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OWNERSHIP STRUCTURE AND TOTAL FACTOR PRODUCTIVITY: DIFFERENCES ACROSS INDUSTRIES IN CROATIA

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Abstract

Factors explaining productivity growth include internal and external categories, such as quality of management and labour, product innovation and competition. However, ownership structure is rarely mentioned as a potential factor for impacting productivity growth. On the other hand, it is often assumed that private firms are more productive than state-owned, the argument frequently additionally emphasized in the public discussions in (post)transition economies. Since aggregate data hides developments in individual sectors, it is important to investigate the relationship between ownership and productivity on the industry level. Hence, in this article we investigate trends in productivity related to the ownership structure across industries using data for Croatia both during the boom and recession phase. Results show higher increases in productivity in the observed period in the public, not private, sector and that TFP path at the sectoral level in the state-owned firms is more erratic than in the private segment of the economy.

Keywords: TFP, ownership structure, industries

1. INTRODUCTION

In the literature, factors explaining productivity growth include internal and external categories, such as quality of management and labour, product innovation and competition. However, ownership structure is rarely mentioned as a potential factor of productivity growth. On the other hand, public discussions often assume that private firms are more productive than state-owned, the argument frequently additionally stressed in (post)transition economies. The intensive process of privatization at the beginning of the 1990s relied on this assumption. Since empirical research emphasise that total factor productivity (TFP) growth can lead to long-term GDP per capita growth and since state-owned firms are still important employers in Croatia, it is interesting to reveal to what extent TFP differs in firms with different ownership structure. Furthermore, since aggregate data hides developments in individual sectors, it is important to investigate the relationship between ownership and productivity on the industry level.

Evidence on TFP growth does not offer straightforward conclusions in transition economies. For example, Djankov and Murrell (2002) summarized 23 studies which investigated the impact of increased competition brought by the early phases of transition on firm performance, and did not offer clear conclusion. Bah and Brada (2009) argue that TFP level is lower in transition countries than in advanced economies. This leads to the assumption that transition towards market economy and the subsequent convergence process should be marked up by intensified TFP growth. Such assumptions were seldom confirmed by data evidence. Researchers have offered several explanations for the relatively low TFP growth. Some emphasized the disruption of previous economic connections within the previous economic system (Blanchard and Kremer, 1997), others focused on the privatization problems that may further delay restructuring and the technological catching up process (Estrin et al., 2001).

Previous research on TFP in Croatia does not encompass the ownership issue. Hence, in this article we investigate trends in productivity related to the ownership structure using data for Croatia both during the boom and recession phase. For estimating production function and backing out TFP we use firm-level data divided by the 2-digit level of the Nace Rev. 2 classification.

The paper adopts the following structure. Section 2 briefly discusses the relevant literature. Section 3 presents the data and methodology used for the empirical analysis. Section 4 contains presentation of empirical results and discussion, while the last section offers conclusions.

2. LITERATURE REVIEW

The economic growth in countries is traditionally explained by the growth of human and physical capital, but also more recently through the increased emphasis on the famous residual – total factor productivity. Indeed, studies have revealed that a large proportion of growth can be attributed to this

rather vague indicator (Hall and Jones, 1999).

Most often in the literature TFP is defined as a variation in output that cannot be attributed to variations in production inputs (Krugman, 1994; Hulten, 2001; Helpman, 2004). This implies that TFP is a non-observable variable which has to be estimated, producing extant studies discussing appropriate methodological issues. More comprehensive analysis of methodological issues related to TFP estimation can be found in Van Beveren (2010) and Del Gatto, Di Liberto and Petraglia (2011).

