

What determines the scale of state ownership in enterprises? Some evidence from post-socialist countries¹

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Abstract: State-owned enterprises still play an important role in many countries around the world. The aim of this research is to indicate which factors had a significant impact on the scale of state ownership in enterprises in the group of twenty eight post-socialist countries. The large scale privatisation indicator from the EBRD and the novel micro-level-based SOE measure were regressed on sets of cultural, political, economic and control variables. The results show that cultural factors—represented by the dominant religion—had a substantial impact on the scale of state ownership in enterprises while the role of political and economic factors was less pronounced. These results emphasise the importance of cultural factors in shaping the scale of state ownership in enterprises. This study contributes to the literature by analysing factors influencing the scale of state ownership in enterprises in contemporary economic conditions which has been missing until now.

Keywords: state-owned enterprises, state ownership, post-socialist countries, privatisation, transition.

JEL codes: O11, P26, L32, L38.

Introduction

A discussion on the role of the state as an owner of enterprises has been an important part of contemporary economic literature. The importance of this topic is driven by the fact that the scale of state ownership in enterprises is substantial in many countries around the world. Christiansen and Kim (2014) showed that 282 out of the 2,000 largest publicly listed companies worldwide were state-owned in 2012–2013. Szarzec, Dombi and Matuszak

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(2019) indicated that state-owned enterprises (SOEs) accounted for more than 20% in terms of total assets in the group of very large enterprises over the period 2007–2016 in nineteen out of thirty European countries and that state-owned enterprises played an important role not only in post-socialist countries but also in the ‘old-EU’ states such as Greece, Italy, Austria and France as well as in Norway.

The topic of state ownership in enterprises is analysed in the literature mainly at the microeconomic level and studies focus largely on the comparison of financial performance between SOEs and privately owned enterprises, causes of the SOE underperformance and the impact of privatisation at firm-level. Despite the importance of state involvement in the economy through enterprises there is still a lack of research analysing the factors influencing the scale of the SOE sector. This study contributes to the literature by analysing the determinants of state ownership in enterprises in contemporary economic conditions.

The focus in this study is on post-socialist countries of Central-Eastern Europe and the former Soviet Union. Nearly thirty years ago this set of states started a process of rapid institutional changes as a group of quite homogenous countries from the perspective of their political and economic systems (Piątek, Pilc, & Szarzec, 2019). The radical transformation involved the transition from authoritarian to democratic systems and from centrally planned to market economies (Ratajczak, 2009). At the beginning of the transition state ownership dominated in the group of large enterprises in the region and privatisation was perceived as a means to increase the efficiency of divested enterprises, to reduce government interference in the economy, to enhance competition and as a source of budget revenues (Megginson & Netter, 2001; Mihályi, 2017). It was also expected that the role of state ownership would gradually decline over time and that most economies in the region would become very much alike (Bałtowski & Mickiewicz, 2000). However the scale of state ownership in companies differs substantially among post-socialist countries nowadays and SOEs still remain important in many countries in Central-Eastern Europe and the former Soviet Union (see Figure 1 and Table A1 in Appendix). What is more privatisation processes have slowed down in recent years and the scale of state ownership in enterprises seems to be relatively stable from the mid-2000s (see Figure 2; Szarzec et al., 2019).

The aim of this research is to indicate which factors had a significant impact on the scale of state ownership in enterprises in the group of post-socialist countries. The data employed in the econometric analysis covers twenty eight post-socialist countries. State ownership in enterprises is represented in the econometric analysis by the large scale privatisation indicator by the European Bank for Reconstruction and Development (EBRD) for the years 2007–2014 and the share of SOEs in the group of large enterprises in terms of total assets from the novel dataset by Szarzec and others (2019) for the

years 2007–2016.³ This set of the data was chosen for the following reasons: first, state ownership in enterprises is concentrated in the group of large entities; second, the group of post-socialist countries started the transition with fairly homogenous economic systems and a large enterprise sector strongly dominated by SOEs⁴ but the role of the state as an owner differs substantially in the region currently; third, the focus on recent years allows the analysis of the heterogeneity in terms of state ownership in enterprises as a result of deliberate choices of economic policies of states rather than as an effect of selected modes of privatisation and the speed of economic reforms. Cultural, political and economic factors are considered as independent variables in the econometric analysis. The results show that the scale of state ownership in enterprises is substantially affected by cultural factors represented by the dominant religion. The role of political and economic factors is less pronounced.

The paper is structured as follows. In Section 1 a brief literature review on the factors influencing institutional changes in post-socialist countries is presented. Section 2 introduces the dataset and Section 3 presents the research design. Section 4 contains the results. Results are discussed in Section 5. The last section concludes.

1. Literature review

The focus in this study is on addressing the question about the factors influencing the scale of state ownership in enterprises based on the experience of post-socialist countries. In order to facilitate the discussion on the cultural, political and economic factors as potentially impacting the share of SOEs in the economy this review builds on the broadly analysed literature on determinants of institutional performance (e.g. La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999; De Melo, Denizer, Gelb, & Tenev, 2001; Di Tommaso, Raiser, & Weeks, 2007; Piątek, Szarzec, & Pilc, 2013; Alesina & Giuliano, 2015; Piątek et al., 2019).

Guiso, Sapienza and Zingales (2006) described culture as ‘those customary beliefs and values that ethnic, religious and social groups transmit fairly unchanged from generation to generation.’⁵ In the opinion of Pejovich (2003), a process of the institutional transition of post-socialist countries was a cultural issue rather than a simple technical one. The formal institutions are strongly influenced by cultural factors and the pace of the transition depends on the in-

³ 2014 is the last year for which transition indicators from the EBRD are available and the SOE measures by Szarzec and others (2019) cover the period 2007–2016.

⁴ The large scale privatisation indicator was equal to 1 (little private ownership) in all of twenty eight post-socialist countries included in the analysis in 1989.

