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UNTAPPED EXPORT OPPORTUNITIES OF SERBIAN ECONOMY AFTER A DECADE OF INVESTMENT AND EXPORT BASED GROWTH MODEL

Neiskorišćene izvozne mogućnosti srpske privrede nakon decenije modela rasta zasnovanog na izvozu i investicijama

Abstract

Relying on the economic complexity and product space approach developed by Hidalgo and Haussmann [21], and using trade data, exporters' financial reports and available macroeconomic statistics, we try to assess the degree of transformation of structure and production potential of the Serbian economy over the last decade. We argue that although the overall economic complexity, as a decent predictor of higher economic growth, did slightly improve over the observed period, there is still large untapped potential in local knowledge and know-how. FDI inflow into manufacturing industry, as the most important factor of the transformation of the production structure and size of the economy, has contributed to growth in employment and export, improving the macro stability. On the other side, its contribution to the higher growth outlook by improving the production capacity was limited as FDI inflow has been directed mostly into low and medium-low technology industries with low complexity products. Moreover, it seems that the vertical spillover through linkages with local suppliers and transfer of technology, knowledge and practices could also be larger. In the same period, some positive developments of limited scale yet are reflected in emergence of a certain number of high-tech industries' products with high complexity, most likely produced by SMEs, such as electrical equipment, lighting, various software embedded devices, etc.

Keywords: *economic complexity, export, FDI, growth policy.*

Sažetak

Oslanjajući se na ekonomsku složenost i pristup proizvodnog prostora (*product space*) koji su razvili Hidalgo i Haussmann [21] i koristeći podatke o trgovini, finansijske izveštaje izvoznika i dostupne makroekonomske statistike, pokušavamo da ocenimo stepen transformacije strukture i proizvodnog potencijala privrede Srbije tokom poslednje decenije. Iznosimo stav da se ekonomska složenost, kao dobar prediktor većeg ekonomskog rasta, donekle povećala, ali da postoji značajan neiskorišćen potencijal u domaćem znanju i *know-how*. Priliv stranih direktnih investicija u prerađivačku industriju, kao najvažniji faktor transformacije proizvodne strukture i veličine privrede, doprineo je rastu zaposlenosti i izvoza, poboljšavajući makrostabilnost. Međutim, njegov doprinos potencijalu za veći rast poboljšanjem proizvodnih kapaciteta bio je prilično skroman, jer je priliv SDI uglavnom bio usmeren u industrije niske tehnologije sa proizvodima male složenosti. Štaviše, čini se da se nije dogodilo ni vertikalno „prelivanje" kroz veze sa lokalnim dobavljačima i prenos tehnologije, znanja i praksi. S druge strane, neki pozitivni pomaci ograničenog obima i dalje se ogledaju u pojavi određenog broja proizvoda visoke tehnologije sa velikom kompleksnošću, koje su najverovatnije proizvela MSP, poput električne opreme, osvetljenja, različitih ugrađenih uređaja, itd.

Ključne reči: *ekonomska složenost, izvoz, SDI, privredni rast.*

Introduction

Ever since the 2008 global crisis, Serbia has based its growth on exports and investments. However, despite recent improvements, growth rate has in general been relatively lukewarm and the gap between Serbia and its peers is not closing. Although this growth model has resulted (and has been supported) in much more stable macroeconomic environment, achieving much higher growth rates in a sustainable manner is necessary. As Serbia is facing demographic challenges, increasing productivity and competitiveness will be especially important. Higher value-added will need to come both via continued attraction and improved quality of FDI as well as enhancing domestic SMEs. With an aging population, emigration pressures and shrinking labor force, shift toward higher value-added activities and higher productivity will be a key tool in attaining and sustaining higher growth.

Over the observed period, since the GFC, the industrial policy in Serbia has been implicitly mostly relying on direct subsidies to FDI investing in manufacturing industry. Although since 2015 all investors – both domestic and foreign were given the same rights to subsidies, the users – new investors were predominantly foreign ones. The rule for attribution of subsidies was proportional to the number of newly created jobs. Other policies, though minor in terms of value of budget envelope, consisted in grants and subsidized loans to SMEs for investment and export promotion and grants to startups for innovation. Until 2020, grants to SMEs were not explicitly targeting a specific policy outcome in line with usual industrial policy goals such as export or productivity and were rather based on compliance to formal rules of the call [31].

The overall literature on FDI and host economy benefits can be observed through two main approaches. Macro level approach, though suffering from a clear lack of theoretical guidance as no overall theoretical prediction connects the stock of foreign investment to the rate at which national income grows (for more elaboration see [11], [27]), aims to identify the causal link from FDI to growth. Hence, micro level approach focuses on measuring of the level of positive externalities, so called spillovers of FDI to local economy. Through the lenses of welfare economics, these positive spillovers should exceed the cost of policy and negative effects in order to confirm the host country's interest to devote scarce domestic resources to attracting and incorporating FDI into its development strategy [28].

In general, the evidence on the macro-level effect of FDI suggests that economic growth is positively associated with FDI but only under certain conditions: for example when countries have sufficiently high incomes [8], have a minimum threshold stock of human capital [9], or are financially developed [2]. One recent study on the developments and the drivers of foreign direct investment in Central and Eastern European countries over the period 1993–2014, through a dynamic panel data analysis, shows that the positive impact of FDI inflows on economic growth has amplified during this 2007-2008 crisis.

Another stream of literature analyses impact of FDI on host economy by focusing on microeconomic effect of FDI spillovers to domestic industries. The spillover from FDI takes place when the entry or presence of multinational corporations increases the productivity of domestic firms in a host country and the multinationals do not fully internalize the value of these benefits. Spillover may take place through improvement of the efficiency of local firms as they introduce new technologies or knowledge by hiring workers trained by foreign firms. Another kind of spillover occurs through intensifying competition in host market led by the entry of FDI. The latter forces local firms to use their resources more efficiently or to search for new technologies [7].

As comprehensively summarized in Estrin and Uvalic [14], examples of mechanisms for positive external spillovers from FDI in the literature include those through the dissemination of new higher levels of technological productivity on locally-owned firms ([3], [4]), via demonstration effects or reverse engineering [5]. Situations where this happens include enhancing of the knowledge base of host economy by foreign firms, for example by introducing new products, processes, management techniques and workforce skills. Through interaction of local and foreign firms, domestic firms can learn about new technologies, market opportunities, and superior manufacturing techniques and as a result improve their productivity [25]. Knowledge can also

spread to local firms via workforce dynamics, as some of the workers from foreign owned firms and trained in new technological or managerial methods move to domestic companies, either vertically or horizontally [15]. Efforts by foreign owned firms to raise the productivity of their local suppliers can also result in vertical spillovers. However, as for the macro-economic impact, some authors also highlight that there could be negative externalities from FDI for domestic firms [1], [4]. One of the negative impacts can occur by the crowding out of domestic firms in an industry through the use of uncompetitive practices such as predatory pricing or entry-deterrence [11].

