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The impact of Privatisation – Empirical Analysis and Results in Serbian Industry

Abstracts: *The privatization concept, applied after the 2000 changes, failed to bring the expected performance to Serbian industry. Privatization partly initiated the enterprises restructuring in some fields of manufacturing industry. It brought fresh capital, new technologies and new managerial know-how. However, the result thereof was far weaker than the initially expected. The reasons for the said, but also the final aims of the given process, are analyzed in detail throughout the following article. The research is based on the processing of data from financial statements, submitted by the companies from the Serbian non-financial corporate sector in the period 2002-2007. Panel analysis disclosed how the results of each of the observed ownership forms have changed over time in different sectors and branches of the industry. On the other hand, we also tested the hypothesis according to which privatization effects on the companies' performances significantly vary depending on the company size, whereby the effects of capital sales model have been implicitly assessed.*

Keywords: privatization, industry, productivity, labor costs

Efekti privatizacije – Empirijska analiza i rezultati na srpsku industriju

Apstrakt: *Koncept privatizacije primenjen nakon oktobarskih promena 2000. godine industriji Srbije nije doneo očekivane performanse. Privatizacija je*

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delom pokrenula restrukturiranje preduzeća u pojedinim oblastima prerađivačke industrije. Donela je svež kapital, nove tehnologije i nova menadžerska znanja. Međutim, njen rezultat je daleko slabiji od prvobitno očekivanog. Razlozi koji su tome doprineli, ali i krajnji dometi navedenog procesa, detaljno su analizirani u tekstu koji sledi. Istraživanje je bazirano na obradi podataka iz finansijskih izveštaja koja su privredna društva nefinansijsko poslovnog sektora Srbije predale u periodu od 2002. do 2007. godine. Panel analizom je pokazano kako su se rezultati svakog od posmatranih svojinskih oblika u različitim sektorima i oblastima industrije menjali kroz vreme. S druge strane, testirana je i hipoteza da efekti privatizacije na performanse preduzeća značajno variraju u zavisnosti od njegove veličine, čime se implicitno ocenjeni i efekti modela prodaje kapitala.

Ključne reči*: privatizacija, industrija, produktivnost, troškovi rada*

1. Introduction

The aim of the paper is to research privatization effects on the performance of

industrial companies, with a particular emphasis on the creation of gross value added and profitability of the Serbian economy in the period 2002-2007. The late 2007 period was taken in order to exclude the distortion effect caused by the global economic crisis.

The global economic crisis seems to have further induced already heated debate among economic experts and policy makers over economic effects of the privatisation of state-owned and, in our case, socially-ownedfirms as well. However, the experience gained by the transition countries over the period of twenty years now creates firm grounds for making reliable assessments of the process that had directed the fortune of these countries, and that is still regarded as controversial.

For the two major attempts at summarising theoretical and empirical knowledge in this area, which predominantly correspond to the subject of our research, for the time being we are obliged to Simeon Djankov and Peter Murrel (Djankov et al, 2002), i.e. to Estrin, Hanousek, Kocenda and Svejnar (Estrin et al, 2009). The study prepared for the IMF by Oleh Havrylyshyn and Donal McGettigan (Havrylyshyn et al, 1999), should also be noted as the initial general attempt at systemising theoretical researches concerning the first transition years of 25 non-Asian countries, however also as the conclusive evidence absolutely confirming the superiority of privatised over state-owned firms.

There is a series of theoretical models that are envisaged for examining the relationship between privatisation, on one hand, and macroeconomic

performances and economic growth, on the other. Putting aside methodological differences of certain surveys, it is a notable fact that the assessment of this relationship changes in time.

For example, Zinnes, Eilat and Sachs (Zinnes et al, 2001), in the panel of 25 transition countries held in 2001, determined that privatisation by itself would not contribute to GDP growth, however expressive positive effects could be noted if privatisation went along with firm budgetary restrictions and in-depth institutional reforms. In 2007, Benett, Estrin and Urga (Benett, et al, 2007) in the panel data of 26 transition countries could not identify statistically significant relation between the share of private sector and growth; wherefrom it may be deducted that there is no direct relation between privatisation and economic growth. Even so, the countries that implemented the method of mass privatisation expressed better results in relation to the countries that opted for other methods. Therefore, the advantages of fast privatisation regarded long-term can have positive effects on growth, this result being the consequence of increased ownership concentration that is produced by mass privatisation, which ensures much higher control within privatised firms. However, especially interesting is the fact that Fabian Gouret (Gouret, F. 2007), analysing the same data comes to the conclusion that mass privatisation may have yielded long-term benefits in terms of economic growth; however to much less extent than gradualist approach. Generally, it can be concluded that the existent 'macro' studies mainly confirm the positive effect of privatisation on the level of aggregate output of economic growth, when the privatisation is followed by complementary reforms. However, assessments are unclear when the effects of velocity are observed, i.e. dispersed or concentrated ownership.

The conclusions diverge also in the sense of privatisation impact on performances of enterprises.

Certain interpretations determine that there are no significant effects of privatisation on performances (Bevan et al, 1999), the others find that reliable proofs for these effects are weak (Shirley et al, 2001), while for the third group of authors (Megginson et al, 2001) privatisation is of crucial importance for better business performances. The interpretations of data tend to vary, mostly because of different and limited data, both for enterprise performances and certain ownership forms. Therefore, three significant methodological problems appear and they are especially characteristic of the early papers in this area. Firstly, objective limitation refers to a short period of time that all relevant observations concentrate directly before or after the privatisation. Secondly, the analyses are based on: (a) small and often non-representative samples of enterprises; (b) the problem of identifying varied ownership form in enterprises under the process of privatisation; (c) creating panel of countries with various accounting systems. Finally, there are numerous studies where the issue of

selection/endogenous features is not treated in an adequate way, which later tends to be hindering for making correct conclusions.