⁵ The literature on the culture-institutions nexus was surveyed by Alesina and Giuliano (2015). For a review of the literature on the deeply rooted determinants of economic development, see: Spolaore and Wacziarg (2013).

teraction between prevailing informal rules and new formal rules—when both are not coordinated the transition costs of institutional restructuring are much higher (Pejovich, 2003). One of the most commonly used proxies of unobservable cultural factors is a dominant religion (e.g. Schweickert, Melnykovska, Belke, & Bordon, 2011; Piątek et al., 2019). The religion impacts the society's attitudes towards the role of the state in the economy, including expectations regarding the provision of certain goods through market incentives or directly by the state (Grigoriadis, 2016), and one can expect that SOEs would play a more substantial role in countries dominated by collectivist religions (Eastern Orthodox and Muslim populations) than by individualist religions (Protestant). Gorodnichenko and Roland (2011) analysed the culture-growth nexus with a number of cultural dimensions and concluded that individualism versus collectivism is the main dimension in shaping long-run growth differences across countries. The most commonly used measure for individualism was developed by Hofstede (2001) which distinguished also the dimensions such as power distance, masculinity, uncertainty avoidance, long-term orientation and indulgence. Based on Hofstede's typology and the dataset by Beugelsdijk, Maseland and van Hoorn, (2015), Tarabar (2017) showed for post-socialist countries that individualist and low power-distance cultures are associated with greater reform efforts.

Several decades of the centrally planned economy had a substantial effect on the individual and social behaviours of East-European and the former Soviet Union countries. As indicated by Ratajczak (2009) the societies of the countries undergoing transformation were characterised by a low level of social trust, a high level of corruption and egalitarian attitudes, which had a negative impact on the pace of changes towards a market economy. Similarly Landes (2000) emphasised that even after the fall of the socialist regime people were afraid of uncertainties of the market and longed for the safe monotony of state employment. Therefore one can expect that the longer the period under central planning, the more a society is dependent on the provision of goods by enterprises owned by the state, which can lead to the larger SOE sector.

An accession to the international organizations can be perceived as an important political determinant of institutional changes (e.g. Di Tommaso et al., 2007; Staehr, 2011; Piątek et al., 2019). Democratization and economic reforms in many post-socialist countries were supported by steps towards joining the European Union. States that plan to become a member of this organization need to fulfil the Copenhagen criteria. They require that a candidate country is located in Europe, has a market economy and formal institutions that preserve democratic governance and human rights. Moreover, rules operating within the member countries of the EU—*acquis Communautaire*—need to be adopted before joining the organization. As developed Western countries hold smaller SOE sectors than post-socialist countries (Szarzec et al., 2019), the accession to the EU might be seen as a factor that might lead to the decrease in the scale of state ownership in enterprises.

Another potentially important political factor influencing the scale of state ownership in enterprises is the ideological orientation of the rulers. Governments on the right of the political spectrum are likely to be more market-oriented and supportive of private ownership, while left-leaning parties tend to keep larger state-owned sectors. Opper (2004) showed that for transition economies privatisation processes of large enterprises were more intense when right-leaning parties were in power. Bjørnskov & Potrafke (2011) indicated that right-leaning governments fostered ownership changes in post-socialist countries and that the difference in privatisation processes between market-oriented and leftist governments was more substantially pronounced in the group of smaller-scale industries than in large-scale ones.

Large SOE sectors were traditionally associated with developing countries (World Bank, 1995). Szarzec and others (2019) showed that a negative correlation between the level of income and the scale of state ownership in enterprises was also present in the group of European states in the more recent period. In post-socialist economies state-owned enterprises were employed to provide social stability in terms of keeping employment and subsidising some crucial services especially at the beginning of the transition when an efficient social security system was missing (Bai, Li, Tao, & Wang, 2000). As this multi-task role of SOEs was more likely in less-developed countries one can expect higher SOE shares at lower income levels.

State-owned enterprises are dominant in the natural resource sector (Kowalski, Buge, Sztajerowska, & Egeland, 2013; Szarzec & Nowara, 2017). Income from extraction of natural resources might also lower the pressure for economic restructuring—Esanov, Raiser and Buiter (2004) showed that resource abundance in Azerbaijan, Kazakhstan, Uzbekistan and Turkmenistan did not positively influence economic reforms. Therefore the scale of state ownership in enterprises may be higher in resource-abundant countries.

At the beginning of the transition period economies of the countries of Eastern-Central Europe and the former Soviet Union were substantially maladjusted to market conditions (Kowalski, 2013). What is more the newly formed independent states had to establish national institutions—including systems of justice and security, central banks and customs bureau—from scratch. The initial conditions of the transition are analysed in many empirical studies with the dataset proposed by de Melo and others (2001). It includes state independence and market reforms before the transition, the degree of over-industrialization, black market exchange rate premium, trade shares with socialist economies and repressed inflation. These measures reflect the level of maladjustment of post-socialist economies to market conditions and one can expect larger SOE shares in economies that at the beginning of the transition were less adapted to market rules.

To sum up, the literature on institutional changes provides a broad set of cultural, political and economic factors that potentially determine the scale of

state ownership in enterprises. The aim of the following parts of the paper is to show which of them had a substantial impact on the scale of state ownership in enterprises in post-socialist countries.