The empirical studies on the host country productivity spillover effects of FDI mostly address the possibility of horizontal spillovers i.e., within an industry, while there is limited evidence on vertical spillovers on firms up and down a value chain of industries [14], probably due to the lack of data. The existing studies on FDI spillover in European transition economies have found rather ambiguous results in terms of local spillovers of FDI. Lipsey [26] found that foreign participation in Central and Eastern Europe (CEE) countries is associated with higher productivity in the affiliates themselves while spillovers to indigenous firms are more spotty, clearer to upstream suppliers than to firms in the same industries as the affiliates. On the other side, Bijsterbosch and Kolasa [6] analyzed factors of productivity convergence of CEE countries using a new harmonized industry-level database and provided empirical evidence that FDI and absorptive capacity are key factors for productivity convergence in these countries. More importantly, according to the same authors, the favorable impact of FDI on productivity is not automatic and can be strengthened by improving the absorptive capacity of the recipient economy, for example via raising the level of human capital. One more recent study on FDI spillover on the Western Balkan countries [13] using data for five countries (Albania, Bosnia and Herzegovina, Croatia, Macedonia and Serbia) for the period 2002-2012, indicate that FDI inflows have had almost no horizontal effects on key measures of performance of the manufacturing industry, a sector of fundamental importance for strengthening export potential and accelerating economic growth of the Western Balkan countries.

In contrast with earlier literature that failed to find positive intra-industry spillovers from FDI, one of the few studies exploring vertical spillovers by Javorcik [24] focuses on effects operating across industries. The analysis is based on manufacturing firm-level data from survey from Lithuania covering 1996-2000 period. It produced evidence consistent with positive productivity spillovers from FDI taking place through contacts between foreign affiliates and their local suppliers in upstream sectors.

On the other side, presence of the well-developed domestic SME sector is very important both as a generator of income and employment. The recent empirical literature on perspective for high growth firms among SMEs in developing countries add insights to the existing grounds that the policy focus should be on productivity due to its linkage to growth. The large longitudinal study on firm level high growth episodes in large set of developing countries show that factors such as innovation, agglomeration and network economies, managerial capabilities and worker skills, global linkages, and financial development contribute significantly to increasing the probability of a high-growth episode [16].

In this paper we explore the potential for spillovers of abundant FDI to Serbia in the post 2008-crisis period. We focus on the two main drivers of growth – investment and exports – and try to assess what it would take to scale up these drivers and achieve higher growth rates. It should be noted that the paper focuses mainly on export of goods, which contributes to approximately 72% of total exports in 2020. Goods exports performance is generally used for the analysis of countries' overall competitiveness and technological development. Beside the advantage in terms of relative richness in data, trade of goods is also a good proxy for overall competitiveness of an economy as traded goods compete on both domestic and foreign markets, as discussed in Durand and Giorno [12]. In this paper, we focus in particular on manufacturing industry, as it provides a room for productivity improvements. Moreover, that FDI in manufacturing can be important for economic development is supported by the experience worldwide and the related empirical literature. According to detailed evidence examined in a study on FDI, among the twelve principal channels through which FDI impacts

development (real income, standard of living and the growth rate of the host economy), as many as eight are through FDI in manufacturing and only one is through FDI in services [28]. Notwithstanding, services exports have been growing rapidly in recent years, in particular ICT exports (which over the previous decade expanded almost six-fold, from EUR 240 million in 2010 to EUR 1.4 billion in 2019), and these warrant attention as well, but are outside the scope of this paper.

By exploring the possibility for FDI spillovers and more effective SME support programs under the overall industrial policy framework, we try to explore the indicators of competitiveness of the Serbian economy, and in particular of its manufacturing industry, in terms of its performance in attracting foreign investment and the ability to compete on the international market. In doing so, we aspire to contribute to assessing the outcome of the overall industrial policy conducted over the past (post-GFC) decade and to put some ground for next generation of policies.

In this context, we try to identify some important opportunities for improvement in the overall export performance of Serbian economy, both in terms of value of direct export and in terms of integration into international value and supply chains. In other words, given the significant change of the structure of the economy over the last decade which was in a large part driven by FDI inflow into more export oriented industries, we try to assess the productive capacity of this change and to point to some axis of how to leverage it and proceed in future in order to move to higher growth rates of income.

As many other studies in this area of thinking, we are to the certain extent limited in terms of details that could be found in the available data. Apart from macroeconomic statistics, we use product level data on international trade and firm level data on Serbian exporting companies where we combine data on export with financial information in order to assess the export orientation of firms.

We largely rely on our analysis on the economic complexity approach [21]. The economic complexity can be highly predictive of future economic growth as it, together with the product complexity in the product space, offers an excellent measure capturing information about the capacity of an economy to generate income over the long run [22]. In that respect, following the implications of this framework, valuable insights related to the production structure and its evolution can be traced as a direction for more targeted and more effective industrial policy in terms of FDI and SME promotion. In other words, as in Serbia, like in many other countries, the changes of product structure and economic complexity thereof are mainly driven by FDI and local SME emergence, according to the proposition of this strand of economic literature, focusing on supporting industries/products which contribute to increase in economic complexity of a national economy contributes to its more sustainable growth and prosperity.

After this introductory section, we proceed with the overview of the recent trends in export and its structure. In the third section we analyze export pattern of FDI. In the fourth section we examine the perspective of domestic SMEs in internationalization of their businesses and contribution to export. In the last section we conclude and give some policy recommendations.

Export structure and trends

Serbian exports are dominated by exports of mineral and metal, agricultural products and some low value added manufacturing like textile, rubber products, cables and wiring, and wood products. These products represent more than half of the total export in 2008 and almost half of it in 2020 (Figure 1).

Nevertheless, much of the growth of Serbian goods exports over the recent decade can be attributed to products aggregated in the group Tools, machines, and devices. Importantly, this group contains a number of products of higher complexity and higher value added. Exports of this group grew by 218 percent from 2008 to 2020 (corresponding to compound annual growth rate of 11.1 percent). This group of products contributed to almost a third of the overall growth of exports (Figure 1, Table 1).

The concept of economic complexity and its product space represent a measure of an important determinant of economic development which is highly predictive of future economic growth [22]. This measure, developed and empirically tested as a predictor of economic growth

by Hidalgo and Haussmann (see for example [18], [19], [20], [21]) aims to capture the knowledge, know-how and information accumulated at the collective level, which gives rise to the diversity and sophistication of economic activities [22]. By using data on industries and products from international goods trade statistics, these authors create a statistical measure that incorporates the identity of an economy in terms of its productive capacity. Data on industries and products represent, according to this concept, not only the knowledge and know-how embodied in the region's productive networks but also its diversity of physical and human capital. For calculating the final indicator of the economic complexity and product complexity both diversity and ubiquity of export are taken into account by extracting information from a country-product matrix with values for products with Revealed Comparative Advantage (RCA)[1] in international trade of above 1. Normalized eigenvectors of matrices are considered a measure of the economic complexity of all analyzed countries and products.[2].

Economic complexity index (ECI) and product complexity index (PCI) values exist in the range (-4, 4). The mean values of ECI or PCI in the datasets are 0 and the standard deviation values are 1, due to the normalization by Z-transform. The distributions of ECI and PCI values are flatter than the Gaussian distribution (kurtosis is less than 0 in such distributions) and slightly inclined (for PCI to the right side - skewness < 0, the median is about 0.1, and for ECI to the left side - skewness > 0, the median is about - 0.1).

