ORIGINAL SCIENTIFIC PAPER
UDK: 338.1(497.11)"2010/2017"
339.727.24
DOI: 10.5937/EKOPRE1808035L
Date of Receipt: December 12, 2018

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MULTIPLIERS AND FOREIGN DIRECT INVESTMENT IMPACT ON GROWTH

Multiplikatori i uticaj direktnih stranih investicija na rast

Abstract

One way to achieve high and sustainable growth is for the government to use subsidies and tax incentives not only for foreign investments, but also for domestic investments, in sectors where multipliers justify such a policy. In this paper, we introduce two novelties into practical input-output analysis: statistical and analytical. We have presented multipliers which were never before calculated for Serbia, and analyzed sectoral impacts of investment based on their partition into domestic and foreign investments. On the basis of preliminary data from the Statistical Office of the Republic of Serbia, we have compiled an input-output table for 2014 and estimated the multipliers of production, employment, income and investment. These results were compared with the National Bank of Serbia (NBS) data on foreign direct investment (FDI) in the 2010-17 period. Those information provide evidence about the economy-wide efficiency of FDI. Our conclusion is that FDI does not go into sectors where the greatest effects are on output and employment. Investors take care of their own commercial interests, which do not necessarily coincide with social interests. We recognize the efforts the government has put into promoting economic growth by subsidizing FDI, which has an unintentional side effect of depressing domestic investment. Our analysis shows that encouraging domestic investment through reduction in corporate income tax would be a useful complement to promoting FDI through subsidies. Also, on the basis of multipliers, the government could better define sectoral priorities in fostering FDI.

Keywords: *input-output tables, multipliers, foreign direct investment, growth.*

Sažetak

Jedan od načina da se postigne visok i održiv rast jeste da Vlada koristi subvencije i poreske podsticaje, ne samo za strane investicije, nego i za domaće investicije i to u sektorima u kojima multiplikatori opravdavaju ulaganja. U ovom radu uveli smo dve novine u praktičnu input-output analizu: statističku i analitičku. Po prvi put smo obračunali za Srbiju multiplikatore, jer ranije nije postojala statistička osnova za to, i analizirali smo sektorski uticaj investicija na osnovu njihove podele na domaće i strane investicije. Na bazi preliminarnih podataka Republičkog zavoda za statistiku formirali smo našu input-output tabelu za 2014. godinu i ocenili multiplikatore proizvodnje, zaposlenosti, dohodaka i investicija. Ove rezultate smo uporedili sa podacima Narodne banke Srbije (NBS) o stranim direktnim investicijama (SDI) u periodu 2010-17. godine. Na osnovu tih informacija mogli smo da izvedemo zaključke o opštoj efikasnosti SDI. Naš zaključak je da SDI ne idu u sektore gde postoji najveći efekat na proizvodnju i zaposlenost. Investitori vode računa o svojim komercijalnim interesima, što nužno ne mora da se poklapa sa društvenim interesima. Mi smo prepoznali činjenicu da Vlada vodi računa o razvoju privrede i da shodno tome podstiče SDI, ali previđa da time depresira domaće investicije. Naša analiza pokazuje da bi podsticanje domaćih investicija preko smanjivanja poreza na profit moglo da predstavlja neophodnu dopunu za podsticanje SDI putem subvencija. Takođe, na bazi multiplikatora, Vlada bi mogla bolje da odredi sektorske prioritete u podsticanju SDI.

Ključne reči: *input-output tabele, multiplikatori, strane direktne investicije, rast.*

Introduction

The government can partially - but not entirely - influence the inflow of FDI with its policy of subsidies and tax incentives. The remaining factors influencing investment decisions depend on the commercial conditions, development of the market and risk assessment of the investors by themselves. When they decide on new investments, data on multipliers are extremely important in order to assess the overall effects which such investments will make to their business. In this sense, multiplier analysis from input-output tables is crucial for the correct assessment of investment impacts.

That equally applies to the government. If it is trying to determine the differential effects of FDI spending on the output and employment of a sector, comparison of related multipliers will show where this spending will have the greatest impact generated throughout the economy. If maximum total employment effects are the exclusive goal of FDI spending, it would always be rational to channel all the money to the sectors with the largest employment multiplier. This, *mutatis mutandis*, holds for the output. Of course, there might well be other reasons – taking into account strategic factors, equity, capacity constraints for sectoral production, regional development – for directing some of the new FDI to the output and employment of other sectors. However, the lack of information on multipliers and their size precludes the government from assessing correctly which sectors to channel new FDI into.

Serbia has neither input-output tables nor estimated multipliers, despite the relatively advanced status of statistics in Serbia. In this paper, we will provide estimates of those multipliers[1]. The Statistical Office of the Republic of Serbia (RZS), in cooperation with Eurostat, is currently working on compiling I-O tables for the 2016-17 period. Input-output tables for 2014-15 already exist, but are not yet ready for official publication[2]. In such a situation, we used these raw data; where balancing was needed we mathematically reconciled imbalances, and we added our estimates for the sectoral distribution of income from work and property, operating surplus, as well as employment distribution by sectors and products. On that basis we have compiled a 25x25 I-O table for 2014 from the original 65x65 table. Any errors or omissions are entirely ours.

In 2012, the RZS made an extensive survey among 17,627 undertakings in Serbia on the structure of business revenue and costs for 2011, with the assistance of Eurostat. This survey created a principal data set for assessment of Serbia's economic structure [9].The survey has provided data that enable observation of the structures of the production processes of all the activities of the national economy (NACE classification) and products (CPA classification). The data collected by this survey were later updated and used by the RZS for calculation of the production and technical coefficients needed for compiling supply and use tables as well as the symmetric input-output matrices for 2014-15.

On the other hand, the National Bank of Serbia (NBS) records FDI data within its balance of payments account [7]. These data have been disaggregated to the level of 25 branches of activity over the past eight and a half years (from the first quarter of 2010 to the second quarter of 2018). For that reason, we have compiled a parallel I-O table of 25x25 that fully corresponds to these accounts. A period of eight years is long enough to reveal trends in the allocation of FDI. During this period, a total of EUR 15.7 billion was invested or an average of EUR 2 billion per year. These figures are gross data that do not take into account the outflow of capital from the country. According to these data, the most FDI was invested in the sectors of financial services, trade and transportation, construction, mining and food processing.

Based on the I-O matrix, we have calculated multipliers of output, employment and income. These multipliers show how many units change output, employment, or income, if the final demand increases for one unit. Final demand or final use includes private personal consumption, government consumption, investments and exports.

In our analysis, we proceed in three steps. In the first step, we adopt the assumption that all components of final demand are exogenously determined. This cannot be

1 For theoretical background, see [3], [4] and [5].

2 The draft version of use, supply and I-O tables was prepared under the IPA project *The Strengthening of the Serbian Statistical System by Upgrading Methodologies and Standards and by the Appliance of Good Practice*. The project was implemented by a consortium led by GOPA, Worldwide Consultants, Bad Homburg, Germany. We were on the team as a short-term consultant with the task to calculate input-output multipliers and assess whether there are any inconsistencies in I-O tables from that point of view.

taken for granted because, for example, export depends on transformation of gross product to domestic product and export. However, this cannot be modelled on the basis of an I-O analysis. It requires a CGE model that will have an I-O table, but also other relationships that allow modelling export as an endogenous variable. A similar objection could be raised with respect to personal consumption. Nevertheless, we temporarily treat all components of final demand as exogenous variables. In this sense, we have calculated multipliers of type I or simple multipliers.

