FDI, PRODUCTIVITY GROWTH AND STRUCTURAL CHANGE IN EUROPEAN POST-COMMUNIST COUNTRIES: AN INDUSTRY-LEVEL ANALYSIS[1]

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Economic development is a complex process in which aggregate output growth is accompanied by changes in the sectoral structures of output and employment. Although scholars like Simon Kuznets and Hollis Chenery have demonstrated, from the late 1950s, the quantitative importance of structural change, the issue remained largely ignored by mainstream economists, who tended to treat structural change as a by-product of growth of lesser importance. However, over the last two decades the interest on the topic has been revigorated, fuelled by concerns about premature deindustrialisation and the viability of alternative routes to prosperity. This paper focuses on the role played by foreign direct investment (FDI) in structural change in host economies. Using industry-level data of 12 European post-communist economies, the article investigates whether the effect of FDI on productivity growth and structural change depends on institutional quality, human capital endowment, participation in global value chains (GVCs) and alignment to comparative advantage.

Keywords: foreign direct investment (FDI); productivity growth; structural change; post-communist economies.

INVESTIMENTO DIRETO ESTRANGEIRO, CRESCIMENTO DA PRODUTIVIDADE E MUDANÇA ESTRUTURAL NOS PAÍSES EUROPEUS PÓS-COMUNISTAS: UMA ANÁLISE NO NÍVEL DA INDÚSTRIA

O desenvolvimento econômico é um processo complexo, por meio do qual o crescimento do produto agregado é acompanhado de mudanças nas estruturas setoriais de produção e de emprego. Embora autores importantes como Simon Kuznets e Hollis Chenery tenham demonstrado, desde o fim dos anos 1950, a importância, em termos quantitativos, da mudança estrutural, o tema permaneceu amplamente ignorado pelos economistas *mainstream*, que tendiam a enxergá-lo como um subproduto de menor importância do crescimento econômico. Contudo, nas últimas duas décadas, o interesse a respeito do tema tem sido retomado, alimentado, entre outras coisas, por discussões sobre desindustrialização prematura e sobre a viabilidade de rotas alternativas para a prosperidade. Este estudo foca o papel exercido pelo investimento direto estrangeiro (IDE) no processo de mudança estrutural dos países receptores do investimento. Usando dados setoriais de doze economias pós-comunistas da Europa, o artigo investiga se o efeito do IDE sobre o crescimento da produtividade e sobre a mudança estrutural depende da qualidade institucional, da dotação de capital humano, do grau de envolvimento em cadeias globais de valor (CGVs) e do alinhamento a vantagens comparativas.

Palavras-chave: investimento direto estrangeiro (IDE); crescimento da produtividade; mudança estrutural; economias pós-comunistas.

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LA IED, EL CRECIMIENTO DE LA PRODUCTIVIDAD Y EL CAMBIO ESTRUCTURAL EN LOS PAÍSES EUROPEOS POSTCOMUNISTAS: UN ANÁLISIS A NIVEL INDUSTRIAL

El desarrollo económico es un proceso complejo por medio del cual, el crecimiento de la producción agregada va acompañado de cambios en las estructuras sectoriales de producción y empleo. Si bien autores destacados como Simon Kuznets y Hollis Chenery han demostrado desde finales de los años 50 la importancia, en términos cuantitativos, del cambio estructural, el tema ha permanecido en gran medida ignorado por los economistas de la corriente principal, que tendían a considerarlo un subproducto menor del crecimiento económico. Sin embargo, en las dos últimas décadas ha aumentado el interés por el tema, alimentado, entre otras cosas, por los debates sobre la desindustrialización prematura y la viabilidad de las rutas alternativas hacia la prosperidad. Este estudio se centra en el papel que desempeña la inversión extranjera directa (IED) en el proceso de cambio estructural de los países receptores. Utilizando datos sectoriales de 12 economías postcomunistas de Europa, el artículo investiga si el efecto de la IED sobre el crecimiento de la productividad y el cambio estructural depende de la calidad institucional, la dotación de capital humano, el grado de participación en las cadenas globales de valor (CVG) y el alineamiento con las ventajas comparativas.

Palabras clave: inversión extranjera directa (IED); crecimiento de la productividad; cambio estructural; economías postcomunistas.

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1 INTRODUCTION

The empirical literature on the development effects of foreign direct investment (FDI) can be roughly divided into two major streams. There is a voluminous microeconomic literature, which has benefited from the increasing availability of longitudinal firm-level databases, that primarily focuses on how the presence of foreign multinational enterprises (MNEs) affect other economic agents, especially the firms owned by local nationals. Almost every sizeable country has already been covered by a study on FDI spillover effects on domestic firms' productivity, export propensity or innovation performance, to mention just the most studied issues. Besides this, there is a less numerous literature that focuses on the relationship between FDI and economic growth, aiming at identifying which factors make positive effects of FDI on growth more likely and stronger. In general, studies in this area either focuses on a single country or adopts a cross-country perspective. In both cases, the use of aggregate (country-level) data is the norm.[3]

3. Narula and Pineli (2019) survey both streams of the literature on the development impacts of MNEs, highlighting the most robust empirical evidence and pointing out the remaining research gaps.

From a structuralist perspective, an intermediate (meso) treatment is clearly missing in the literature. More specifically, little is known about how the distribution of inward FDI between industries affect economic growth. Even less is known about how FDI influence the evolution of the economic structure. In order to fill this gap, this article builds on the structural change literature, more precisely on shift-share analysis, to firstly decompose labour productivity growth in former communist countries of Central and Eastern Europe into the within-industry productivity growth and the structural change components, and then investigate whether they can be associated with changes in FDI stocks at the industry level.

The choice of this group of countries can be justified on the following grounds. First, former communist economies represent a useful laboratory to test the effects of FDI on development because they departed from virtually no FDI stocks at the beginning of transition to market economy. Second, the particularities of these countries are still under-researched. Catching-up in an industrialised country after the fall of communism is likely to be very different from catching-up in a backward economy (Tondl and Vuksic, 2003). Indeed, the most industrialised communist countries and the advanced capitalist countries were much more alike in terms of physical and human capital endowments than the typical developing country. What fundamentally set them apart from the advanced capitalist world was their distance to the technological frontier (Campos and Kinoshita, 2002). For this reason, the role of FDI in fostering development in former communist countries is likely to differ from the role played in developing countries.

Having in mind the importance of accounting for heterogeneous effects of FDI – as evidenced by previous empirical studies (Carkovic and Levine, 2005; Herzer, 2012; Kottaridi and Stengos, 2010) as well as theoretical developments (Dunning, 1981; Dunning and Narula, 1996; Narula, 1996; Narula and Dunning, 2010) – the analysis is carried out considering that identifying differential effects is as important as estimating "average" effects. For such, the following potential causes of heterogeneous effects of FDI are explored throughout the article: institutional development, human capital endowment, conformity to comparative advantage and integration to global value chains (GVCs).

The article focuses on 11 countries – Croatia, Czechia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Russia, Slovakia and Slovenia – which were selected due to the availability of industry-level FDI data.[4] Considering the highly

4. The OECD uses the term "Central and Eastern European countries" (CEECs) to refer to a group of former communist countries, some of which not covered in this article, that does not include Russia. Nonetheless, for simplification, the term CEECs is sometimes used in this article in reference to the group of 11 countries under analysis.

specific historical context of these countries, the article begins with a snapshot of the defining characteristics of the communist mode of economic organization, which is followed by a discussion of the process of transition, including an evaluation of economic performance over the 1990s. Next, a few statistics on the evolution of FDI are presented together with a brief review of the literature on FDI determinants in transition economies. Finally, section 4 brings the results of the empirical exercise performed in the article.

2 TRANSITION, THE FIRST TEN YEARS: PRIMARY FEATURES OF THE COMMUNIST ECONOMIES AND THE CHALLENGES OF TRANSITION TO CAPITALISM

First and foremost, it is important to bring in the defining elements of the Soviet-type economy. The distinguishing feature of these economies – apart from the omnipresence of the Communist Party in every relevant decision process – was the system of central planning. Another key aspect was the dominant state ownership of the means of production. Production was concentrated in (often excessively) large, often monopolist, and poorly specialized enterprises (Lavigne, 1999; Popov, 2007). Managers had to fulfil output targets, not maximize profits. Prices were rigidly controlled and neither reflected scarcity nor demand.

Economic activity in centrally planned economies (CPEs) was much more concentrated in the manufacturing sector than it would be expected according to their per capita income levels, with a clear preference for heavy industry – according to estimates by Dohrn and Heilemann (1996), the industry of investment goods was typically three times the expected size. The military-industrial complex as well as the intermediate goods industry and the construction sector were also rather oversized, while the services sector – regarded as unproductive in Marxist conception – was considerably undersized. Trade structures were also distorted as a substantial part was realized with other communist countries (members of the Council of Mutual Economic Assistance – Comecon) (Havrylyshyn and Al-Atrash, 1998). Foreign investment was almost non-existent.

CPEs were relatively successful in mobilizing resources for capital formation – investment rates exceeded 30% of the GDP. For this reason, they could sustain relatively high rates of economic growth – at least until the 1960s – but at the expense of increasing inefficiency. Indeed, the system was geared towards full employment of resources, instead of their efficient use (Campos and Coricelli, 2002). For several reasons, the system was poorly suited to foster innovation: firms faced almost no competition (Campos and Coricelli, 2002), innovators barely reaped the economic rewards of their innovations, the links between basic research and applied development were rather weak (Radosevic, 1998; 1999).

On the economic side, the substitution of central planning by market incentives as the mechanism of resource allocation constituted the ultimate objective of the transition process. This would require profound changes in institutions, laws and attitudes. Transition would involve the reallocation of resources from the activities performed under the old centrally planned system to activities performed within the new marked-based economy. An extreme version of Schumpeter's creative destruction would take place, bringing far-reaching changes at all levels – from the product and factor of production levels, passing by the firm and industry level, up to the economy-wide level. Transition would entail the closure of inefficient firms, the restructuring of the surviving firms and the emergence of new firms (Blanchard and Kremer, 1997). Overindustrialized countries would be faced with a difficult choice – if they liberalize their economies, major segments would be exposed as uncompetitive. There should be pressures to subsidize these industries, to sustain output and preserve jobs (Gelb, 1999).

Transition began to be conceived by government officials, scholars and experts of international organizations when the old systems were in their death throes (Fischer and Gelb, 1990; Lipton et al., 1990; Nordhaus, 1990; Przeworski, 1991; Balcerowicz, Blaszczyk and Dabrowski, 1997). The broad range of reforms required by systemic transformation can be divided into two groups. Type I reforms would target the dismantling of the central planning and involve measures like price and international trade liberalization and elimination of subsidies. Type II reforms would be more ambitious and complex as they would involve the introduction of a myriad of laws and regulations as well as the creation of institutions that could ensure the replacement of the old system by a well-functioning market economy. Among the most important type II reforms would be the development of a financial system, especially a viable banking sector, and the transfer of ownership of productive assets from the State to private hands (Svejnar, 2002). Along with the dismantling of the system of central planning, privatization was at the core of the transition process. At the enterprise level, privatization was expected to raise efficiency and profitability. Transfer of ownership should also help to remedy the communist economy's well-known problem of soft budget constraint (Kornai, 1986). At the economy level, privatization was expected to improve the allocation of resources and enhance long term economic growth (Megginson and Netter, 2001).

Defenders of shock therapy argued that reforms should progress as fast and on as many fronts as possible while gradualists prioritized the right sequencing and timing of reforms as they viewed complementarities between them (Bennett, Estrin and Urga, 2007). Some argued that in the absence of appropriate institutions, corruption and rent-seeking could spread out and privatization of former State assets could lead to deleterious concentration of wealth and political power (Godoy and Stiglitz, 2007).

2.1 Transition in practice

Although former communist countries have been grouped under a same label by international organizations, "transition economies" were quite heterogeneous, not only in terms of initial conditions but also in terms of transition strategies. Indeed, reforms have been implemented in different ways, in different sequences and at different speeds in those countries.

Almost all countries adopted a shock therapy approach in respect to type I reforms, which were accompanied by stabilization policies aimed at tackling macroeconomic imbalances. Small firms were privatized, barriers to the creation of new firms were removed and most State subsidies were supressed. Rapid adjustment of domestic prices contributed to improve resource allocation (Svejnar, 2002). By the mid-1990s, most of the potential progress had already been made.