In our analysis, we calculate ECI and PCI values for all countries and products using calculations based on a complete set of data on international trade (240 countries and over 5,000 products) applying the relevant methodological grounds set by Hidalgo and Haussmann [21] and presented in more details in [17] and [10]. Some small differences in

1 RCA - the revealed comparative advantage is a measure of competitiveness in the international trade of any country for any export product in any market and it is calculated using the following formula:

$$RCA_{Ai} = \frac{\frac{X_{Ai}}{\sum_{j\in P} X_{Aj}}}{\frac{M_{W_i}}{\sum_{j\in P} M_{Vj}}}$$

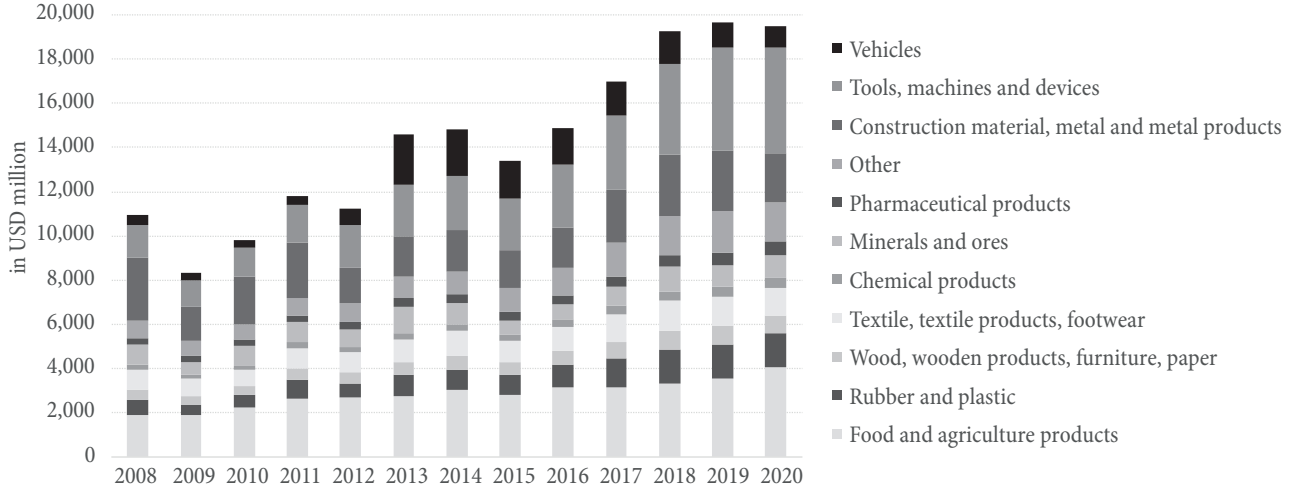
, where X_{Ai}) is the export of product *i* of country A and M_{Wi} is the world import of product *i*.

2 The Economic Complexity Index (ECI) is a measure of the production capacity of economic systems. The equivalent of ECI is a Product Complexity Index (PCI) in product space. The value of each element $M_{c,p}$ of the trade matrix, M (countries by-products) has a value of 1 (for RCA≥1) or 0 (for RCA<1). The diversity of the economy represents the sum of the values of $M_{c,p}$ in the row, and the ubiquity of the product represents the sum of the values of $M_{c,p}$ in the column of the matrix M. The $M_{c,c'}$ and $M_{p,p'}$ matrices are obtained after multiplying the $M_{c,p}$ matrix by itself:

$$M_{c,c'} = \frac{\sum_p \frac{M_{c,p}M_{c',p}}{k_{p,0}}}{k_{c,0}}$$ (trade matrix of countries) and $$M_{p,p'} = \frac{\sum_c \frac{M_{c,p}M_{c,p'}}{k_{c,0}}}{k_{p,0}}$$

(trade matrix of products).
By applying the Z-transform, the eigenvectors of matrices $M_{c,c'}$ and $M_{p,p'}$ were normalized, and ECI and PCI values were obtained as the final result.

Figure 1: Structure of export by sector, 2008-2018



Source: Statistical Office of the Republic of Serbia. Authors' calculations.

Table 1: Contribution to overall growth of export of goods 2020-2008, by type of goods

Export of goods by type of goods	Value of export in USD million, 2020	CAGR 2020-2008	Growth rate 2020-2008	Share 2008	Share 2020	Contribution to growth rate 2020/2008
Tools, machines and devices	4,760	11.1%	218.39%	13.62%	24.41%	29.75%
Food and agriculture products	4,089	7.1%	112.33%	17.55%	20.97%	19.71%
Other	1,734	7.3%	117.99%	7.25%	8.89%	8.55%
Rubber and plastic	1,523	7.6%	123.58%	6.21%	7.81%	7.67%
Vehicles	981	7.0%	109.84%	4.26%	5.03%	4.68%
Pharmaceutical products	664	7.4%	119.44%	2.76%	3.40%	3.29%
Wood, wooden products, furniture, paper	781	5.6%	82.33%	3.90%	4.01%	3.21%
Textile, textile products, footwear	1,247	3.0%	37.81%	8.24%	6.39%	3.12%
Chemical products	458	6.1%	91.46%	2.18%	2.35%	1.99%
Minerals and ores	1,002	1.1%	13.40%	8.05%	5.14%	1.08%
Construction material, metal and metal products	2,260	-2.1%	-20.73%	25.97%	11.59%	-5.38%
Total export of goods	19,498	5.4%	77.68%	100.00%	100.00%	77.68%

Source: Statistical Office of the Republic of Serbia. Authors' calculations.

obtained output vis-à-vis that of Harvard Observatory of Economic Complexity (OEC) result from the fact that OEC calculation was performed for 140 countries (excluding small countries) and for 3,000 products (excluding products with lower trade volume). Serbian economy, according to our calculation has ECI at 0.59 in 2018 (latest available detailed trade statistics) represent a slight improvement since 2008 when it was at 0.55.

We use both concepts of economic complexity and RCA to look in more detail at the structure of Serbia's export basket, and observe some important trends. Table 2 below shows Serbia's export disaggregated to 4-digit level of SITC classification. We can observe from the table that in general the product groups with largest share in exports are low complexity products. For example, the largest product group in Serbia's export consists of insulated wires, cables and similar products, and this group has the PCI value of -0.373, indicating low complexity (and low value added). Several other product groups among the top 20 exports have similarly low PCI values. With these products predominant in terms of share of exports, weighted average PCI of overall Serbian export in 2018 was fairly low, at -0.0767. Further, many of these products also have high RCA values. Although this indicates Serbia has comparative advantage when it comes to these products, it also indicates that Serbia's share of exports of these products in global markets is already fairly high, also indicating limited scope for longer term growth.