In order to avoid the mentioned limitations, early in 2009 Estrin, Hanousek, Kocenda and Svejnar (Estrin et al, 2009) compiled 34 most relevant surveys released before December 2007 and brought out synthetic conclusions on privatisation effects on level and growth of total factor productivity – TFP, level and growth of profitability, i.e. level and growth of enterprise earnings. In addition, they analysed the impact of privatisation on labour productivity, employment and salaries and wages. The subject countries are classified as the countries of Central and Eastern Europe (CEE), enlarged for the Balkan and Baltic countries; and the Commonwealth of Independent States (CIS), which started transition later, without being decisively dedicated to develop market-oriented legislative and institutional frame.

The results indicate that the positive impact of privatisation made by domestic investors was considerably lower than in the case of foreign investors, and that the period needed for effectuating positive impact was longer; moreover, the effects were more expressive in CEE countries than in the CIS countries, where cases of fully negative impact were noted.

Regarding the concentration of ownership, the findings also confirm the hypothesis that concentrated ownership, in contrast to dispersed private ownership, tends to favour efficiency more strongly; only in Estonia the positive effect of dispersed ownership by employees on the TFP level was statistically documented.

There are two studies that specially deal with the issue of efficiency of privatised state-owned firms and new-established private enterprises. Examining the Czech Republic and Russian industrial enterprises in the period from 1992 – 2000, Sabirianova, Svejnar and Terrell (Sabirianova et al, 2005) come to the conclusion that foreign start-up firms are less efficient than foreign already running enterprises, although they are much more efficient than domestic start-up enterprises, which are, on the other hand, far more efficient than the existent domestic companies. Therefore, the survey results indicate that new-established enterprises, so-called de novo, tend to be more efficient than the enterprises having been privatised by domestic investors.

The findings of the second survey carried out by Commander and Svejnar (Commander et al, 2007) on a sample of 26 transition countries in the period from 2002 to 2005 also confirm the fact that domestic start-up enterprises are noted to be less efficient in comparison to foreign enterprises, however the difference is not significant when the same are related to domestic privatised and state-owned firms.

In contrast to the impact of privatisation on the TFP level that, as noted before, was positive and rather strong in all Eastern Europe transition

countries, the effect of privatisation on the TFP growth was assessed only for the CEE countries. In the above cited paper Commander and Svejnar determined that in the period from 2002 to 2005 the impact of privatisation on the TFP growth was not statistically significant.

An important indicator of enterprise performances is profitability, despite the fact that in transition economies, due to tax evasions it used to be seriously underestimated. The surveys also focused almost exclusively on the CEE countries, and the results suggest that the positive impact of privatisation on the level of profitability is small, both when carried out by domestic or foreign proprietors. However, when the impact on growth of profitability is observed, the assessments are statistically insignificant. In the study conducted in 2006 (Jeffrey, M. 2006), Jeffrey Miller determined that in Bulgaria there was certain positive impact of ownership concentration on the rate of net return on total business assets (ROA). Marko Simoneti and Aleksandra Gregorić (Simoneti et al, 2004) asserted that in Slovenia ownership concentration (although not by the employees) had positive effects on profits. Simultaneously, the keeping of 'golden action' by the government, as well as the concentration of ownership secured by the employees, can hardly be related to profitability.

Numerous studies try to uncover the effects of privatisation on labour productivity, employment and earnings. The general results can be summarised in the following way. The impact of private ownership on labour productivity is mainly positive or insignificant. Just as in the case of TFP, foreign ownership, as well as ownership concentration, have major positive and significant effects, while the impact of ownership by the employees, the management, as well as the control of 'golden action' by the government are largely statistically insignificant.

The effects of privatisation on employment are also an indicator of intensity of restructuring that is produced by privatisation; therefore they represent a major link to theoretical models of transition. According to 17 studies that Estrin, Hanousek, Kocenda and Svejnar cross-compared in their analysis, privatised enterprises, especially those in foreign ownership, tend to increase, rather than to decrease employment relative to state-owned enterprises/firms. It is also clearly evident that the concept of workers' action and control cannot have statistically significant impact on employment.

The conclusions relative to the impact of privatisation on salaries and wages cannot be made straightforward. Some authors tend to find that state ownership correlate with low salaries and wages in certain countries, such as Russia and former Czechoslovakia; however this was the case in other countries, including Poland for example.

2. Methodology

Below, the survey will be divided into four segments. The first segment analysed the synthetic influence of privatisation on performances of the Serbian industrial enterprises, relative to the enterprises run under different ownership forms. The second assesses the influence of privatisation on the performances of the subject subset of enterprises, which is followed by the analysis of performances of the total set of privatised enterprises relative to the year when privatisation has been carried out. Finally, we present the assessment of the impact of FDI on the indicators of productivity, labour costs and profitability of the Serbian privatised enterprises in the period from 2002 to 2007.

Having reviewed the reference literature we can state that the impact of privatisation on economic performances in most international, and especially in domestic empirical surveys, was estimated by comparative, i.e. cross-section data. However, in this paper we considered various specifications of correlation based on panel data, as combined comparative data and time series data. It is a specific approach that enables both structural analysis of various privatisation factors and analysis of structural changes over time. In addition, higher variability of panel data in relation to time series and comparative data ensures better efficiency of assessments and lower occurrence of collinear effects.

This methodological approach is based on panel analysis of structural business indicators, i.e. profitability and financial status of the sets of enterprises that are defined as privatised enterprises in the observed period, from 2002 to 2007 conclusive, and their comparison with the set of all enterprises, segregated by ownership type, size and activity.

Privatised enterprises are identified by cross-comparisons with the data provided by the Privatisation Agency. However, it shall be noted that the number of these enterprises is changeable depending on the year when the privatisation was conducted, but it is included in financial reports for certain years.

