1990-2003. In regard to privatization variable they employ three time-specific dummy variables, SALE, VOUCHER and MEBO, each taking the value of zero in the years prior to privatization and the value of unity in the year of privatization and subsequent years in their model. Cieslik et al. (2013) analyzed the empirical relationship between privatization, income convergence, and economic growth for transition countries using the open economy versions of two competing growth models and static and dynamic panel data estimation techniques. The results indicate that only small-scale privatization is positively associated with growth.

Empirical Framework

By using three labor productivity indicators and six privatization indicators, we investigated the impact of privatization on labor productivity in transition economies for the years between 1989 and 2008 which is the period EBRD provides uniform data regarding productivity indicators. Our largest sample includes 19 transition economies: Albania, Armenia, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovak Republic, Slovenia, and Ukraine. Availability of the long-term data for transition countries at the data sources restricted our sample with 19 transition countries.

By using unbalanced panel data, we estimate the following multivariate fixed effect (FE) model:

$$\text{Productivity}_{it} = \alpha_{0i} + X_{it}'\beta + u_{it} \qquad (1)$$

and the following multivariate random effect (RE) model:

$$\text{Productivity}_{it} = \alpha_{0} + X_{it}'\beta + \varepsilon_{i} + u_{it} \qquad (2)$$

where $X_{it}'\beta = \beta_1 \text{GROSFIXCAP}_{it} + \beta_2 \text{OPENNESS}_{it} + \beta_3 \text{DOMCREDIT}_{it} + \beta_4 \text{AWWH}_{it} + \beta_5 \text{PRIV}_{it}$

where *it* stands for the *i-th* country's observation value at time *t* for the particular variable. All variables are in logarithmic forms. α_{0i} represents country specific factors not considered in the regression, which may differ across countries but not within the country and is time invariant. ε_i is a stochastic term, which is constant through the time and characterizes the country specific factors not considered in the regression. u_{it} is error term of the regression. All variables are in logarithmic form. The variables were included in the econometric model based on previous studies (Djankov and Murrell 2002, Estrin et al. 2009, Belorgey et al. 2006), data availability, and main hypothesis.

The dependent variable is labor productivity. Three labor productivity indicators of two different data sources are used to evaluate the sensitivity of empirical results (See Table 1). Results may vary depending on which productivity indicator is used. If the results hold across different productivity indicators, it will be an indication of their robustness.

Table 1. *Labor Productivity Indicators Used in the Study and their Data Source*

Labor Productivity Indicator	Data Source
labor productivity per person engaged in 1990 US$ (converted at Geary Khamis PPPs)	The Conference Board and Groningen Growth and Development Centre, Total Economy Database
GDP per person employed (constant 1990 PPP $)	World Bank, World Development Indicators
Gross value added at factor cost (constant 2000 US$) divided by total employment	World Bank, World Development Indicators (Gross Value Added at Factor Cost) The Conference Board and Groningen Growth and Development Centre, Total Economy Database (Total Employment)

Explanatory variables are as follows. The level of privatization (PRIV) is represented by six distinct variables defined in Table 2. Five of total six privatization indicators are gathered from EBRD while one indicator is from ILO; as such all available privatization indicators with long time series are used.

Table 2. *Privatization Indicators Used in the Study and their Definition and Data Source*

Variable	Definition	Data Source
PRIVREVENUE	Privatization revenue (cumulative, in per cent of GDP)*	EBRD
PRIVEMP	Private sector share in total employment (in per cent)*	EBRD
PRIVSHARE	Private sector share in GDP (in per cent)	EBRD
SMALL	Index of small-scale privatization created by EBRD on a scale of 1 to 4.33, with higher numbers indicating higher levels of achievement in the effort to privatize small-scale enterprises.	EBRD
LARGE	Index of large-scale privatization created by EBRD on a scale of 1 to 4.33, with higher numbers indicating higher levels of achievement in the effort to privatize large-scale enterprises.	EBRD
POESHARE	The ratio of employment in publicly owned enterprises to total employment.	ILO

* Since some observations of privatization revenue take the value zero, we add 0.1 to the all observation values in the variable in order to take the logarithmic transformation.