In the next step, we calculate multipliers of the type II or total multipliers. They imply that personal consumption is endogenized and bound to gross income. The underlying assumption is that there are no changes in consumption unless they are generated by additional income, which will have repercussions to inter-industrial flows of goods and services. Other parts of final demand are held as exogenous variables.

It is not entirely correct to assume that all investments are exogenous. In the third step, we recognize that domestic investments depend on domestic savings, or on operating surplus (including depreciation allowances), which is an element of the I-O table. It still makes sense to treat foreign investments as exogenous, because in the I-O framework they do not react to changes in inter-industrial flows of goods and services in the domestic economy. In standard I-O tables, FDIs are not separated from domestic investment. Since we are particularly interested in assessing effects of FDIs, we endogenize domestic investment, while leaving FDIs as exogenous. When modelling investment multipliers, we will bear in mind this double nature of investment. Please notice that under this assumption all remaining components of final demand remained exogenous variables. We call this type of multipliers type III or investment (induced) multipliers.

Three different types of multipliers are based on three different analytical assumptions. Irrespective of that, each of these multipliers points to the same conclusion. We have found that there was no statistically significant relation between the FDI structure and the I-O multipliers. We illustrated this conclusion with Spearman's correlation coefficients of rank-order. None of these correlation coefficients was statistically significant. In other words, the zero hypothesis that there is no statistically significant relation between these indicators could not be rejected with a significant degree of probability. Statistical analysis disclosed that FDIs were not invested in the sectors where they generate the greatest direct and indirect effects.

The paper is organized in the following way. In the first part, we present the design of the I-O table for 2014. In the second and third sections, we explain the calculation of simple and total multipliers. In the fourth part, we show the dynamics of investment, its partition into domestic and foreign parts, and calculate investment multipliers. In the fifth part, we explain the related economic concept of elasticity of output. In the sixth part, we compare FDI with corresponding multipliers and assess their efficiency. Also, we estimate the impact of FDI on output by using the I-O framework. We give a brief conclusion and propose how to improve the public policy of promoting investment.

Input-output table

The input-output framework consists of three types of tables: supply tables, use tables and symmetric input-output tables. The supply and use tables enable detailed analysis of industries and products through a breakdown of the production account, the goods and services account and the generation of income account. These tables show the structure of the costs of production and income generated in the production process, the flow of goods and services produced within the national economy, and the flows of goods and services with the rest of the world.

A supply table has the format of "product by industry" and shows the supply of goods and services by product and by type of supplier, distinguishing supply by domestic industries and imports from other countries. In the production matrix (transposed make matrix), the domestic output of industries is shown by products. The vector of import shows total imports of the country by products. The last row of the supply table records total output by sector, total imports and total supply by product. In the last column of the supply table, total supply by product is reported consisting of domestic and imported products. The supply table is compiled at basic prices.

The use table has the format of "industry by product" and shows how value added components (compensation of employees, net taxes on production, consumption of fixed capital, net operating surplus) are generated by industries in the domestic economy and provides a detailed picture of the use of goods and services for intermediate consumption and final use (consumption, gross capital formation and exports).

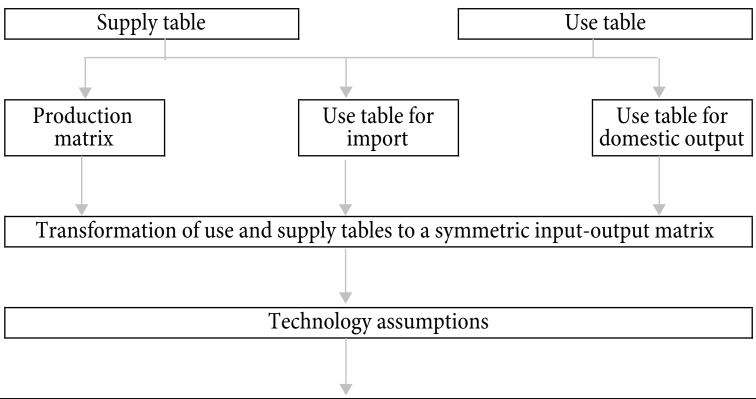
A symmetric input-output table has the format of "product by product". Transformation of use and supply tables into input-output tables is illustrated in Figure 1. *Exempli causa*, we use only four sectors (agriculture, mining, manufacturing and services). The classification in the symmetric input-output tables coincides with those in the supply and use tables. The symmetric input-output table is accompanied by a symmetric input-output table for domestic output and a matrix showing the use of imports. The symmetric input-output table at basic prices is our main target for analysis.

The number of products and sectors do not have to be equal. In practice, there often are many more products than sectors. Hence, two rectangular matrices should be transformed to a square or symmetric input-output matrix. This transformation requires a set of supply and use tables at purchasers' prices and valuation matrices from which supply and use tables at basic prices can be compiled with separate results for domestic output and imports.

As emphasized by Eurostat, the input-output tables and in particular the supply and use tables serve two purposes: statistical and analytical. They provide a framework for checking the consistency of statistics on flows of goods and services obtained from quite different statistical sources, and for calculating much of the economic data contained in the national accounts. As an analytical tool, input-output data are conveniently integrated into macroeconomic models in order to analyze the link between final demand and industrial output levels. Input-output analysis also serves a number of other analytical purposes such as impact analysis, productivity analysis, employment effects, analysis of interdependence structures and analysis of price change [2, p. 297].

For analytical purposes we reduced the original size of the I-O matrix from 65x65 sectors to 25x25 sectors. We have done this in order to work with the same homogeneous sectors for which NBS provides data on FDIs. Also, we wanted to have the same aggregates as used by the RZS in

Figure 1: Transformation of use and supply tables to an input-output table, product by product



Products \ Products	Homogeneous units of production				Final use			Total
	Agriculture	Mining	Manufacturing	Services	Final consumption	Gross capital formation	Export	
Agriculture Mining Manufacturing Services	Intermediate consumption by products and homogeneous units of production				Final use by products and categories			Total use by products
Value added	Value added by components and homogeneous units of							GDP
Import by similar products	Total import by products							
Supply	Total supply by homogeneous units				Total final use by categories			Total supply

its quarterly GDP accounts. For that reason, we selected 13 broad classification divisions, and then disaggregated manufacturing into 12 sectors. This resulted in an input-output matrix with different levels of aggregation from the original one, but comparable to the FDI figures and quarterly GDP.

We present in Table 1 a part of the input-output table for 2014, with figures for only the first three sectors and the last three sectors. The complete table is too large to be published here.

Simple multipliers

The input-output matrix for 2014 was estimated in a reduced-form format as reported in Figure 1. Value added was not separated into key factor income accounts, but aggregated into a single account. The final use part also was not disaggregated into components, but compiled as a single account. Such a table allows us to calculate output and employment multipliers per RSD 1.0 change of final demand.