TFP is closely related to the level of income per capita. Existing research shows that richer countries are more productive, while poorer are less productive. Helpman (2004) shows that countries with high level of TFP have high income per capita and concludes that since richer countries have a higher level of physical capital and a better educated workforce, their income is higher because of all the three factors – more physical and human capital and higher TFP. Pires and Garcia (2012) argue that differences in productivity account for all the differences in economic growth between developed and developing countries. Easterly and Levine (2001) and Hulten and Isaksson (2007) also argue that differences in TFP are the main source of the differences in the level of development. Literature on total factor productivity is mostly focused on the developments in the overall economy, while research of industries is less in focus. Existing studies, however, suggest large and persistent heterogeneity in firm-level productivity, even in narrowly defined industries, across the countries (Bartelsman, Haltiwanger, and Scarpetta 2013). Thus, the between-industries differences in TFP are expected.

Since the goal of transition economies has been real convergence to the advanced economies' development level, the increase in TFP is an important determinant of the catch up process. Structural changes that transition economies have gone through are perceived as a crucial stimulus to increase TFP, and the removal of central planning and increase in private ownership should have been the carriers of future development. Some studies argue that until the beginning of the transition period, TFP growth was almost non-existent, while the main source of growth was increase in capital and labour (De Broeck and Koen, 2000; Campos and Coricelli, 2002). However, the first decade of the transition did not bring the expected convergence, due to initial (surprising) fall in both TFP and growth rates. Campos and Coricelli (2002) argue that the reason for that is a lack of coherence in the reform strategies.

After initial struggles, transition countries managed to start convergence process, especially those preparing for the membership in the EU (Bah and Brada, 2009; Epstein, 2014). However, even though the convergence process has finally started, transition countries still have not caught up with the developed countries in the level of GDP per capita.

Even though growth accelerated after the initial drop, the interest in the role of private ownership in the economic development remained, due to its utmost importance for establishing market economy. Privatisation is perceived

as an important vehicle to increase TFP and economic growth. Advocates of privatisation argue that privatisation will improve the performance of the companies, but also that it will impose hard budget constraints, forcing loss makers to exit the market and leaving productive companies to attract investors. Studies have shown that in the case of transition countries experience with privatisation was generally positive. Privatised companies tend to restructure more quickly and perform better than state-owned companies, but only if competition on the market, hard budget constraints, high corporate government standards and effective legal structure are present (IMF 2000). Estrin et al. (2009) find a positive effect of privatisation on TFP in the CEE countries, but note that privatisation has a larger effect on TFP in companies that were privatised by foreigners than by domestic owners. Frydman et al. (1999) compare the performance of private and state owned firms in Central Europe and argue that privatisation to outsider-owners (including foreign investors), but not to insiders (managers and employees of the privatised companies), has a significantly positive effect on firms' performance.

This paper is focused on the TFP evolution in Croatia, with particular focus on ownership and sector differences. Previous studies are relatively scarce. Raguž, Družić and Tica (2016) estimate aggregate TFP evolution in the period 1952-2010 and find positive effect of transition on TFP growth. Transition changed the trend in TFP growth rates from negative to positive, but those higher TFP growth rates affected only moderately the contribution of TFP to the GDP growth rates. The authors explain the moderate change in TFP contribution by the similar effect of transition on physical and human capital, causing relative importance of growth factors not to change significantly. Sectoral approach has been adopted by Gelo and Družić (2015). The authors have focused on the 2009-2013 period and have established important differences in TFP growth between the different sectors of the Croatian economy. The rest of the present paper is devoted to exploring these issues in more details, by examining a longer period and disaggregated approach by adding the ownership component into consideration.

3. DATA SOURCES AND METHODOLOGY

Since TFP is an unobserved variable, it has to be estimated. The most common approach relies on an estimation which adopts the production function:

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \beta_m m_{it} + \omega_{it} + \eta_{it} \quad (1)$$

where y is value added proxied by sales net of intermediate inputs from firm i at time t, l is labour costs, k is capital, reserves and retained earnings, m is intermediate inputs proxied by costs of goods sold, but without labour and amortization costs, while ω is productivity and η is measurement error, both unobserved. All variables are deflated using sectoral deflators from AMECO database and transformed to natural logarithms. Equation (1) is estimated for different sectors of 2-digit NACE classification in order to obtain more precise

estimates. Levinsohn and Petrin's (2003) methodology is used to estimate the coefficients of the production function. After we estimate coefficients from Equation (1) for every sector, we use these estimated coefficients to calculate TFP for every firm separately. The results presented below are shown in logarithmic form.