Table 1. Privatised enterprises in the period 2002-2007
– number of analysed enterprises

	2002	*2003*	*2004*	*2005*	*2006*	*2007*
Non-financial business sector	218	684	263	204	228	280
Of which: *Industry*	93	268	113	72	102	109

Source: SORS

The variables used in the following regression models are defined in Table 2.

Table 2. Variables used in regression models – Definitions

Variable	Definition
PROD	Labour productivity
LC	Labour cost
PROD_t	Productivity of enterprises privatised by tender method
PROD_a	Productivity of enterprises privatised by auction method
LC_t	Labour cost coefficient of enterprises privatised by tender method
LC_a	Labour cost coefficient of enterprises privatised by auction method
PROD_t-2 to PROD_t-6	Artificial variables representing labour productivity in enterprises privatised by tender method depending on year of privatisation
PROD_a-2 to PROD_a-6	Artificial variables representing labour productivity in enterprises privatised by auction method depending on year of privatisation
TR_t-2 do TR_t-6	Artificial variables representing labour cost coefficient in enterprises privatised by tender method depending on year of privatisation
TR_a-2 do TR_a-6	Artificial variables representing labour cost coefficient in enterprises privatised by auction method depending on year of privatisation
$PROD_{stat}$	Labour productivity of state-owned enterprises
$PROD_{soc}$	Labour productivity of socially-owned enterprises
$PROD_{priv}$	Labour productivity of private enterprises (excluding privatised after 2002)
$PROD_{priz}$	Labour productivity of enterprises privatised pursuant to Privatisation Law of 2002, 2007 conclusive
LC_{stat}	Labour cost of state-owned enterprises
LC_{soc}	Labour cost of socially-owned enterprises
LC_{priv}	Labour cost of private enterprises (excluding privatised after 2002)
LC_{priz}	Labour cost of enterprises privatised pursuant to Privatisation Law of 2002, 2007 conclusive
FDI	Share of foreign ownership in total assets value for divisions of industry section, 2007

Source: Author's calculations

3. Synthetic assessment of effects of privatisation on performances of Serbian industrial enterprises

In order to estimate the real contribution of various ownership forms to upgrading the overall productivity in industry, i.e. to reducing labour costs, we will apply a panel analysis to observe how the data for each ownership form changed over time in various manufacturing divisions. In Table 3 we presented the results of regression analysis carried out to determine the influence of various ownership forms on the productivity of the Serbian industry. As stated in the methodological notes, for the data analysis we used STATA v.10 statistical package.

We assessed the equation:

$$PROD_{i,t} = \alpha_i + x'_{it}\beta + \gamma_i + \varepsilon_{i,t} \tag{1.1}$$

where variable $PROD$ is defined as logarithm of gross value added by employee, i is manufacturing division, α is constant, x is vector including independent variables, β is vector of corresponding coefficients, t is time period, and γ is the effect specific for each division and it does not change over time.

Table 3. Summarised statistics of variables used in the panel

Variables		Mean	Std. Dev.	Min	Max	Observations
id	overall	9,2941	5,5125	1	22	N = 102
	between		5,6542	1	22	n = 17
	within		0	9,2941	9,2941	T = 6
t	overall	2004,5	1,7162	2002	2007	N = 102
	between		0	2004,5	2004,5	n = 17
	within		1,7162	2002	2007	T = 6
PROD	overall	6,1151	0,8266	4,4043	8,3737	N = 102
	between		0,6699	5,0595	7,5858	n = 17
	within		0,5067	4,9633	7,2738	T = 6
PROD$_{stat}$	overall	2,2991	3,0990	0,0000	7,8100	N = 102
	between		2,1817	0,0000	6,5888	n = 17
	within		2,2538	-3,3109	7,1859	T = 6
PROD$_{soc}$	overall	5,0006	1,4195	0,0000	7,8974	N = 102
	between		0,8191	3,1678	6,2776	n = 17
	within		1,1836	-1,2769	8,9059	T = 6
PROD$_{priz}$	overall	5,4722	1,6068	0,0000	8,5543	N = 102
	between		1,3428	1,2166	7,3054	n = 17
	within		0,9316	2,2027	11,5553	T = 6
PROD$_{priv}$	overall	6,3179	0,7981	2,2417	8,5819	N = 102
	between		0,5603	5,5210	7,9882	n = 17
	within		0,5818	3,0387	7,9263	T = 6
FDI	overall	0,2535	0,1931	0,0301	0,8654	N = 102
	between		0,1981	0,0301	0,8654	n = 17
	within		0,0000	0,2535	0,2535	T = 6

Source: Author's calculations

Independent variables are $PROD_{stat}$, $PROD_{soc}$, $PROD_{priv}$ and they define logarithm of newly-created value *per* employee in all enterprises within all observed divisions distributed by ownership form; $PROD_{priz}$, logarithm of newly-created value *per* employee in privatised enterprises in the observed divisions from 2002 to 2007. Variable FDI represents share of foreign capital

in total assets value in 2007 at the level of divisions, i.e. two-digit level of the national Classification of Activities. It was obtained as share of the sum of foreign capital in stock capital (aop 624), shares of limited liability companies (aop 626) and deposits of members of partnership and limited partnership (aop 628) in total assets value (aop 633). The origin of foreign capital and its effects on privatisation results will not be analysed.

Since we had analysed panel data, the tables presented results both for the fixed effects and stochastic effects method, for two models, with and without variable FDI. This is a balanced model including 2012 observations – 17 observed manufacturing divisions, the productivity of which is followed by ownership types over a six-year period, from 2002 to 2007.

The final selection of the method will depend on the results of so-called Hausman test. It should be noted that the test establishes and evaluates two hypotheses. The null hypothesis is the one suggesting that there are no significant differences between the methods of fixed and stochastic effects and therefore they are equally applicable, i.e. the coefficients estimated by the method of stochastic effects are equal to those estimated by the consistent method of fixed effects. The alternative hypothesis suggests that the use of stochastic effects cannot be justified and that fixed effects shall be applied. The Hausman test low value implies that the null hypothesis shall be applicable. Unfortunately, the Hausman test cannot be calculated for cluster data, such as used in this case, and therefore we present the results for the both methods.