Regarding type II reforms, the developments have been much more heterogeneous. The speed seems to have been influenced by conditions at the start of transition – countries with less favourable initial conditions tended to progress more slowly (Campos and Coricelli, 2002). By the turn of the century, Central European countries were the most advanced, followed by the Baltic countries, then Bulgaria and Romania, and lastly Russia and other former Soviet republics (Svejnar, 2002).

Selling state-owned enterprises, as fast as possible, to private investors able to restructure and run them efficiently would be desirable from a purely economic point-of-view. However, privatization in former communist countries was also a political process that required public approval while dealing with vested interests. In practice, privatization processes were shaped by systemic characteristics of the soviet-style economies, such as the shortage of private savings, as well as by specificities of each country. Countries resorted to different mixes of privatization methods, depending on factors such as political slant of the government, foreign debt, levels of economic and institutional development as well as firm idiosyncratic factors (Hunya, 2000; Bennett, Estrin and Urga, 2007). Some countries, such as Czechia and Hungary, transferred the ownership of most medium and large sized firms rather fast, while others, such as Poland and Slovenia, privatized at a much slower pace (Hunya, 2000; Svejnar, 2002). The main methods also differed. The so-called mass privatization, through the free distribution of vouchers to the population, allowed a fast transfer of ownership to private hands. This method was largely employed in Czechia, Latvia and Lithuania. Sales to insiders – managers and workers – were common in Croatia, Poland, Romania, Russia, Slovakia and Slovenia. Sales to outsiders were important only in Estonia and Hungary (Havrylyshyn and McGettigan, 2000; Svejnar, 2002). Furthermore, the sequencing of privatization was not random. As shown by Gupta, Ham and Svejnar (2008), in the case of

Czechia, firms that were more profitable and had higher market shares tended to be privatized earlier.

Subsequent development of the private sector was impacted by privatization strategies. Takeovers by outsiders seem to have led to superior corporate governance and performance as compared to buyouts by insiders and, especially, to mass privatization. Indeed, the drawbacks of mass privatization, which led to highly dispersed ownership structures, became clear already in the second half of the 1990s (Nellis, 1999; Svejnar, 2002; Megginson, 2005). In general, studies show that privatization improved firm performance in CEECs (Megginson and Netter, 2001; Djankov and Murrell, 2002; Estrin et al., 2009), even though this was not true in the case of firms acquired by their workers (Djankov and Murrell, 2002). Firms whose ownership is more concentrated perform better than firms with dispersed ownership (Commander and Svejnar, 2011). Estrin et al. (2009) show that privatization raised efficiency relatively to state-owned enterprises, but the effect was much larger when the firm was acquired by foreign investors instead of domestic ones.

2.2 Aggregate economic performance

The effects of type I reforms were felt very fast. Substantial changes in relative prices took place following price and trade liberalization (Gomulka, 2000). Trade flows were rapidly reoriented from East to West, even before the privatization of large state companies (Havrylyshyn and Al-Atrash, 1998; Svejnar, 1999).

TABLE 1
Per capita gross domestic product, in 2010 constant prices (1989-2000)
(In index number; 1989 or 1990 = 100)

Country	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Croatia	-	100	79	70	**65**	70	75	80	86	89	89	92
Czechia	-	100	88	**88**	88	90	96	100	100	99	101	106
Estonia	-	100	93	75	**72**	72	76	81	91	95	95	105
Hungary	100	97	85	83	**82**	85	86	86	89	93	97	101
Latvia	-	100	90	59	**51**	52	53	54	60	64	67	71
Lithuania	-	100	94	74	63	**57**	59	63	68	74	73	77
Poland	100	88	**82**	84	86	91	97	103	109	114	119	125
Romania	100	94	82	**75**	77	80	87	91	87	86	86	89
Russia	-	100	95	81	74	64	62	60	61	**58**	61	68
Slovakia	-	100	85	**79**	80	85	90	96	102	106	105	107
Slovenia	-	100	91	**86**	89	94	98	101	107	110	116	121

Source: United Nations Department of Economic and Social Affairs.
Author's elaboration.
Obs.: Years in bold indicate the peak of transformational recession in each country.

Removing the distortions accumulated by CPEs was widely seen as growth-enhancing (Blanchard and Kremer, 1997; Campos and Coricelli, 2002; Svejnar, 2002). However, growth performance in the first decade of transition was disappointing, to say the least. Central European countries lost about a fifth of their GDP at the start of transition, while Baltic countries and Russia lost more than 40% (on average) – see table 1. Such downfalls were accompanied by major changes in the sectoral composition of output. As shown in table 2, by the middle of the decade overindustrialisation was already largely corrected. Growth only resumed, in a consistent way, after a few years, in the case of Central Europe, and by the end of the decade, in Russia. During the 1990s, all the transition countries had witnessed a widening of their income gaps relatively to the OECD average. In sum, actual depressions were much deeper and lengthier than the "transformational recessions" expected by governments and experts of international agencies at the launch of the transition processes (Kornai, 1994; Svejnar, 2002). What could explain such a debacle?

TABLE 2
Manufacturing share in total value added, in current prices (1988-2000)
(In %)

Country	1988	1990	1995	2000
Croatia	-	29	20.5	18
Czechia	-	31.8	23.7	25.9
Estonia	-	32.8	19.8	17.3
Hungary	21.4	20	21.4	22.4
Latvia	-	33.5	20	15.3
Lithuania	-	36.2[1]	18.7	18.9
Poland	31.3	31.4	21.4	18.2
Romania	41.4	36.4	25.2	22.1
Russia	-	27.1	20.1	22.7
Slovakia	-	33.5	25.7	23.9
Slovenia	-	31.3	25.3	24.9

Source: United Nations Department of Economic and Social Affairs.
Author's elaboration.
Note: [1] 1991.

First of all, it must be stressed that analysing economic performance during the first years of transition is challenging because the official statistics have major measurement problems. On the one hand, output statistics of the communist era are probably overestimated because the firms' managers had incentives for doing so (Campos and Coricelli, 2002). In addition, output was not aggregated using market prices. On the other hand, national statistical offices largely overlooked

the production coming from the new small firms that proliferated during the first years of transition, most of them operating in the shadow economy. Thus, statistical illusion could account for part of the measured decline in output during the first years of transition.

Nonetheless, it is more or less consensual that part of the slump was an inevitable consequence of tackling the imbalances of the communist economies, such as the excessive militarization, the overindustrialization and the distorted structure of trade among communist countries (Gomulka, 2000; Lavigne, 2000). Blanchard and Kremer (1997) assign the collapse in output to the disruption in production links between state-owned plants that were not immediately replaced by market-based links.

However, a sounder explanation is offered by Popov (2007), who affirms that the deep recession is intrinsically related to the shock therapy approach adopted by CEECs, in opposition to the gradual approach followed by China. Sudden liberalization of prices and international trade and the elimination of subsidies and trade tariffs led to rapid changes in relative prices and profits. Several industries and enterprises became inviable almost overnight. However, since capital is not homogeneous, it could not be moved easily from those industries and firms to the competitive ones. In turn, savings and investments generated and realized by the competitive firms were not enough to compensate for the capital being rapidly "destroyed" in the inviable firms. Therefore, the deep decline in GDP can be explained by the fact that output fell in uncompetitive industries much faster than the "transfer" of capital to the viable industries. Cross-country regression results indicate that the speed of liberalization, which was determined by political economy factors, had an adverse effect on economic performance initially but had a positive effect on growth during subsequent recovery. Cumulative output loss during transformational recession was larger in countries with greater distortions in industrial structure and trade patterns. However, these initial conditions did not affect growth rates during the recovery stage, what is interpreted by Popov (2007) as evidence of the shutdown of inefficient industries and firms.

Additional cross-country evidence on the ultimately positive effect of reforms is presented by Berg et al. (1999), which find that more liberalized transition economies grew faster in the 1990s; De Melo, Denizer and Gelb (1996) find that countries which liberalized faster had recovered faster; and Campos and Coricelli (2002), which find that countries that developed market institutions faster had better economic performance. A feedback relationship between reforms and growth is detected by Falcetti, Lysenko and Sanfey (2006). Havrylyshyn and Van Rooden (2003) provide evidence that economic liberalization had a more significant impact on economic performance than institutional quality in the

period 1991-1998, but the importance of the later increased over time. All these findings conflict with Krueger and Ciolko's (1998) results, which indicate that the effects of liberalization on growth becomes insignificant once initial conditions of countries are accounted for. However, more recent work by Eicher and Schreiber (2010) shows that, even though initial conditions are quite important, so is progress in transition. Initial conditions have a level effect on subsequent growth rates but the effects of changes in structural policy on growth does not depend on initial conditions. Moreover, their results suggest that there is no "growth bonus" to early reformers.

Growth performance seems to have been affected by reforms in ownership structures, although not unconditionally. According to Zinnes, Eilat and Sachs (2001), privatization contributed positively to GDP growth only when accompanied by corporate sector reforms, among a group of 25 countries in the period 1990-1998. Linkage effects are detected by Berkovitz and De Jong (2002), which find that Russian regions with more large-scale privatization had a greater formation of new enterprises, which in turn was strongly associated with economic growth. This finding is relevant because, during the 1990s, growth in the most successful transition economies was driven mostly by new private enterprises, rather than through restructuring of state-owned firms (including privatization). This new private activity was initially strongly concentrated in services and was carried out by local entrepreneurs. By the end of the decade, however, it expanded to the manufacturing sector, with increasing presence of MNE affiliates (Gomulka, 2000).

A few studies analyse the relationship between FDI and economic growth in transition economies. A considerably strong effect is reported by Jimborean and Kelber (2017): using quarterly data for 10 countries over the period 1993-2014, they find that an increase of 1 percentage point (p.p.) in FDI flows/GDP ratio is associated to an increase of 0.17-0.23 p.p. in GDP growth rate. Tondl and Vuksic (2003) use a sample of 36 regions within Czechia, Hungary, Poland, Slovakia and Slovenia over the period 1995-2000 to analyse the effect of FDI and some geographical factors on economic growth. Even controlling for capital areas and European Union (EU) border regions (which outperformed other regions), they detect a strong positive effect of FDI on growth. Campos and Kinoshita (2002) also find a positive impact of FDI on growth using a panel of 25 transition economies in the period 1990-1998. Interestingly, they detect a negative effect of human capital, measured by average years of schooling, on growth, what they attribute to the fact that human capital measures were artificially high in communist countries and did not reflect the types of skills required by market economies. Weber (2011) uses time-series techniques to distinguish long- from short-run relationships between GDP, exports and FDI within a group of 7 transition economies over the period

1993-2009. Impulse-response functions suggest a strong positive effect of FDI on GDP in the Baltic States and Russia, a negative effect in Czechia, and no significant effect in Poland and Slovenia. Nonetheless, using data of eight transition economies in the period 1994-2001, Mencinger (2003) find that FDI/GDP ratio Granger-causes a negative effect on GDP, a result that he attributes to the character of FDI during this period – mostly privatization instead of greenfield. As underlined by Narula and Guimon (2010), privatization-driven acquisitions tend to imply a higher risk of downsizing and break of linkages with domestic suppliers, that are replaced with MNE's global network of affiliates and partners. Curwin and Mahutga (2014) also find a negative relationship between FDI stock/GDP ratio and GDP growth for a sample of 25 transition economies over the period 1990-2010. Using a fixed-effects model, Nath (2009) fails to find any significant association between FDI flows (as a percentage of GDP) and GDP growth for a sample of 13 transition economies over the period 1990-2005, what suggests that higher FDI inflows bring no growth bonus to host economies. Summing up, the available evidence is inconclusive as the results seem to be quite dependent on the methods and samples employed.

3 FDI IN TRANSITION ECONOMIES

In principle, former communist economies seemed to hold location advantages for both horizontal (market-seeking) and vertical (resource-seeking) FDI. The underdeveloped services sector offered a great opportunity for foreign investors, even in small countries. In turn, the relatively well-educated work force, that could be employed for a fraction of the wages paid in advanced economies, offered opportunities for labour cost-minimizing FDI. However, the establishment of export-oriented plants would certainly depend on an improvement of the business environment.