However, since TFP is non-observable variable, there are many methodological issues related to its estimation, such as simultaneity bias, selection bias, proxying for firm-level prices using industry-level deflators and problem of multi-product firms (Van Beveren, 2010). In order to solve simultaneity problem, which is mostly discussed in the literature, Levinsohn and Petrin (2003) use firm's intermediate inputs, unlike Olley and Pakes (1996) who use firm's investment decision, to control for correlation between inputs and the unobserved productivity shock. In this way they avoid the problem of firms reporting zero investment and are able to use almost all firms in the sample to estimate TFP. Intuitive approach and the ease of use made Levinsohn and Petrin's (2003) methodology very popular.

The source of Croatian firm-level data used in the analysis is Annual Financial Statements Registry that Croatian non-financial companies are obliged to provide to the Financial agency (FINA) covering the period 1999-2015. The initial aim was to provide a comparative overview of the developments at the sector level even during the longer period. However, there were some methodological concerns as regards the possibility to ensure the comparability of the data. Naturally, the NACE classification itself has been changed many times since its introduction. At the beginning of the analysed period it was not even developed[1]. Thus, additional effort has been made to consolidate the individual firm-level data to ensure the correspondence of NACE classification in the data used. For the analysis of aggregate TFP dynamics, the number of observations was lower at the beginning of the sample – most probably due to the problems in identification of correct NACE classification. Additional sector overview suffered from low observation count for the state-owned enterprises. In order to avoid firm-level disclosures of the data, we present the data at the level of NACE sectors and only for those when the number of observations is larger than 10.

It has to be emphasized that when presenting aggregated data (for a specific sector), we do not use any weighting scheme, but simply rely on individual firm level indicators. The reason for this approach is that we are not interested in the contribution of firms/sectors to the overall TFP development in Croatia. Instead, we are more interested in the underlying differences in the speed of transformation in the analysed segments of the Croatian economy.

The definition of ownership is not straightforward, in particular when transition economies are considered. Our classification is governed by the dataset used. We distinguish between two types of ownership:

[1] Prior to NACE adoption in Croatia, the national classification of activities was JKD and not entirely comparable to the classification used in other European countries.

a) Private: including those that went through privatization process, those established private (new firms), cooperatives and mixed ownership if the share of private capital is more than 50 percent.

b) State: public enterprises, firms whose privatization process has not formally ended, firms whose privatization process has not yet begun (although it was expected that they will be privatized) and firms with mixed ownership if the share of public capital is more than 50 percent.

Bearing in mind all the above mentioned data caveats, our final sample used in the remaining of the paper is restricted to the 1999-2015 period. The characteristics of the sample are depicted in Figure 1 and Table 1.

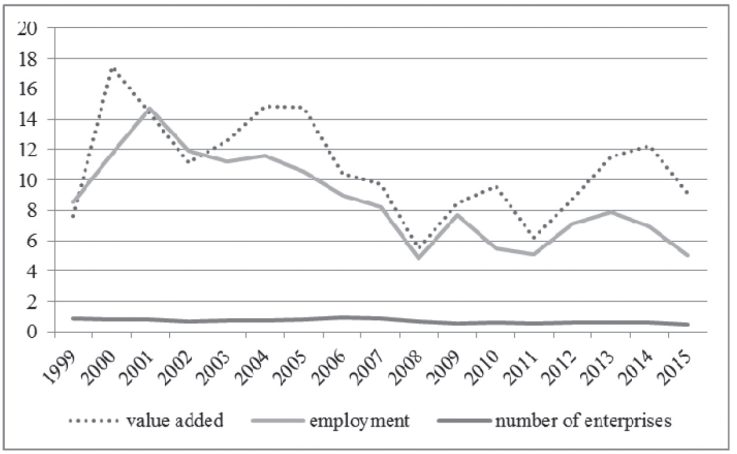

Figure 1 Share of state-owned enterprises in value added, employment and the number of enterprises, 1999-2015

Source: authors' estimates based on FINA.