The use of the method of fixed effects in the panel makes it possible to eliminate γ_i, but also all other potential effects that are specific for each activity division, and do not change over time. The advantages of this method are expressed in the possibility to eliminate variables such as γ_i that cannot be possibly measured or data are not available, and it further ensures more precise solution of the equation (1.1). However, the method of fixed effects eliminate the effects like γ_i that we are interested in and that are contained in x. Therefore, we also apply the method of stochastic, i.e. random effects in the panel, which enables evaluation of these effects, by assuming that γ_i has distribution with 0 mean value and constant standard deviation. Even though the advantages of the method of random effects are obvious, the method can be used on the major assumption that unobserved features of the respective divisions of activities are always the same.

According to the coefficients assessed in the analysis that adopts all variables with the same time dimension (excluding FDI variable that is time-invariant, which is the reason why it could not be assessed by the model of fixed effects), we may conclude that private ownership is by far the most superior regarding the impact on productivity growth.

Table 4. Assessment of impacts of various ownership forms on change of productivity ($PROD$) in the industry of the Republic of Serbia, 2002 – 2007

Variable	1.		2.	
	Model FE	*Model RE*	*Model FE*	*Model RE*
$PROD_{soc}$	0,04033	0,0466	0,04033	0,04960
	(0,0147)	(0,0115)	(0,0147)	(0,0146)
$PROD_{stat}$	0,11600	0,0867	0,11600	0,08739
	(0,0302)	(0,0319)	(0,0302)	(0,0316)
$PROD_{priz}$	0,17752	0,0601	0,17752	0,04088
	(0,4283)	(0,0373)	(0,4283)	(0,0366)
$PROD_{priv}$	0,49630	0,6476	0,49630	0,63115
	(0,0599)	(0,0608)	(0,0599)	(0,0618)
FDI	-	-	(*dropped*)	0,76622
				(0,3562)
Constant	1,33540	1,1534	1,33540	1,15858
	(0,3927)	(0,4114)	(0,3927)	(0,4070)
N	102	102	102	102
R^2: overall	0,7078	0,6822	0,7078	0,7096
R^2: between	0,4522	0,7425	0,4522	0,7501
R^2: within	0,5463	0,6762	0,5463	0,6674
sigma_u	0,4984	0,2105	0,4984	0,1915
sigma_e	0,3059	0,3058	0,3059	0,3059
rho	0,7264	0,3215	0,7264	0,2816

Note: Dependent variable is logarithm of labour productivity in 17 respective industrial divisions in the period from 2002 to 2007; Standard errors on the level of significance of 1% are given in brackets. Hausman test for the first model equals 1606,34 (p=0,000); for the second model (including FDI variable) it equals -115,67, therefore the model does not satisfy the asymptotic presumption of the test. *Source*: SORS; Author's calculations.

However, it is a clear fact that within the subset of private enterprises, the share of enterprises privatised in the period from 2002 to 2007 is low (the both models in case of stochastic effects provide the result that is by more than ten times lower than the average of the subset of private enterprises). The results for the second model, which includes FDI variable, indicate that the increase of share of foreign capital in owned assets of the Serbian industrial enterprises by one percentage point tends to increase the productivity of these enterprises by about 0.7%. Therefore we may also conclude that the enterprises entirely or partly in foreign ownership in this period were on average by 20% more productive even compared to the average of private enterprises. It is worth noting that Zdravko Marić also came to similar results while analysing correlation between direct foreign investments and productivity of the Croatian enterprises of the sector of industry (Marić, 2008).

When we replaced the variable $PROD$ from the quotation (1.1) with labour cost coefficient, which denotes the burden of gross salaries and wages for newly-created value, and independent variables, under the same title, here expressing labour costs depending on business ownership form, and by using the equation (1.2), we could assess the impact of certain ownership forms on labour cost movements in the economic real sector.

$$LC_{i,t} = \alpha_i + x'_{it}\beta + \gamma_i + \varepsilon_{i,t} \tag{1.2}$$

Table 5. Summarised statistics of variables used in the panel

Variable		Mean	Standard error	Min	Max	Observations
id	overall	9,2941	5,5125	1	22	N = 102
	between		5,6542	1	22	n = 17
	within		0	9,2941	9,2941	T = 6
t	overall	2004,5	1,7162	2002	2007	N = 102
	between		0	2004,5	2004,5	n = 17
	within		1,7162	2002	2007	T = 6
LC	overall	-0,3736	0,3681	-1,3433	0,7182	N = 102
	between		0,2859	-0,9839	0,0712	n = 17
	within		0,2405	-0,9527	0,9905	T = 6
LC_{stat}	overall	-0,1048	0,2868	-0,9295	0,8222	N = 102
	between		0,1948	-0,4356	0,2552	n = 17
	within		0,2149	-0,7718	0,4621	T = 6
LC_{soc}	overall	0,1863	0,5599	-1,3965	2,1464	N = 102
	between		0,4139	-0,9713	0,8211	n = 17
	within		0,9331	-1,0604	2,0203	T = 6
LC_{priz}	overall	-0,1643	0,4510	-1,3593	1,0857	N = 102
	between		0,3329	-0,7894	0,3734	n = 17
	within		0,3131	-1,0179	1,2872	T = 6
LC_{priv}	overall	-0,6724	0,3295	-1,6892	0,1289	N = 102
	between		0,2078	-0,9901	-0,204	n = 17
	within		0,2598	-1,7901	-0,079	T = 6
FDI	overall	0,2535	0,1931	0,0301	0,8654	N = 102
	between		0,1981	0,0301	0,8654	n = 17
	within		0	0,2535	0,2535	T = 6

Source: Source: Author's calculations

It is evident that all assessed parameters bear respective mark. The negative mark for FDI clearly indicates the increased share of foreign capital in the owned assets of industrial enterprises lead to reduced labour costs. Private ownership form, i.e. privatised enterprises had the most expressive contribution to decreasing labour costs in the industry sector. In contrast to them, in this sense the effect of state and socially-owned enterprises was by 2.5 to 3 times lower.