2. Description of dataset

The empirical literature on the role of SOEs at the macroeconomic level is very limited because of a lack of comprehensive datasets on the scale of state involvement in the economy through enterprises. Szarzec and others (2019) addressed this substantial research gap by constructing micro-level-based economic weights of SOEs for European countries in the years 2007–2016. The state ownership indicator based on the share of SOEs in the group of large enterprises in terms of total assets and the 25% ownership threshold (*TA25*) is employed in the current analysis. As this variable covers only sixteen out of twenty eight post-socialist countries in the CEE region and the former Soviet Union it was decided to employ the large scale privatisation indicator (*LSP*) from the EBRD as a proxy of the scale of state ownership in enterprises for all twenty eight states.⁶ It can be argued that since SOEs are concentrated in the

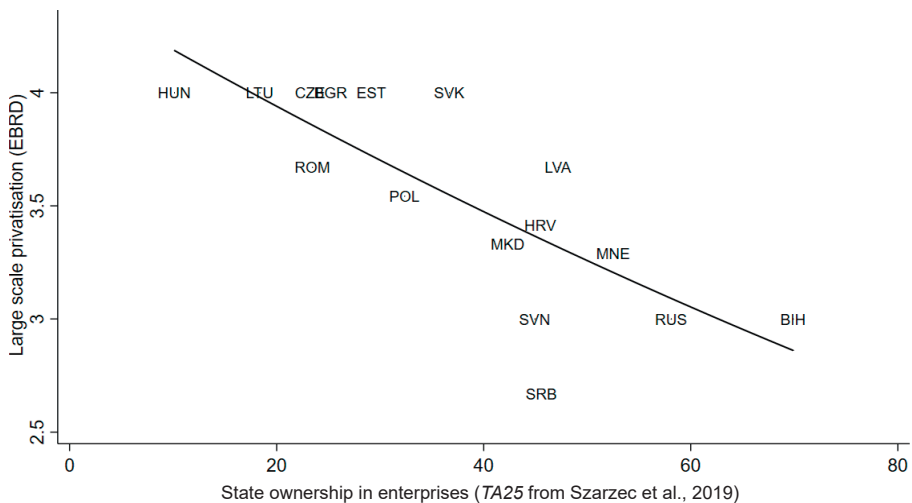


Figure 1. *LSP* (EBRD) and *TA25* from Szarzec et al. (2019)

Note: Mean values of *LSP* (2007–2014) and *TA25* (2007–2016). *TA25* is the share of SOEs in the group of large enterprises in terms of total assets and based on the 25% ownership threshold (Szarzec et al., 2019). Correlation coefficient = -0.78 .

Source: Own elaboration based on (data from the EBRD and Szarzec et al., 2019).

⁶ CEE non-EU: Albania, Bosnia and Herzegovina, Macedonia, Montenegro, Serbia. CEE EU: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia. CIS: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan.

group of large enterprises and that the analysed countries started the transition with the large enterprise sector dominated by SOEs, the scale of SOEs in the economy should reflect the progress in privatization of the largest companies. In order to check this conjecture the *LSP* variable was compared with *TA25*. The correlation coefficient was equal to -0.78 . This shows the strong negative correlation and one can point out that greater progress in privatization of large enterprises (measured by the *LSP* variable) leads, unsurprisingly, to a lower share of state-owned enterprises in the economy. Therefore the *LSP* variable can be considered as a proper proxy of state ownership in enterprises for post-socialist countries. Figure 1 presents the correlation between mean values of *LSP* (2007–2014) and *TA25* (2007–2016).

LSP and *TA25* are employed as dependent variables in the econometric analysis. Based on the literature review from Section 2 sets of cultural, political and economic factors were included as independent variables. The data and their sources along with descriptive statistics are presented in Table 1. A correlation matrix of the variables is presented in Table A2 in the Appendix.

Based on the *TA25* variable the SOE shares were the lowest in Hungary and Lithuania, while the highest in Russia and Bosnia and Herzegovina (see Figure 1). For the *LSP* variable (see Table A1 in Appendix; 2007–2014 mean values), the highest values (i.e., the smallest SOE shares) were recorded for Bulgaria, the Czech Republic, Estonia, Georgia, Hungary, Lithuania and Slovakia (4.00), while the lowest were for Azerbaijan (2.00), Belarus (1.59) and Turkmenistan (1.00). Figure 2 shows how the average values of the *LSP* variable were changing across three groups of post-socialist states: Central-Eastern European countries not being the EU member (CEE non-EU), the EU members (CEE EU) and the former Soviet Union countries being members of the Commonwealth of Independent States (CIS). At the beginning of the transition period SOEs were dominant in each group of post-socialist countries and in the first half of the 1990s substantial progress was made in privatization not only in the group of current EU members but also among the CIS countries. However after the year 1997, the pace of ownership changes in the latter group was much slower than in other post-socialist countries. The scale of state ownership in enterprises remained rather stable starting from 2005–2007 and the largest progress in large scale privatization was made in the group of current EU members, while the smallest among the CIS countries.

In the group of cultural factors the dominant religion and years under central planning were included.⁷ The dataset consisted of eleven predominantly Orthodox, eight predominantly Muslim, seven predominantly Catholic and

⁷ It was decided not to include the measure of individualism from Hofstede (2001) because this indicator is non-missing for only thirteen out of twenty eight post-socialist countries included in this analysis and the inclusion of this variable would substantially limit the number of observations in the econometric analysis.

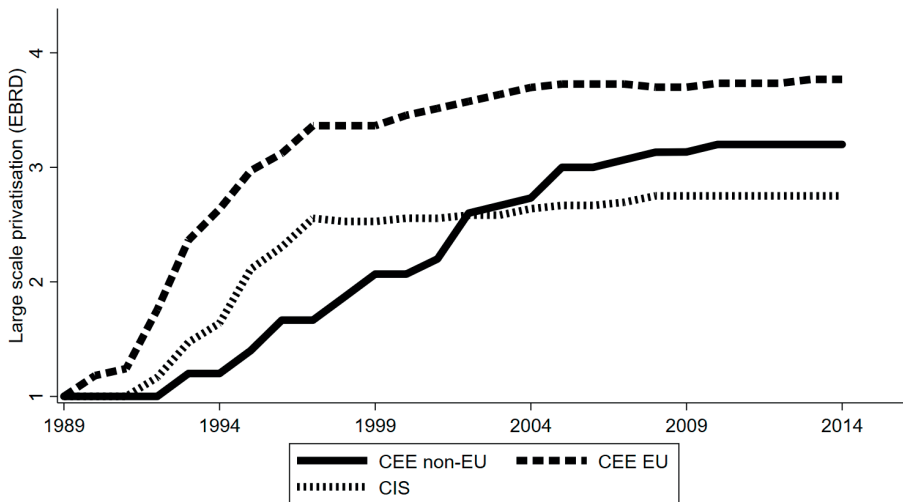


Figure 2. LSP (EBRD) by group, 1989–2014

Source: Own elaboration based on data from the EBRD (2014).