As expected, the share of state-owned firms in the total number of enterprises in Croatia is relatively low (but also importantly not significantly declining during the analysed period). It can also be noticed that the share of state-owned enterprises in both employment and value added has been declining in the period before the 2009 crisis. However, the more recent trend actually reveals revival of the state-owned enterprises' role in the economy. The reason might be that they have been additionally sheltered during the bust period, since they had additional channel of financial resources (through the state budget).

Table 1

Private and public firms according to size

	Private					State-owned				
	Micro	Small	Med	Large	Total	Micro	Small	Med	Large	Total
1999	16,999	2,642	460	89	20,190	50	58	57	19	184
2000	21,149	3,193	495	108	24,945	56	65	58	21	200
2001	23,509	4,073	626	121	28,329	66	59	82	26	233
2002	22,177	4,302	682	117	27,278	60	65	47	22	194
2003	22,943	4,785	744	134	28,606	71	53	55	29	208
2004	21,908	4,765	732	119	27,524	84	46	47	34	211
2005	22,782	5,137	814	142	28,875	96	65	48	33	242
2006	24,984	6,299	951	147	32,381	139	86	55	35	315
2007	26,282	6,838	1,100	168	34,388	125	91	58	34	308
2008	25,897	6,724	1,103	173	33,897	88	65	44	27	224
2009	23,952	5,815	934	147	30,848	51	64	32	22	169
2010	23,303	5,328	816	143	29,590	61	67	29	20	177
2011	24,322	5,089	783	150	30,344	61	63	32	19	175
2012	23,777	5,103	780	157	29,817	57	67	34	18	176
2013	27,558	5,763	828	167	34,316	74	71	33	24	202
2014	28,039	5,885	911	165	35,000	80	82	32	22	216
2015	30,175	6,339	973	184	37,866	56	80	40	19	195

Source: FINA.

Even though private firms outnumber state-owned, the relevance of state-owned firms for the economy is relatively high. State-owned firms account for only 0.7 percent of the total number of firms, but participate with almost 9 percent in the total number of employees and 11 percent in total value added. Hence, examining TFP separately in the private and public sector contributes to the ongoing policy discussions of the structural reforms in the Croatian economy.

4. RESULTS AND DISCUSSION

We first analyse the evolution of overall TFP differences between the public and private sector in Croatia. As noted before, the data presents simple averages for the whole period.

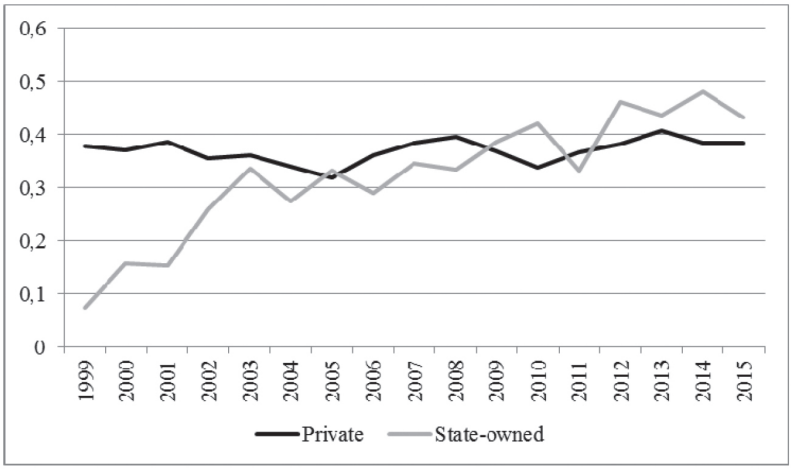

Figure 2 TFP in public and private sector in Croatia, 1999-2015
Source: authors' estimates based on FINA.