Table 6. Assessment of impacts of various ownership forms on change of labour cost coefficient (LC) in the industry, 2002 – 2007

Variable	1.		2.	
	Model FE	**Model RE**	**Model FE**	**Model RE**
LC_{stat}	0,06313	0,13818	0,06313	0,13683
	(0,1017)	(0,0963)	(0,1017)	(0,0967)
LC_{soc}	0,15695	0,15721	0,15695	0,15630
	(0,0573)	(0,0507)	(0,0573)	(0,0511)
LC_{priz}	0,39584	0,33137	0,39584	0,33118
	(0,0695)	(0,0633)	(0,0695)	(0,0646)
LC_{priv}	0,18118	0,30049	0,18118	0,29489
	(0,0836)	(0,0827)	(0,0836)	(0,0829)
FDI	-	-	(dropped)	-0,05446
				(0,2038)
Constant	-0,20938	-0,13192	-0,20938	-0,12187
	(0,0621)	(0,0677)	(0,0621)	(0,8451)
N	102	102	102	102
R^2: overall	0,3992	0,4572	0,3992	0,4567
R^2: between	0,4315	0,5561	0,4315	0,5531
R^2: within	0,3559	0,3301	0,3559	0,3314
sigma_u	0,2155	0,1131	0,2155	0,1178
sigma_e	0,2155	0,2155	0,2155	0,2155
rho	0,5001	0,2160	0,5001	0,2301

Note: Dependent variable is logarithm of labour costs expressed as share of gross salaries and wages in gross value added for 17 respective industrial divisions in the period from 2002 to 2007; Standard errors on the level of significance of 1% are given in brackets. The Hausman test for the first model equals 51,24 (p=0,000); for the second model (including FDI variable) it equals 66.41 (p=0,000). *Source*: Author's calculations.

4. Impact of privatisation method on performances of privatised industrial enterprises

As early as in pioneering theoretical and empirical studies of privatisation in the European countries undergoing transition we encountered the dilemma of the opportunisms, i.e. selection of the successful method for conducting this process. At the same time, expert public leaders showed fast readiness to reach wide consensus on the conclusion that insider privatisation, in contrast to external sales, expressed lower effects. Privatisation by the employees did not have positive results in the Central and Eastern Europe countries (CEE); moreover it produced negative impact in the countries of the Commonwealth of Independent States (CIS) (Djankov et al, 2002).

We can suppose that this knowledge served as the basis for the World Bank experts to recommend to the Government of the Republic of Serbia in 2001 to formulate privatisation on somewhat modified model of the classic sales. For the privatisation of 70% of capital, the Law on privatisation envisaged two methods of sales: auction and tender; however the Government regulations proscribed that the first method, i.e. auction relates to small-size and 'weak' enterprises, and the latter to large and 'strong' ones.

The reason for this change was a need to try and find 'proper buyers', namely those that will be able to make the best of the enterprises undergoing privatisation, simultaneously making earnings for the budget, which used to be empty. A special imperative was to direct sales to strategic investors that would ensure efficient corporative management in the post-privatisation period. In this way it was secured that full control over enterprise should be undertaken by one majority owner, in order to facilitate and effectuate the complex procedure of the forthcoming enterprise restructuring. Whether the expectations concerning the superiority of strategic investors are fulfilled or not will be determined by assessing the effects of the applied privatisation method on performances of privatised enterprises of the Serbian non-financial business sector, regarding the improvement of indicator of labour productivity and labour cost coefficient.

Taking into account the fact that only data on privatised enterprises classified by size are available, the structure of the panel specified in this way (maintaining certain reserve regarding the correctness of the coverage) is determined by the above cited legislation on privatisation of large enterprises through tender. Therefore, their performances could be largely attributed to the efficiency of strategic investors. Namely, large privatised enterprises will be presented by the variable defining sales by tender, while small- and medium-sized enterprises – by the variable defining sales by auction.

The results of the analysis are given in Table 8 and Table 9.

Table 8. Assessment of impact of labour productivity in enterprises privatised via tender and auction on changed level of productivity of all privatised enterprises in the period 2002-2007

Random-effects GLS regression			Number of obs		=	126
Group variable: id			Number of groups		=	23
R-sq: within =	0,8355		Obs per group: min		=	1
between =	0,9251		avg		=	5,5
overall =	0,8891		max		=	6
Random effects u_i ~ Gaussian			Wald chi2 (12)		=	740,43
corr(u_i, X) =	0 (assumed)		Prob > chi2		=	0
PROD	Coef.	Robust std.err.	z	P> |z|	[95% Conf. Interval]	
PROD_t	0,7773	0,2995	25,95	0	0,7186	0,8359
PROD_a	0,4009	0,0941	4,26	0	0,2165	0,5852
Constant	60,9267	45,7254	1,33	0,183	-28,6933	150,5468
sigma_u	163,0048					
sigma_e	159,3174					
rho	0,5114	(fraction of variance due to u_i)				

Source: Author's calculations

On the other hand, enterprises that have undergone sales by tender, i.e. large enterprises, show three times lower labour cost coefficient (LC_t) in relation to enterprises privatised by auction (LC_a).