In the model, a positive association between productivity and PRIVREVENUE, PRIVEMP, PRIVSHARE, SMALL, and LARGE and a negative association between productivity and POESHARE are expected. While SMALL, LARGE, and PRIVREVENUE variables may be considered as real privatization variables, PRIVEMP, PRIVSHARE, and POESHARE are not really indicators of privatization and can be treated as proxy privatization variables. That is why, when making comments on the estimation results, privatization indicators can be divided in two groups: 1) SMALL, LARGE, PRIVREVENUE 2) PRIVEMP, PRIVSHARE, POESHARE. Positive coefficients on SMALL, LARGE and PRIVREVENUE variables tell us about positive impact of privatization on labor productivity. However, PRIVEMP, PRIVSHARE and POESHARE variables essentially say something about how large the private (or public) sector is. The private sector shares of GDP (PRIVSHARE) and of employment (PRIVEMP) include both privatized firms and de novo private firms, i.e. firms that were never state owned. This

means that the source of an increase in the share of the private sector could be either the entry of new private firms[1] or privatization, or both. Thus, positive coefficients of PRIVREVENUE, PRIVEMP, PRIVSHARE, SMALL, and LARGE and negative coefficients of POESHARE can be interpreted as "increasing share of the private sector through privatization have positive impact on labor productivity" or "increasing share of the private sector through the entry of new private firms have positive impact on labor productivity" or both. Although results are the same, policy recommendations from these results would be different. Hence if the purpose of the authority is to increase labor productivity, it faces two options. The first option is to increase the share of private sector through privatization while the second option is to increase the share of private sector by facilitating the entry of new private firms. In this case, the authority may prefer facilitating the entry of de novo private firms instead of rapidly privatization state owned enterprises.[2]

It should be also noted that privatization revenue doesn't give an idea about methods of privatization when interpreting the coefficient of PRIVREVENUE. Some methods involves selling or giving the shares to managers and workers of the firm with payment accepted in the form of vouchers, deferred payment arrangements or for free (management and employees buyouts), some transfer shares of the enterprise to the general population for free or a nominal fee (voucher-based mass privatization), some sell shares of the enterprise on the domestic capital markets (initial public offering), some sells the enterprise's controlling stake of shares of to strategic investors (asset sale privatization), some transfers shares of the enterprise to the managers and/or to high ranking bureaucrats and politicians (spontaneous privatization), some methods place restrictions on what could be done with the assets or on investment or employment, and there are sometimes restrictions on foreign investor participation[3]. Thus, some of these privatization methods yields no revenue but creates private employment which is missed by privatization revenue variable.[4] If the results hold across different privatization indicators, it will be an indicator of their robustness.

We also introduced four more determinants of productivity to see how robust our finding is:

GROSFIXCAP refers to the logarithmic value of gross fixed capital formation (percent of GDP). The coefficient of the GROSFIXCAP is expected to be positive since investment in both human and fixed capital stimulates the labor productivity.

AWWH refers to the logarithmic value of average working hours in manufacturing. The coefficient of AWWH is expected to be positive since an increase in the average of hours worked per week leads to increase in the total output and hence productivity per worker until certain weekly working hours.

OPENNESS refers to the logarithmic value of openness (namely, the ratio of imports plus exports of goods and services to GDP in all current USD). We expect a positive relationship between OPENNESS and the labor productivity. Increased openness may boost the labor productivity through stimulating investment in human capital, market size, and diffusion of more efficient production techniques.

DOMCREDIT refers to the logarithmic value of domestic credit (percent of GDP). Financial depth represented by GDP share of domestic credit plays an important role in the determination of labor productivity. Productivity is enhanced by financial markets through efficient capital reallocation whereby resources are allocated to the most productive and innovative sectors (Belorgey et al. 2006: 155). Thus, the coefficient of DOMCREDIT is expected to be positive.