During the communist era, FDI was almost nil. The launch of transition did not change the picture very much as FDI inflows remained low at least until 1997 – the only exception was Hungary, whose privatization scheme had given preference, since 1993, to foreign exchange generating methods as a way of countering its high foreign debt (Svejnar, 1999). Despite the unique opportunity to acquire potentially lucrative assets at bargain prices, the attractiveness of privatization was substantially reduced by the severe institutional uncertainty that foreign investors faced especially in first years of transition. Privatization-related FDI was initially concentrated in manufacturing. Nonetheless, from the late-1990s, it directed increasingly to regulated industries such as banking, utilities and telecommunications (Meyer and Jensen, 2005). In some countries, like Czechia, Hungary and Poland, the foreign share in the banking sector jumped in the second half of the 1990s.

In 2000, several CEECs were already displaying larger FDI stocks than countries at similar levels of development. The economy with the highest FDI stock as a fraction of GDP was Hungary, but Estonia was not far behind – see table 3. FDI stocks kept growing fast throughout the following years, but this trend was suddenly aborted by the 2008 global financial crisis – in the case of Russia, FDI stock declined substantially after 2008. In 2014, Estonia and Hungary were still at the top of the ranking, with about two times Poland's and Romania's FDI/GDP stock ratios and three times of Slovenia's.

TABLE 3
Inward FDI stock (1995-2014)
(In % of GDP)

Country	1995	2000	2005	2010	2014
Croatia	2.2	12.2	29.4	52.7	50.3
Czechia	12.3	35.2	44.6	62.1	58.5
Estonia	15.2	46.5	79.9	79.7	79.7
Hungary	24.3	48.3	54.1	69.4	71.1
Latvia	11.4	21.3	29.0	46.0	48.0
Lithuania	5.3	20.2	30.0	36.1	31.9
Poland	5.5	19.5	28.2	39.1	38.8
Romania	2.2	18.6	25.5	40.9	36.6
Russia	1.4	11.5	23.4	30.4	14.5
Slovakia	6.5	33.7	60.4	56.2	49.3
Slovenia	8.5	11.7	19.4	22.2	24.8
Greece	8.0	10.7	11.8	11.7	9.1
Portugal	15.7	28.9	33.8	48.3	52.4
Spain	17.2	26.3	33.2	43.9	43.4

Source: UNCTAD, *World Investment Report,* Statistical Annex.

As shown in table 4, most foreign investors are from EU member States, particularly Austria, France, Germany and Netherlands, and this prominence did not change substantially over time. The important role played by Cyprus as a source country is due almost exclusively to Russia.

TABLE 4
Inward FDI stock in transition economies, by country of origin (2000-2014)
(In % of total)

Partner	2000	2005	2010	2014
EU-15	66.34	68,21	56.57	64.65
Austria	6.99	9.30	6.74	7.90
Belgium	1.96	1.99	1.60	1.88
Denmark	1.78	1.52	0.96	0.95
Finland	1.41	1.60	1.33	1.14
France	6.25	6.61	5.26	5.58
Germany	19.67	16.05	9.93	11.23
Italy	2.51	3.14	2.00	2.43
Luxembourg	0.89	2.70	5.25	7.64
Netherlands	17.53	20.76	14.95	17.05
Spain	0.75	1.84	1.47	1.99
Sweden	3.06	3.58	3.35	2.44
United Kingdom	2.59	3.70	2.18	2.89
Bahamas	0.01	0.21	2.20	2.24
Bermuda	0.00	0.02	4.45	1.71
British Virgin Islands	0.06	0.58	4.71	1.33
Cyprus	1.04	4.94	17.59	14.04
Switzerland	2.28	2.73	2.77	3.19
United States	6.89	5.48	2.63	1.96
Other	23.38	17.84	9.09	10.89

Source: The Vienna Institute for International Economic Studies (WIIW), FDI Database.
Author's elaboration.

Table 5 presents the evolution of the distribution of FDI stocks across industries.[5] In general, the importance of the manufacturing sector has declined over time while the importance of the services sector has increased. Within the latter, the main recipient of FDI is the financial industry, but the importance of business services has been growing. In most countries, the share of transportation and telecommunications in total FDI stocks has decreased over time. Notwithstanding some common trends across countries, remarkable differences persist. In countries like Hungary, Slovakia and Slovenia, the manufacturing sector has twice the importance it has in Estonia and Latvia. Russia is the only country where natural resource extraction is a major recipient of FDI.

5. For each country, table 5 presents the first and the last year considered in subsequent regression analyses. Tables A.1 and A.2, in the appendix, describe the activities encompassed by each industry.

TABLE 5
Distribution of FDI by industry (2000-2014)
(In %)

	Czechia		Estonia		Croatia		Hungary		Lithuania		Latvia	
	2000	2013	2000	2014	2000	2014	2000	2014	2000	2009	2000	2014
A-B	0.2	0.2	0.9	1.9	1.1	0.9	0.8	0.6	0.5	0.9	1.3	4.3
C	1.9	1.7	0.5	0.4	0.2	0.8	0.3	0.2	1.1	0.5	0.4	0.8
D	38.1	32.2	20.6	12.2	34.6	26.3	40.2	25.0	28.8	26.6	16.3	12.3
DA	4.8	3.2	3.7	2.6	6.9	2.1	7.0	2.1	11.5	4.8	4.8	1.6
DB-DC	1.3	0.5	3.4	0.7	0.2	1.4	1.4	0.4	4.7	1.2	1.6	0.3
DD-DE	3.1	1.4	3.0	2.6	2.3	0.5	2.1	1.0	2.5	2.3	3.5	3.2
DF	1.1	0.3	0.0	0.0	0.0	9.8	0.0	0.0	-0.1	9.0	0.0	0.0
DG	3.1	2.1	1.8	1.0	7.1	6.0	4.8	4.9	1.9	5.9	1.8	0.4
DH-DI	8.2	4.3	3.5	1.7	10.8	3.2	4.0	3.6	2.8	2.1	1.7	0.0
DJ	3.6	3.4	0.9	0.8	0.6	1.1	1.9	1.9	0.5	0.5	1.2	0.8
DK	1.7	2.7	0.4	0.3	1.7	0.5	1.8	1.4	0.3	0.2	1.0	0.1
DL	4.0	3.5	1.1	1.6	3.8	1.0	9.0	3.7	2.3	0.8	0.2	0.1
DM	6.5	9.7	1.5	0.4	0.8	0.2	7.9	4.7	2.1	1.5	0.1	0.6
DN-OTHER	0.6	1.2	1.2	0.4	0.5	0.5	0.3	1.2	0.3	0.7	0.4	5.3
E	6.6	5.7	2.7	2.2	1.1	1.1	6.4	2.6	2.5	5.3	5.2	4.3
F	1.5	1.3	3.1	1.0	1.3	1.2	1.3	0.8	0.7	2.0	1.9	3.4
G	15.0	10.1	12.2	14.1	9.8	8.6	9.3	9.5	22.7	14.0	20.3	12.7
H	0.3	0.4	2.2	0.5	6.4	4.2	1.3	0.5	2.3	0.7	1.7	1.1
I	11.2	6.2	6.2	7.3	14.4	6.4	16.5	7.0	18.7	11.4	20.4	6.8
J	14.7	27.9	43.1	29.1	27.1	27.6	10.1	15.9	16.2	18.0	23.0	28.2
K	9.2	11.3	8.2	28.8	3.7	21.3	11.3	31.5	5.2	17.6	7.5	17.2
OTHER-SERV	1.2	3.2	0.5	2.5	0.3	1.6	2.4	6.5	1.2	3.1	2.0	8.9

	Poland		Romania		Russia		Slovakia		Slovenia	
	2000	2014	2008	2014	2005	2013	2000	2014	2000	2014
A-B	0.5	0.5	1.5	2.5	1.0	1.6	0.1	0.4	0.0	0.2
C	0.4	0.4	4.4	5.6	25.9	16.5	1.1	0.5	0.0	0.4
D	38.6	29.3	31.2	32.0	39.0	36.7	53.0	33.4	43.2	32.4
DA	8.4	5.4	4.5	4.0	7.5	6.8	6.4	1.7	3.6	1.6
DB-DC	0.7	0.3	1.6	1.6	0.3	0.2	1.0	0.6	2.2	0.7
DD-DE	4.4	2.8	2.0	2.5	2.9	3.4	3.4	1.2	6.8	3.4
DF	0.1	0.0	1.4	1.0	7.2	1.6	4.2	3.3	0.0	0.0
DG	4.1	3.0	1.8	2.2	1.2	2.6	3.3	1.7	6.0	9.4
DH-DI	2.4	2.6	4.7	5.1	3.3	4.3	3.6	4.7	7.5	5.5
DJ	2.0	3.8	6.9	4.5	13.3	8.8	22.9	6.0	3.1	1.6

(Continues)

(Continuation)

	Poland		Romania		Russia		Slovakia		Slovenia	
	2000	2014	2008	2014	2005	2013	2000	2014	2000	2014
DK	1.3	1.0	2.0	2.4	0.8	2.2	2.3	2.7	1.1	2.1
DL	1.2	0.7	1.4	2.4	0.5	1.6	2.3	3.5	6.7	2.7
DM	6.4	5.2	4.0	5.4	1.5	4.7	3.4	7.1	5.3	4.9
DN-OTHER	7.8	4.5	0.8	0.9	0.5	0.4	0.2	1.1	0.9	0.5
E	1.2	3.4	5.6	11.1	0.5	3.9	0.2	4.0	0.8	3.8
F	6.6	4.5	8.8	4.2	1.1	2.2	1.2	1.1	0.2	0.8
G	16.7	14.0	12.4	11.7	6.6	9.6	11.6	9.1	15.2	22.8
H	0.5	0.3	0.4	0.9	0.5	0.3	0.8	0.6	0.6	0.3
I	8.0	7.4	7.8	7.7	7.3	5.8	16.8	6.7	2.9	9.1
J	20.0	22.6	20.5	13.0	7.2	5.0	11.9	24.5	30.5	15.6
K	7.0	13.8	7.1	10.8	10.2	17.7	2.9	19.3	6.6	12.2
OTHER-SERV	0.5	3.8	0.3	0.6	0.8	0.7	0.4	0.5	0.1	2.4

Source: The Vienna Institute for International Economic Studies (WIIW).
Author's elaboration.
Obs.: For each country, the table presents the distribution of FDI in the first and in the last years considered in subsequent regression analyses.

By the turn of the century, cross-country studies on the determinants of inward FDI in former communist countries began to pop up. Early studies, such as Campos and Kinoshita (2003), employ aggregate FDI data. They find that institutions, natural resources endowment, agglomeration economies and labour costs were the main determinants of per capita FDI stocks within a group of 25 transition countries in the period 1990-1998. In turn, market size and educational level were not important. When the sample is split between Eastern European plus Baltic countries and CIS countries, agglomeration economies remain statistically significant only for the first group, natural resources seem to matter only for the later, while labour costs become insignificant within both groups of countries.

More recently, influenced by gravity models of international trade, studies began to rely more on bilateral FDI data when looking for FDI determinants. Bevan and Estrin (2004) find that gravity factors (market size and proximity) and unit labour costs were the most important determinants of bilateral FDI flows between 18 advanced home countries and 11 transition host countries in the period 1994-2000. They also detect a positive effect of announcements of proposals for EU accession in the final years of the sample. Using a panel of 7 advanced home countries and 8 transition host countries over the period 1995-2003, Bellak, Leibrecht and Riedl (2008) confirm that FDI flows are influenced by labour costs as well as labour productivity, but these factors are less important than market size and distance. They also find that countries

that raised more revenues from privatization received more FDI. For the same group of countries, Bellak, Leibrecht and Damijan (2009) find that lower corporate tax rates and better infrastructure are associated with higher bilateral FDI flows. An interactive term suggests that better infrastructure alleviate the negative effect induced by higher taxes. Focusing on the role of institutional factors, which theoretically influence strategic decisions such as location, entry mode and establishment mode of foreign operations, Bevan, Estrin and Meyer (2004) find a positive association between institutional development and FDI receipts within a sample of 12 transition economies over the period 1994-1998. Among the several measures of institutional development used in the study, the most strongly associated with FDI inflows are the share of private sector in GDP, the development of the banking sector, legal development and liberalization of trade and foreign exchange. They also find a positive association between FDI inflows and progress in privatization, but the main method of privatization seems to be unimportant, what is interpreted as an indication that countries that do not sell firms directly to foreign investors receive an equivalent amount of FDI in other forms, such as greenfield or the acquisition of already private firms.