Table 9. Assessment of influence of labour costs in enterprises privatised via tender and auction on labour cost level of all privatised enterprises in the period 2002-2007

Random-effects GLS regression			Number of obs		=	126
Group variable: id			Number of groups		=	23
R-sq: within =	0,0872		Obs per group: min		=	1
between =	0,2831		avg		=	5,5
overall =	0,1214		max		=	6
Random effects u_i ~ Gaussian			Wald chi2 (12)		=	14,47
corr(u_i, X) =	0 (assumed)		Prob > chi2		=	0
LC	Coef.	Robust std.err.	z	P> |z|	[95% Conf. Interval]	
LC_t	0,0389	0,0192	2,03	0,043	0,0013	0,7671
LC_a	0,1249	0,0378	3,3	0,001	0,0508	0,1991
Constant	0,8383	0,0771	10,89	0	0,6874	0,9893
sigma_u	0,2182					
sigma_e	0,4418					
rho	0,1962	(fraction of variance due to u_i)				

Source: Author's calculations

The assessed impact of the changed level of labour productivity in privatised enterprises relative to the mode of sales on the trends of labour productivity of all privatised enterprises in the period from 2002 to 2007 is statistically significant. At the same time, the coefficients bear the desired mark and are also statistically significant.

It is a doubtless fact that productivity of enterprises, i.e. large enterprises, privatised by the method of public tender ($PROD\_t$), is almost two times higher in relation to those that have undergone sales by auction ($PROD\_a$).

The results confirmed our starting hypothesis that the effects of privatisation considerably vary according to their size; namely the progress was the most expressive for large enterprises. Implicitly we may conclude that the method of sales by tender proved to be more successful than the sales of enterprises by auction, and strategic investors rendered positive impact in the privatisation of enterprises of the Serbian non-financial business sector.

5. Performance of total set of privatised industrial enterprises from 2002 to 2007

The specification of the previously analysed model could be elaborated by introducing artificial variables that describe the year when the subject privatisation of enterprises was carried out. Accordingly, the assessed model in this case would provide the answer to the question whether in the process of privatisation from 2002 to 2007 investors made selection, to the effect that the most successful enterprises were privatised already in the first years of privatisation. Or the other way round, whether the performances of privatised enterprises significantly changed as the process dragged on and the finalisation was delayed.

It should be noted that the variables used in the regression models are described in the Table 2. The results of assessing artificial variables are rather interesting.

Large enterprises privatised by tender method expressed the best results regarding labour productivity in the first two to three years from the start of privatisation, and especially in 2003. The privatisation of enterprises after this time showed much lower influence on productivity. On the other hand, for small- and medium-sized enterprises the timing of privatisation did not prove to be a significant determinant of their productivity. For this category, productivity remained within almost the same range, disregarding the year when privatisation was carried out.

Table 10. Assessment of influence of labour productivity in enterprises privatised by tender and auction relative to year of privatisation on changed level of productivity of all privatised enterprises from 2002 to 2007

Random-effects GLS regression		Number of obs	=	828
Group variable: id		Number of groups	=	138
R-sq: within =	0,8858	Obs per group: min	=	6
between =	0,955	avg	=	6
overall =	0,9262	max	=	6
Random effects u_i ~ Gaussian		Wald chi2 (12)	=	8139,01
corr(u_i, X) =	0 (assumed)	Prob > chi2	=	0

prod	Coef.	Robust std.err.	z	P> |z|	[95% Conf. Interval]	
prod_a	0,763	0,063	12,19	0,000	0,640	0,885
prod_t	0,665	0,064	10,46	0,000	0,540	0,790
prod_t-2	0,012	0,066	0,19	0,851	-0,117	0,141
prod_t-3	0,249	0,066	3,78	0,000	0,120	0,378
prod_t-4	-0,060	0,078	-0,77	0,444	-0,213	0,093
prod_t-5	-0,291	0,083	-3,53	0,000	-0,453	-0,129
prod_t-6	-0,497	0,143	-3,48	0,001	-0,777	-0,217
prod_a-2	0,155	0,067	2,32	0,021	0,024	0,287
prod_a-3	-0,362	0,077	-4,67	0,000	-0,514	-0,210
prod_a-4	-0,109	0,068	-1,61	0,107	-0,243	0,024
prod_a-5	0,188	0,080	2,35	0,019	0,031	0,345
prod_a-6	0,141	0,076	1,86	0,063	-0,008	0,291
Constant	10,030	7,233	1,39	0,166	-4,147	24,207
sigma_u	63,570					
sigma_e	116,363					
rho	0,230	(fraction of variance due to u_i)				

Source: Author's calculations

The assessed impact of labour costs of enterprises privatised throughttender and auction relative to the year of privatisation on the changed level of labour costs of all privatised enterprises implies the same conclusion. For large privatised enterprises, labour cost coefficient presents the lowest value in the first year of privatisation process. In the forthcoming years it gradually grows, peaking in the last year observed. The subject trend is expected and just confirms the hypothesis that the major part of the most desirable (large) enterprises, privatised after 2002, was sold as early as in 2002 and 2003; however later on, less and less socially-owned firms with positive business capability remained to be privatised.

This conclusion may not be applicable for small- and medium-sized enterprises that used to be privatised through auction sales. The desired regular movements of labour costs could not be traced, and this leaves us free to state that these enterprises were privatised without a clear vision regarding their future developments.