GROSFIXCAP, OPENNESS and DOMCREDIT data are taken from World Development Indicators of the World Bank while World Marketing Data and Statistics of Euromonitor International is the source of AWWH data.

Estimation Results

Estimation results for three different labor productivity indicators are reported in Table 3, 4, and 5.[5] Each table has 6 models for 6 different privatization indicators. Tables also present Hausman test statistics.

Table 3 reports estimation results for regressions where labor productivity per person (Geary Khamis PPPs) is used as a dependent variable. All coefficients of privatization indicators are statistically significant (except SMALL

variable) and take the expected signs. LARGE and PRIVREVENUE have consistently positive and significant coefficients, indicating that privatization process seems to increase labor productivity. PRIVEMP and PRIVSHARE have positive and significant coefficients while POESHARE has a negative and significant coefficient. Thus, positive coefficients of PRIVEMP and PRIVSHARE and negative coefficient of the POESHARE essentially tell us that an economy with larger private sector has larger aggregate labor productivity which may indicate that increasing share of the private sector through privatization can have positive impact on labor productivity.[6]

Regarding other variables, the coefficient of the GROSFIXCAP variable is positive and statistically significant except Model 3. Thus, investment seems to increase labor productivity in transition countries. The estimated coefficient of OPENNESS variable takes the expected positive sign and is statistically significant in all models but Model 1. The results support the proposition that trade openness is positively correlated with productivity. The coefficients of AWWH are positive and statistically significant in all models. It shows that the average working hours in manufacturing is positively correlated with labor productivity. The coefficients of DOMCREDIT are significant and have expected positive sign in all models. This result indicates that domestic credit has a positive and significant effect on labor productivity.

Table 3. *Estimation Results Using Labor Productivity per Person (Geary Khamis PPPs) as a Dependent Variable* (*Transition Countries Sample)*

	1	2	3	4	5	6
Constant	4.7596	5.0045	3.9126	3.9432	4.1840	4.1957
Standard Error	0.5937	0.5733	0.7367	0.5959	0.5966	0.5859
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GROSFIXCAP	0.1834	0.5321	0.1050	0.3229	0.3610	0.3128
Standard Error	0.0718	0.0732	0.0661	0.0689	0.0697	0.0692
P-value	0.0114	0.0000	0.1143	0.0000	0.0000	0.0000
OPENNESS	0.0661	0.2403	0.4463	0.1176	0.1903	0.1277
Standard Error	0.0607	0.0937	0.0530	0.0637	0.0675	0.0614
P-value	0.2773	0.0115	0.0000	0.0661	0.0052	0.0386
AWWH	1.0800	0.6592	0.9643	1.0466	1.0608	1.0546

Standard Error	0.1580	0.1691	0.1909	0.1597	0.1623	0.1589
P-value	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
DOMCREDIT	0.0984	0.0536	0.1820	0.1594	0.1584	0.1541
Standard Error	0.0228	0.0311	0.0233	0.0226	0.0230	0.0226
P-value	0.0000	0.0869	0.0000	0.0000	0.0000	0.0000
PRIVREVENUE	0.0595					
Standard Error	0.0094					
P-value	0.0000					
POESHARE		-0.2567				
Standard Error		0.0376				
P-value		0.0000				
PRIVEMP			0.3157			
Standard Error			0.0380			
P-value			0.0000			
PRIVSHARE				0.0995		
Standard Error				0.0350		
P-value				0.0048		
SMALL					0.0073	
Standard Error					0.0547	
P-value					0.8931	
LARGE						0.1555
Standard Error						0.0513
P-value						0.0027
Number of Observations	239	158	189	265	264	265
Number of Countries	19	17	17	19	19	19
R-squared	0.927	0.9525	0.772	0.599	0.589	0.601
Estimated Model	FE	FE	RE	RE	RE	RE
Hausman-statistics	24.207	27.401	7.097	8.686	7.4843	9.624

The estimation results for regressions of GDP per person employed (constant 1990 PPP $) are reported in Table 4. All coefficients of privatization indicators are statistically significant (except SMALL) and take the expected signs. The coefficients of AWWH and DOMCREDIT are positive and statistically significant in all models while the coefficients of GROSFIXCAP and OPENNESS are positive and statistically significant in all models except Model 3 for GROSFIXCAP and Model 1 for OPENNESS.