two predominantly Protestant countries. Figure 3 presents the box plot of the *LSP* and *TA25* variables by dominant religion. Protestant and Catholic countries were characterized by the higher levels of the large scale privatisation indicator than the Orthodox and Muslim states which shows that the role of the state as an owner of enterprises was limited in the former groups compared to the latter. Based on data from Szarzec and others (2019) differences between Catholic, Protestant and Orthodox countries were less pronounced and the only predominantly Muslim country, Bosnia and Herzegovina, had the largest SOE share. The length of the period under central planning was the longest in eleven states of the former Soviet Union (70 years and more). Another post-Soviet republics—Estonia, Latvia, Lithuania and Moldova—had a *legacy* of a non-market system of 51 years. Seven Balkan and six Central-European countries had a centrally governed economy for 41–47 years. The number of years under central planning was negatively correlated with *LSP* and positively with *TA25* which suggests that the longer periods under central planning were associated with the larger SOE sector.

The group of political variables consisted of variables indicating an armed conflict, signing the Association Agreement with the European Union and the ideological orientation of the largest government party. The number of years in which a country was involved in an armed conflict (over the period 1991–2006) was negatively correlated with *LSP* and positively with *TA25*. The opposite relationship was indicated for the number of years after signing the Association Agreement with the EU. Finally the longer periods of the rule of right-leaning parties were associated with the smaller SOE sector when both

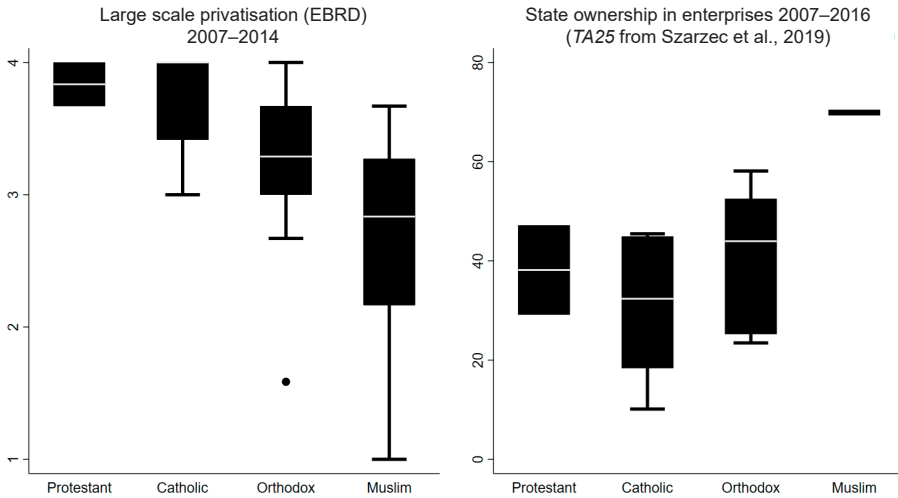


Figure 3. State ownership in enterprises and religion

Note: the horizontal line inside the box presents the median value, upper hinge—75th percentile, lower hinge—25th percentile, upper adjacent line—the highest value in the group, lower adjacent line—the lowest value in the group (unless a dot is presented), dot—outside value.

Source: Own elaboration in Stata based on data from the EBRD.

LSP and *TA25* were considered and for left-leaning parties this relationship was ambiguous—the higher number of years of left-leaning parties in power was associated with the larger SOE sector as measured by *LSP* but with the smaller one measured by *TA25*.

The set of economic variables contained the level of proved reserves of crude oil and natural gas per capita and GNP per capita in 1989. It was decided to use values of reserves to indicate resource abundance instead of the share of resource export in GDP or in total exports due to a problem of endogeneity of the latter indicators (this issue is discussed in e.g. Brunnschweiler & Bulte, 2008). The values of oil and gas reserves were highly correlated (correlation coefficient = 0.86) and the first principal component of these variables was included in the econometric analysis in order to limit a problem of multicollinearity.⁸ There was a positive correlation between the variable representing natural resource abundance and the larger scale of state ownership in enterprises. Higher income levels at the beginning of the transition were related to the smaller future SOE sector.

Control variables consisted of initial economic conditions of the transition and physical proximity of Western Europe. Initial economic conditions were reflected by the first principal components of the variables indicating the de-

⁸ The first principal component explains 93.3% of the sample variation of natural resources variables and has a positive factor loading for oil and gas reserves (scoring coefficients = 0.71).