Input-output simple multipliers have been defined in a standard way [5]. Let's define intermediate inputs' transaction matrix **Z** as:

$$\mathbf{Z}=(z_{i,j}) \quad , \quad for_{\ i,j} = 1,\ldots,25 \qquad (1)$$

and technical coefficients:

$$a_{i,j} = \frac{z_{i,j}}{x_j}, \ \mathbf{A} = (a_{i,j}) \qquad (2)$$

where vector $\mathbf{x} = (x_j)$ is the vector of output by j sectors. If we define the vector of final demand $\mathbf{y} = (y_j)$, then we got a standard Leontief system (3):

$$\mathbf{x} = \mathbf{A}\bullet\mathbf{x} + \mathbf{y} \qquad (3)$$

with the solution:

$$\mathbf{x} = (\mathbf{I}\text{-}\mathbf{A})\text{-}1\bullet\mathbf{y} = \mathbf{L}\bullet\mathbf{y} \qquad (4)$$

$\mathbf{L} = (\mathbf{I}-\mathbf{A})^{-1} = (l_{i,j})$ is the Leontief inverse matrix of total input requirements per a unit of output **x**, which depends on the vector of final demand $\mathbf{y} = (y_j)$.

Simple output multipliers

An output multiplier for sector *j* is defined as the total value of production in all sectors of the economy that is necessary in order to satisfy a dinar's worth of final demand for sector *j*'s output. The simple output multiplier is one out of several closely related types of multipliers and input-output effects. For the simple output multiplier, this total production is obtained from a model with households deemed to be exogenous. It is calculated from the Leontief inverse $(\mathbf{I}\text{-}\mathbf{A})^{-1}$ as the column totals:

$$\mathbf{m(o)} = \mathbf{u} \bullet \mathbf{L} \qquad (5)$$

where $\mathbf{u} = (1,1,\ldots,1)$ is the unit row vector.

As Table 2 reveals (the first row on the left), the simple multiplier for the agricultural sector in Serbia shows that RSD 1.6212 of extra output will be induced in the economy by investing one additional dinar in agriculture (consumption or investment). In other words, to produce RSD 1 of output in 'Agriculture', aside from the Agriculture's additional unit of output, the economy's

Table 1: Extract from the input-output matrix

ESA2010 Questionnaire 1700 - Symmetric input-output table at basic prices (product x product), 2014, mil.RSD

	CPA	Sectors	1 A Agriculture	2 B Mining	3 C10 Food	… … …	23 M,N Profes-sional	24 O,P,Q Public	25 R,S,T Arts	Con-sump-tion	Government consumption	Gross capital formation	Total exports	Total supply
1	A	Agriculture	53,760	33	298,055	…	982	1,938	692	152,799	59	19,528	70,780	642,740
2	B	Mining	158	25,876	431	…	148	641	150	17,093	0	-3,277	5,932	306,259
3	C10	Food processing	20,423	12	153,899	…	129	7,493	272	484,006	0	3,360	173,576	877,336
…	…	…	…	…	…	…	…	…	…	…	…	…	…	…
23	M,N	Professional services	6,601	4,553	32,179	…	90,423	32,486	27,012	75,109	9,226	40,148	83,047	602,848
24	O,P,Q	Public services	94	124	583	…	722	7,604	775	103,057	585,712	0	3,281	706,404
25	R,S,T	Arts&Others	298	102	573	…	1,684	5,900	16,666	196,340	13,307	3,414	5,928	259,394
		Value added, gross	343,494	44,733	463,814	…	298,726	486,250	145,010					
		Output	575,945	112,926	752,565	…	509,580	700,156	257,582					
		Imports cif	66,797	193,333	124,776	…	93,268	6,248	1,813					
		Supply at basic prices	642,742	306,259	877,341	…	602,848	706,404	259,395					

Table 2: Simple output multipliers effects

Simple output multipliers and effects									
Sectors	Simple multiplier	Initial effects	Direct effect	Indirect effect	Sectors	Simple multiplier	Initial effects	Direct effect	Indirect effect
Agriculture	1.621	1.000	0.362	0.260	Transport vehicles	1.363	1.000	0.209	0.154
Mining	1.368	1.000	0.223	0.145	Furniture	1.787	1.000	0.468	0.320
Food	2.450	1.000	0.770	0.680	Electricity & gas	2.603	1.000	0.670	0.933
Textile	1.511	1.000	0.316	0.195	Water supply	1.914	1.000	0.494	0.420
Wood	1.800	1.000	0.444	0.356	Constructions	2.098	1.000	0.585	0.513
Coke & petroleum	1.673	1.000	0.466	0.207	Trade & transportation	1.899	1.000	0.505	0.394
Chemicals	1.471	1.000	0.282	0.189	Information	1.628	1.000	0.372	0.255
Pharmaceutics	1.496	1.000	0.299	0.197	Financial services	1.645	1.000	0.387	0.258
Rubber& plastics	1.845	1.000	0.477	0.368	Real estate	1.487	1.000	0.246	0.240
Metals & metal products	1.830	1.000	0.464	0.366	Professional services	1.597	1.000	0.350	0.247
Electrical eqipments	1.401	1.000	0.234	0.167	Public services	1.550	1.000	0.303	0.247
Machinery	1.189	1.000	0.150	0.039	Arts & others	1.752	1.000	0.434	0.318

output will increase by an additional RSD 0.6212. That increase is composed of RSD 0.3617 of inputs from the suppliers to the 'Agriculture' in order to satisfy its additional demand, and RSD 0.2595 to provide inputs to the suppliers to the 'Agriculture'. The effects encompassed by the simple multiplier are the initial effect (RSD 1.00), the first round effect or direct effect (RSD 0.3617) and the industrial support effect or indirect effect (RSD 0.3617)[3].

The sectors of mining, machinery and production of other transportation vehicles have lower simple output multipliers than agriculture: 1.3680, 1.1891 and 1.3629, respectively. The sectors with the highest simple output multipliers are: food processing (2.4498), electricity and gas (2.6027) and construction (2.0978).

The direct effects can be read from the matrix of the technical coefficients A. The initial effects are equal to 1.00. The direct effects are the column sums of the direct requirement matrix A. Then the indirect effects are easily calculated as: *Indirect effects = Multiplier type I - Initial effects - Direct effects*. The indirect effects and the direct effects are shown in the second and third column of the Table 2 for all production activities. We can also calculate the production induced effects from Table 2. The formula is: *Production induced effect = Direct effects + Indirect effects*. In the case of the agriculture sector, the production induced effect was 0.6212.

Simple employment multipliers

Employment effects have also been defined in a standard way. Let's define the row of employments by sectors as $\mathbf{h} = (h_j)$. The row vector of employment per unit of output e is:

$$\mathbf{e} = \mathbf{h} \bullet \hat{\mathbf{x}}^{-1} \tag{6}$$

where matrix is a diagonal matrix of output by sectors. Employment as a function of final demand is:

$$\mathbf{h} = \mathbf{e} \bullet \mathbf{L} \bullet \mathbf{y} \tag{7}$$

Employment direct effects are defined by matrix multiplication $\mathbf{e} \bullet \mathbf{A}$, employment indirect effect by $\mathbf{e} \bullet (\mathbf{L} - \mathbf{A})$, and employment overall effects by $\mathbf{e} \bullet \mathbf{L}$. We call them effects rather than multipliers because their value depends on the unit of measure. In order to neutralize the impact of measurement, multipliers are defined per unit of employment per unit of output (e_j) in equ. (9). Direct and indirect employment effects are obtained by equ. (8) and (10).