As presented in the previous chapters, convergence literature argues that increase in TFP is an important determinant of the catch up process. However, as can be seen from Figure 2, the only increase in productivity in the observed period comes from the public and not the private sector. The increase in TFP in the public sector has been particularly strong in the period up to the year 2003. The 1999-2003 state-owned firms' productivity growth is so strong, that it influences the identification of productivity differences for the whole period[2]. Hence, the increase in TFP for the state-owned sector is important for the overall TFP developments.

Next we focus on the specific developments in different economic sectors. As previously indicated, we consider only those activities in which there have been enough observations in the public sector. Naturally, some activities have constantly higher estimated TFP, both in public and private firms. The data shows that in sectors D (electricity, gas, steam and air conditioning supply) and I (accommodation and food service activities), followed by sector L (real estate activities) the estimated TFP is relatively the highest.

[2] To verify this, we run a simple panel regression model and inspect whether the difference in TFP between state-owned firms and private firms is significant. The results imply that when the whole period is taken into account, we can establish statistically significant differences – private firms are more productive than state-owned. However, when we focus on 2003-2015 period, the difference is not statistically significant. Results can be obtained from the authors upon request.

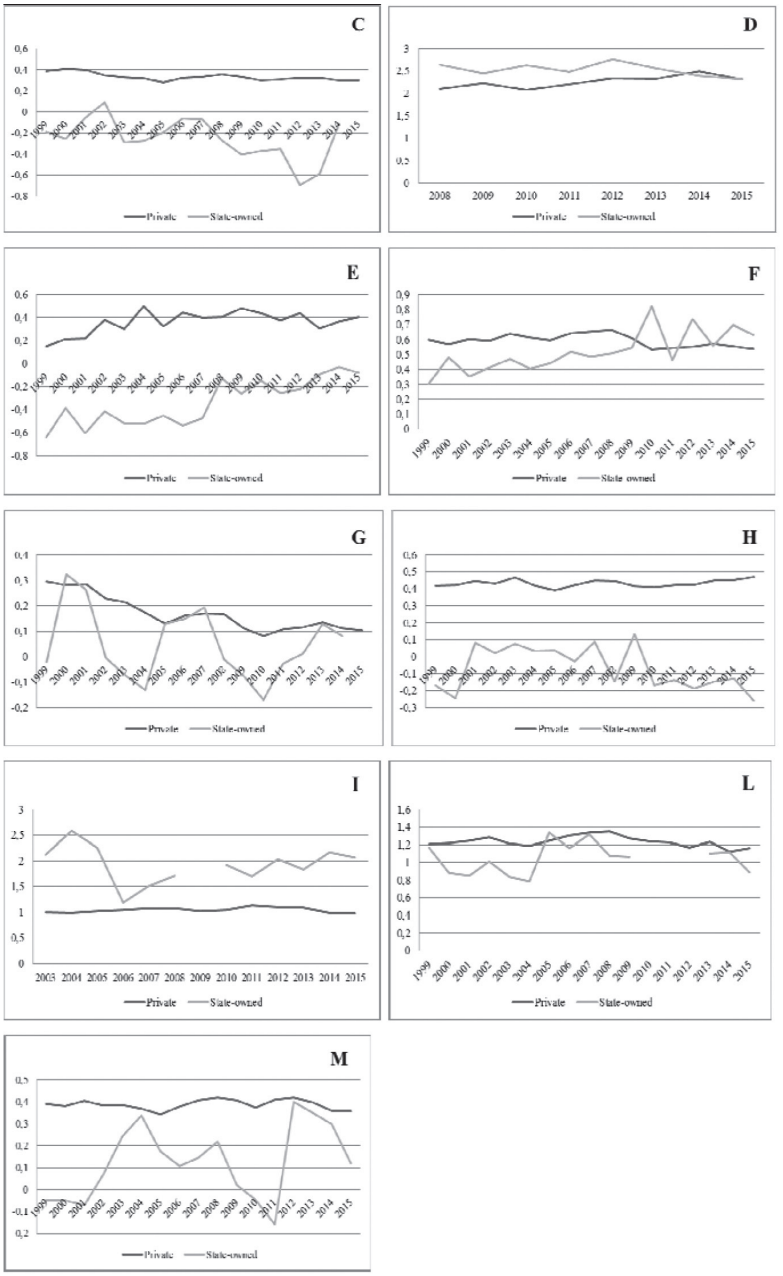

Figure 3 TFP in public and private sector in Croatia across NACE, 1999-2015

Note: C - manufacturing, D - electricity, gas, steam and air conditioning supply, E - water supply, sewerage, waste management and remediation activities, F - construction, G - wholesale and retail trade; repair of motor vehicles and motorcycles, H - transportation and storage, I - accommodation and food service activities, L - real estate activities, M professional, scientific and technical activities.

Source: authors' estimates based on FINA.

In addition to general differences between economic activities in terms of productivity, the data presented in Figure 3 also reveals interesting differences in evolution patterns. In general, it can be seen that the TFP path in the state-owned firms is more erratic than in the private segment of the economy. This is probably related to the increased correlation with political cycles, where necessary investment decisions are sometimes postponed. This creates technology gaps and leaps, disabling the state-owned firms' management from making long-term decisions. Specifically, both management and financing opportunities change with the election cycle. This disrupts normal decision making processes on research and development or investments and probably influences the possibility of state-owned enterprises to participate in market competition. It could indirectly also be related to the opposition towards further privatization. Prolongation of privatization decisions can in such context create huge technological gaps, making the management structures of the state-owned enterprises convinced that their firm will not survive the competition without the safety net of the public sector.