Table 1. Description of variables

Variable	Short description	Source	Obs.	Mean	Standard dev.	Min	Max
Dependent variables							
LSP	Large scale privatisation indicator; mean values 2007–2014 (measured from 1 to 4.33): 1: little private ownership, 2: comprehensive scheme almost ready for implementation; some sales completed, 3: more than 25% of large-scale enterprises assets in private hands or in the process of being privatised, but possibly with major unresolved issues regarding corporate governance, 4: more than 50% of SOEs and firms' assets in private ownership and significant progress with corporate governance of these enterprises, 4.33: standards and performance typical of advanced industrial economies; more than 75% of enterprise assets in private ownership with effective corporate governance)	EBRD (2014)	28	3.216	0.772	1	4
TA25	The share of state-owned enterprises in total assets in the group of large enterprises, based on the 25% ownership threshold, mean values 2007–2016	Szarzec et al. (2019)	16	37.80	15.84	10.14	69.90
Independent variables							
Cultural factors							
<i>Catholic</i> <i>Orthodox</i> <i>Protestant</i> <i>Muslim</i>	Dominant religion	Froese (2004), Barrett, Kurian & Johnson (2001)	28	0.250 0.393 0.071 0.286	0.441 0.497 0.262 0.460	0 0 0 0	1 1 1 1

<i>YUCP</i>	Length of the period under central planning, in years	De Melo et al. (2001)	28	55.93	13.03	41	74
Political factors							
<i>WAR</i>	Armed conflict (equals 1 in years when a country experienced an armed conflict classified at least as "Category 3—Serious Political Violence" in the source), sum of years in 1991–2006	Center for Systemic Peace (2020)	28	1.679	3.163	0	11
<i>EUA</i>	EU accession (equals 1 starting in the year of signing Association Agreement with the EU), sum of years in 1991–2006	European Commission web page	28	4.536	5.751	0	13
<i>GovRight</i> <i>GovCenter</i> <i>GovLeft</i> <i>GovUn</i>	Party orientation of the largest government party (right [conservative, Christian democratic, right-wing], centrist, left [communist, socialist, social-democratic, left-wing], non-classified [for all those cases that do fit into the above-mentioned category, including party's platform not focusing on economic issues, or there are competing wings])	Cruz, Keefer & Scartascini (2017)	28	2.536 1.607 5.857 4.679	3.958 3.624 5.563 5.271	0 0 0 0	13 13 15 16
Economic factors							
<i>NatRes</i>	First principal component of variables reflecting the mean levels of log values of oil and gas reserves per capita in 1991–2006	Own calculation based on BP (2019)	28	0	1.34	-0.64	4.19
<i>GNPpcc1989</i>	GNP per capita in 1989 (in thousand US\$ at PPP)	De Melo et al. (2001)	28	5.465	2.040	1.400	9.200
Control variables							
<i>InitCond</i>	First principal component of variables reflecting degree of over-industrialization in 1990, independent state before 1989, market reforms during the socialist era, black market exchange rate premium in 1990, trade shares with socialist economies as % of GDP in 1990, repressed inflation 1987–1990	Own calculation based on De Melo et al. (2001)	28	0	1.80	-3.11	2.19
<i>KMBrussels</i>	Physical proximity of Western Europe, measured as the distance between the capital of the country and Brussels, in this km	Internet sources	28	2.165	1.276	0.717	4.828

Source: Own elaboration.

gree of over-industrialization in 1990, independent state before 1989, market reforms during the socialist era, black market exchange rate premium in 1990, trade shares with socialist economies as % of GDP in 1990 and repressed inflation 1987–1990 (collected from De Melo et al., 2001).⁹ As the first principal component demonstrates a positive factor loading for the black market premium, trade dependency and repressed inflation and negative factor loading for market reforms and independent state, this variable can be regarded as a measure of the maladjustment of economies to market conditions at the beginning of the transition. The higher level of maladjustment was related to the larger future SOE sector as measured by *LSP*, however this relationship was insignificant for *TA25*. Physical proximity of Western Europe was measured by the distance between the capital of the country and Brussels. This approach allows to control for the possible spatially dependent nature of the diffusion of institutions and norms being crucial to the construction of market economies including privatisation and the country's integration into the EU (Kopstein & Reilly, 2000). In the analysed dataset, the smaller distance to Western Europe was associated with the smaller SOE sector.

3. Research design

This study aims to indicate which factors had a significant impact on the scale of state ownership in enterprises in the group of post-socialist countries. The estimated model takes the following form:

$$\text{State ownership}_i = \beta_0 + \beta_1 \text{Cultural}_i + \beta_2 \text{Political}_i + \beta_3 \text{Economic}_i + \beta_4 \text{Controls}_i + e_i,$$

where *State ownership* is the dependent variable representing the average values of the *LSP* (2007–2014) or *TA25* (2007–2016) indicators of a country *i*, *Cultural*, *Political*, *Economic* and *Controls* represent the sets of variables as presented in Table 1. These sets are added to the model according to the procedure explained below. The model is estimated via OLS with identification based on the exogeneity of explanatory variables employed. This approach assumes that the scale of state ownership at the beginning of the transition was not correlated with omitted factors that were themselves correlated with the subsequent ownership changes and that the sets of cultural, political and economic fac-

⁹ The first principal component explains 54.1% of the sample variation of initial conditions variables and has a positive factor loading for the black market exchange rate premium (scoring coefficient = 0.53), trade dependency (0.47), repressed inflation (0.49) and negative factor loading for over-industrialization (–0.04), market reforms (–0.38), independent state (–0.29).

tors were not affected by the subsequent shares of state ownership in enterprises. The former assumption can be considered as plausible because when socialist systems were on the decline and the transition was about to begin the large enterprise sector was strongly dominated by SOEs (see Figure 2), which was a result of the domination of the socialist ideology favouring state ownership in the region. With the end of the socialist era this imposed ideological favouring of state ownership was likely to disappear. For the latter assumption an important issue is the fact that ownership changes introduced once seem to be long-lasting (see Figure 2; correlation coefficient between *LSP* and its first-lagged value was 0.97). Therefore state ownership indicators calculated for the periods 2007–2014 (*LSP*) and 2007–2016 (*TA25*) are likely to strongly depend on their values from previous years (after the beginning of the transition). This leads to the question as to whether state ownership shares in the previous transition years might have affected some of explanatory variables. Dominant religion, years under central planning, an armed conflict, oil and gas reserves, income level in 1989, initial conditions of the transition and physical proximity to Western Europe can be definitely considered as not affected by the subsequent shares of state ownership in enterprises. However, the signing of the Association Agreement with the EU and ideological orientation of the largest government party might have been endogenous—the decision to join the EU might have been affected by the previous progress in economic reforms¹⁰ and changes of the party in power might have been influenced by society's (dis)satisfaction with the progress or lack of privatisation.