Employment simple direct effects: $\mathbf{e} \bullet \mathbf{A} \bullet \hat{\mathbf{e}}^{-1}$ (8)

Employment simple multipliers: $\mathbf{m}(\mathbf{e}) = \mathbf{e} \bullet \mathbf{L} \bullet \hat{\mathbf{e}}^{-1}$ (9)

Employment simple indirect effects: $\mathbf{e} \bullet (\mathbf{L} - \mathbf{A}) \bullet \hat{\mathbf{e}}^{-1}$ (10)

We report employment simple multipliers and related effects in table 3. How should multipliers of employment be interpreted? If, at a given level of final demand, employment in a sector increases, for example

3 Figures for the Australian economy in 1990 were rather similar: "The simple multiplier for Agriculture shows that $1.6281 of extra output from the Australian economy is induced by an additional output of $1.00 in the Agriculture. In other words, to produce an additional unit of output in 'Agriculture', aside from Agriculture's additional unit of output, the economy's output must increase by an additional $0.3719 in order to provide inputs to 'Agriculture', and in turn to increase by $0.2562 to provide inputs to the suppliers to 'Agriculture'. The effects encompassed by the simple multiplier are the initial effects ($1.00), the first round effects ($0.3719) and the industrial support effects ($0.2562)". See [1].

Table 3: Employment simple multipliers and effects

Sectors	Simple multiplier	Initial effects	Direct effects	Indirect effects	Sectors	Simple multiplier	Initial effects	Direct effects	Indirect effects
Agriculture	1.217	1.000	0.140	0.077	Transport vehicles	1.309	1.000	0.178	0.131
Mining	1.698	1.000	0.392	0.306	Furniture	1.869	1.000	0.524	0.345
Food	3.256	1.000	1.466	0.791	Electricity & gas	3.666	1.000	0.968	1.698
Textile	1.590	1.000	0.384	0.205	Water supply	1.536	1.000	0.311	0.225
Wood	2.390	1.000	0.780	0.610	Constructions	1.670	1.000	0.387	0.283
Coke & petroleum	2.648	1.000	0.981	0.667	Trade & transportation	1.511	1.000	0.304	0.206
Chemicals	2.501	1.000	0.750	0.750	Information	1.425	1.000	0.277	0.148
Pharmaceutics	2.930	1.000	1.046	0.883	Financial services	1.626	1.000	0.387	0.240
Rubber& plastics	2.229	1.000	0.651	0.578	Real estate	2.965	1.000	1.219	0.746
Metals & metal products	2.049	1.000	0.561	0.488	Professional services	1.802	1.000	0.477	0.325
Electrical eqipments	2.013	1.000	0.574	0.439	Public services	1.391	1.000	0.230	0.161
Machinery	1.353	1.000	0.247	0.106	Arts & others	1.197	1.000	0.135	0.063

by 100 jobs, how much will this sector induce new jobs in the whole economy, bearing in mind the production-technological linkage of the economy? In agriculture, another 21.75 jobs will be created, as multiplier I is 1.2175. In the economy as a whole, that is the smallest effect. The largest effect takes place in electricity and gas, where 266.62 jobs will be created if the initial employment rises by 100 jobs. The feedback effect on the sector itself is that an additional 96.82 jobs will be generated, but in the rest of the economy, as many as 169.80 jobs will be created. After electricity and gas, the next greatest promoters of additional employment are food processing (3.2561), real estate (2.9651), pharmaceuticals (2.9296) and production of motor cars (2.9120).

Total multipliers

The household sector receives wages and salaries for work done in the production process and spends some or all of this income on goods and services. If we add to the previously defined **A** matrix the remuneration row and the personal consumption column, we will augment that matrix and obtain the **B** matrix, which in effect adds a "household" sector to the production side of the economy.

By this modification to the input-output table, we are in position to calculate total multipliers. They change the analytical treatment of personal consumption. Instead of being treated as an exogenous variable, it is now endogenized and linked to employee remunerations. This means that we introduce an assumption that personal spending is financed by employee compensation for work done. In this sense, there is no increase in consumption without a corresponding increase in salaries and wages. Previously, in calculating the simple multiplier, we effectively assumed that the spending of households took place outside the model and there was no feedback between the household sector and other sectors. However, in calculating now the total multiplier, we allow the feedback to occur, and the input-output table is said to be closed with respect to households.

It is obvious that total multipliers cannot be estimated without data on labour compensation. In the augmented input-output table, the consumption column matches the remuneration row. The augmented input-output table for Serbia has the format as reported in Table 4. The shadow areas indicate the adjustments made in the previous input-output table. Subscripts i,j represent rows and columns respectively, and Σ summation.

Types of total multiplier

Let's mark the vector $\mathbf{w} = (w_j)$ employee remuneration per unit of output, and matrix **B** as the augmented technological matrix. Then the total income multiplier has the form as in the equation (11). At the same time, the previously defined simple output and employment multipliers change their form according to equations (12) and (13), respectively. The matrix $\overline{\mathbf{B}} = (\mathbf{I} - \mathbf{B})^{-1}$ is the Leontief inverse of the **B** matrix.

Total income multipliers $\overline{m}(w) = w \bullet \overline{B} \bullet \hat{w}^{-1}$ (11)

Total output multipliers $\overline{m}(o) = u \bullet \overline{B}$ (12)

Total employment multipliers $\overline{m}(e) = u \bullet \overline{B} \bullet \hat{e}^{-1}$ (13)

The consumption induced effects can then be calculated as: *Consumption induced effects = Total multiplier type – Simple multiplier.* Table 5 shows total multipliers for output, employment and income. Endogenization of consumption caused an increase in output multipliers. The average total multiplier is 2.2781, while the average simple multiplier is 1.7123. This means that consumption induces an increase in output multipliers by 0.5658 on average. The branches where this effect is greatest are: food (3.8203, induced for 1.3706), electricity (3.3541, induced for 0.7515), construction (3.0828, induced for 0.9850), trade (2.7864, induced for 0.8878) and finances (2.6352, induced for 0.9905).

The effect of consumption spending on total multipliers is lower for employment and income than for output, but it is also significant here. In principle, consumption increases the multiplier effect everywhere, except for income multipliers in the case of textile, pharmaceutics, metals and metal products, and food sectors.

Table 4: The format of augmented input-output table

Products	Agriculture	Mining	Manufacturing	Services	Consumption	Investment	Export	Government	Total
Agriculture Mining Manufacturing Services	Intermediate inputs					The net final demand			Total gross output
Compensation	Compensation of employees by products				0				Σj
Operating surplus Depreciation allowances	The net value added by products								
Import	Import by products and tariffs								
Total	Total gross output								