More importantly, products that have a low product complexity index are produced by low and mid-low technology industries, which in turn implies they have only limited perspective in terms of the future growth outlook of Serbia's economy [21]. Rather, these products should be viewed in the context of possibilities for upgrading their technological content, and as a potential basis for expanding production and exports of similar but more complex and sophisticated products.[3]

At the same time, Serbia's exports include many product groups which contain more complex products, although these in general have smaller share in exports. Table 3 shows Serbia's exports for top 10 product groups in terms of product complexity (as measured by PCI). Those products (many are from the broader category of Tools and Machinery) have registered very dynamic growth over the observed decade. At the same time, most of these products have fairly low

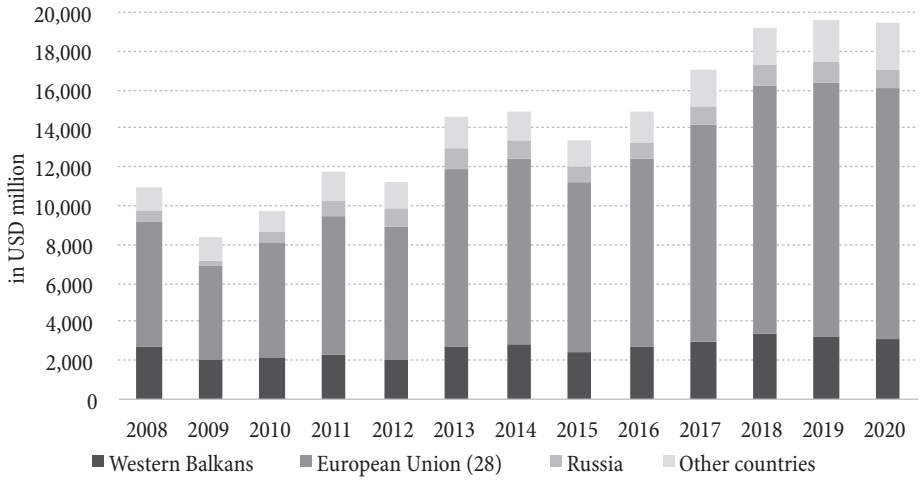
3 As an illustration, pork has the highest PCI value (0.8) compared to the meat of all other animals. This is because pork meat is frequently used by the processing industry or fast-food industry. Conversely, sheep or goat meat is generally not processed in the industry, and thus has low PCI value (-1.7). Another illustration is related to copper and copper products. Serbia has significant reserves of copper ore. The ore itself without processing has extremely low PCI. Copper is obtained by a very complex process in the form of massive pieces that have no significant use-value. Only in rolling mills did the first forms of usable copper in the industry appear, in the form of sheets, pipes, and wires. The complexity of copper wires (pipes) over 6 mm thick is - 0.6, and those used in electrical installations of smaller thicknesses - 0.2. The complexity of the conductors and connectors used in electricity is close to that value. Copper foils required for electronics less than 0.15 mm thick and used in printed circuit boards have a complexity significantly greater than 1.0. Basic components in electronics and electromechanics, even active electronic components, have significant use in industry but do not belong to high tech level (PCI: 0.0 - 1.0). PCI values are greater than 1.0 for integrated circuit parts or sensor components, specialized development modules (embedded amplifiers, etc.). Complex measuring (oscilloscopes), control, and automatic systems (robotic systems), which are used exclusively in industry, can have PCI values close to 2.0.

RCA values, indicating that, although individual companies are successful in exporting them, overall Serbia's exports of these products are well below potential.

Yet presence of such fairly sophisticated products in Serbia's export basket indicates that there are pockets of excellence among Serbia's exporting companies, and companies successfully exporting these and similar products could serve as a basis for sustained expansion and growth of exports. The respective industries belong to the mid-high technology and high-technology (for electronic devices) industries and have higher PCI, improving the overall economic complexity index of the Serbian economy (ECI). Having such companies also increases the overall absorptive capacity of Serbia's economy in terms of technology transfers and upgrades.

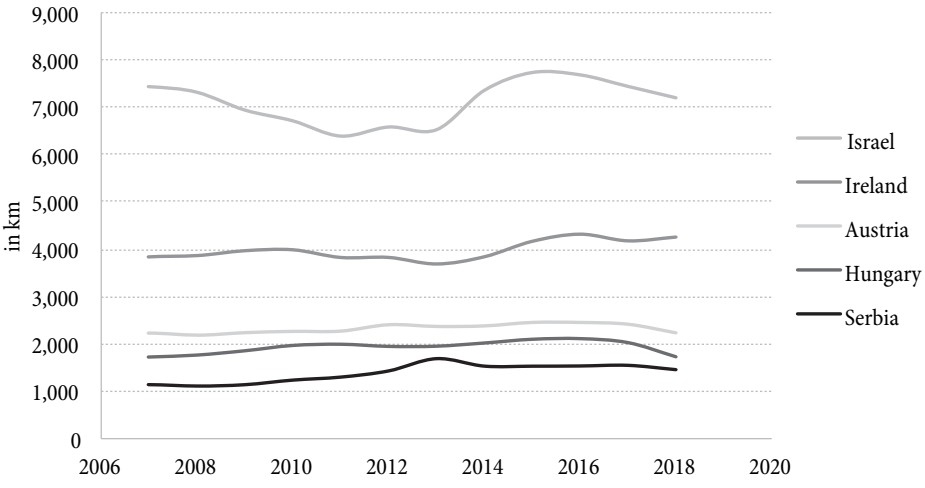
Another interesting observation can be made looking at the data from Tables 2 and 3, and this relates to weighted average distance of export. Although there are exceptions, broadly speaking products of higher complexity (higher PCI) have higher average distance of exports, while less complex products have lower average distance of exports. This makes intuitive sense, as lower complexity products compete primarily on price, and thus transport costs can play an important role. As such, these products are likely to be less competitive for more distant markets where transport costs are higher. For higher complexity products it is likely that transport costs are comparatively less important, and as a result they can be competitive at more distant markets as well. Much of Serbia's current exports are direct to close-by markets (Figures 2 and 3).

Figure 2: Structure of Serbian export by destination country, 2008-2018



Source: Statistical Office of the Republic of Serbia. Authors' calculations.

Figure 3: Average distance of export



Source: UN Comtrade statistics. Google.com (KML format). Authors' calculations.