Among the analysed economic activities, those where throughout the analysed period the TFP has been higher in private sector are – C (manufacturing), E (water supply, sewerage, waste management and remediation activities), H (transportation and storage) and M (professional, scientific and technical activities)[3]. In these activities, state presence can be found in large enterprises which were either not fully privatized or have been undergoing several private-public changes in ownership. The state was in those incidences mostly concerned with the social component – preserving workplaces, while private investors were more focused on profitability. These two goals have been proven difficult to achieve simultaneously, creating lingering unresolved issues.

It is also interesting to note that in one of the activities (I - accommodation and food service activities), TFP growth seems to be higher in state-owned enterprises. We attribute these results to the methodology used to estimate TFP growth, which is based on production function and subsequently can be less appropriate for measuring productivity advances in services.

5. CONCLUSIONS

The paper has explored the role of ownership for productivity of enterprises in Croatia. The main contribution of the paper is associated with longer-term perspective, enabling discussion related to the evolution of productivity in private and public segment of the economy.

Results contribute to the ongoing policy discussions of the structural reforms in the Croatian economy. We explore sectoral patterns of TFP development and establish that TFP path in the state-owned firms is more erratic than in private segment of the economy. We attribute this to the connection of state-owned enterprises through its management structures with political cycles.

[3] Only in these activities as well private firms have statistically higher TFP than state-owned.

We argue that this link disrupts usual decision making process, in particular when it comes to making decision on research and development investments, which require longer-term vision of firm's participation on the market. Even though some of the state-owned enterprises are natural monopoly on Croatian market, the size of that market is relatively small and thus these firms could potentially suffer from competitive pressures stemming outside national borders. The important policy recommendation extracted from such arguments would be to establish longer-term perspective and financing for the state-owned enterprises.

Although it seems encouraging that we found activities in which TFP growth is higher in state-owned enterprises than in private ones, we attribute this specific result to the methodology applied. Since productivity and TFP measurement is additionally burdensome in service sector, we leave these issues for future research endeavours.

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