Table 5: Consumption induced multipliers

	Output multipliers		Induced effects	Employment multipliers		Induced effects	Income multipliers		Induced effects
	Simple	Total		Simple	Total		Simple	Total	
Agriculture	1.6212	1.9910	0.3698	1.2175	1.2643	0.0468	1.3876	2.2490	0.8614
Mining	1.3680	1.6386	0.2706	1.6976	2.0278	0.3302	1.6577	1.8092	0.1515
Food	2.4498	3.8203	1.3706	3.2561	3.7896	0.5334	2.1767	1.8467	-0.3300
Textile	1.5105	1.9894	0.4788	1.5896	1.8050	0.2153	1.7462	1.7149	-0.0312
Wood	1.7997	2.1937	0.3940	2.3898	2.7301	0.3403	2.1933	2.4656	0.2723
Coke/petroleum	1.6728	2.0516	0.3787	2.6481	3.3576	0.7095	1.7090	1.9304	0.2214
Chemicals	1.4714	1.6229	0.1515	2.5007	2.9518	0.4510	2.3425	3.0552	0.7127
Pharmaceutics	1.4961	1.7690	0.2729	2.9296	3.6190	0.6894	2.2545	2.1127	-0.1418
Rubber/plastics	1.8451	2.2511	0.4061	2.2292	2.6236	0.3944	2.0213	2.3611	0.3398
Metals	1.8296	2.2971	0.4674	2.0491	2.4268	0.3777	2.4007	2.2477	-0.1530
Electrical eqipments	1.4012	1.7188	0.3176	2.0128	2.4631	0.4503	1.8021	1.8077	0.0056
Machinery	1.1891	1.3523	0.1632	1.3528	1.6451	0.2923	1.2594	1.4494	0.1901
Motor vehicles	1.8314	2.3598	0.5284	2.9120	3.6716	0.7596	1.9470	2.0828	0.1358
Transport vehicles	1.3629	1.7120	0.3491	1.3094	1.4786	0.1692	1.5589	1.6117	0.0528
Furniture	1.7874	2.4541	0.6667	1.8688	2.2184	0.3496	1.8009	1.8019	0.0010
Electricity/gas	2.6027	3.3541	0.7515	3.6662	4.8991	1.2329	2.5899	3.0548	0.4650
Water supply	1.9136	2.5218	0.6082	1.5365	1.7218	0.1853	1.7051	2.0357	0.3306
Constructions	2.0978	3.0828	0.9850	1.6697	1.9440	0.2743	1.8751	1.8886	0.0135
Trade	1.8986	2.7864	0.8878	1.5109	1.7135	0.2026	1.7667	1.7886	0.0219
Information	1.6275	2.4273	0.7997	1.4245	1.6117	0.1871	1.5317	1.6289	0.0973
Finance	1.6446	2.6352	0.9905	1.6261	2.0063	0.3802	1.5523	1.5811	0.0288
Real estate	1.4867	1.9184	0.4318	2.9651	3.5839	0.6188	1.2394	2.2522	1.0128
Professional	1.5969	1.8992	0.3023	1.8016	1.9823	0.1807	1.4866	2.8120	1.3254
Public	1.5496	2.2237	0.6741	1.3912	1.6061	0.2149	1.2870	1.5745	0.2875
Arts	1.7522	2.8817	1.1295	1.1972	1.2936	0.0963	1.5678	1.5047	-0.0630

Investment induced multipliers

We will measure the impact of FDI on development by two methods. The first method is to compare multipliers and FDI directly by branches of activity. What we want to discover is whether the priorities in allocating investments and total, direct and indirect multipliers coincide or not. In the previous section, we provided data on multipliers, and the next part of the paper will show how FDI was allocated across branches. On the basis of this information, we will conclude whether the investments could have influenced development better than they actually did.

The key fact of this approach is to treat all investments as exogenous variables that are part of the final demand in input-output matrices. In this sense, the model is "open", because funding investment and investment allocation are completely independent of the inter-industrial links described by the matrix of technical coefficients. In the second method, however, we will partially "close" the model and separate the investments into FDI and DI (domestic investment). For DI, we will assume that it is financed out of operating surplus, including depreciation allowances. In this sense, any change in operational surplus will affect the level of DI that, in return, will affect sectoral production and additional generation of operating surplus.

Technically speaking, the whole analysis resembles the method of endogenization of consumption spending in an input-output framework. Instead of expanding the matrix **B**, we will form an augmented matrix $\mathbf{D} = (d_{i,j})$. In it, the salary row will be replaced by operating surplus, and the column of consumption with domestic investments. FDI is still a part of the final demand that we treat as an exogenous variable in the usual manner for I-O analysis.

If we mark with $\overline{\mathbf{D}} = (\mathbf{I} - \mathbf{D})^{-1}$ the Leontief inverse of the augmented matrix **D**, the output multiplier based on induced investment is defined as:

Total output multipliers

(induced by domestic investment) $\overline{\mathbf{m}}\,(\mathbf{d}) = \mathbf{u} \bullet \overline{\mathbf{D}}$ (14)

We report in Table 6 (the first column) total output multipliers induced by DI under the hypothesis that the surplus for 2014 remains as provided by the RZS. Then we made a simple, but highly important counterfactual experiment. We inflated surplus across the sectors by 10 percent, and recalculated multipliers. The outcome is reported in the second column of Table 6. All multipliers increased more or less, but by 4% on average. More funding for domestic sources for investment will further promote growth and consequently employment and income.

This counterfactual experiment demonstrated one important fact. The impact of FDI on output can be improved by a corresponding policy of distribution that promotes savings from the operating surplus.

Multipliers and elasticities

Multipliers are closely related to coefficients of elasticity, but are not identical concepts. The difference arises from different units of measure and interpretation. If, for

Table 6: Total output multipliers induced by investment

Sectors	Total output multipliers		Difference	Sectors	Total output multipliers		Difference
	Normal surplus	Inflated surplus by 10%			Normal surplus	Inflated surplus by 10%	
Agriculture	2.247	2.275	0.028	Transport vehicles	1.434	1.459	0.025
Mining	1.465	1.485	0.020	Furniture	1.902	1.950	0.048
Food	2.850	2.950	0.100	Electricity & gas	3.017	3.072	0.055
Textile	1.578	1.612	0.035	Water supply	2.246	2.290	0.045
Wood	2.011	2.040	0.029	Constructions	2.262	2.333	0.071
Coke & petroleum	1.831	1.859	0.028	Trade & transportation	2.231	2.295	0.065
Chemicals	1.567	1.578	0.011	Information	1.988	2.046	0.058
Pharmaceutics	1.573	1.593	0.020	Financial services	1.986	2.058	0.072
Rubber& plastics	2.077	2.107	0.030	Real estate	2.299	2.333	0.033
Metals & metal products	1.914	1.948	0.034	Professional services	2.265	2.289	0.024
Electrical eqipments	1.4581	1.4811	0.0230	Public services	2.1311	2.1812	0.0501
Machinery	1.2755	1.2875	0.0120	Arts & others	1.9960	2.0779	0.0818
Motor cars	1.9537	1.9920	0.0383	Average	1.9822	2.0237	0.0414

example, the final demand in agriculture is increased by one million dinars, the simple multiplier shows how many million dinars must be generated in output, both in agriculture and in related sectors, in order to produce output that will meet such an increased demand. The total increase in production will amount to RSD 1,621 million. Initially, agriculture itself has to produce one million dinars of output, and then an additional 362 thousand dinars to meet the increased demand from other sectors. Other sectors, however, need to produce additional 260 thousand dinars of their output in order to meet all inter-industry demands.