The following procedure is used in the calculations. First, the dependent variable is regressed on the sets of cultural and control variables (Models 1 and 7 in Table 2). Then the sets of political (Models 2 and 8) and economic (Models 3 and 9) factors, for which potential endogeneity can be definitely ruled out, are added separately and jointly (Models 4 and 10). Finally factors for which there were some doubts in terms of their exogeneity, are added in Models 5 and 12.¹¹ As many of the explanatory variables are significantly correlated with each other (see Table A2 in Appendix), the variance inflation factor was checked at each step. The VIF values exceeded the level of 10 for at least one variable in Models 5, 10 and 12, which showed that a problem of multicollinearity was present in these models. To overcome this issue, the variables with the highest *p*-values were excluded stepwise until the VIF values were below 10—these results are presented as Models 6, 11 and 13. Each model was also

¹⁰ In fact countries that signed the Association Agreement with the EU were characterised by substantially higher values of *LSP* in the year before the signing than other states in the same periods (these differences ranged from 0.41 points of *LSP* in 2002 to 1.37 points in 1995).

¹¹ In the literature the variables representing the signing of the Association Agreement with the EU and the ideological orientation of the ruling party are often assumed as exogenous to progress in economic reforms and privatisation (e.g. Bjørnskov & Potrafke, 2011; Piątek et al., 2019).

Table 2. Econometric analysis, OLS, dependent variables: *LSP* (2007–2014), *TA25* (2007–2016)

Dep. variable	LSP												TA25													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
<i>Muslim</i>	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
<i>Catholic</i>	1.168* (0.59)	1.126* (0.61)	1.259 (0.82)	1.248 (0.78)	1.552 (0.92)	1.731** (0.71)	-47.281*** (12.03)	-45.593** (13.86)	-32.338* (16.11)	-32.696 (17.49)	-32.545* (15.11)	12.468 (40.70)	11.662 (16.92)													
<i>Orthodox</i>	0.906* (0.50)	0.890* (0.51)	0.892* (0.49)	0.890* (0.46)	0.910* (0.46)	0.973** (0.40)	-19.567 (12.82)	-18.911 (13.69)	-7.938 (15.49)	-7.701 (16.75)	-8.937 (14.06)	6.056 (30.43)	-0.450 (15.69)													
<i>Protestant</i>	1.542** (0.60)	1.537** (0.63)	1.769 (1.12)	1.767* (0.96)	1.676 (1.22)	1.897* (0.99)	-27.249 (15.21)	-25.471 (17.08)	1.155 (26.00)	1.616 (28.15)	-1.201 (22.76)	21.684 (52.78)	15.387 (24.09)													
<i>YUCP</i>	-0.034* (0.02)	-0.029 (0.02)	-0.019 (0.03)	-0.017 (0.02)	-0.015 (0.03)	-0.020 (0.02)	1.998*** (0.61)	1.784* (0.96)	2.916** (1.06)	3.068* (1.47)	3.027** (0.90)	1.679 (3.41)	-													
<i>WAR</i>	-	-0.027 (0.04)	-	-0.009 (0.06)	-0.019 (0.05)	-0.027 (0.04)	-	0.489 (1.62)	-	-0.296 (1.80)	-	-1.321 (2.63)	-													
<i>NatRes</i>	-	-	-0.152 (0.12)	-0.146 (0.18)	-0.139 (0.11)	-0.130 (0.10)	-	-	10.514 (9.21)	2.221 (8.36)	-	-0.919 (14.20)	-													
<i>GNPpc1989</i>	-	-	-0.042 (0.14)	-0.042 (0.14)	-0.138 (0.13)	-0.137 (0.12)	-	-	-0.444 (4.62)	-5.470 (4.47)	-4.773 (3.24)	-2.858 (7.08)	-													
<i>EUA</i>	-	-	-	-	0.017 (0.05)	-	-	-	-	-	-	-1.756 (2.63)	-2.259** (0.71)													
<i>govCenter</i>	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	

<i>govRight</i>	-	-	-	-0.016	-0.015	-	-	-	-	-	-	-3.757	-3.615*
				(0.04)	(0.04)							(3.02)	(1.61)
<i>govLeft</i>	-	-	-	-0.087**	-0.086**	-	-	-	-	-	-	-4.718	-4.152*
				(0.03)	(0.03)							(4.42)	(2.09)
<i>govUn</i>	-	-	-	-0.015	-0.008	-	-	-	-	-	-	-2.442	-2.218
				(0.04)	(0.03)							(3.30)	(1.88)
<i>InitCond</i>	-0.069	-0.091	-0.115	-0.166	-0.168	-0.025	0.213	0.897	0.889	0.201	0.201	-5.294	-3.922
	(0.12)	(0.13)	(0.14)	(0.12)	(0.12)	(3.14)	(3.41)	(4.20)	(4.53)	(2.96)	(2.96)	(9.15)	(3.18)
<i>KMBrussels</i>	0.391	0.373	0.372	0.401	0.443**	-43.617*	-42.152*	-68.571*	-71.279	-63.124**	-63.124**	-21.089	1.213
	(0.25)	(0.26)	(0.23)	(0.24)	(0.20)	(19.67)	(21.30)	(32.58)	(38.79)	(22.77)	(22.77)	(69.62)	(16.87)
<i>Intercept</i>	3.544***	3.361***	2.898**	3.661**	3.801***	34.664	40.950	44.987	43.839	29.258	29.258	56.757	89.706***
	(0.96)	(1.07)	(1.21)	(1.27)	(1.16)	(25.92)	(34.36)	(68.17)	(73.80)	(24.67)	(24.67)	(129.95)	(22.00)
<i>N</i>	28	28	28	28	28	16	16	16	16	16	16	16	16
<i>Adj. R²</i>	0.309	0.287	0.324	0.522	0.551	0.545	0.494	0.544	0.470	0.597	0.597	0.227	0.678
<i>Dep. var. mean</i>	3.22												37.80

Note: Standard errors are reported in parentheses. Asterisks denote significance levels: ***-1%, **-5%, *-10%. *N* denotes the number of observations, *ref.* denotes a reference group. *Adj. R²* is adjusted *R*-square.