Table 4. *Estimation Results Using GDP per Person Employed (Constant 1990 PPP $) as a Dependent Variable (Transition Economies Sample)*

	1	2	3	4	5	6
Constant	4.7596	5.0044	3.9125	3.9431	4.1840	4.1956
Standard Error	0.5937	0.5733	0.7366	0.5959	0.5966	0.5859
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GROSFIXCAP	0.1834	0.5321	0.1050	0.3229	0.3610	0.3128
Standard Error	0.0718	0.0732	0.0661	0.0689	0.0697	0.0692
P-value	0.0114	0.0000	0.1143	0.0000	0.0000	0.0000
OPENNESS	0.0661	0.2402	0.4463	0.1176	0.1903	0.1277
Standard Error	0.0607	0.0937	0.0530	0.0637	0.0675	0.0614
P-value	0.2774	0.0115	0.0000	0.0662	0.0052	0.0386
AWWH	1.0800	0.6592	0.9644	1.0466	1.0608	1.0546
Standard Error	0.1580	0.1691	0.1909	0.1597	0.1623	0.1589
P-value	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000
DOMCREDIT	0.0984	0.0536	0.1820	0.1594	0.1584	0.1541
Standard Error	0.0228	0.0311	0.0233	0.0226	0.0230	0.0226
P-value	0.0000	0.0869	0.0000	0.0000	0.0000	0.0000
PRIREVENUE	0.0595					
Standard Error	0.0094					
P-value	0.0000					
POESHARE		-0.2567				
Standard Error		0.0376				
P-value		0.0000				
PRIVEMP			0.3157			
Standard Error			0.0380			
P-value			0.0000			
PRIVSHARE				0.0995		
Standard Error				0.0350		
P-value				0.0048		
SMALL					0.0073	
Standard Error					0.0547	
P-value					0.8930	
LARGE						0.1555
Standard Error						0.0513
P-value						0.0027
Number of Observations	239	158	189	265	264	265
Number of Countries	19	17	17	19	19	19
R-squared	0.927	0.952	0.772	0.599	0.589	0.601
Estimated Model	FE	FE	RE	RE	RE	RE
Hausman-statistics	24.209	27.399	7.097	8.687	7.484	9.625

Table 5 shows the estimation results for regressions where gross value added at factor cost (constant 2000 US$) divided by total employment is used as a dependent variable. All coefficients of privatization indicators are statistically significant (except SMALL variable) and take the expected signs. The coefficient of AWWH is positive and statistically significant across all models while the coefficients of GROSFIXCAP, OPENNESS, and DOMCREDIT are positive and statistically significant in all models except Model 3 for GROSFIXCAP, Model 2 for DOMCREDIT, and Model 1, 4 and 6 for OPENNESS.

Table 5. *Estimation Results by Using Gross Value Added at Factor Cost (constant 2000 US$) Divided by Total Employment as a Dependent Variable (Transition Economies Sample)*