However, the mining sector is five times smaller than agriculture. One million dinars of new demand in this sector is higher, relatively speaking, than the same investment in agriculture. In order to avoid differences in the size of the sectors, coefficients of elasticity are needed. They show how much a one percent increase in final demand increases production in agriculture. The same applies for all other sectors. A coefficient of elasticity is the measure of responsiveness that has no dimension. It indicates the percentage change that will occur in one variable when another variable changes one percent. In the input-output framework it is always important to underline how the final demand is compiled. With three different technological and augmented matrices (**A**, **B** and **D**), there are three different compositions of the final demand vector, and consequently three interpretations of output elasticity. For the simple output multiplier, the formula for output elasticity is presented in equation (15) [5, p. 283]:

Simple output elasticity $$\boldsymbol{\lambda}(\mathbf{o}) = \mathbf{m}(\mathbf{o}) \bullet \boldsymbol{f} \bullet \hat{x}^{-1} \qquad (15)$$

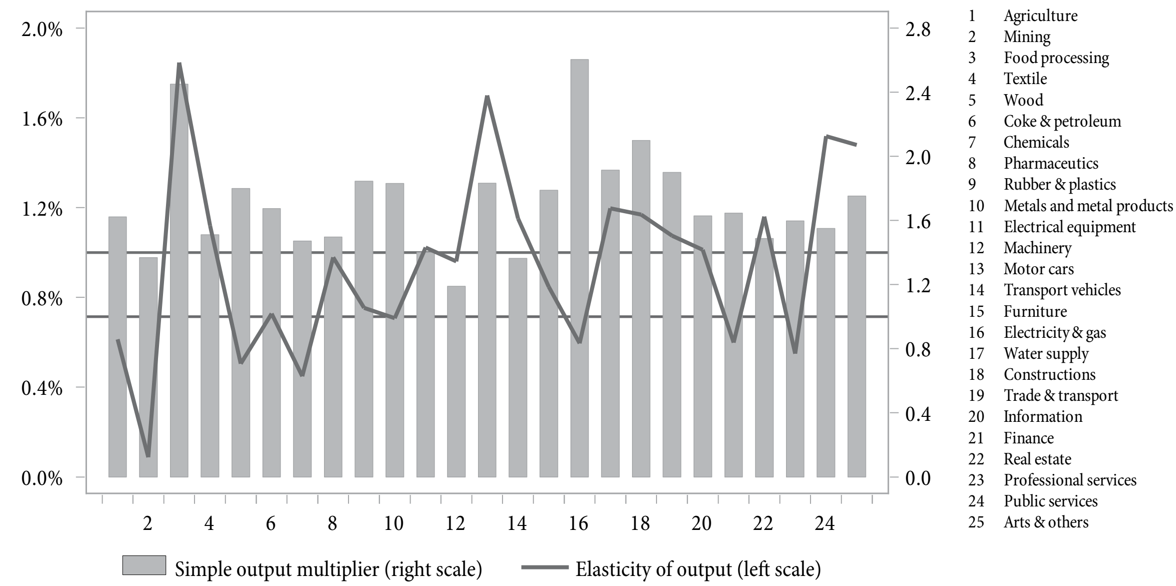
Matrices with a cap over them are diagonal matrices, $\mathbf{f} = (f_j)$ is the column vector of final demand in absolute terms. Other coefficients of elasticity can be appropriately defined.

Interpretation of coefficients of elasticity in an input-output framework must be cautious. This is the percentage change in total output (or income or employment) due to a percentage change in the final demand of the given sector (agriculture, etc.). The idea is to express both the stimulus (change in final demand) and its effect (change in output, income or employment) in percentage terms.

We showed in Figure 2 simple output multipliers and related coefficients of elasticity. The latter should be called coefficients of elasticity of "output with respect to the final demand". All multipliers must be larger than one unit. This is not the case for coefficients of elasticity. If it is larger than one, we say that this is a case of "elastic" output with respect to the final demand. If it is smaller than one, we say that this is the opposite case of an "inelastic" output with respect to the final demand.

In the food processing sector there is a high simple output multiplier and a high elasticity of output with respect to the final demand (larger than 1). In contrast, mining has a low multiplier and low elasticity (smaller than 1). Electricity and gas sector has a high multiplier,

Figure 2: Multipliers and coefficients of elasticity



but low elasticity. In terms of numbers, there are more "inelastic" sectors than "elastic" sectors.

Foreign direct investments

According to our estimation, the FDI in 2014 represented 22%-27% of total investments, and the DI 78%-73% (depending on the data source). However, throughout the period 2010-17, accumulated DI amounted to EUR 32,627 bil., while FDI accumulated to EUR 15,993 bil. This means that DI accounted for 67% of total investment, while FDI accounted for 33%. There is a low but significant correlation between them -0.3906 [t statistics -2.4002]. The negative coefficient of correlation reveals that there was a substitution of DI for FDI in the observed period. Hence, the growth of FDI pushed down the growth of DI. Although we do not believe the government was aware of this substitution, an excessive focus on FDI, to the neglect of DI, does not seem to us a good policy.

Table 7 shows the FDI (in EUR) and the assessment of DI and FDI in 2014. These data were compiled by using information from the NBS report on FDI and the I-O matrix with respect to gross fixed capital formation in 2014. In the period of eight years, FDI was mostly invested in financial sector (EUR 3,361 million), trade and transportation (EUR 2,923 million), construction (EUR 1,320 million), mining (EUR 1,198 million) and food processing sector (EUR 1,082 million).

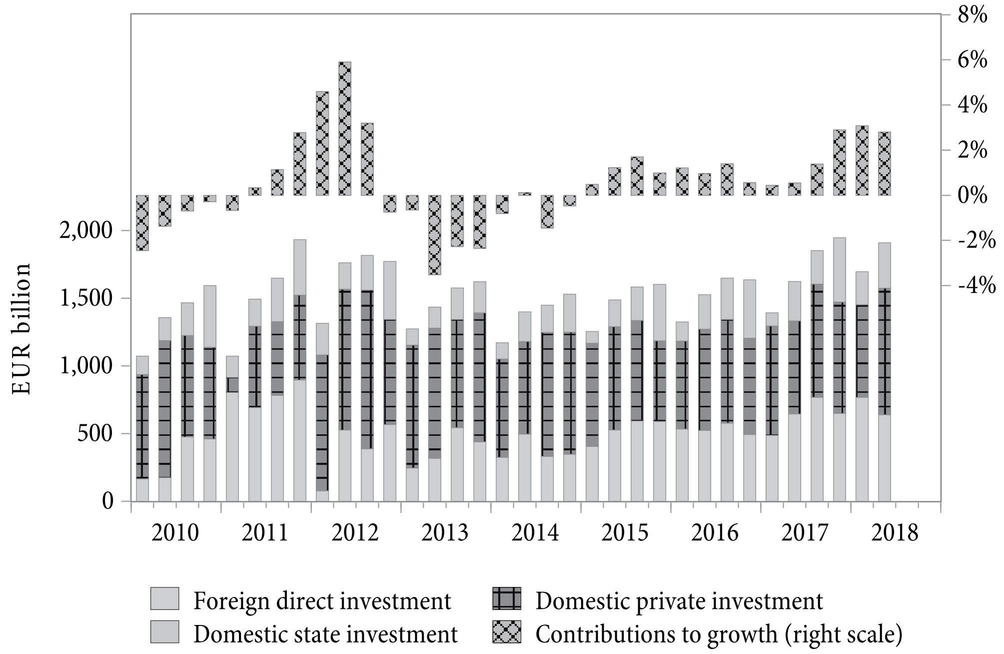
The last two columns on the right in Table 7 report corresponding cross-section data for 2014. They show separation of investments with respect to domestic ("Total minus Domestic", which corresponds to data in column "2014") and foreign origin[4]. Within a single year, the investment structure can differ from the multiyear average. However, between foreign investment and DI, there is a rank coefficient of correlation of 0.91. In some sectors, gross fixed capital formation was zero in 2014, but foreign investments were positive. This indicates that in these sectors there was domestic disinvestment (water supply, financial services, real estate, and public services).