Table 2: Top 20 products by value of export in 2018

Rank by value of export	Item name	HS 1992, 4- digit code	Value of export in 2018, in USD million	RCA, in 2018	PCI, in 2018	10-year growth rate 2018-2008, in %	Weighted average distance of export, in km	Share of Serbian export in total world export, 2018	Share in total Serbian export of goods in 2018
1	Insulated wire, cable and other electric conductors, connector fitted or not; optical fiber cables of individually sheathed fibers, whether or not assembled with electric conductors or fitted with connectors	8544	1,114	8.63	-0.37	708%	925	0.869%	5.9%
2	Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading no. 8702), including station wagons and racing cars	8703	860	1.14	1.06	2721%	836	0.115%	4.6%
3	Iron or non-alloy steel; flat-rolled products of a width of 600mm or more, hot-rolled, not clad, plated or coated	7208	586	11.09	0.53	-36%	1,010	1.116%	3.1%
4	New pneumatic tires, of rubber	4011	581	7.47	0.54	126%	2,047	0.751%	3.1%
5	Cigars, cheroots, cigarillos and cigarettes; of tobacco or of tobacco substitutes	2402	434	16.02	-0.75	1697%	6,219	1.601%	2.3%
6	Electric motors and generators (excluding generating sets)	8501	379	6.92	1.00	139%	1,590	0.696%	2.0%
7	Copper, refined and copper alloys, unwrought	7403	348	5.66	-1.35	982%	860	0.570%	1.8%
8	Fruit and nuts; uncooked or cooked by steaming or boiling in water, frozen, whether or not containing added sugar or other sweetening matter	0811	329	70.59	-0.51	26%	2,187	7.108%	1.7%
9	Seats (not those of heading no. 9402), whether or not convertible into beds and parts thereof	9401	291	3.56	0.35	251%	1,005	0.358%	1.5%
10	Petroleum oils, oils from bituminous minerals, not crude; preparations n.e.s. containing less than 70% petroleum oils, oils from bituminous minerals; these being the basic constituents of the preparations	2710	287	0.36	-0.65	76%	584	0.036%	1.5%
11	Hosiery; panty hose, tights, stockings, socks and other hosiery, including stockings for varicose veins and footwear without applied soles, knitted or crocheted	6115	270	20.23	-0.66	23%	2,751	2.037%	1.4%
12	Paper, paperboard, cellulose wadding and webs of cellulose fibers, coated, impregnated, covered, surface-colored, decorated or printed, rolls or sheets, excluding goods of heading no. 4803, 4809, 4810 and 4818	4811	242	12.37	0.64	58%	2,020	1.245%	1.3%
13	Medicaments; (not goods of heading no. 3002, 3005 or 3006) consisting of mixed or unmixed products for therapeutic or prophylactic use, put up in measured doses or in forms or packings for retail sale	3004	232	0.67	0.73	20%	1,999	0.067%	1.2%
14	Motor vehicles; parts and accessories, of heading no. 8701 to 8705	8708	228	0.56	1.25	158%	1,304	0.057%	1.2%
15	Furniture and parts thereof, n.e.s. in chapter 94	9403	199	2.29	0.42	97%	1,050	0.230%	1.1%
16	Tubes, pipes and hoses and fittings thereof (for example, joints, elbows, flanges), of plastics	3917	198	7.58	-0.13	251%	1,641	0.763%	1.0%
17	Organic surface-active agents (not soap); surface-active, washing (including auxiliary washing) and cleaning preparations, containing soap or not, excluding those of heading no. 3401	3402	194	5.53	0.12	216%	1,343	0.557%	1.0%
18	Pumps for liquids, whether or not fitted with measuring device, liquid elevators	8413	191	2.88	1.30	847%	2,926	0.290%	1.0%
19	Lighting or visual signaling equipment (excluding articles of heading no. 8539), windscreen wipers, defrosters and demisters; electrical, of a kind used for cycles or motor vehicles	8512	191	5.69	1.01	17211%	1,773	0.573%	1.0%
20	Electric motors and generators; parts suitable for use solely or principally with the machines of heading no. 8501 or 8502	8503	182	10.30	0.79	8%	1,199	1.037%	1.0%

Note: Items 'Electrical energy' HS 1992 code 2716 and 'Commodities not specified according to kind' HS 1992 code 9999 are not ranked in the list notwithstanding the value of export of 438 USD million (2.3% of total export) and 291 USD million (1.5% of total export), respectively.
Source: Harvard Dataverse, Atlas of Economic Complexity. Authors' calculations.

Table 3: Top 10 products by value of product complexity (PCI) and total value of export above 10 million USD, in 2018

Rank by PCI in 2018	Item name	HS 1992, 4-digit code	RCA, in 2018	PCI, in 2018	Value of export in 2018, in USD million	10-year growth rate 2018-2008, in %	Weighted average distance of export, in km	Share of Serbian export in total world export, 2018	Share in total Serbian export of goods in 2018
1	Machinery and mechanical appliances having individual functions, n.e.s. in this chapter	8479	0.37	1.96	47	200%	1,564	0.037%	0.25%
2	Measuring or checking instruments, appliances and machines, n.e.s. or included in this chapter; profile projectors	9031	0.47	1.71	22	741%	1,855	0.047%	0.12%
3	Taps, cocks, valves and similar appliances for pipes, boiler shells, tanks, vats or the like, including pressure-reducing valves and thermostatically controlled valves	8481	0.30	1.63	27	46%	1,423	0.030%	0.14%
4	Tools, interchangeable; for hand tools, whether or not power-operated, or for machine tools (pressing, stamping, punching, drilling, etc.), including dies for drawing or extruding metal, and rock drilling or earth boring tools	8207	0.74	1.58	18	28%	1,223	0.075%	0.09%
5	Ball or roller bearings	8482	0.46	1.55	15	-16%	2,370	0.046%	0.08%
6	Transmission shafts (including cam and crank); bearing housings and plain shaft bearings, gears and gearing, ball screws, gear boxes, flywheels and pulleys, clutches	8483	0.44	1.47	26	-17%	1,953	0.044%	0.14%
7	Tools for working in the hand, pneumatic or with self-contained non-electric motor	8467	3.83	1.46	32	141%	1,291	0.385%	0.17%
8	Machinery, plant or laboratory equipment for the treatment of materials by a process involving change of temperature (i.e., heating, cooking, etc.); instantaneous or storage water heaters, non-electric	8419	1.00	1.45	40	42%	922	0.101%	0.21%
9	Machine-tools; parts suitable for use with the machines of heading no. 8456 to 8465, work or tool holders, self-opening die heads, dividing heads and other attachments	8466	1.13	1.41	23	-1%	1,158	0.114%	0.12%
10	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter-pins, washers (including spring washers) and similar articles, of iron or steel	7318	0.59	1.36	24	101%	1,381	0.059%	0.13%

Source: Harvard Dataverse, Atlas of Economic Complexity. Authors' calculations.

To ensure sustainable growth of exports, opening up new markets, including more distant ones, will be important for Serbia over the medium term. This is another reason why a shift toward more complex products is desirable.

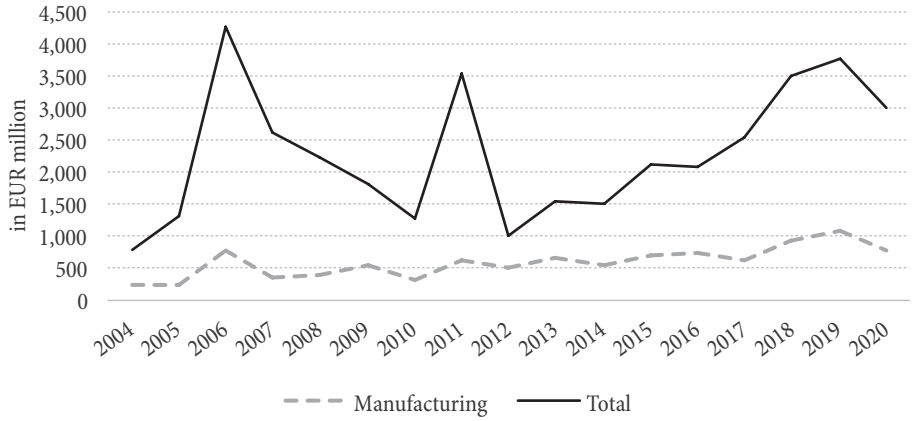
Foreign direct investment (FDI) and export