4 FDI, LABOUR PRODUCTIVITY GROWTH AND STRUCTURAL CHANGE IN THE PERIOD 2000-2014

After reviewing the developments of the first ten years since the launch of transition, it can be assumed that most of the adjustments needed to rebalance the economies had already taken place, so that the growth process of those economies resembled the growth process of a "normal" country, even though progress in institutional development was in some instances rather sluggish. For this reason, the period starting in 2000 seems appropriate to an analysis of the relationship between FDI, productivity growth and structural change in CEECs as growth tended to be less volatile and FDI determinants tended to be less dependent on transition-related developments.

The main objectives of the following empirical exercise are: i) decomposing aggregate labour productivity growth of CEECs, in the period 2000-2014, into the *within, static shift and dynamic shift* components, using standard shift-share analysis; and ii) investigating how FDI relates to each of these components. The latter is the main contribution of this article as it enables the simultaneous treatment of the effect of FDI on within-industry labour productivity and on structural change. Complementing the basic analysis, the article also investigates whether the effect of FDI on labour productivity and structural change is influenced by the level of institutional development and the human capital endowment of the host country, the level of participation of the industry in GVCs and the alignment of FDI to host country's comparative advantage.

4.1 Data description

In this study, each observation refers to a specific industry of a specific country in a specific year. Most variables are taken at the country-industry level but a few is measured either at the country level or at the industry level. Data on nominal value added, prices and employment, all at the country-industry level, come from the Socio-Economic Accounts of the World Input-Output Database (WIOD) (Timmer et al., 2015). This is also the source of data on employment by skill level in the United States (U.S.), which is used to benchmark the skill intensity of industries, a procedure used by other studies such as Ciccone and Papaioannou (2009). Data on inward FDI stocks by country-industry are provided by the Vienna Institute for International Economic Studies (WIIW). The OECD's Trade in Value Added (TiVA) database is the source of the two measures of GVC participation used – foreign value added in gross exports and dependency on exports – both expressed at the country-industry level. Data on regulatory quality come from the World Bank's Worldwide Governance Indicators (WGI) whereas the human capital index is sourced from the Penn World Table 9.0. Both variables are measured at the country level. Finally, data on exports, used to calculate Revealed Comparative Advantage indexes, come from the UN Comtrade. They are originally expressed in country-product level but were rearranged to reflect the country-industry classification employed in the study.

For all the 11 economies, the shift-share analysis covers the period 2000-2014. Nonetheless, the panels used next in regression analyses are unbalanced because disaggregated FDI data is not available for the whole period for every country, as shown in table 6.

TABLE 6
Periods included in the regression analyses, by country

Country	Period
Croatia	2001-2014
Czechia	2001-2013
Estonia	2001-2014
Hungary	2001-2014
Latvia	2001-2014
Lithuania	2001-2009
Poland	2001-2014
Romania	2009-2014
Russia	2006-2013
Slovakia	2001-2014
Slovenia	2001-2014

Author's elaboration.

4.2 Decomposition of labour productivity growth in the period 2000-2014

There are two ways through which an economy can achieve higher labour productivity. *Productivity gains can be obtained within industries as a result of capital deepening, technological change or reduction of misallocation across plants* (McMillan and Rodrik, 2014) or via labour moves from lower-productivity industries to higher-productivity industries. This can be expressed in the following decomposition:

$$\Delta Y_t = \sum_{j=1}^{n} \theta_{j,t-k} \Delta y_{j,t} + \sum_{j=1}^{n} y_{j,t-k}\, \Delta \theta_{j,t} + \sum_{j=1}^{n} \Delta y_{j,t}\, \Delta \theta_{j,t}$$

Where Y and yj refer to economy-wide and industry ($j = 1 \ldots n$) labour productivity levels, respectively, and Θ_j is the share of industry j in total employment. The operator Δ denotes changes in yj or Θ_j between t-k and t. It is easy to note that the first term is a weighted sum of labour productivity growth within industries, where the weights are industries' shares in total employment in the base period. This term is commonly called the *within* component. The other two terms relate to changes in the structure of employment. The second term captures the productivity effect of labour reallocations, holding constant the initial labour productivity at the industry level. This term is commonly known as the *structural change* component but, in this article, it is referred to as the *static shift* component, following the nomenclature used by Peneder (2001) and Havlik (2004), among others. The static shift term is positive when labour moves preponderantly from industries with below the average labour productivity to industries with above the average labour productivity. Finally, the third term captures the joint effect of changes in employment shares and industry-level productivity. It is positive when industries with above-average productivity growth increase their share in total employment. In this article it is referred to as *dynamic shift* component, though it is also known as *covariance* or *cross* term.

TABLE 7
Decomposition of labour productivity growth (2000-2014)
(In % per year)

Country	Within	Structural change		**Total**
		Static shift	Dynamic shift	
Croatia	0.96	0.82	-0.39	**1.39**
Czechia	1.52	0.01	0.07	**1.59**
Estonia	3.32	0.07	-0.28	**3.10**
Hungary	1.09	0.58	-0.20	**1.47**

(Continues)

(Continuation)

Country	Within	Structural change		**Total**
		Static shift	Dynamic shift	
Latvia	3.08	0.49	-0.16	**3.42**
Lithuania	4.28	0.57	-0.11	**4.74**
Poland	1.83	0.92	-0.06	**2.70**
Romania	3.34	1.34	0.17	**4.85**
Russia	2.16	0.56	0.29	**3.01**
Slovakia	3.19	0.14	-0.35	**2.98**
Slovenia	1.39	0.60	-0.30	**1.70**
Average	2.38	0.55	-0.12	**2.81**

Source: World Input-Output Database (WIOD), Socio Economic Accounts.
Author's elaboration.
Obs.: The real estate industry is not included in the calculations.

Table 7 presents the decomposition of labour productivity growth in the period 2000-2014, using 21 industries. The numbers indicate a strong convergence as the least productive countries grew much faster than the most productive ones over the period under analysis.[6] However, there is no association between the static shift component and the initial labour productivity of the country.[7]

The within component is the most important in all countries, but the structural change component is far from negligible in most of them. To have an order of magnitude, it is useful to compare these results with McMillan and Rodrik's (2014) findings for developing Asia: over the period 1990-2005, labour productivity grew, on average, 3.87% annually in that region, of which 0.57 p.p. was due to structural change. These numbers are akin to the figures displayed in table 7 – except for Czechia, Estonia and Slovakia. The dynamic shift component is negative in most cases, indicating that industries whose share in employment is shrinking are the ones with the highest labour productivity growth (or, alternatively, industries whose share in employment is expanding are the ones with lowest labour productivity growth). As shown in table 8, this result is mainly due, on the one hand, to labour moving out of agriculture and manufacturing and, on the other hand, to labour moving to hotels and restaurants, business services and other services, which include education and health services (respectively industries H, K and OTHER-SERV in table 8). It must be noted

6. A regression of labour productivity growth (from table 7) on the natural logarithm of the initial per worker GDP (in PPP) indicates a semi-elasticity of -0.0295 (t-stat = -4.05 and R-squared = 0.65).

7. A regression of the static shift component (from table 7) on the natural logarithm of the initial per worker GDP (in PPP) indicates a semi-elasticity of -0.0059 (t-stat = -1.86 and R-squared = 0.20). Nonetheless, this result is entirely driven by Romania.

that labour move to business services brings a strong contribution to the static shift component, as this industry was initially much more productive than the average, but as this industry's productivity growth is significantly lower than the average growth rate, it negatively affects the dynamic shift component.

TABLE 8
Employment share and relative labour productivity by industry (2000-2014)

Industry	Employment share (%)				Relative labour productivity (ratio of the economy's labour productivity)			
	2000		2014		2000		2014	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
A-B	16.62	11.44	9.99	7.36	0.35	0.16	0.55	0.39
C	0.92	0.53	0.65	0.48	2.41	2.21	2.45	2.12
D	21.44	4.18	18.51	3.94	0.88	0.20	1.13	0.16
DA	3.35	0.77	2.66	0.76	1.18	0.58	1.17	0.64
DB-DC	3.80	1.03	1.85	0.93	0.44	0.18	0.48	0.12
DD-DE	2.46	0.92	2.02	0.72	0.68	0.12	0.92	0.23
DF	0.34	0.49	0.15	0.11	5.91	7.71	4.76	4.30
DG	0.90	0.44	0.73	0.30	1.76	0.82	2.00	1.13
DH-DI	1.73	0.72	1.71	0.64	0.87	0.20	1.21	0.23
DJ	2.44	1.34	2.70	1.22	0.97	0.38	1.01	0.23
DL	1.76	1.02	1.67	0.95	0.78	0.49	1.38	0.33
DK	1.35	0.90	1.20	0.72	0.70	0.42	1.19	0.44
DM	1.27	0.69	1.76	1.11	1.09	0.36	1.38	0.65
DN-OTHER	2.03	0.80	2.04	0.73	0.76	0.36	0.89	0.17
E	2.43	0.58	2.02	0.24	2.50	0.69	2.17	0.55
F	6.43	1.08	7.43	0.68	1.10	0.23	0.96	0.21
G	13.35	1.70	15.50	2.28	0.92	0.30	0.96	0.21
I	6.79	1.45	7.03	1.24	1.56	0.41	1.47	0.31
H	2.58	1.07	3.36	1.35	0.93	0.36	0.64	0.23
J	1.57	0.52	1.92	0.51	2.88	1.35	2.54	0.84
K	3.68	1.83	6.07	2.72	1.81	0.59	1.46	0.65
OTHER-SERV	24.17	5.14	27.51	4.50	1.18	0.60	0.81	0.13

Source: World Input-Output Database (WIOD), Socio Economic Accounts.
Author's elaboration.
Obs.: The real estate industry is not included in the calculations.

4.3 FDI, labour productivity growth and structural change

4.3.1 FDI and within-industry labour productivity growth

To investigate how FDI relates to within productivity growth, the following model is estimated:

$$\begin{aligned}\text{labour productivity growth}_{jct} = \\ = \alpha + \beta_1\text{FDI growth}_{jct} + \beta_2\text{relatory quality}_{ct} \\ + \beta_3\text{dummy regulated industries} + \beta_4\text{FDI growth}_{jct}X\text{relatory quality}_{ct} \\ + \beta_5\text{FDI growth}_{jct}X\text{dummy regulated industries} \\ + \beta_6\text{relatory quality}_{ct}X\text{dummy regulated industries} \\ + \beta_7\text{FDI growth}_{jct}X\text{relatory quality}_{ct}X\text{dummy regulated industries} \\ + \beta_8\text{human capital index}_{ct} + \beta_9\text{skill intensity}_{jt} \\ + \beta_{10}\text{FDI growth}_{jct}X\text{human capital index}_{ct} \\ + \beta_{11}\text{FDI growth}_{jct}X\text{skill intensity}_{jt} \\ + \beta_{12}\text{human capital index}_{ct}X\text{skill intensity}_{jt} \\ + \beta_{13}\text{FDI growth}_{jct}X\text{human capital index}_{ct}X\text{skill intensity}_{jt} \\ + \beta_{14}\text{foreign value added in exports}_{jct} \\ + \beta_{15}\text{FDI growth}_{jct}X\text{foreign value added in exports}_{jct} \\ + \beta_{16}\text{dependency on exports}_{jct} \\ + \beta_{17}\text{FDI growth}_{jct}X\text{dependency on exports}_{jct} + \delta_c + \delta_t + \varepsilon_{jct}\end{aligned}$$

Where the last three terms are, respectively, country and year dummies and the error term. As both the dependent variable and the explanatory variable of interest are log growth rates, it is important to clarify how the coefficients must be interpreted. If, instead of growth rates, both productivity and FDI stock were expressed in levels, a positive (negative) coefficient would signify that a marginal increase in FDI stock would be associated to a productivity level above (below) the conditional mean. Differently, the regression that focuses on the within component can be interpreted as an analysis of deviations from average growth rates. If the sum of the effects of the FDI coefficients is positive (negative) – note that there are several interaction terms in the regression – it indicates that labour productivity grows faster (slower) than would be expected – given the values of all the other variables – when FDI stock grows marginally faster. Given the high number of interactions, the results are presented preferably in charts as to facilitate understanding.