Table 11. Assessment of influence of labour costs in enterprises privatised through tender and auction relative to year of privatisation on changed labour cost level of all privatised enterprises from 2002 to 2007

Random-effects GLS regression		Number of obs	=	828
Group variable: id		Number of groups	=	138
R-sq: within =	0,9144	Obs per group: min	=	6
between =	0,9129	avg	=	6
overall =	0,9142	max	=	6
Random effects u_i ~ Gaussian		Wald chi2 (12)	=	8678,6
corr(u_i, X) =	0 (assumed)	Prob > chi2	=	0

| LC	Coef.	Robust std.err.	z	P> |z|	[95% Conf. Interval]	
LC_a	0,687	0,174	3,940	0,000	0,345	1,029
LC_t	0,951	0,092	10,29	0,000	0,770	1,132
LC_t-2	0,248	0,693	0,36	0,720	-1,111	1,608
LC_t-3	-0,665	0,417	-1,60	0,111	-1,482	0,152
LC_t-4	-0,930	0,119	-7,83	0,000	-1,163	-0,697
LC_t-5	-1,423	0,555	-2,57	0,010	-2,510	-0,336
LC_t-6	-0,963	0,093	-10,41	0,000	-1,145	-0,782
LC_a-2	-0,608	0,176	-3,45	0,001	-0,954	-0,263
LC_a-3	0,246	0,183	1,34	0,180	-0,113	0,605
LC_a-4	0,055	0,176	0,31	0,754	-0,289	0,399
LC_a-5	0,313	0,175	1,79	0,073	-0,029	0,656
LC_a-6	0,701	0,204	3,43	0,001	0,300	1,101
Constant	0,190	0,079	2,41	0,016	0,036	0,344
sigma_u	0					
sigma_e	2,141					
rho	0	(fraction of variance due to u_i)				

Source: Author's calculations

6. Effects of FDI on performances of privatised industrial enterprises

So far we have determined that that the impact of FDI on the total industrial productivity and labour costs is considerable and statistically significant. However, is this also applicable to privatised enterprises? Unfortunately, we may not provide available data on business operations of enterprises that are partly or entirely in foreign ownership, which we may further cross-compare with performances of the subset of privatised enterprises. Therefore, we can only assess the correlation between indicators of presence of foreign capital in the total value of assets of the observed manufacturing divisions and the selected business indicators of enterprises privatised from 2002 to 2007. As in the previous stages, these are: labour productivity, labour cost coefficient and profitability, i.e. the rate of business financial result, which means the quotient of business financial result and total earnings from sales.

The expected correlation between the observed dependencies is quite evident, despite the fact that the share of foreign ownership in total assets is somewhat wider value in relation to the subset of privatised enterprises from 2002. Namely, it partly includes enterprises privatised during the nineties, but also enterprises established by foreign physical persons, namely greenfield investments.

Figure. 1. Correlation between foreign ownership and labour productivity of privatised manufacturing enterprises from 2002 to 2007, in 2007
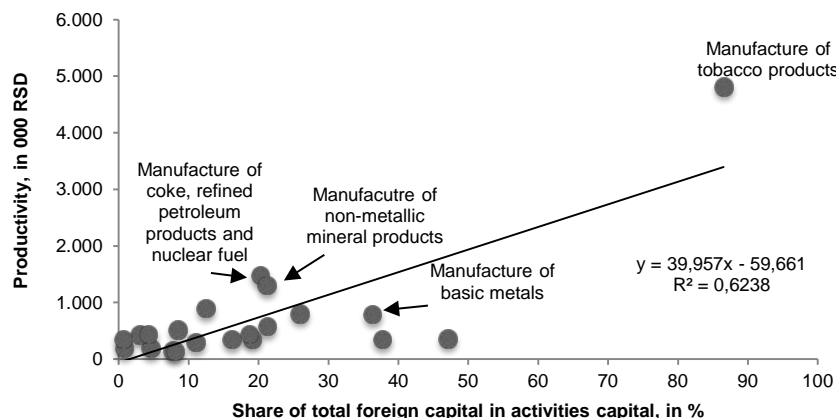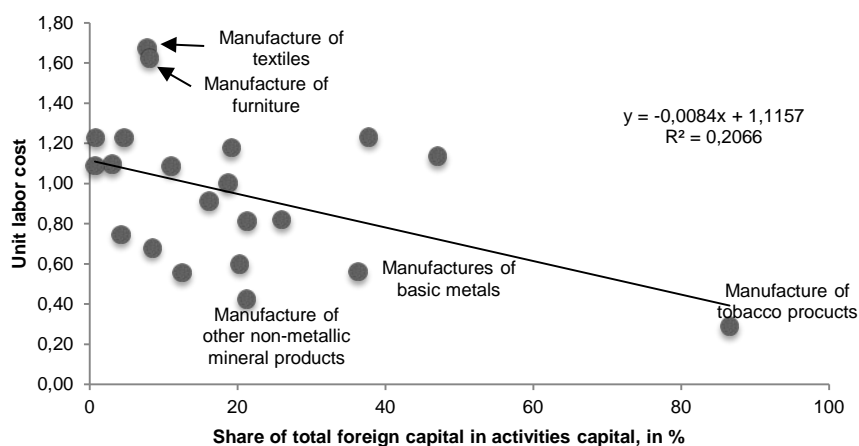

Source: Author's calculations

Another specific issue would be to examine and find out the measure of de facto or 'real' assets in foreign ownership according to the existing accounting records. In a large number of cases, foreign companies, or investment funds, hid the capital that during the nineties was taken out of the country or that was acquired through criminal activities. It should be stressed that the Serbian Privatization Agency never used to check the origin of assets/capital of a potential purchaser of certain enterprise, because it had not been authorised to do that.

It is evident that even in this way observed influence of foreign ownership on the level of labour productivity of privatised manufacturing enterprises proved to be strong. Regarding the value of coefficient of determination, we can see that about 62% of the total variations of productivity of these enterprises around the mean value are explained by the variations of foreign capital share in the total assets value observed by manufacturing divisions.