Source: Own elaboration with Stata 15.

tested for heteroskedasticity and heteroskedasticity robust standard errors were calculated if needed.

4. Results

Table 2 presents the results of the econometric analysis. For the *LSP* dependent variable (Models 1–6), the coefficients representing predominantly Catholic, Orthodox and Protestant countries had positive signs and were all significant at least at the 10% level in Models 1, 2 and 6. For Model 4, the coefficients are significantly different from zero for *Orthodox* and *Protestant*, while for Models 3 and 5, for *Orthodox* only. In order to discuss whether the obtained results are not only statistically but also economically significant, one can compare the magnitudes of the coefficients to the average levels of the dependent variables. The mean value of the *LSP* variable was equal to 3.22. As the (statistically significant) coefficients for the *Catholic*, *Orthodox* and *Protestant* variables vary from 0.890 to 1.897, it can be indicated that differences in the scale of state ownership in enterprises between these countries and predominantly Muslim states were substantial not only statistically but also economically. When *TA25* was considered the only cultural variable with the statistically significant coefficient was *Catholic* in Models 7, 8, 9 and 11. The magnitude of this coefficient (ranging from 32.545 to 47.281) and its negative sign suggest that predominantly Catholic countries had substantially smaller SOE sectors than predominantly Muslim ones. However, this difference was not significant when (potentially endogenous) political variables were included in Models 12 and 13.

The length of the period under central planning was statistically significant at the 10% level in Model 1, however, it turned out to be insignificant when other sets of independent variables were added to the analysis with the *LSP* dependent variable (Models 2–6). For *TA25*, more years under central planning were statistically significant related to higher SOE shares in Models 7–11. The magnitudes by these coefficients show that an additional ten years under central planning led to the SOE shares higher by 18–31 percentage points.

In the group of political factors the estimated impact of the number of years with an armed conflict was close to zero at each step of the analysis. The coefficient by the variable indicating the signing of the Association Agreement with the EU was insignificant for *LSP* (Model 5) and this variable dropped because of multicollinearity from Model 6 (as the variable with the highest p-value), but was significant and negative (i.e., associated with lower SOE shares) for *TA25* (Model 13). The relationship between the number of years of right-leaning parties in power was insignificant for the *LSP* variable (Models 5 and 6), however, it was significant for *TA25* in Model 13 and its negative sign shows that these parties were associated with the smaller SOE sector. The results were ambiguous for the variable representing left-leaning parties—the larger number of years

in power of left-leaning parties was related to the larger SOE sector when *LSP* was considered (Models 5 and 6) but the opposite held for *TA25* (Model 13). In the group of economic factors both natural resources and initial income levels were insignificant in each model.¹²

5. Discussion

The results of the econometric analysis suggest that cultural factors had a substantial influence on the scale of state ownership in enterprises in post-socialist countries and the role of political and economic factors was less pronounced. The role of culture as an important determinant of institutional performance is broadly discussed in the literature (Alesina & Giuliano, 2015). The smaller scale of the SOE sector in predominantly Protestant and Catholic post-socialist countries might be perceived as being in line with the previous studies on this group of states that show that countries with dominant Protestant and Catholic religions were characterized by the higher pace of institutional changes towards the market economy and free political system (Schweickert et al., 2011; Piątek et al., 2019). What is more predominantly Orthodox states also had a smaller SOE sector than Muslim countries. As religion might shape the society's expectations towards the provision of goods based on market incentives or directly by the state (Grigoriadis, 2016; Tarabar, 2017) the analysis of the role of SOEs in the economy focusing on the differences between individualistic and collectivistic societies is an interesting avenue for further research.

The analysis with the data from Szarzec and others (2019) indicated the substantial relationship between the number of years under central planning and the larger SOE sector. This suggests that a longer period under central planning was associated with larger a SOE share. However, this result should be treated with caution, as in the group of sixteen countries for which *TA25* is available, fifteen of them had a centrally planned economy for 41–51 years and Russia for 74 years. Therefore the relationship between *TA25* and *YUCP* might be driven solely by a single country. In order to test this conjecture a dummy variable for Russia was additionally introduced into the analysis and the impact of the years under central planning turned out to be insignificant.¹³

The impact of natural resource abundance—represented by the first principal component of oil and gas reserves—was insignificant in each model. As large

¹² Additional analyses were conducted with the following independent variables: an accession to WTO, the former Soviet Socialist republics, population size, religion and ethnic diversity. Each of these variables turned out to be insignificant and led to the problem of multicollinearity.

The models presented in this paper were also recalculated with the dependent variables *LSP* and *TA25* for the year 2014 instead of their average values. These calculations lead to the same conclusions as presented in the article. Results available upon request.

¹³ Results available upon request.

enterprises operating in the natural resources' sectors are often state-owned (Kowalski et al., 2013; Szarzec & Nowara, 2017), this indication is quite surprising. Therefore this field should be further investigated, especially in studies employing a broader set of analysed countries and more complex measures of natural abundance.