The panel is unbalanced, with a total of 2,512 observations. The dependent variable is expressed in log percent, while the FDI variable is presented in decimals. The estimated effect of FDI growth, holding all the other variables at

their respective means, is 1.38. This means that an increase of 10 log percent in FDI stock is associated with productivity growth 0.14 log percent above the expected, given the values of the other variables. Considering that the unconditional mean of the dependent variable is 3.08, this "average" effect can be considered relatively small. In addition, it is statistically insignificant at conventional levels (t-statistic = 1.47). The influence of the interacting factors on the effect of FDI is investigated in the next subsections.

Institutions

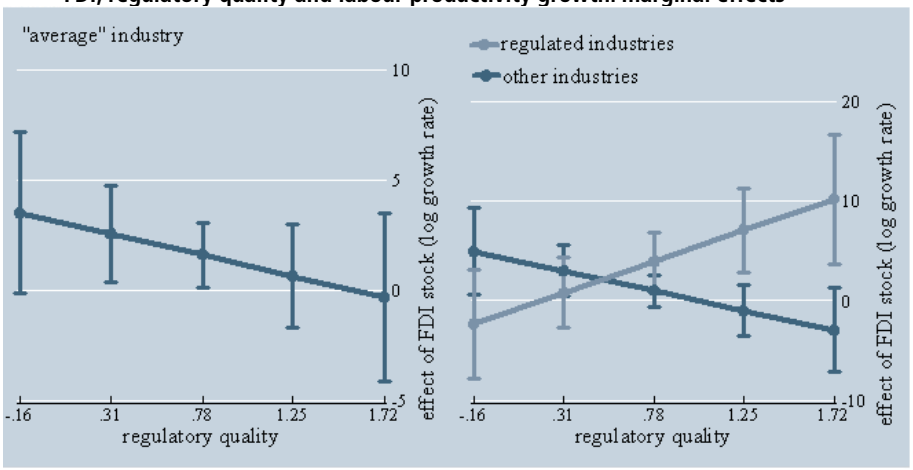
Several cross-country studies find that institutional factors were relevant determinants of aggregate growth in former communist economies during the initial decade of transition (Berg et al., 1999; Campos and Coricelli, 2002; Eicher and Schreiber, 2010). Countries that moved faster in the direction of western-type institutions may have suffered larger GDP losses initially but recovered faster (De Melo, Denizer and Gelb, 1996; Popov, 2007). In most CEECs, type-I reforms were largely concluded by the turn of the century. Nonetheless, when it comes to type-II reforms, precisely those which are related to institution-building, progress was then much more heterogeneous and remained so in subsequent years.

The way institutions shape the incentives faced by economic agents is likely to differ across industries. Long-term contracts, prevalent in industries like mining and infrastructure, are necessarily incomplete as it is impossible to foresee all the possible contingencies, let alone cover them. This fact enhances the chances of opportunistic behaviour by the contracting parts, not to mention corruption by State agents. A well-functioning regulatory system helps to mitigate the uncertainty faced by economic agents and, consequently, contribute to reduce the transaction costs they need to incur in. Empirical studies suggest that industries that are traditionally more regulated by the State are likely to be particularly affected by the quality of regulation of a country.

Figure 1 presents the effect of FDI on productivity growth in different institutional settings. The horizontal axis displays countries' regulatory quality, sourced from the WGI.[8] The average regulatory quality in the sample is 0.78 and the standard deviation is 0.47. The chart on the left shows the effect on the "average" industry. FDI seems to have stronger growth effects in poorer institutional settings, but the differences are not statistically significant.

8. According to the World Bank, this indicator reflects perceptions of the ability of governments to formulate and implement sound policies and regulations that permit and promote private sector development.

FIGURE 1
FDI, regulatory quality and labour productivity growth: marginal effects



Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

Things change considerably in the right chart, in which industries are classified according to the level of regulation they are subject to. Based on Coates (2012), the following industries are classified as (heavily) regulated: mining (C), utilities (E), transportation and communication (I) and financial (J). The results indicate that a good regulatory quality enhances the effect of FDI in regulated industries but has no significant effect on other industries. For regulated industries, the effect of FDI on productivity growth is particularly strong at higher levels of regulatory quality. In turn, for the lightly regulated industries, the effect of FDI on productivity growth was positive and statistically significant only for countries with weaker institutional setting. Therefore, the growth effects of FDI tended to be larger in countries in which a large regulated sector was accompanied by better regulatory quality and in countries with weaker regulatory quality but a large lightly regulated sector. These differential effects have gone unnoticed by studies using aggregate data.

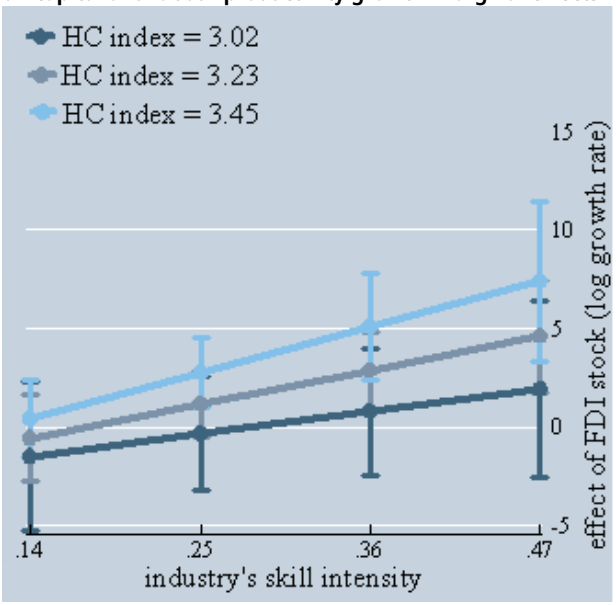
Human capital

The empirical evidence on the relationship between human capital and aggregate economic growth is mixed at best. This striking situation may be due to multiple causes such as the inadequacy of the educational proxies usually used to measure human capital and the failure of most studies in taking the demand for skilled labour into consideration. Cross-country studies using aggregate data, such as Borenzstein, De Gregorio and Lee (1998), Li and Liu (2005) and Solomon (2011), ratify that the effect of FDI on growth is moderated by human capital,

within large samples of both developed and developing countries. Nonetheless, such moderating role is not detected by Jimborean and Kelber (2017) within a sample of 10 CEECs. Can an industry-level approach change such results?

Figure 2 presents the results. The horizontal axis displays the skill intensity of the industries. Following previous studies, such as Ciccone and Papaioannou (2009), that use the U.S. as reference, this variable captures the share of high-skilled workers in the total workforce employed by that country's industries. The three lines refer to the mean human capital index (3.23) of CEECs and one standard-deviation below and above. As the lines never cross each other, it can be said that the effect of FDI on productivity growth is possibly higher in countries with higher stocks of human capital, independently of the skill intensity of the industry, but the differences are not statistically significant. This result is, however, not surprising given that CEECs are not too different in terms of educational attainment as indicated by the relatively small standard deviation of human capital index.

FIGURE 2
FDI, human capital and labour productivity growth: marginal effects



Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

A different picture emerges in respect to the skill intensity of the industry. The results indicate that the effects of FDI on productivity growth was significantly higher among industries intensive in high-skilled labour, especially among

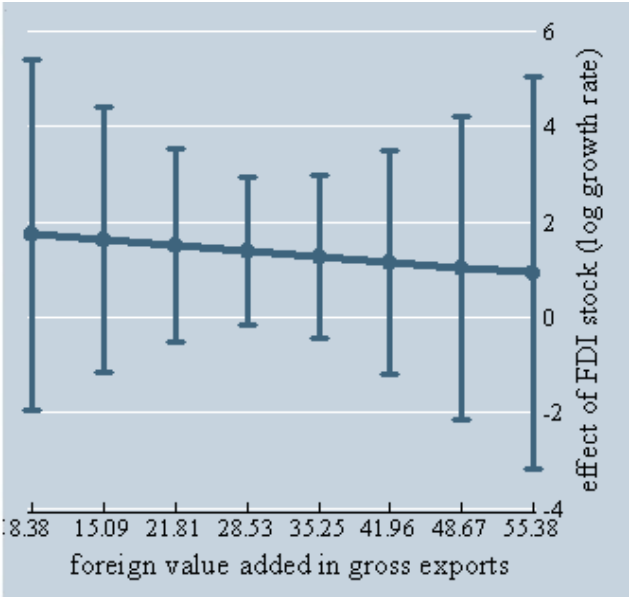
countries with higher human capital stocks. What can explain such differences? Studies has shown that technical change is not neutral, in the sense that the productivity of high-skilled workers tends to be considerably more (positively) impacted than the productivity of low-skilled workers (Kahn and Lim, 1998; Berman and Machin, 2000). As a corollary, technical change tends to lead to higher labour productivity growth among industries that employ larger shares of high-skilled workers (Kahn and Lim, 1998). Considering that technological upgrading constituted the crucial contribution brought by FDI to former communist countries, it is plausible that the differential effects of FDI partially reflect differences in potential for productivity growth through technological assimilation. Therefore, countries in which skill-intensive industries responded for a larger share of economic activity tended to benefit more from FDI. In turn, FDI in industries that employ few skilled workers tended to pay no productivity growth dividend, regardless of the human capital endowment of the country.

Participation in GVCs

Several factors, including falling transportation and communication costs, declining trade barriers and increasing modularity of production stages led to an increasing fragmentation of production across borders over the last few decades (Jones and Kierzkowski, 2005a). Intra-industry trade (of intermediate goods) now accounts for a large share of the world trade and the international division of labour increasingly follows comparative advantage in performing specific tasks within a value chain, instead of comparative advantage in producing (final) goods (Jones and Kierzkowski, 2005a; 2005b). A corollary is that efficiency is likely to be associated with the level of within-industry specialization which, in turn, is positively associated with the level of use of outsourced – including imported – inputs.[9] If higher efficiency enhances the effect of FDI on productivity, it can be expected that this effect will be larger if the industry uses more imported inputs. To test whether this hypothesis holds for CEECs, foreign value added in gross exports is used as a moderator of the effect of FDI on productivity. In addition, it is investigated whether the growth effect of FDI varies according to the level of dependency of the country-industry on exports. In both cases, the subjacent idea is that industries that are more integrated into the global economy tend to make more efficient use of production factors. Both indicators are sourced from the OECD's TiVA database.

9. Halpern, Koren and Szeidl (2015) find a positive association between the use of imported inputs and productivity gains at the firm-level. According to their estimates, one-quarter of Hungary's productivity growth between 1993 and 2002 can be attributed to the use of imported inputs.

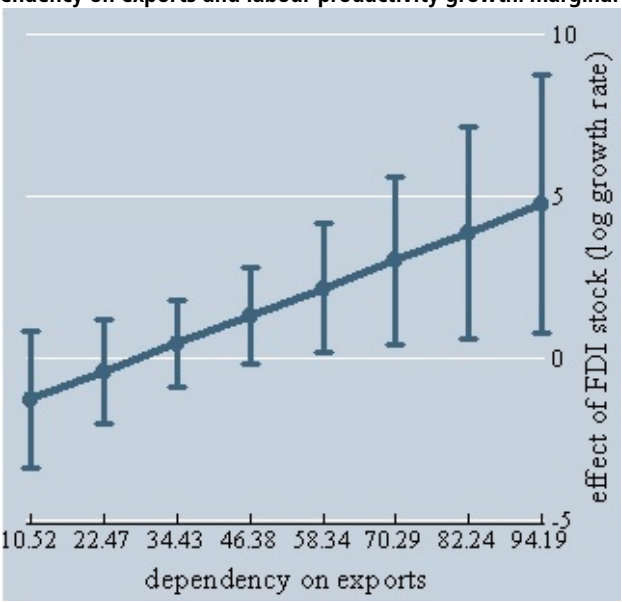
FIGURE 3
FDI, foreign value added in gross exports and labour productivity growth: marginal effects



Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

The results presented in figure 3 provide no indication that the growth effects of FDI is greater when the use of imported inputs is higher. The line connecting the point estimates is almost flat and the confidence intervals do not exclude the hypothesis of no effect. A different picture, however, emerges from figure 4. FDI seems to have translated into productivity growth in more export-oriented industries but may had even harmed productivity growth in more domestic-oriented industries. Summing up, the export channel seems to be more relevant than the import channel to explain heterogenous effects of FDI on productivity growth.