4 The underlying average annual exchange rate is RSD 117.3662 for one EUR.

Table 7: Breakdown of foreign direct investment by activities, mil. EUR

	Annual investment									2014	
	2010	2011	2012	2013.	2014.	2015.	2016.	2017.	Total	Domestic	Total
Agriculture	19.84	30.90	9.22	65.80	-0.33	63.85	43.34	71.96	304.58	166.72	166.39
Mining	204.25	478.11	218.83	179.87	26.03	22.15	-33.00	102.45	1,198.68	-53.95	-27.92
Food	38.02	249.26	157.83	166.18	108.52	122.94	145.70	93.94	1,082.39	-79.90	28.63
Textile	10.47	26.63	8.04	44.91	67.47	65.06	5.34	27.93	255.86	-14.30	53.16
Wood	20.07	12.86	9.48	26.76	15.11	22.48	3.54	21.27	131.57	-6.38	8.73
Coke and petroleum	4.57	0.82	-0.10	2.46	-0.11	0.01	-0.01	-0.13	7.52	22.34	22.23
Chemicals	38.17	51.21	31.20	45.76	46.30	66.62	42.70	45.91	367.87	-39.48	6.82
Pharmaceutics	12.36	-24.70	45.61	41.38	28.25	65.02	31.99	43.56	243.46	-21.25	7.00
Rubber and plastics	67.21	93.24	151.14	186.82	172.56	141.89	39.96	97.47	950.30	-155.83	16.73
Metal products	28.54	18.76	20.72	25.77	2.95	5.89	241.36	86.42	430.40	199.06	202.01
Electrical eqipments	2.20	4.93	4.40	5.48	2.09	2.15	4.04	6.88	32.16	666.30	668.39
Machinery	4.70	19.42	21.73	20.14	9.62	21.56	22.43	28.32	147.92	952.20	961.83
Motor vehicles	10.49	70.61	14.93	31.22	37.78	140.46	118.73	107.81	532.03	262.39	300.17
Transport vehicles	10.01	0.97	-0.68	8.07	-1.56	1.03	-3.25	1.61	16.21	43.70	42.14
Furniture	82.29	107.11	56.94	73.92	46.19	66.36	96.99	73.44	603.25	36.15	82.33
Electricity and gas,	5.97	2.85	3.76	9.01	9.90	12.84	15.03	52.21	111.57	-12.93	-3.03
Water supply	3.78	6.02	5.88	12.10	17.68	17.90	13.59	11.06	88.01	-17.68	0.00
Constructions	35.30	91.59	19.44	67.14	162.66	264.51	272.85	406.81	1,320.30	1,958.74	2,121.40
Trade	159.80	1,100.05	238.21	367.76	213.46	283.90	209.77	351.00	2,923.95	1,674.79	1,888.24
Information	-8.19	125.61	-479.95	28.54	46.81	108.14	120.72	197.92	139.59	113.89	160.71
Finance	432.75	840.44	290.56	141.45	357.96	484.04	446.99	367.49	3,361.67	-46.81	311.14
Real estate	-19.88	72.08	22.06	-55.73	24.72	57.57	124.46	221.75	447.03	-357.96	-333.23
Professional	33.43	83.24	125.33	34.29	73.95	41.34	152.97	104.48	649.04	268.12	342.07
Public	0.04	0.64	0.21	1.24	1.47	0.23	-0.09	2.21	5.94	-1.47	0.00
Arts	81.91	81.82	34.01	17.22	30.93	36.65	10.84	24.49	317.86	-1.84	29.09

Figure 3: Foreign and domestic investment



The time series on investments is presented in Figure 3[5]. The upper part of Figure 3 shows the contributions of investment to the GDP growth rates. These contributions have a cyclical pattern. After the outbreak of the Great Recession, the contributions were negative, but they changed to positive in a short period between 2011 and 2012. Subsequently, the investments were downgrading the GDP growth rate until the beginning of 2015. From then until the second quarter of 2018, it is evident that there are positive contributions of investment to growth, especially in the last three quarters. However, these contributions still have cyclical oscillations.

With the exception of the short period between 2011 and 2012, the share of foreign investment in the total investment has not exceeded one third. These shares, also, depict a cyclical pattern. On the other hand, between the total investment and its contribution to growth there is a significant positive correlation, but of a moderate size (0.4931 [t statistics 3.2067]). Such a correlation does not exist for any particular type of investment by three different sources of funding. The investment contributions to growth depend more on the total size of investment than on its structure. Surprisingly, between domestic private investment and FDI there is a high and negative correlation coefficient (-0.5940 [t statistics -4.1705]). This suggests, importantly, that rather than synergy there is rivalry between private DI and FDI. Such a rivalry does not exist between state DI and FDI, where there is a moderate, but positive correlation coefficient (0.4102 [t statistics 2.5443]). Between private DI and state DI there is no significant correlation (-0.1012, [t statistics -0.5756]).

Ranking and sector impacts

Multipliers and FDI have different units of measures. Irrespective of this, it is possible to monitor their relationship through correlation coefficients. We here provide the structure of FDI by sectors and the size of multipliers by sectors, also. It seems to us that there is one very simple way to show the connection between these two variables. To this end we will use ranks of those variables. Table 8 (in the first column) shows the ranking of all sectors according to the size of FDI invested in them. Then, in the next four columns we show ranks by multipliers of output, employment, income and investments. We compare these figures and their mutual correlation.

We see, for example, that the financial sector had the highest FDI in the period 2010-17. It is ranked first by

5 Data on the total investment are taken from RZS [10], and converted to euro terms by the nominal exchange rates. The Ministry of Finance provided data on public investment [6]. Data on FDI are from the NBS [7], while the remaining data on the domestic private investment have been compiled as residuals.

this criterion. However, its output multiplier is lower and according to it, this sector ranks in 6th place. It is ranked even worse with respect to multipliers of employment and income (14th and 22nd place). However, according to the induced investment impact, its multiplier is somewhere in the middle (14th place).

Another striking example is the construction sector. It is placed to the third position in attracting FDI with equally efficient impact on output. However, it did not provide much additional employment or income (16th and 13th place, respectively).

If the government was trying to determine the differential effects of FDI spending on the employment of a sector, comparison of employment multipliers would show where this spending would have the greatest impact generated throughout the economy. If maximum total employment effects are the exclusive goal of FDI spending, it would always be rational to spend all the money in the sectors with the largest employment multipliers. Of course, there might well be other reasons – taking into account strategic factors, equity, capacity constraints for sectoral production, and so on – for using some of the new FDI on the output and employment of the other sectors.