Figure 2. Correlation between foreign ownership and labour costs of privatised manufacturing enterprises in the period from 2002 to 2007, in 2007
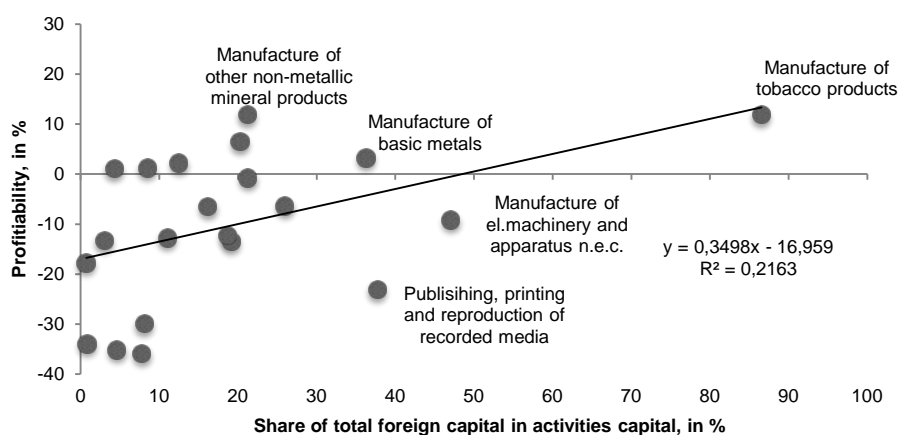

Source: Author's calculations

In contrast to productivity, labour cost coefficient is found in negative correlation with foreign capital. It is a clear fact that higher labour cost coefficient is more likely in privatised enterprises belonging to divisions with smaller share of foreign capital, i.e. those for which foreign investors expressed lower interests, and vice versa. In the period from 2002 to 2007, this area was mainly represented by labour-intensive industries, such as manufacture of textiles and furniture.

Growing share of foreign ownership can be related to increasing profitability of privatised enterprises, even though, just in the previous case, the model explains only about one fifth of the observed variations.

Figure 3. Correlation between foreign ownership and profitability of privatised manufacturing enterprises from 2002 to 2007, at the end 2007

Source: Author's calculations

There is no doubt that presence of foreign ownership, per se, cannot guarantee successful business operations of industrial enterprises. Only seven out of observed 21 manufacturing divisions expressed positive profitability at the end of 2007, despite the fact that for many of them the presence of foreign ownership in assets was noted to be relative high.

However, it also proved evident that from the aspect of analysed indicators the impact of strategic foreign investors, compared to financial investors, was extremely positive. To this effect, three manufacturing divisions came as examples worth to be noted: manufacture of tobacco products, manufacture of non-metallic mineral products and manufacture of basic metals. They expressed the best performances, and it was in these divisions that foreign investors were the most largely present.

It should be noted that, generally, strategic investors are enterprises of the same, similar or complementary industries that along with capital bring space for inducing synergic effects by transferring know-how and experience, by strengthening management, reducing purchase costs or establishing new sales channels. On the other hand, financial investors do not take active part in operative management over enterprise. Naturally, neither strategic nor financial investors are expected to be interested in making investments that

do not ensure adequate potential for generating sufficiently positive monetary flows in future.

However, the difference between strategic and financial investors, being in favour of the first ones, predominantly lies in their experience regarding the core business itself, role in operative management and envisaged duration of their investments.

7. Conclusion

This survey presents an empirical examination of data of privatisation carried out since 2002 in the non-financial business sector, and it specially focused on industry. The panel analysis ensured that all respective subsets of enterprises are followed over time and the changes thereof to be assessed, with the aim to derive a synthetic conclusion on the ultimate effects of privatisation on the performances of the Serbian industrial enterprises.

Hereafter a brief summary follows:

- Observed by ownership form, from 2002 to 2007 private enterprises of the industrial sector were superior regarding the influence on productivity growth. However, within the subset of private enterprises the contribution of enterprises privatised from 2002 is expressed as low (the model with stochastic effects indicates results that are ten times lower than the average of the subset of private enterprises).

- Production organised by foreign proprietor expressed 20% higher productivity in relation to the average of the subset of private enterprises, while the growth of foreign capital share in owned assets of enterprises proved to reduce labour costs.

- Private property, with subset of privatised enterprises – used to be the leading agent in decreasing labour costs in the sector of industry. On the other hand, the impact of state-owned firms and socially-owned enterprises was by 2.5 to 3 times lower.

- The productivity of enterprises privatised by the method of public tender, i.e. large enterprises was almost two times higher in relation to those that underwent sales by auction. These enterprises expressed also three times lower labour costs coefficient.

- Large enterprises used to show the best performances in the first two to three years from the start of privatisation, especially in 2003. The subsequent privatisation resulted in far lower impact regarding productivity. On the contrary, for small- and medium-sized privatised enterprises the timing (of privatisation) did not seem to be an important determinant of their productivity.

Productivity remained almost within the same range, regardless the year of privatisation.

- For large privatised enterprises, labour cost coefficient was noted to be lowest in the first year of privatisation. It gradually increased over the years, and it reached its maximum in the last year observed. This trend is seen as expected and just proves the hypothesis that the largest number of the most attractive (large) enterprises, which were privatised after 2000, were sold as soon as in 2002 and 2003. Later on, fewer sound and profitable enterprises remained to be privatised.

- The above conclusion does not apply to small- and medium-sized enterprises that were privatised through auction sales. No desirable regular trends were noted here regarding labour cost movements and this can be explained by the lack of clear vision for future when their privatisation was undertaken.

- It is almost a certain fact that increased presence of foreign capital resulted in upgraded performances of privatised enterprises. However, the obtained results may implicitly lead to the conclusion that it was not the decisive factor. The appearance of foreign owner, per se, was not a warrant of business success for industrial enterprises, not even in the time of maximum conjuncture. Namely, only seven out of observed 21 manufacturing divisions were found in the positive profitability zone at the end of 2007, in spite of the fact that with many of them the presence of foreign ownership in the total value of assets used to be relatively high.

- At the same time, a major difference is notable between foreign strategic and financial investors. Those manufacturing divisions where the presence of strategic investors was the most expressive also proved to be the most successful. The subject divisions are manufacture of tobacco products, manufacture of non-metallic mineral products and manufacture of basic metals.

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