FIGURE 4
FDI, dependency on exports and labour productivity growth: marginal effects



Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

These mixed results are not surprising. Indeed, the development impact of GVCs is still a controversial issue. For small countries, catching-up may become easier as they can efficiently specialise in a few production stages within a GVC. Nonetheless, scholars like Baldwin (2012) are sceptical about the development impact of GVC-related FDI because the high fragmentation of production stages often leads to minimal transfer of technological know-how to foreign affiliates. A recent study by Fagerberg, Lundvall and Srholec (2018) reinforces the scepticism as it finds that higher participation in GVCs, proxied by foreign value added in gross exports, is negatively associated with GDP growth within a sample of 125 countries over the period 1997-2013.

Comparative advantage

Up to this point, the relationship between FDI and productivity growth has been investigated disregarding the role of comparative advantage. However, the so-called "dynamic comparative advantage theory of FDI", put forth by Japanese economist Kiyoshi Kojima and developed in a series of papers (Kojima, 1973; 1982; 2000; Kojima and Ozawa, 1984; Lee, 1990), grants comparative advantage a central role in explaining the development impact of FDI. According to

Kojima's macroeconomic approach to FDI, which can be viewed as an extension of the neoclassical trade theory based on factor endowments, FDI contributes to enhance efficiency and, thus, promote growth in both home and host countries, when it is driven by changes in production factor costs differentials. More precisely, FDI contributes to raise productivity and foster positive structural change when it is made by a firm whose home country presents a comparative disadvantage (due to rising costs) in a host country where the same industry has a comparative advantage (Kojima, 1973; 1982). This type of FDI is viewed by Kojima as beneficial to economic development because it does not replace but promotes trade (in intermediate goods). In turn, the development impact of market-seeking FDI is uncertain, possibly negative, if driven by excessive trade barriers under oligopolistic structures, as countries forego the gains arising from trade and specialization according to comparative advantage.

Alignment to comparative advantage is the defining element of Kojima's approach to FDI. To investigate whether this matters for the relationship between FDI and productivity growth, the empirical model is re-estimated, for the manufacturing industries only, with the inclusion of a dummy variable that classify the observations according to Balassa's (1965) revealed comparative advantage (RCA) index. If RCA index is larger than 1, it is assumed that such a country had (revealed) comparative advantage in that industry in that year. The RCA variable enters the model individually and in interaction with FDI. Nonetheless, before commenting the results, it is important to underline that this is not a perfect test of Kojima's conjecture because his model is a general equilibrium one, what means that the effects derived from a given foreign investment are not confined to the invested industry.

The model with manufacturing industries only has 1,260 observations. The estimated marginal effect of the FDI variable, holding all the interactive variables at their respective means, is -0.09 (t-statistic = -0.06). When this effect is broken down according to RCA groups, the estimated marginal effect drops to -3.33 (t-statistic = -1.30) for the observations without comparative advantage but increases to 2.71 for the observations with comparative advantage (t-statistic = 1.65). Considering that the unconditional mean of the dependent variable is 4.31 (4.40 for observations with RCA > 1 and 4.21 for observations with RCA≤1), the "average" effect is nil but the effect within each group is not negligible. Nonetheless, despite the differences between the estimated effects, it is not possible to affirm that a statistically significant role for RCA is detected in the sample due to the existence of a small overlap between the two groups' confidence intervals.

Considering that the effect of RCA may be masked by the inclusion of other trade-related variables in the model, other specifications are tested – see

table 7 – but the results remain qualitatively similar. In addition, specifications in which RCA enters interacting not only with FDI but also with human capital index, foreign value added in gross exports and dependency on exports (one at a time) were also tested but the results are not substantially different from the basic specification – for this reason, they are not shown.

TABLE 9
FDI, comparative advantage and labour productivity growth

Model/group	Marginal effect of FDI	Confidernce interval (90%)	
With foreign VA in gross exports and dependency on exports			
"average"	-0.089	-2.492	2.313
RCA≤1	-3.334	-7.542	0.873
RCA>1	2.714	0.012	5.416
Without foreign VA in gross exports			
"average"	0.044	-2.318	2.406
RCA≤1	-3.090	-7.261	1.081
RCA>1	2.751	0.061	5.442
Without dependency on exports			
"average"	-0.071	-2.465	2.324
RCA≤1	-3.584	-7.740	0.573
RCA>1	2.964	0.431	5.496
Without foreign VA in gross exports and dependency on exports			
"average"	0.075	-2.292	2.442
RCA≤1	-3.379	-7.521	0.763
RCA>1	3.059	0.556	5.562

Author's elaboration.
Obs: All the continuous variables held at sample means.

4.3.2 FDI and structural change

As seen in the shift-share analysis, the static shift component of aggregate labour productivity growth is positive when industries with higher initial productivity levels increase their shares in employment. Thus, *FDI promotes positive structural change, through the static shift component, if it is associated with increases in the employment share of the most productive industries or, alternatively, with decreases in the employment share of the least productive industries*. Identifying such relationship is relatively straightforward. One just need to find out whether the effect of FDI on employment growth in industries with above-the-average initial relative productivity is statistically different from the effect on industries with below-the-average initial relative productivity.

In turn, the dynamic shift component of aggregate labour productivity growth is positive when the industries that increase their shares in total employment have above-the-average productivity growth. Linking FDI to dynamic shift is not trivial because, in this case, the dependent variable would be the arithmetic product of employment growth and productivity growth. Using employment growth as control variable in a regression in which productivity growth is the dependent variable is also inadequate because that variable is endogenous. For this reason – and given that dynamic shift accounts for only a small fraction of CEECs' labour productivity growth in the period 2000-2014 –, the following analysis is confined to the static shift part of structural change.

To address this issue empirically, it is necessary, first, to differentiate the effects of FDI according to industries' initial relative productivity. Since structural change takes place within countries, this measure needs to reflect productivity comparatively to the country's average productivity. So, in this subsection, all the FDI variables, including the interactions with other variables, are interacted with initial relative productivity. Values below 1 means initial productivity below the country's average in that year.

The empirical model is presented below. It is quite similar to the model used for within productivity, except for the inclusion of initial relative productivity and the exclusion of the dummy for regulated industries and the skill-intensity variable – this is needed because the fact that they are correlated with initial relative productivity could mask the latter's effect.

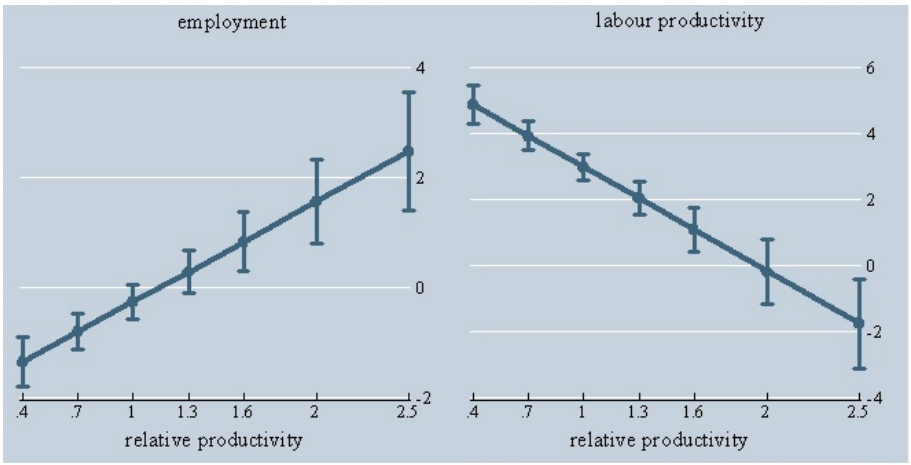
$$
\begin{aligned}
&\text{employment growth}_{jct} = \\
&= \alpha + \beta_1 \text{FDI growth}_{jct} + \beta_2 \text{relative productivity}_{jct} \\
&+ \beta_3 \text{FDI growth}_{jct} X \text{relative productivity}_{jct} + \beta_4 \text{relatory quality}_{ct} \\
&+ \beta_5 \text{FDI growth}_{jct} X \text{relatory quality}_{ct} + \beta_6 \text{relative productivity}_{jct} X \text{relatory quality}_{ct} \\
&+ \beta_7 \text{FDI growth}_{jct} X \text{relative productivity}_{jct} X \text{relatory quality}_{ct} \\
&+ \beta_8 \text{human capital index}_{ct} + \beta_9 \text{FDI growth}_{jct} X \text{human capital index}_{ct} \\
&+ \beta_{10} \text{relative productivity}_{jct} X \text{human capital index}_{ct} \\
&+ \beta_{11} \text{FDI growth}_{jct} X \text{relative productivity}_{jct} X \text{human capital index}_{ct} \\
&+ \beta_{12} \text{foreign value added in exports}_{jct} \\
&+ \beta_{13} \text{FDI growth}_{jct} X \text{foreign value added in exports}_{jct} \\
&+ \beta_{14} \text{relative productivity}_{jct} X \text{foreign value added in exports}_{jct} \\
&+ \beta_{15} \text{FDI growth}_{jct} X \text{relative productivity}_{jct} X \text{foreign value added in exports}_{jct} \\
&+ \beta_{16} \text{dependency on exports}_{jct} + \beta_{17} \text{FDI growth}_{jct} X \text{dependency on exports}_{jct} \\
&+ \beta_{18} \text{relative productivity}_{jct} X \text{dependency on exports}_{jct} \\
&+ \beta_{19} \text{FDI growth}_{jct} X \text{relative productivity}_{jct} X \text{dependency on exports}_{jct} + \delta_c + \delta_t + \varepsilon_{jct}
\end{aligned}
$$

A model in which employment growth is replaced by labour productivity growth is also estimated. Although it does not have an analytical purpose, its results may serve to complement the analysis of the effect of FDI on the static shift.

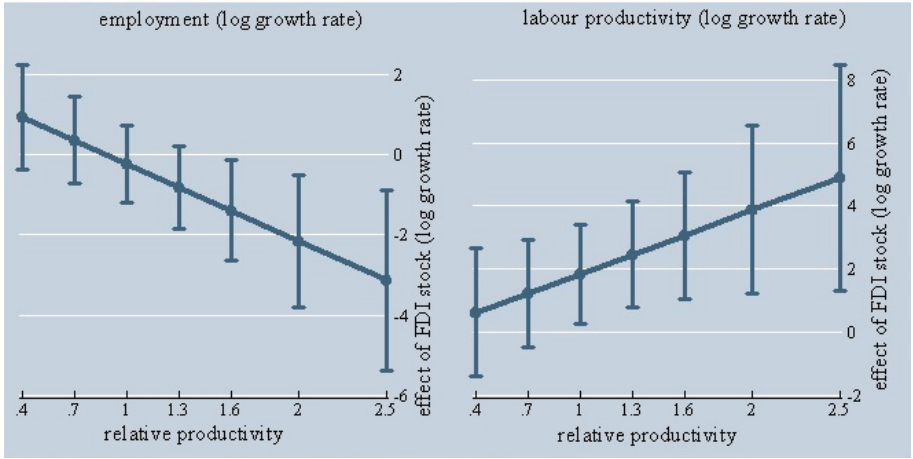
As before, the results are presented in charts to facilitate the analysis of the interactions. Figures 5 to 9 display four charts each. The top charts show the log growth rates of employment and labour productivity predicted by models without FDI, that is, models that include all the mentioned variables except FDI and its interactions with other variables. Therefore, they are viewed as growth rates disregarding the potential effect of FDI. The bottom charts show the marginal effects of FDI on employment and productivity growth, derived from models that include FDI and its interactions with other variables. Thus, they can be interpreted as the extent to which FDI accentuate or attenuate the trends identified in the top charts. As previously, the dependent variables are expressed in log percent, while FDI growth rate is expressed in decimals. Therefore, if a chart displays a marginal effect equal to 1 it means that an increase of 1 log percent in FDI stock relates to an increase of 0.01 log percent in employment or productivity.