The signing of the Association Agreement with the EU was shown to be insignificant in the analysis with the *LSP* variable and as significant with *TA25*. The negative sign in the latter case shows that the higher number of years after the signing of the agreement was associated with the smaller SOE sector, which is in line with Di Tommaso and others (2007), Schweickert and others (2011) and Piątek and others (2019) that showed that the prospect of membership in the EU was positively associated with market reforms. However the results of the analyses employing the signing of the Association Agreement with the EU as an exogenous variable should be treated with caution because this decision might be affected by the previous progress in reforms. The relationship between the number of years of left-leaning and right-leaning parties in power and the scale of state ownership is ambiguous. Similarly to the last discussed variable these results should be also taken with a grain of salt.

An important caveat to the interpretation of the results and a comparison between the analyses with the *LSP* and *TA25* variables is that the latter indicator is available for only sixteen out of the twenty eight post-socialist countries. What is more the selection to this sample is also likely to be biased because the construction of the dataset by Szarzec and others (2019) was dependent upon micro-level data availability, which seems to be substantially worse for less-developed economies. In fact the average values of the *LSP* indicator for countries included in the dataset of Szarzec and others (2019) was 3.54, while for those not included—2.79. Therefore the set of countries included in the analysis with *TA25* is likely to be less heterogenous than the overall group of post-socialist countries, which might lead—along with the smaller sample size—to the smaller explanatory power of independent variables. Concerning the *LSP* variable one needs to keep in mind that the measure from the EBRD includes a component related to corporate governance, which might lead to relatively lower values of *LSP* in countries where corporate governance improvements were lagging behind. Therefore, despite a strong correlation between *LSP* and *TA25*, the large scale privatisation indicator might suggest relatively higher SOE shares when privatisations were not accompanied by corporate governance restructuring. The two above-mentioned caveats unambiguously indicate the need to establish micro-level-based SOE measures for a broader set of countries.

Conclusions

This study contributes to the literature by analysing the little studied field of factors influencing the scale of state ownership in enterprises. To address this research gap the data for twenty eight post-socialist countries were collected and the large scale privatisation indicator from the EBRD and the SOE measure from Szarzec and others (2019) were regressed on sets of cultural, political, economic and controls variables. The results show that cultural factors—represented by the dominant religion—had a substantial impact on the scale of state ownership in enterprises while the role of political and economic factors was less pronounced. This emphasises the importance of cultural factors in shaping the scale of state ownership in enterprises.

State-owned enterprises still play an important role in the world economy and state ownership in enterprises is present not only in post-socialist countries, but also in developed states. While this study provides some empirical evidence on the determinants of the prevalence of SOEs in the economy, further research focusing on the broader set of countries, as well as including more precise measures of economic weight of SOEs is still needed.

Appendix

Table A1. Large scale privatization, EBRD, mean values 2007–2014

Bulgaria	4.00	Romania	3.67	Slovenia	3.00
Czech Republic	4.00	Albania	3.54	Ukraine	3.00
Estonia	4.00	Poland	3.54	Serbia	2.67
Georgia	4.00	Croatia	3.41	Uzbekistan	2.67
Hungary	4.00	Macedonia	3.33	Tajikistan	2.33
Lithuania	4.00	Montenegro	3.29	Azerbaijan	2.00
Slovakia	4.00	Bosnia and Herzegovina	3.00	Belarus	1.59
Armenia	3.67	Kazakhstan	3.00	Turkmenistan	1.00
Kyrgyzstan	3.67	Moldova	3.00		
Latvia	3.67	Russia	3.00		

Source: Own elaboration based on data from EBRD.

Table A2. Correlation matrix

LSP	TA25	Muslim	Catholic	Orthodox	Protestant	YUCP	WAR	NatRes	GNPpc-1989	EUA	govCenter	govRight	govLeft	govUn	InitCond	KM-Brussels
LSP	1.00															
TA25	-0.78*	1.00														
Muslim	-0.48*	0.54*	1.00													
Catholic	0.38*	-0.44*	-0.37*	1.00												
Orthodox	-0.05	0.18*	-0.49*	-0.47*	1.00											
Protestant	0.23*	0.01	-0.18*	-0.17*	-0.23*	1.00										
YUCP	-0.54*	0.41*	0.44*	-0.52*	0.12*	-0.10	1.00									
WAR	-0.32*	0.56*	0.15*	-0.18*	0.11*	-0.15*	0.30*	1.00								
NatRes	-0.51*	0.28*	0.38*	-0.27*	-0.04	-0.13*	0.51*	0.42*	1.00							
GNPpc1989	0.28*	-0.17*	-0.63*	0.48*	-0.11*	0.46*	-0.17*	-0.05	-0.06	1.00						
EUA	0.61*	-0.78*	-0.51*	0.64*	-0.31*	0.37*	-0.67*	-0.40*	-0.31*	0.55*	1.00					
govCenter	0.07	0.16*	0.01	-0.22*	0.13*	0.12*	0.34*	-0.24*	0.11*	0.10	-0.17*	1.00				
govRight	0.43*	-0.29*	-0.03	0.20*	-0.36*	0.40*	-0.25*	-0.16*	-0.28*	0.14*	0.32*	-0.17*	1.00			
govLeft	-0.30*	-0.24*	0.11*	0.23*	-0.14*	-0.31*	-0.21*	-0.18*	-0.10	-0.26*	-0.02	-0.32*	-0.30*	1.00		
govUn	-0.02	0.19*	-0.10	-0.16*	0.30*	-0.12*	0.20*	0.42*	0.26*	0.09	-0.03	-0.24*	-0.26*	-0.60*	1.00	
InitCond	-0.35*	0.03	0.29*	-0.54*	0.06	0.29*	0.77*	0.05	0.28*	-0.06	0.32*	-0.11*	-0.29*	0.16*	1.00	
KMBrussels	-0.42*	0.21*	0.72*	-0.52*	-0.13*	-0.11*	0.80*	0.17*	-0.47*	-0.55*	0.25*	-0.10	-0.02	-0.05	0.65*	1.00

Notes: Pairwise correlations. The asterisk denotes significance at the 1% level.

Source: Own elaboration.

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