The correlation coefficients - the ordinary coefficients and the Spearman rank order coefficients - do not indicate that there is a link between FDI and the sector multipliers or contributions, direct and indirect, to production, employment, and earnings. This is important information. It points to the fact that the sectoral allocation of FDI does not support development of the relevant sectors in the most efficient way. For example, the Spearman coefficients between FDI and output, employment and investment multipliers are: 0.2992 (t-value 1.5039), 0.1276 (t-value 0.6174) and 0.2538 (t-value 1.2586), respectively. None of them is significantly different from zero. The ordinary coefficients of correlation point out to the same conclusion: 0.3396 (t-value 1.7319), -0.1262 (t-value -0.6103) and 0.1751 (t-value 0.8533), respectively. Hence, investments as a whole contribute to the GDP growth, as shown in Figure 3, but their sector allocation does not provide the most efficient use within the framework of the economy's technological linkages, as shown in Table 8.

There is another way to measure impact of FDI on output in the input-output framework. Based on the assumption of a linear technology, equation (4) can be used to define impacts of a change in FDI (**fdi**) on net changes in output (16):

$$\Delta \mathbf{x} = (\mathbf{I}-\mathbf{A})^{-1} \bullet \Delta \mathbf{fdi} \qquad (16)$$

Both GDP and FDI can be divided into two equal subperiods: until 2014 and since 2014. Based on the equation (16), we can determine how much the increase in FDI in the second period affected the increase in outputs in the same period. Strictly analytically speaking, we should have two **A** matrices for 2010 and 2014, compiled on the assumption that they did not change in the subsequent period of four years. However, we only have matrix **A** for 2014, so we cannot check if the multipliers altered from one period to the next. Additionally, our presentation of results should be partially modified. Quarterly data on GDP are not available at the disaggregated level for manufacturing, so we had to aggregate 13 sectors, which

Table 8: Ranking of activities by FDI and multipliers

Sectors	FDI	Multipliers			
		Output II	Labor II	Income II	Investment
Agriculture	14	16	25	7	6
Mining	4	23	13	15	22
Food	5	1	2	14	2
Textile	15	17	17	19	19
Wood	19	14	8	4	11
Coke and petroleum	24	15	6	12	18
Chemicals	12	24	7	1	21
Pharmaceutics	16	20	4	9	20
Rubber and plastics	6	12	9	5	10
Metal products	11	11	11	8	16
Electrical eqipments	22	21	10	16	23
Machinery	17	25	20	25	25
Motor vehicles	9	10	3	10	15
Transport vehicles	23	22	23	21	24
Furniture	8	8	12	17	17
Electricity and gas	20	2	1	2	1
Water supply	21	7	18	11	7
Constructions	3	3	16	13	5
Trade	2	5	19	18	8
Information	18	9	21	20	13
Financial sector	1	6	14	22	14
Real estate	10	18	5	6	3
Professional services	7	19	15	3	4
Public services	25	13	22	23	9
Arts and others	13	4	24	24	12

comprise manufacturing, into the only one sector. Instead of 25 sectors, we present 13 sectors in Figure 4.

Regardless of all the above mentioned restrictions, the conclusion from Figure 4 is rather convincing. As with the ranking in Table 8, there is not a strong connection between the multipliers and historical GDP growth based on FDI. The mining, water supply and financial sector are good examples for such an outcome. In those sectors, the GDP increase due to FDI is far greater than it would be expected from the corresponding multipliers. By contrast, the multipliers for manufacturing, electricity and gas, and construction are much larger than the percentage of corresponding contribution of FDI. Those should be sectors for attracting much more FDI, if the overall impact on the economy would be the main criterion for investing. Again, the correlation coefficients do not indicate that there is a link between FDI and the sector multipliers or the sector contributions, direct and indirect, to output. The coefficient is -0.2866 (t statistics -0.9921).

Conclusions

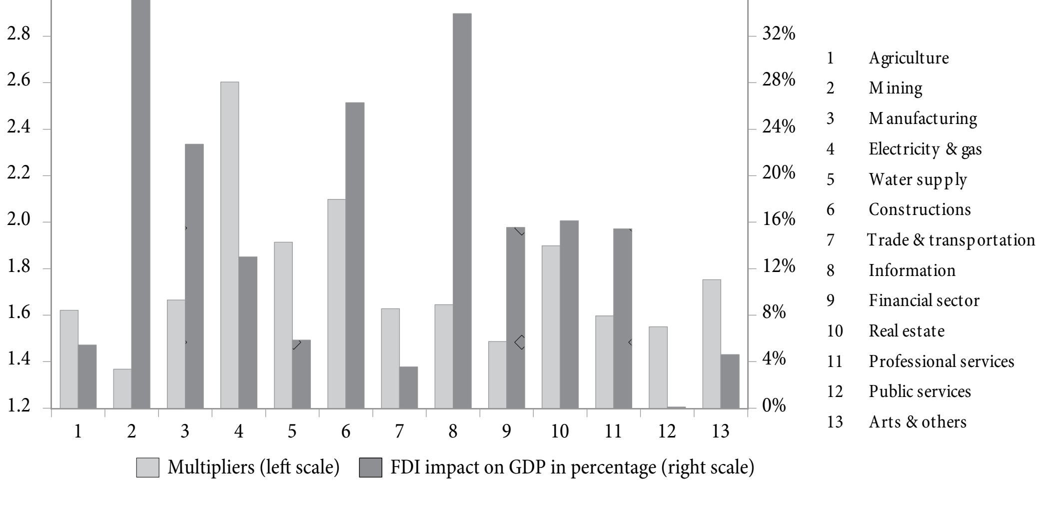
In this paper, we introduced two novelties from the perspective of input-output analysis: statistical and analytical. For the first time we have presented multipliers for Serbia and analyzed the sectoral effects of investment based on their partition into domestic and foreign investments.

Serbia still does not have official I-O tables; although there is quite well prepared a draft of these tables for 2014 and 2015 for 65 sectors. We used the preliminary data for 2014, and based on them compiled our I-O table for 25 sectors. We also allocated the value added to its components, partitioned the investment to domestic and foreign parts, and carried out employment allocation across sectors, i.e., by products or homogenized sectors of activity.

On this ground, we calculated three types of multipliers: simple, total and investment multipliers: $\mathbf{m}(\mathbf{o})$, $\mathbf{m}(\mathbf{e})$, $\overline{\mathbf{m}}(\mathbf{o})$, $\overline{\mathbf{m}}(\mathbf{e})$, $\overline{\mathbf{m}}(\mathbf{w})$ and $\overline{\mathbf{m}}(\mathbf{d})$. We then compared these multipliers with the sectoral FDI structure and contribution of FDI to growth. We concluded that the allocation of investments by sectors does not follow the contribution of these sectors to the formation of output or employment. In other words, the most optimal social investment structure is far from reality, and it is still a task that has to be achieved in Serbia. In this sense, awareness of multipliers is the first necessary step in this direction.

The government can partially, but not completely, influence the inflow of FDIs with its policy of subsidies and tax incentives. The remaining factors are the commercial conditions, development of the market and risk assessment of the investors by themselves. However, when investors decide on new investments, data on multipliers are extremely important in order to assess the overall effects which such investments will cause to their business and the entire economy. In this sense, multiplier analysis is crucial for the correct assessment of the investment impacts, both by private investors and the government.

Figure 4: FDI impact on GDP and multipliers



The final point is equally important. Domestic investors should not be left behind from the policy of attracting new investment. That is particularly important, since we discovered that there was no synergy, but rivalry, between domestic private investment and FDI. The government can use tax incentives and corporate income tax framework for that purpose. Our counterfactual experiment strongly supports this proposal.

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