FIGURE 5
FDI and structural change

5A – Growth rates
(ln log percent)



5B – Marginal effects



Author's elaboration.

Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.

2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

The top charts in figure 5 show the predicted employment and labour productivity growth rates holding all the variables, except initial relative productivity, at sample means. Employment growth tends to be positive for country-industries with initial relative productivity 15% above country's average. The difference in terms of employment growth rates between high productivity and low productivity industries is statistically significant, thus ratifying the positive static shift found in the shift-share analysis. The bottom charts in figure 5 display the marginal effects of FDI on employment and productivity growth, holding all the other variables at their sample means. The left chart indicates that in high productivity industries, employment tends to grow less when FDI stock increases. This negative effect is statistically significant. For the low productivity industries, the estimated effect of FDI is positive but it is statistically insignificant. What is most important, however, is that the effect of FDI on employment growth among low productivity industries is statistically different from the effect among very high productivity industries. Therefore, if FDI plays any role in structural change through the static shift component, it is by attenuating the employment growth in high productivity industries. This result suggest that foreign affiliates bring labour saving technologies to high productivity industries and help to enhance productivity – as shown in the bottom right chart.

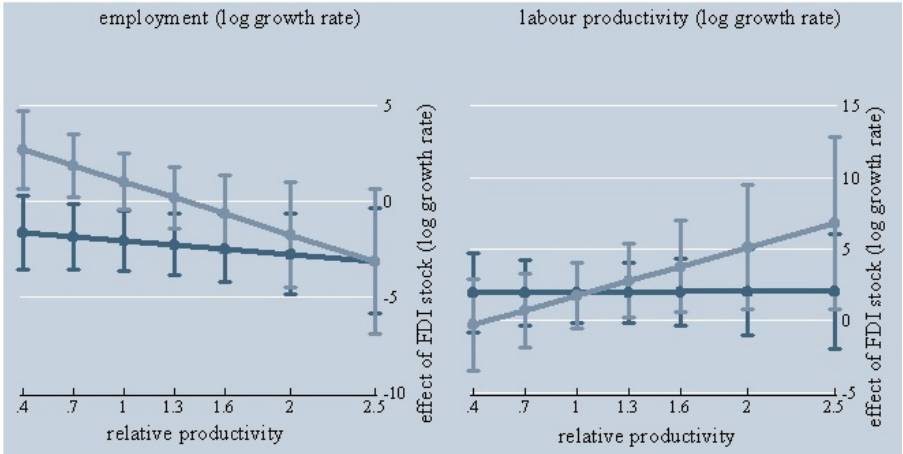
Figure 6 shows the effects of FDI according to the regulatory quality of the country. The mean regulatory quality index in the sample is 0.78. The charts display the results for (relatively) low and high regulatory quality environments, using one standard deviation from the mean (0.47) as parameter. Looking first to the top

left chart, (positive) static shift seems to be more pronounced in countries with higher regulatory quality. In countries with lower regulatory quality, the differences in employment growth rates across levels of initial relative productivity are not statistically significant. Moving to the bottom left chart, it is possible to note distinct patterns. In countries with lower regulatory quality, increase in FDI stock almost always means lower employment growth, with insignificant differences across industries with different relative productivities. This suggest that in these countries, foreign affiliates bring labour saving technologies to all industries. The results for countries with high regulatory quality have large variance but point estimates suggest that only high productivity industries receive labour saving technologies from foreign affiliates as compared to local firms. Summing up, FDI does not seem to influence static shift in countries with lower regulatory quality but possibly exert an attenuation effect in countries with higher regulatory quality.

FIGURE 6
FDI, regulatory quality and structural change

6A – Growth rates
(In log percent)

6B – Marginal effects

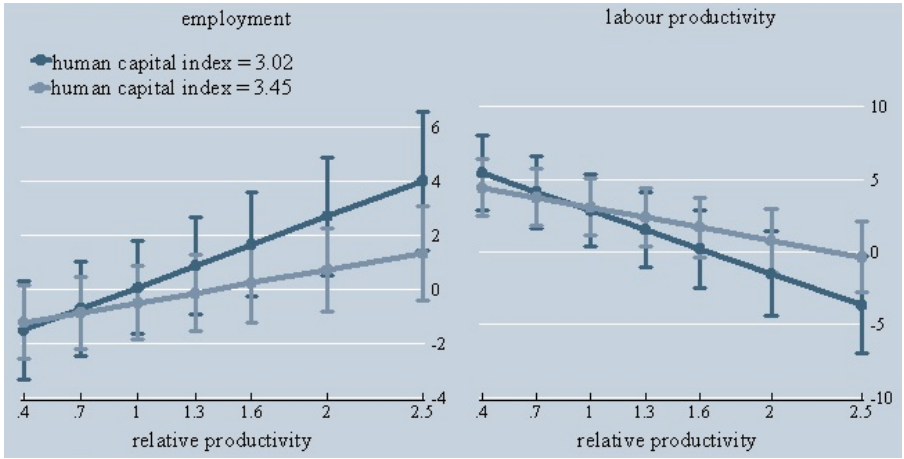


Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

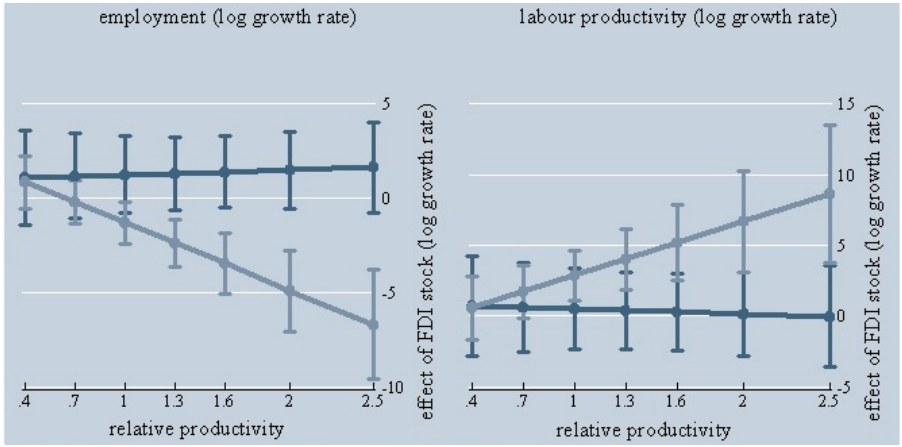
The effects of FDI on structural change, according to the human capital endowment of the country, are shown in figure 7. The mean human capital index in the sample is 3.23 and the standard deviation is 0.21. Static shift seems stronger among countries with lower human capital stocks but in these countries the effect of FDI on employment growth is almost constant across industries with different productivity levels. In turn, the effect of FDI on employment seems to be very negative in high productivity industries in countries with higher human capital stocks. The effect of FDI on productivity growth in these industries – shown in the bottom right chart – is, therefore, largely driven by the effect on employment instead of the effect on value added. Summing up, FDI does not seem to be related to static shift in countries with lower human capital stock but seems to have a significant attenuating effect in countries with higher human capital stocks.

FIGURE 7
FDI, human capital and structural change

7A – Growth rates
(In log percent)



7B – Marginal effects



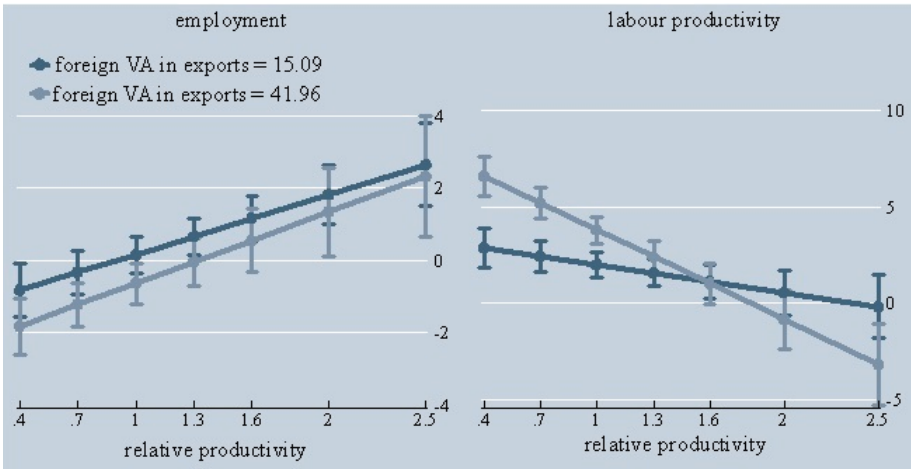
Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

Figures 8 and 9 show how integration to the global economy interferes on the effect of FDI on structural change. The top right chart in figure 8 shows that more intense use of imported inputs is associated to higher productivity growth among low productivity industries while in high productivity industries it is just the opposite. The interpretation of the differential effects of FDI is

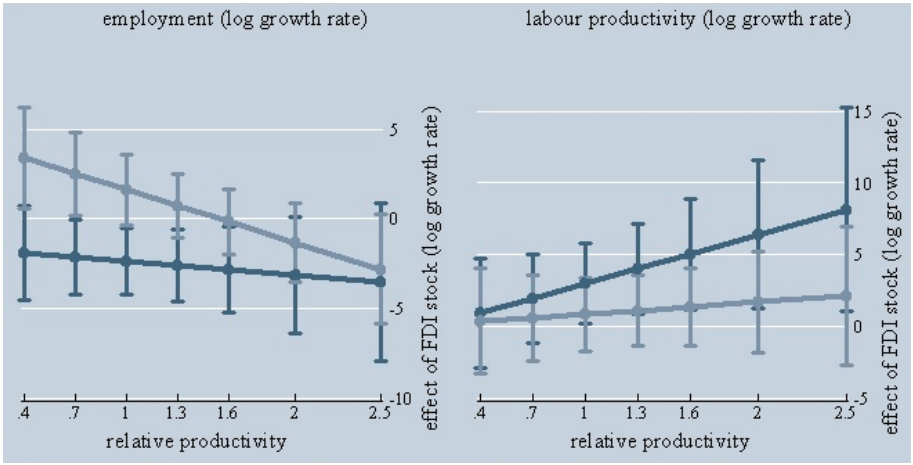
more intricate in this case because the interacting variable is measured at the country-industry level. Comparing the effect of FDI at same productivity level is more meaningful than comparing the effect of FDI at a same level of use of imported inputs (the connecting lines). The sample mean of foreign value added in gross exports is 28.53 and the standard deviation is 13.44. Looking at the bottom left chart, the biggest difference between the connecting lines in found in the region of low productivity industries. For these industries, FDI seems to counteract the positive static shift if it is accompanied by a high use of imported inputs. In low productivity industries, FDI is associated with employment and value added growth when accompanied by high use of imported inputs but it is associated with employment and value added reduction when accompanied by low use of imported inputs. At first sight this result is intriguing because a higher proportion of imported inputs is usually linked with fewer linkages with the domestic economy and, thus, fewer jobs. However, higher use of imported inputs may also signal higher efficiency, what increases the probability of serving as a hub for exports and enhances the ability to compete with imports. In the case of high productivity industries, the effect of FDI on employment is not dependent on the level of use of imported inputs.