In very broad terms, FDI developments in Serbia since the beginning of the transition went through two stages. In the first stage, FDI inflows from 2004 to 2010 have been high and volatile, mainly related to privatizations and often dominated by several large transactions in financial sector and telecommunications. In the second stage, since 2011 FDI has been constantly growing (Figure 4). FDI inflows in this period became to a good degree a result of targeted FDI attraction policies as a mechanism for job creation, through abundant support by subsidies targeting job creation, especially since 2012-2014. This policy shift focus was marked by the Government's decision to attract a major car manufacturer (FIAT) to establish its plant launched in 2012 on the existing site being a part of the inherited metal and machines industry complex developed through the 1970s and 1980s. The share of FDI in manufacturing industry doubled from 18% in the 2004-2008 period to 32% of total net FDI inflow (Figure 5).

FDI attraction policies have been successful in job creation. For example, Serbia was ranked first globally in terms of FDI jobs created per million inhabitants in 2018 [23]. Also, some 40 thousand net new jobs have been created in de novo FDI companies in manufacturing between 2014 and 2019 out of ca. 256 thousand total net job creation in the same period [32].

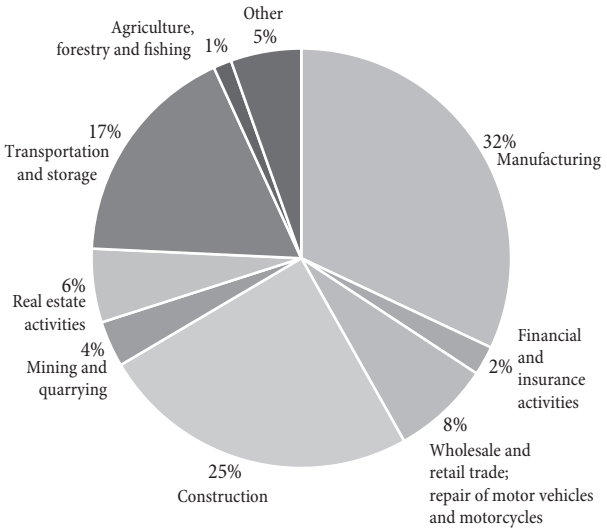
Yet in the same period, the productivity of de novo FDI did not increase significantly and the gap with domestic de novo firms in manufacturing industry has been almost closed. This is mainly because much of the

Figure 4: Value of net FDI inflow to Serbia 2004-2020



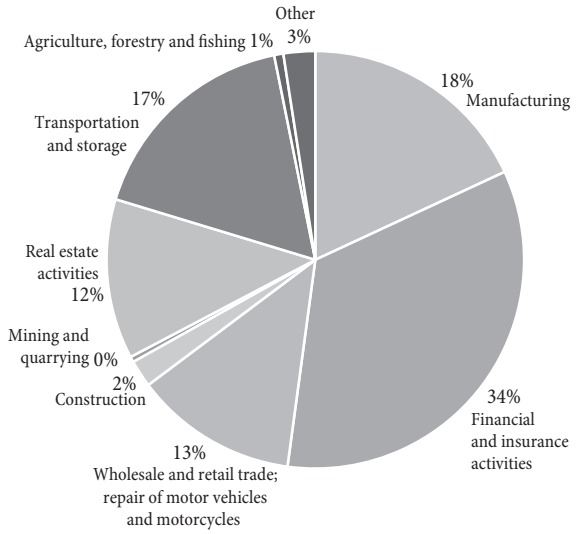
Note: Two peaks relate to large one-off deals: privatization of nationalized mobile operator Mobi063 to Norwegian Telenor (1.5 billion euro) and state-owned pharmaceutical company Hemofarm to German Stada (475 million euro), both in 2006, and to the sale of the retail chain Delta Maxi to Belgian Delhaize (933 million euro) in 2011.
Source: National Bank of Serbia. Authors' calculations.

Figure 5: FDI net inflow to Serbia by sector, 2010-2019



Source: Statistical Office of the Republic of Serbia. Authors' calculations.

Figure 6: FDI net inflow to Serbia by sector, 2004-2008



Source: Statistical Office of the Republic of Serbia. Authors' calculations.

recent de novo FDI in manufacturing has been in low-value added, labor intensive sectors such as cable production and rubber products such as tires. As a result of these developments, productivity in the FDI companies has in fact been decreasing from 2014 to 2018 (Figure 7).

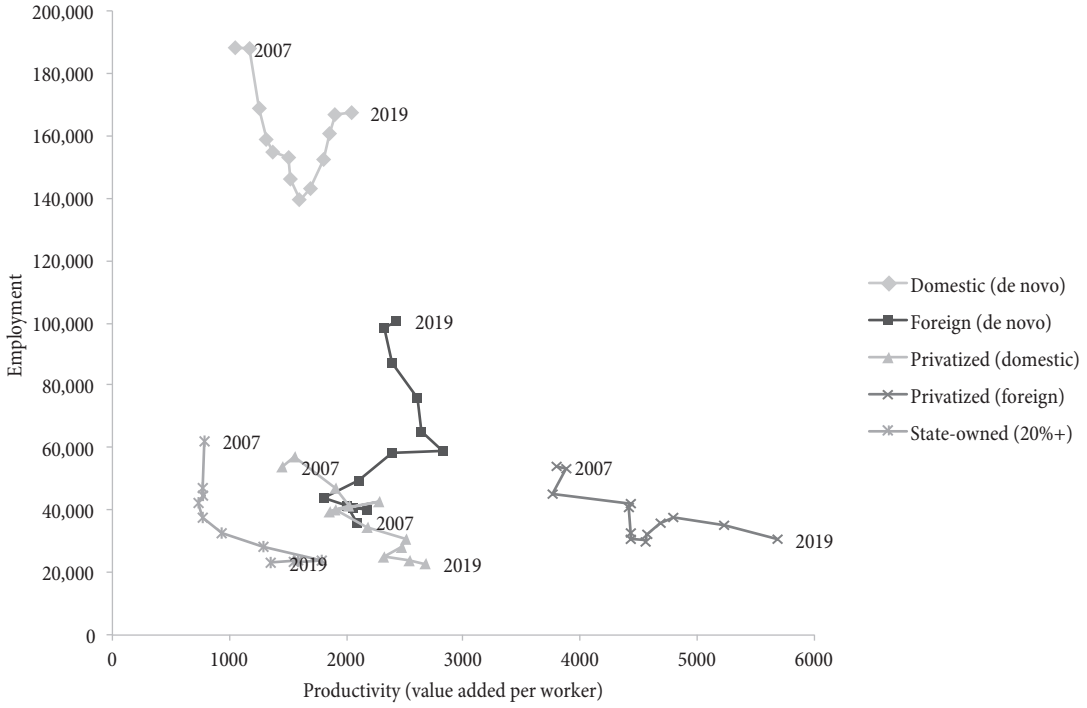
FDI has also significantly contributed to the growth of exports. For example, out of 30 largest exporters in 2019, 26 are FDI companies. Top 30 exporters account for EUR 5.48 billion of exports, of which FDI companies account for EUR 4.73 billion, or 86 percent according to the calculations based on Customs Administration data in combination with Business Registry data for 2019.