	1	2	3	4	5	6
Constant	3.8949	4.3849	3.2902	2.9581	3.2392	3.2274
Standard Error	0.6005	0.5619	0.7651	0.6274	0.6258	0.6154
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GROSFIXCAP	0.1749	0.5074	0.0991	0.3106	0.3540	0.3005
Standard Error	0.0726	0.0718	0.0658	0.0705	0.0711	0.0706
P-value	0.0169	0.0000	0.1340	0.0000	0.0000	0.0000
OPENNESS	0.0693	0.2220	0.4451	0.0939	0.1796	0.1033
Standard Error	0.0614	0.0918	0.0541	0.0668	0.0708	0.0639
P-value	0.2598	0.0170	0.0000	0.1614	0.0119	0.1073
AWWH	1.0304	0.5524	0.9057	1.0475	1.0501	1.0507
Standard Error	0.1598	0.1657	0.1994	0.1697	0.1720	0.1691
P-value	0.0000	0.0011	0.0000	0.0000	0.0000	0.0000
DOMCREDIT	0.0937	0.0471	0.1796	0.1428	0.1415	0.1370
Standard Error	0.0230	0.0304	0.0232	0.0232	0.0235	0.0231
P-value	0.0001	0.1245	0.0000	0.0000	0.0000	0.0000
PRIREVENUE	0.0555					
Standard Error	0.0095					
P-value	0.0000					
POESHARE		-0.2648				
Standard Error		0.0369				
P-value		0.0000				
PRIVEMP			0.2953			

Standard Error			0.0379			
P-value			0.0000			
PRIVSHARE				0.1019		
Standard Error				0.0358		
P-value				0.0049		
SMALL					-0.0007	
Standard Error					0.0559	
P-value					0.9897	
LARGE						0.1640
Standard Error						0.0520
P-value						0.0018
Number of Observations	239	158	189	264	263	264
Number of Countries	19	17	17	19	19	19
R-squared	0.982	0.988	0.989	0.975	0.975	0.975
Estimated Model	FE	FE	FE	FE	FE	FE
Hausman-statistics	81.554	48.595	39.001	61.399	63.989	63.621

Robustness Tests

As a part of robustness test, we re-estimate our model without AWWH variable for the Turkic Republics sub-sample.[7] The sub-sample includes 5 Turkic Republics of the former Soviet Union; namely, Azerbaijan, Kazakhstan, Kyrgyz Republic, Tajikistan, and Turkmenistan.[8]

By using unbalanced panel data and a sub-sample including Turkic Republics, we estimate the following multivariate fixed effect (FE) model:

$$\text{Productivity}_{it} = \alpha_{0i} + X_{it}'\beta + u_{it} \qquad (1)$$

and the following multivariate random effect (RE) model:

$$\text{Productivity}_{it} = \alpha_{0} + X_{it}'\beta + \varepsilon_{i} + u_{it} \qquad (2)$$

where $X_{it}'\beta = \beta_1 \text{GROSFIXCAP}_{it} + \beta_2 \text{OPENNESS}_{it} + \beta_3 \text{DOMCREDIT}_{it} + \beta_4 \text{AWWH}_{it} + \beta_5 \text{PRIV}_{it}$

where *it* subscript stands for the *i-th* country's observation at time *t* for the particular variable. All variables are in logarithmic forms. α_{0i} represents country specific factors not considered in the regression, which may differ across countries but not within the country. ε_i is a stochastic term, which is constant through time and characterizes the country specific factors not

considered in the regression. u_{it} is error term of the regression. All variables are in logarithmic form.

Estimation results are reported in table 6, 7, and 8 for three different labor productivity indicators. Each table has 6 models for 6 different privatization indicators.

Table 6 provides estimation results for regressions of labor productivity per person (Geary Khamis PPPs). All privatization indicators have statistically significant coefficients with expected signs. The coefficient of DOMCREDIT is positive and statistically significant in all models and that of OPENNESS is positive and statistically significant in all models except Model 1 while the coefficient of GROSFIXCAP is not significant in all models.