FIGURE 8
FDI, foreign value added in gross exports and structural change

8A – Growth rates
(ln log percent)



8B – Marginal effects

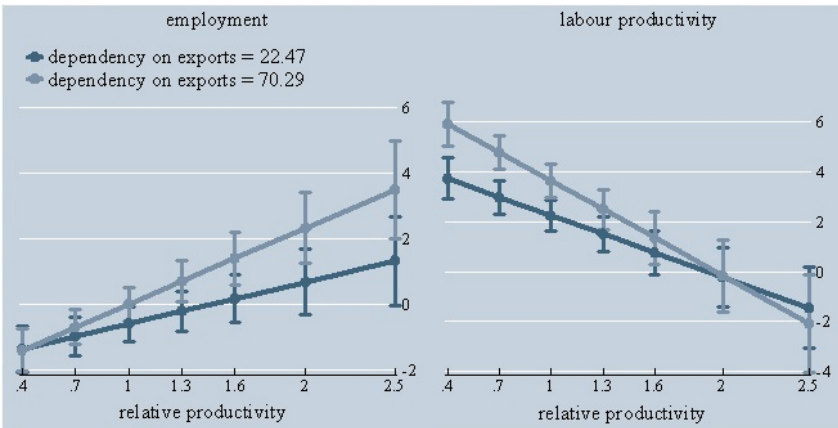


Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

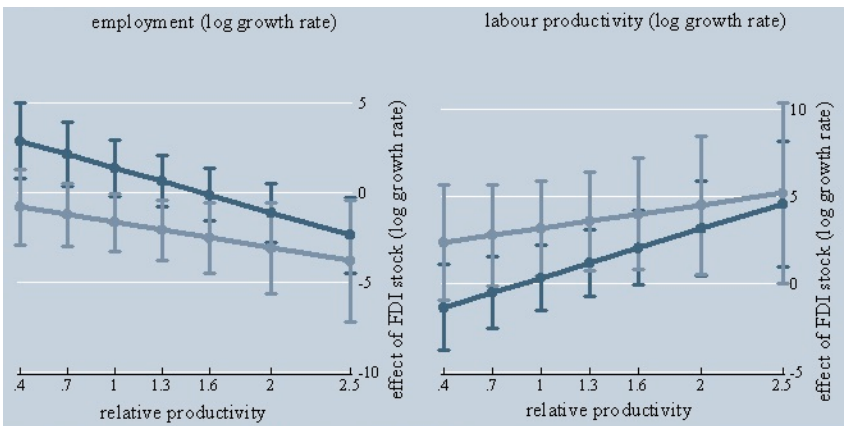
Figure 9 shows the effects of FDI according to country-industry's dependency on exports. The sample mean of this variable is 46.38 and the standard deviation is 23.91. Export orientation possibly strengthens static shift, especially due to the employment effects in high productivity industries, but the difference between the two connecting lines in the top left chart is not statistically significant. According to the bottom left chart, a lower integration to the international economy through exports leads to higher employment effects of FDI at any level of initial relative productivity, although the difference is not statistically significant for high productivity industries. Such results are as expected because domestic-market oriented industries are less urged to keep costs down than industries that are more export-oriented. Summing up, the attenuating effect of FDI on the (positive) static shift term tends to disappear the higher is the export orientation of the low productivity industries.

FIGURE 9
FDI, dependency on exports and structural change

9A – Growth rates
(In log percent)



9B – Marginal effects



Author's elaboration.
Obs.: 1. All the continuous variables held at sample means. Vertical bars are 90% confidence intervals.
2. Figure displayed in low resolution and whose layout and texts could not be formatted due to the technical characteristics of the original files (Publisher's note).

5 CONCLUSION

In the introduction of this article, it was asserted that microeconomic studies have contributed, over the last decades, to considerably extend our knowledge about how the presence of MNEs affect other economic agents in host countries. The same can be said, to some extent, in respect to cross-country macroeconomic studies and our understanding about the relationship between FDI and aggregate

economic growth. Clearly lagging behind is our knowledge about how FDI influences the way the economies evolve, through differential growth rates and reallocation of factors of production across sectors and industries.

The main contribution of this article is the bridge it begins to build between the micro- and the macroeconomic literatures on FDI, drawing on a well-known technique that decomposes aggregate labour productivity growth into the within, static shift and dynamic shift components – the shift-share analysis. Using industry-level data, it was possible to untangle the relationship between FDI and aggregate labour productivity growth. More specifically, it was possible to investigate whether FDI helps to explain differential growth rates in labour productivity as well as labour force reallocations across industries for a sample of 11 former communist countries.

This article also contributes to the literature on the development effects of FDI in former communist countries. To this date, the evidence provided by studies using aggregate data is rather inconclusive as their results seem to be quite dependent on samples and methods employed. Furthermore, they seldom look for heterogeneous effects. This study demonstrates that the actual impact of FDI in these countries may go unnoticed if the analysis does not go below the aggregate level and does not pay attention to potential moderating factors.

This article's basic result suggests that additions to FDI stock are positively associated with industry's labour productivity growth – what is in accordance with Bijsterbosch and Kolasa's (2010) findings that, within a group of 8 transition economies over the period 1995-2005, productivity growth was higher in country-industries with higher FDI flows/value added ratios and that increases in FDI flows/value added ratios were positively associated with productivity increases. However, the estimated "average" effect is economically small and statistically insignificant.

Building on previous studies that have found an erratic relationship between FDI and aggregate growth, the analysis was extended as to incorporate potential sources of heterogeneity. The suspicion was confirmed in some cases. Institutional development seems to influence the productivity growth effect of FDI, especially among heavily regulated industries. In turn, in poorer institutional settings, FDI tends to generate most favourable results when it is directed to slightly regulated industries. It was not possible to statistically detect a moderating role for human capital, possibly due to the high convergence of CEECs in terms of educational attainment, but there is evidence that FDI produce stronger productivity growth effects when directed to industries that are more intensive in skilled labour. Sceptical views about the potential development impact of GVCs were corroborated by the lack of evidence about a moderating role for

foreign value added in gross exports. However, there is some indication that the productivity growth effects of FDI are larger in more export-oriented industries. The hypothesis that the productivity growth effect of FDI is stronger when it takes place in countries in which the invested industry has comparative advantage came close to find statistical support in the data.

According to shift-share analysis, static shift was positive in CEECs during the period 2000-2014, what means that labour moved out of the least productive industries to the most productive industries. This study reveals that FDI tended to attenuate static shift. Compared to a situation of no growth in FDI stock, an increase in FDI stock is associated to lower employment growth in high productivity industries. At the same time, productivity growth in these industries tended to be higher when FDI grew. These results suggest that MNEs bring labour-saving technologies to host countries as compared to local firms. *MNEs contribute to shift output structures in direction of the most productive industries but do not play the same role in respect to employment. On the contrary, higher MNE activity tends to weaken the static shift component of structural change*.

The effects of FDI on structural change seems to be stronger in countries with better institutional development – proxied by regulatory quality – and higher human capital stocks. In the former, FDI attenuates static shift mainly because it is associated with employment growth in low productivity industries, while in the latter it is because it is associated with strong decrease in employment in high productivity industries. Furthermore, the attenuation effect of FDI seems to be influenced by the extent to which the low productivity industries use imported inputs and by these industries' dependency on export markets. Greater domestic orientation and higher use of imported inputs by low productivity industries tends to amplify the attenuating effect of FDI on the static shift. While the former result is expected, the latter is striking, although it may be capturing the effect of increased efficiency on the competitiveness of the industry in both domestic and export markets.

Such findings have important policy implications. Once again, it is shown that positive effects of FDI cannot be taken for granted. Most important, however, is the evidence that the effects in terms of employment growth, output growth and productivity growth do not necessarily go hand in hand. If the aim is to increase aggregate labour productivity growth, the evidence of higher positive effects of FDI in more export-oriented industries makes a case to promote this type of inward FDI. Best results in terms of productivity growth tend to be obtained when countries' attributes are aligned to industries' requirements. Thus, additional efforts to improve the regulatory quality are necessary to magnify the productivity growth impact of FDI in regulated industries. To some extent, the same can be said in respect to human

capital formation: positive marginal gains may be reaped especially if combined with FDI in industries intensive in high-skilled labour. The results also bring some light on what to expect from FDI in terms of job creation and labour force reallocation. FDI in low productivity industries tends to create more jobs when it targets the domestic market. The potential for job creation is higher when these industries use more imported inputs, what may be an indication of greater efficiency. In high productivity industries, FDI is usually associated with lower job creation, especially in more advanced countries, but it is also associated with higher productivity growth.[10]

Among the limitations of the study, the most problematic is certainly the use of annual data because output can be highly volatile in the short run. A future extension could be the application of its empirical approach to lower frequency data – possibly to a larger group of countries.

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APPENDIX

Compatibilization of the industry level data provided by different sources was required to produce this study. An initial effort was made to put all the FDI data under a same classification because they are provided by WIIW under two different classifications (EU's NACE Rev. 1 and NACE Rev. 2), depending on country and year. Given that NACE Rev. 1 is less disaggregated than NACE Rev. 2, it was taken as reference. Particularly relevant was the correspondence between WIOD and WIIW datasets since WIOD is considerably more disaggregated than the FDI database – see table A1. A similar procedure was employed to bring the indicators on GVC participation to the same classification system. Finally, correspondence tables between ISIC Rev. 3 (NACE Rev. 1) and SITC Rev. 3 were used for compatibilization with trade data. At the end, two datasets were created: one comprised by 11 manufacturing industries only; the other comprised by these plus 10 other industries of the primary, secondary and tertiary sectors. To avoid distortions in labour productivity estimations, real estate activities (industry L68 in WIOD's classification) are disregarded in the analysis since this industry's value added comes mainly from imputed rent, what is hardly associated with any measure of sectoral employment.

TABLE A.1
Correspondence table of NACE Rev.1, NACE Rev.2 and ISIC Rev. 3

WIIW		WIOD
(NACE Rev. 1)	(NACE Rev. 2)	(ISIC Rev. 3)
A-B	A	A01-A02-A03
C	B	B
D	C	C
DA	CA	C10-C11-C12
DB-DC	CB	C13-C14-C15
DD-DE	CC	C16-C17-C18
DF	CD	C19
DG	CE-CF	C20-C21
DH-DI	CG	C22-C23
DJ	CH	C24-C25
DK	CK	C28
DL	CI-CJ	C26-C27
DM	CL	C29-C30
DN-OTHER	CM-OTHER	C31-C32-C33
E	D-E	D-E
F	F	F
G	G	G
H	I	I
I	H-J	H-J61
J	K	K
K	L-M-N	L-M-J58-J59-J60-J62-J63
OTHER	OTHER	N-O-P-Q-R-S-T-U

Author's elaboration.

TABLE A.2
Industry classification, description of activities

Description	WIOD (ISIC Rev. 3)
Crop and animal production, hunting and related service activities	A01
Forestry and logging	A02
Fishing and aquaculture	A03
Mining and quarrying	B
Manufacture of food products, beverages and tobacco products	C10-C12
Manufacture of textiles, wearing apparel and leather products	C13-C15
Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C16
Manufacture of paper and paper products	C17
Printing and reproduction of recorded media	C18
Manufacture of coke and refined petroleum products	C19
Manufacture of chemicals and chemical products	C20
Manufacture of basic pharmaceutical products and pharmaceutical preparations	C21
Manufacture of rubber and plastic products	C22
Manufacture of other non-metallic mineral products	C23
Manufacture of basic metals	C24
Manufacture of fabricated metal products, except machinery and equipment	C25
Manufacture of computer, electronic and optical products	C26
Manufacture of electrical equipment	C27
Manufacture of machinery and equipment n.e.c.	C28
Manufacture of motor vehicles, trailers and semi-trailers	C29
Manufacture of other transport equipment	C30
Manufacture of furniture; other manufacturing	C31-C32
Repair and installation of machinery and equipment	C33
Electricity, gas, steam and air conditioning supply	D35
Water collection, treatment and supply	E36
Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services	E37-E39
Construction	F
Wholesale and retail trade and repair of motor vehicles and motorcycles	G45
Wholesale trade, except of motor vehicles and motorcycles	G46
Retail trade, except of motor vehicles and motorcycles	G47
Land transport and transport via pipelines	H49
Water transport	H50
Air transport	H51

(Continues)

(Continuation)

Description	WIOD (ISIC Rev. 3)
Warehousing and support activities for transportation	H52
Postal and courier activities	H53
Accommodation and food service activities	I
Publishing activities	J58
Motion picture, video and television programme production, sound recording and music publishing activities; programming and broadcasting activities	J59-J60
Telecommunications	J61
Computer programming, consultancy and related activities; information service activities	J62-J63
Financial service activities, except insurance and pension funding	K64
Insurance, reinsurance and pension funding, except compulsory social security	K65
Activities auxiliary to financial services and insurance activities	K66
Real estate activities	L68
Legal and accounting activities; activities of head offices; management consultancy activities	M69-M70
Architectural and engineering activities; technical testing and analysis	M71
Scientific research and development	M72
Advertising and market research	M73
Other professional, scientific and technical activities; veterinary activities	M74-M75
Administrative and support service activities	N
Public administration and defence; compulsory social security	O84
Education	P85
Human health and social work activities	Q
Other service activities	R-S
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	T
Activities of extraterritorial organizations and bodies	U

Source: World Input-Output Database (WIOD), Socio Economic Accounts.