However, many export oriented FDI is still based on products with relatively low PCI (with the exception of car production), which is clearly reflected in the structure of Serbia's exports. Out of top 30 exported products, which account for EUR 9.2 billion of Serbia's exports in 2019 (about half of total exports), there are 16 low complexity products (with PCI < 0.3), accounting for approximately 60 percent of top 30 products export value.

Further, FDI companies are still not highly integrated in the local economy. By combining data on firm level import and financial reports, we estimate that foreign companies import approximately 60 percent of inputs.

Moreover, Serbia has a relatively significant number of products where it has a relatively high RCA as it is exporting significant volume of these products to the world market, yet at the same time importing fairly

Figure 7: Productivity and employment in manufacturing, by firm ownership, 2007-2019



Source: World Bank, 2019 (updated with data for 2018 and 2019).

large volume of these same types of products. These are typically products of mid and low-technology industries that are well established in Serbia on highly competitive grounds due to cheap technology and labor. For example, in 2018 Serbia imported USD 176 million of the products in the category Articles for the conveyance or packing of goods, of plastics (HS code 3923), while exporting USD 157 million of the products from this same group. Similarly, it imported USD 88 million of the products from the category Cartons, boxes, cases, bags and other packing containers, of paper, paperboard, cellulose wadding or webs of cellulose fibers (HS code 4819), while exporting USD 74 million of products from this group.

There is apparently a large potential for vertical integration of local SMEs into supplier chains to FDI and to international market in providing more complex and sophisticated products which can spur productivity and employment by much higher pace than the existing production structure dominated by low complexity products and high PCI products represented only in small pockets and niches.

In other words, there are a number of products where Serbia is exporting basic products with relatively low value added, and at the same importing more sophisticated products based on these. For example, in 2018 Serbia exported USD 1,114 million of the products from the group Insulated wire, cable and other insulated electrical conductors; optical fiber cables, of individually sheathed fibers, with conductors etc. or not (HS code 8544). It also exported USD 348 million of products from the group Refined copper and copper alloys, unwrought (HS code 7403). Both of these groups of products are comprised mostly of low value-added products that serve as inputs for more complex products of higher value added.

With still significant share of low-tech industries FDI and generally low integration with the local suppliers, important benefits such as technology transfer and productivity improvements that are typically associated with FDI are underused for local economic development.

Domestic SMEs and export

Serbia's SME sector plays an increasingly important role in the economy. Although about 60% of export is realized by large companies and almost 40% by foreign owned large companies, SMEs play an important role with 40% share in total export. SMEs generate significant employment (66% of employees in all enterprises), [29]. As shown in

Figure 7, since 2014 domestic de novo companies (which are almost exclusively SMEs) have been creating new jobs (not as much as foreign companies) and have in parallel been able to increase their productivity. By 2019 labor productivity of these companies has reached the level comparable to that of FDI companies (Figure 7). Similarly, when it comes to exporting trends, growth of SME exports has been broadly similar to that of large companies.

As noted in the introductory section, presence of the well-developed domestic SME sector is very important for generation of growth and employment. From the perspective of positive spillovers from FDI, these to a large extent depend on the absorptive capacity of the domestic economy, including capacity for technology absorption and level of human capital, all of which at the same time contribute to and depend on the existing sophistication of the domestic SMEs. On the other side, high growth perspective of domestic SMEs is supported by the establishment of global linkages, managerial skills and belonging to networks and agglomerations [16].

For the purpose of the analysis of the relative export orientation and internationalization of SMEs v. FDIs, we took the list of all Serbian exporters in 2019 from the Customs Administration and amended it with the relevant financial data from the Business Registers Agency. As some of firms are exporting (even imported) goods, we took as a criterion that firm had disclosed in its income statement any revenue from export of goods and services in the observed period (2019) to select the product exporting SMEs.

It is very interesting to note a relatively large share of export in revenues of product exporting SMEs. SMEs have typically more difficulties in internationalization, while larger companies are managing to overcome this barrier. The last holds especially for those SMEs in medium to high tech sectors which realize almost 40% of their total income from export (Table 4). This share is still lower than with FDI SMEs in the same technology group (77%) and the total amount is still small contributing with 2.8% to total value of export of all firms. The same segment of the economy is probably reflected in the presence of high PCI products in relatively small amounts of export as shown in Table 3. However, the presence of niches with highly complex products developed and produced by genuinely local SMEs which is almost entirely driven by foreign market placement represents a promising potential for larger scale shifts in economic structure and for designing policies to support it.

This observation seems aligned with other research. For example, Svetličič, Jaklič and Burger [30] note that, compared to larger firms, SMEs face larger financial and capacity problems when it comes to exporting. They note that while larger companies enjoy superiority in marketing, production capabilities and scale economies, SMEs frequently target specialized niches, with their main competitive advantages in the technological know-how, organizational flexibility, and closer relationships with customers.

The presented observations on the internationalization of Serbian SMEs (especially in high tech industries) in combination with the examples of specific products that are being imported while they are represented on highly competitive grounds in the Serbian product space or are in proximity of the existing products in terms of relevant knowledge and know-how, such as those quoted in the section on FDI and export, indicate that there might be significant opportunities for stronger integration between domestic SMEs and FDI companies operating in Serbia and positive spillovers to the local economy from FDI.

Moreover, specific policies targeting specialization and internationalization of specific niches of highly complex products can help to improve its RCA and valorize the local potential in terms of knowledge and know-how for the sake of higher economic growth.

Concluding remarks

Higher private sector investment, including foreign direct investment, in general leads to improved productivity, as well as improved competitiveness. It can also result in improved quality, design and reliability of products. One of the main mechanisms for the foreign direct investment to lead to positive transformation of the host economy is via technological and other spillovers. Yet, for spillovers to happen, the type of FDI (sectors, technology content) as well as absorptive capacity of the host economy (human

Table 4: Export orientation of product exporting firms, by firm size, ownership type and industry technology level[4], 2019