Table 6. *Estimation Results Using Labor Productivity per Person (Geary Khamis PPPs) as a Dependent Variable (the Turkic Republics Sub-Sample)*

	1	2	3	4	5	6
Constant	8.1831	1.1378	4.4544	7.5349	8.5874	8.5034
Standard Error	0.2493	0.6512	0.7991	0.3484	0.3241	0.3716
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GROSFIXCAP	0.0487	0.7571	0.3061	0.2413	0.3225	0.2279
Standard Error	0.0921	0.1418	0.1226	0.1081	0.1170	0.1314
P-value	0.5986	0.0001	0.0166	0.0297	0.0080	0.0885
OPENNESS	0.1151	2.1879	0.1148	0.1110	0.0982	0.0939
Standard Error	0.0997	0.3731	0.1578	0.1343	0.1409	0.1613
P-value	0.2537	0.0001	0.4713	0.4121	0.4887	0.5629
DOMCREDIT	0.1796	0.4856	0.4014	0.3404	0.3470	0.3228
Standard Error	0.0358	0.0620	0.0572	0.0437	0.0459	0.0527
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PRIVREVENUE	0.1214					
Standard Error	0.0262					
P-value	0.0000					
POESHARE		-0.3463				
Standard Error		0.1790				
P-value		0.0751				
PRIVEMP			1.0828			
Standard Error			0.2035			

P-value			0.0000			
PRIVSHARE				0.3696		
Standard Error				0.0575		
P-value				0.0000		
SMALL					0.5141	
Standard Error					0.0900	
P-value					0.0000	
LARGE						0.5307
Standard Error						0.1529
P-value						0.0010
R-squared	0.9384	0.9350	0.9069	0.9384	0.8874	0.8524
Estimated Model	FE	FE	FE	FE	FE	FE

The estimation results for regressions of GDP per person employed (constant 1990 PPP $) are reported in Table 7. All coefficients of privatization indicators are statistically significant and take the expected signs. The coefficient of DOMCREDIT is positive and statistically significant across all models and that of OPENNESS is positive and statistically significant in all models except Model 1 while the coefficient of GROSFIXCAP is not significant in all models.

Table 7. *Estimation Results Using GDP per Person Employed (Constant 1990 PPP $) as a Dependent Variable (the Turkic Republics Sub-Sample)*

	1	2	3	4	5	6
Constant	8.1831	1.1377	4.4544	7.5349	8.5874	8.5034
Standard Error	0.2493	0.6512	0.7990	0.3484	0.3241	0.3716
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GROSFIXCAP	0.0488	0.7570	0.3061	0.2413	0.3225	0.2279
Standard Error	0.0920	0.1418	0.1225	0.1081	0.1170	0.1314
P-value	0.5984	0.0001	0.0166	0.0297	0.0080	0.0885
OPENNESS	0.1151	2.1877	0.1148	0.1110	0.0982	0.0939
Standard Error	0.0997	0.3731	0.1578	0.1343	0.1409	0.1613
P-value	0.2536	0.0001	0.4712	0.4120	0.4886	0.5629
DOMCREDIT	0.1796	0.4856	0.4014	0.3404	0.3470	0.3228
Standard Error	0.0358	0.0619	0.0572	0.0437	0.0459	0.0527
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

PRIREVENUE	0.1214					
Standard Error	0.0262					
P-value	0.0000					
POESHARE		-0.3463				
Standard Error		0.1790				
P-value		0.0751				
PRIVEMP			1.0828			
Standard Error			0.2035			
P-value			0.0000			
PRIVSHARE				0.3696		
Standard Error				0.0575		
P-value				0.0000		
SMALL					0.5141	
Standard Error					0.0900	
P-value					0.0000	
LARGE						0.5307
Standard Error						0.1529
P-value						0.0010
R-squared	0.9384	0.9350	0.9069	0.8977	0.8874	0.8524
Estimated Model	FE	FE	FE	FE	FE	FE

Table 8 presents the estimation results for regressions of gross value added at factor cost (constant 2000 US$) divided by total employment. All coefficients of privatization indicators are statistically significant and take the expected signs. Statistically significant positive coefficients for DOMCREDIT in all modes are found. The coefficient of OPENNESS is positive and statistically significant in all models except Model 1 while the coefficient of GROSFIXCAP is not significant in all models.

Table 8. *Estimation Results Using Gross Value Added at Factor Cost (constant 2000 US$) Divided by Total Employment as a Dependent Variable (the Turkic Republics Sub-Sample)*

	1	2	3	4	5	6
Constant	6.5947	9.2928	4.2653	6.1939	6.9568	6.8561
Standard Error	0.2136	0.6529	0.6420	0.2740	0.2588	0.2802
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

GROSFIXCAP	0.0159	0.6180	0.2544	0.2455	0.2981	0.2493
Standard Error	0.0841	0.1422	0.0985	0.0866	0.0966	0.1020
P-value	0.8506	0.0008	0.0134	0.0067	0.0034	0.0183
OPENNESS	0.0257	1.5282	0.0061	0.0168	0.0275	-0.0699
Standard Error	0.0909	0.3741	0.1268	0.1106	0.1201	0.1288
P-value	0.7787	0.0013	0.9617	0.8793	0.8193	0.5901
DOMCREDIT	0.1731	0.3520	0.3326	0.3164	0.3230	0.3114
Standard Error	0.0364	0.0621	0.0459	0.0384	0.0416	0.0451
P-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PRIREVENUE	0.0764					
Standard Error	0.0235					
P-value	0.0022					
POESHARE		-0.2714				
Standard Error		0.1795				
P-value		0.0545				
PRIVEMP			0.7044			
Standard Error			0.1635			
P-value			0.0001			
PRIVSHARE				0.2677		
Standard Error				0.0458		
P-value				0.0000		
SMALL					0.3471	
Standard Error					0.0747	
P-value					0.0000	
LARGE						0.4600
Standard Error						0.1309
P-value						0.0010
R-squared	0.9735	0.9415	0.9588	0.9620	0.9552	0.9483
Estimated Model	FE	FE	FE	FE	FE	FE

Thus, estimation results for the sample including the Turkic Republics perform better than the sample including transition countries as far as privatization indicators concern.

For further robustness tests, 1) Models are re-estimated by using lagged variables, including some time dummies that control for changing macroeconomic environment during the long period of transition, and including

regional dummies. 2) We make distinction between Central and Eastern Europe (CEE) transition countries and the former Soviet Union (CIS) transition countries since these two regions have different paths regarding restructuring, growth and labor adjustment. 3) Besides three labor productivity indicators, we estimated our models by using total factor productivity as dependent variable. Main findings remain unchanged.

Overall, results indicate that privatization contributes to increase in labor productivity in transition economies and the Turkic Republics for the years between 1989 and 2008. The results support the firm level studies on the relationship between privatization labor productivity and macro level studies on and the relationship between privatization and economic growth.

Conclusion

The ownership structure of the Eastern and Central European (CEE) and the former Soviet Union (CIS) countries has changed rapidly and significantly with the breakup of the Soviet Union and the start of market-oriented reforms in many former socialist economies. The effects of privatization have been widely discussed among economists and policy makers. This study empirically examines the explanatory power of privatization on labor productivity. By using three labor productivity indicators and six privatization indicators, we test the hypothesis that privatization contributes to increase in labor productivity in transition economies. A positive and statistically significant correlation between privatization and labor productivity is found. The hypothesis is also tested for the Turkic Republics sub-sample of transition economies. The estimation results for the sample including the Turkic Republics perform better than those of transition economies. Thus, privatization has a positive and significant effect on labor productivity in transition economies including the Turkic Republics.

Results of the study also have policy implications. Studies on management practices in transition countries (see for example Bloom et al. 2012) indicate that average management practice scores of the Turkic Republics such as Uzbekistan and Kazakhstan are below developing countries such as India and poor management practices disrupt the development of these countries. Further implementation of privatization and structural reforms seem to be most promising policy measures in order to attain higher productivity gains

in the Turkic Republics. Increasing share of private sector could be thorough either the entry of new firms or privatization of state owned firms. The evidence assembled in this study suggests a positive impact of increasing share of the private sector through privatization on labor productivity. Hence empirical results point out a positive impact of privatization and increasing share of the private sector through privatization on labor productivity.