	Value of sales of products, in billion of dinars	Value of export sales of products, in billion of dinars	Share in total value of export of product exporting firms	Share of export in total revenue from sales of products	Firm level share of export in total revenue from sales of products, descriptive statistics					
					Number of firms	10th percentile	25th percentile	50th percentile (median)	75th percentile	90th percentile
	(1)	(2)	(3)	(4)=(2)/(1)	(5)	(6)	(7)	(8)	(9)	(10)
All firms	3,937	1,688	100.0%	42.9%	4,644	1.0%	8.0%	33.0%	82.0%	100.0%
Large firms	2,461	1,022	60.5%	41.5%	284	2.0%	9.5%	36.5%	89.0%	100.0%
Domestic firms	1,458	360	21.3%	24.7%	148	0.1%	8.0%	24.5%	58.5%	87.0%
of which: Manufacturing firms	463	216	12.8%	46.6%	71	8.0%	18.0%	41.0%	63.0%	87.0%
High-tech & Medium high-tech	**145**	**80**	**4.7%**	**55.0%**	**17**	**16.0%**	**24.0%**	**53.0%**	**63.0%**	**92.0%**
Low-tech & Medium low-tech	**319**	**136**	**8.1%**	**42.8%**	**54**	**7.0%**	**16.0%**	**55.0%**	**62.0%**	**87.0%**
Food and beverages	164	44	2.6%	26.9%	22	7.0%	13.0%	24.5%	39.0%	46.0%
Other	154	92	5.5%	59.8%	32	10.0%	23.5%	55.5%	76.0%	89.0%
Foreign firms (any share of foreign ownership)	1,004	662	39.2%	65.9%	136	2.0%	13.0%	69.0%	99.0%	100.0%
of which: Manufacturing firms	752	570	33.7%	75.7%	84	9.0%	34.5%	93.0%	100.0%	100.0%
High-tech & Medium high-tech	**283**	**259**	**15.4%**	**91.5%**	**27**	**15.0%**	**83.0%**	**99.0%**	**100.0%**	**100.0%**
Low-tech & Medium low-tech	**469**	**310**	**18.4%**	**66.1%**	**57**	**9.0%**	**27.0%**	**71.0%**	**99.0%**	**100.0%**
Food and beverages	152	45	2.7%	29.9%	20	7.0%	14.5%	30.0%	42.0%	61.5%
Other	317	265	15.7%	83.5%	37	22.0%	71.0%	98.0%	100.0%	100.0%
SMEs	1,475	666	39.5%	45.2%	4,360	1.0%	8.0%	32.0%	82.0%	100.0%
Domestic firms	813	280	16.6%	34.4%	2,923	1.0%	5.0%	22.0%	60.0%	94.0%
of which: Manufacturing firms	538	194	11.5%	36.1%	1,668	2.0%	7.0%	22.0%	55.0%	85.0%
High-tech & Medium high-tech	**124**	**47**	**2.8%**	**38.1%**	**386**	**1.0%**	**6.0%**	**20.0%**	**53.0%**	**87.0%**
Low-tech & Medium low-tech	**414**	**147**	**8.7%**	**35.5%**	**1,282**	**2.0%**	**7.0%**	**23.0%**	**55.0%**	**85.0%**
Food and beverages	135	37	2.2%	27.0%	261	1.0%	6.0%	19.0%	45.0%	77.0%
Other	278	110	6.5%	39.7%	1,021	2.0%	8.0%	24.0%	57.0%	87.0%
Foreign firms (any share of foreign ownership)	662	386	22.9%	58.3%	1,437	3.0%	19.0%	70.0%	100.0%	100.0%
of which: Manufacturing firms	311	202	12.0%	65.0%	474	5.0%	30.0%	77.0%	99.0%	100.0%
High-tech & Medium high-tech	**95**	**73**	**4.3%**	**77.4%**	**156**	**2.0%**	**24.0%**	**76.5%**	**75.0%**	**100.0%**
Low-tech & Medium low-tech	**216**	**129**	**7.6%**	**59.6%**	**318**	**9.0%**	**32.0%**	**77.0%**	**99.0%**	**100.0%**
Food and beverages	63	30	1.8%	48.3%	64	5.0%	14.5%	52.5%	88.0%	98.0%
Other	153	98	5.8%	64.3%	254	13.0%	37.0%	80.5%	99.0%	100.0%

Source: Business Registers Agency of the Republic of Serbia, Register of Financial Statements. Customs Administration for selection of the list of exporters of goods in 2019. Authors' calculations.

capital, capabilities of local SMEs, technology level of domestic economy, development of the R&D system of the host economy, etc.) are both crucial.

Ever since the 2008 global crisis, Serbia has based its growth on exports and investments with impressive inflow of foreign direct investment (FDI). However, despite recent improvements, growth rate of the economy has in general been relatively lukewarm and the gap between Serbia and its peers is not closing. Although this growth model has resulted (and has been supported) in much more stable macroeconomic environment, achieving much higher growth rates in a sustainable manner is necessary. Over the same period, the industrial policy, although not explicitly formalized so, was based on direct subsidies to foreign direct investments linked to their creation of employment in Serbia and, to a much lesser extent, on

4 Aggregation used by Eurostat (https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf).

programs supporting local SMEs in investment, export and innovation development. In this paper, through the lens of the economic complexity and product space approach developed by Hidalgo and Haussmann [21], we analyze the overall outcome of the post-crisis developments in terms of economic structure and productivity, partly resulting from the applied policies. We draw attention to the finding that the economic complexity, as a good predictor of the future economic growth, only slightly improved over the observed period to the level of 0.59 in 2018 (against 0.5 in 2008).

By combining the perspective of product level complexity and industry level technology as both are indicating the knowledge base and growth perspective of the economy with the current export performance measured by revealed competitive advantage (RCA), we can highlight two similarly large segments in terms of value of export: industries with low and medium-low technology, low PCI products and large RCA, like food, rubber, construction materials, wood products and medium high-technology with higher PCI products (but not very high either) and relatively low RCA, like tools, machinery, equipment and vehicles.

Although the most important factor of increasing export, FDI inflow into manufacturing industry has been directed mostly into low technology industries producing products with low economic complexity. Moreover, is seams that the vertical spillover through linkages with local suppliers and transfer of technology, knowledge and practices did not occur. In sum, while Serbia has been successful in terms of volume of FDI attracted, it now needs to focus on the quality and type of FDI. Policy adjustments could be made to (i) better target FDI, focusing more on higher value-added activities and companies from sectors that have higher likelihood of integration with local economy, and (ii) facilitate spillovers to local economy; this can be done both through incentives, but also through programs assessing FDI needs, facilitating contacts with local suppliers, and upgrading the overall R&D capacity in the country.

At the same time, some positive developments are also registered in export structure dynamics. They are reflected in the presence of some high-tech products with higher complexity such as machines, electrical equipment, lighting, etc. Domestic de novo SMEs with significant share of total income realized from export have developed so far in high and mid high-tech industries. They are responsible for some high PCI products that are produced in Serbia and exported. However, the impact in terms of RCA of these products and total value of exports is still not significant.

These achievements could be significantly scaled up with the policy support. The results so far haven't been supported by a clearly articulated and focused set of measures. The recent programs' design in DAS is a step in the right direction. In general, SME programs could further focus on upgrading SME capabilities, but also technological, managerial, and operational ones, sales, etc., facilitating linkages with FDI and better integration in regional and global value chains, facilitating exports, etc.

It is important to note that the policies and measures discussed above need to be underpinned with sustained improvements to the business and regulatory environment. This should include simplification and more consistent implementation of administrative procedures (including through digitalization); ensuring market contestability and implementing sound competition policies; and having proper state aid controls to ensure level playing field.

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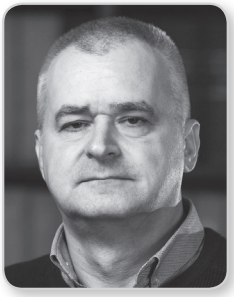

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