Notes

1. If a transition country has a lot of entry of de novo private firms but a slow privatization effort, we would get large shares on the private indicators and a low share on the public indicators. Thus, positive coefficients of the former indicators tell us nothing about the impact of privatization; they just indicate that an economy with a larger private sector has larger aggregate labor productivity. In this case, what really matters is the size of the private sector and not privatization per se.
2. The available data do not differentiate the source of enlargement of private sector such as privatization and the new entry. Further research should be conducted on this subject upon data availability.
3. See Kaufmann and Siegelbaum (1997) for the review of privatization methods implemented in transition countries.
4. The total amount of privatization proceeds and privatization methods could each matter. Ideally, we want to see the effect of each separately. However, the available data do not allow this.
5. Note that numbers in Table 3 and Table 4 looks like similar. However, numbers differentiate generally after third digits. Since we only report until fourth digits, numbers in both tables looks like similar except column 1 in both tables.
6. On the other hand, if the increase in the share of private sector is due to the facilitation the entry of new private firms instead of privatization SOEs, then positive coefficients of PRIVEMP and PRIVSHARE and negative coefficient of POESHARE can be interpreted as increasing share of the private sector through the entry of new private firms, i.e. liberalization, have positive impact on labor productivity.
7. We exclude AWWH in order to increase the number of observations and countries. Otherwise, we don't have enough data to make robust estimation (2 countries and 5 observations). Azerbaijan, Tajikistan, and Turkmenistan are not in our main sample including 19 transition countries due to data unavailability for these countries.
8. Our sample doesn't include Uzbekistan since Domestic Credit data is not available for it.

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Geçiş Ekonomilerinde ve Türki Cumhuriyetlerde Özelleştirmenin Emek Verimliliği Üzerindeki Etkisi*

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Öz

Bu makalede çeşitli özelleştirme göstergeleri ile emek verimliliği arasındaki ilişki incelenmiştir. 1989-2008 yıllarını ve 19 geçiş ekonomisini kapsayan panel veri seti, üç emek verimliliği göstergesi ve altı özelleştirme göstergesi kullanmak suretiyle, geçiş ekonomilerinde özelleştirmenin verimliliğin artmasına katkı sağladığı hipotezi test edilmiştir. Özelleştirme ve emek verimliliği arasında pozitif korelasyon tespit edilmiştir. Araştırma sonuçları, özelleştirmenin geçiş ekonomilerinde verimliliği artırdığına işaret etmektedir. Sonuçlar ayrıca, özel sektörün gelişiminin yeni özel firmaların piyasaya girmesinden ziyade devlete ait firmaların özelleştirmesiyle yoluyla sağlandığı durumun emek verimliliğini olumlu etkileyeceğini göstermektedir.

Anahtar Kelimeler

Emek Verimliliği, Özelleştirme, Etkinlik, Geçiş Ekonomileri, Türki Cumhuriyetler

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Влияние приватизации на производительность труда в переходных экономиках и тюркских республиках*

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Абстракт

В данной статье изучена взаимосвязь между различными показателями приватизации и производительностью труда. Используя панельный набор данных, охватывающий 19 стран с переходной экономикой в период с 1989 по 2008 гг. и используя три индикатора производительности труда и шесть показателей приватизации, авторы протестировали гипотезу о том, что приватизация способствует повышению производительности в странах с переходной экономикой. Была определена статистически значимая положительная корреляция между приватизацией и производительностью труда. Результаты показывают, что приватизация положительно влияет на производительность в странах с переходной экономикой. Результаты также свидетельствуют о том, что развитие частного сектора оказывает положительное влияние на производительность труда более за счет приватизации государственных предприятий, а не за счет выхода на рынок новых частных фирм.

Ключевые слова

Производительность труда, приватизация, эффективность, страны с переходной экономикой, тюркские республики

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