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Abstract

Economic development can be defined as a process in which output growth is accompanied by qualitative changes in the structures of production and employment. Can FDI affect this process? This paper looks for answers in two ways. First, it reviews the extant knowledge about the relationship between MNE activity and economic development in developing countries. Core theoretical and conceptual issues are presented and the key findings of both microeconomic (FDI linkages and spillovers) and macroeconomic (FDI-growth nexus) empirical studies are discussed. The main message of both streams of literature is that FDI has the potential to catalyse development, but actual outcomes are contingent on several factors, such as the absorptive capacity of domestic firms and the level of development of local financial markets. Second, the paper addresses the relationship between FDI and structural change more directly, in a cross-country context, using a two-step estimation approach that is consistent with both theoretical arguments and previous empirical findings which suggest that the FDI-development nexus is highly country-specific. The results confirm such heterogeneity and suggest that the interaction between the sectoral concentration of FDI and the development stage of the country plays a role in determining the development impact of FDI.

Keywords

foreign direct investment, multinational enterprises, developing countries, economic development, structural change

JEL Classification

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1. Introduction

The structuralist tradition defines economic development as a process in which output growth is accompanied by qualitative changes in the structures of production and employment (Kuznets, 1966). The direction of change is expected to follow Lewis' (1954) dual economy model, in which factors of production – particularly labor – move from the traditional, low-productivity sector, to the modern, higher-productivity sector of the economy[1]. As the traditional sector is viewed as stagnant, this move depends fundamentally on the 'pulling forces' accruing from the modern sector, whose growth is intrinsically associated with the accumulation of factors of production, particularly physical and human capital, and increases in their productivity, which in turn is determined by efficiency improvements and technological progress (Szirmai, 2005; Narula, 2018).

The hypothesis that countries could remain indefinitely trapped in a "vicious circle of poverty" was suggested by Ragnar Nurkse in 1953, based on the observation that low income leads to low savings, which leads to low investment, that leads to low productivity, that leads to low income, and so on and so forth (Nurkse, 1953). Foreign direct investment (FDI) might help countries to break out this vicious circle not only by complementing domestic savings and easing balance-of-payments constraints but, most importantly, by bringing better technologies and management practices that could improve productivity (Narula, 2014). Furthermore, FDI may leverage an "unbalanced growth" strategy (Hirschman, 1958) when a few key investments can stimulate further investments along the value chain. Increased demand for inputs can enable productivity

[1] Perhaps more appealing is Hirschman's (1958, p. 5) claim that development "depends not so much on finding optimal combinations for given resources and factors of production as on calling forth and enlisting for development purposes resources and abilities that are hidden, scattered, or badly utilized".

gains due to higher specialization and increasing returns to scale, thereby benefiting domestic firms in downstream sectors (Rivera-Batiz, 1990; Rodriguez-Clare, 1996; Markusen & Venables, 1999). In addition, the multinational enterprises (MNEs) may generate knowledge spillovers to domestic firms (Caves, 1974) and improve the allocation of resources in host economy by causing the exit of the less efficient producers (Melitz, 2003; Alfaro & Chen, 2018), thus contributing to enhanced aggregate productivity. All these elements would impact not only the rate of output growth, but also the structure of the economy.

This paper provides an overview of the extant knowledge about the relationship between MNE activity and economic development in developing countries. Following an introduction to the core theoretical and conceptual issues in the next section, the key findings of the empirical literature on the developmental effects of FDI are discussed in Section 3. The main contribution of the paper is presented in section 4, where the paucity of quantitative evidence on the relationship between FDI and structural change is addressed. Specifically, the aim is to investigate whether the development impact of FDI depends on its sectoral concentration and whether this relationship varies according to the stage of development of the country – two major suggestions emanating from the literature review. This is examined in a two-step approach. In the first step, long-run country-specific coefficients are estimated relating FDI to employment structure as an indicator of structural change. Next, a set of country characteristics and the sectoral concentration of FDI are employed to explain the heterogeneity observed in the FDI-structural change nexus across countries. This approach reflects both theoretical arguments and previous empirical findings suggesting that the relationship between FDI and development is highly country-specific. The results confirm such heterogeneity as

well as the roles of the sectoral concentration of FDI and the development stage in partially determining it. Conclusions are presented in section 5.

2. MNEs, FDI and economic development in theory

2.1. FDI, domestic investment and economic growth

Since most empirical studies are underpinned by mainstream models of economic growth, it is worth briefly presenting how they view the differential effect of investments made by MNEs *vis-à-vis* investments made by domestic firms. In the neoclassical model (Solow, 1956), economic growth is a product of factor accumulation. As every dollar of investment has the same effect on growth whatever the source, there is no specific role to MNEs – not even as a source of technology since technological improvement is exogenous to the model.

Conversely, in endogenous growth models there is scope for distinguishing different sources of investment according to their technological levels. Romer (1993, p. 543) states that "nations are poor because their citizens do not have access to the ideas that are used in industrial nations to generate economic value". MNEs are firms that have the potential to create and transfer knowledge across borders, both intentionally and unintentionally. If foreign MNEs bring more efficient technologies to host countries, their impact on growth would be higher than a quantitatively equivalent investment made by a domestic firm. Furthermore, endogenous growth models emphasize the roles played by specialization (Rivera-Batiz, 1990), economies of scale (Romer, 1986) and human capital externalities (Lucas, 1988; Azariadis & Drazen, 1990) in the process of economic growth, all of them often related with the presence of foreign MNEs in the host economy.

2.2. FDI, comparative advantages and economic development

Another relevant issue is whether the development impact of FDI is contingent on its "nature". FDI projects can be broadly classified into two categories: FDI driven by factor-cost considerations – resource-seeking or vertical FDI – and FDI driven mainly by improved access to markets, often as a means of bypassing trade restrictions – market-seeking or horizontal FDI[2].

According to the proponents of the "dynamic comparative advantage theory of FDI" [3] (Akamatsu, 1961; 1962; Kojima, 1973; 1982; Kojima & Ozawa, 1984; Lee, 1990) – also known as the "international flying geese model" – FDI contributes to increased productivity, while also promoting positive structural change in both home and host countries, when a firm whose home country has a comparative disadvantage in an industry invests in a host country with a comparative advantage in the same industry (Kojima, 1973; 1982; Kojima & Ozawa, 1984). For Kojima (1973; 1982; 2000), this type of FDI improves the allocation of resources and enhances trade. The "wrong" type of FDI overlooks countries' comparative advantages, driven by trade barriers under oligopolistic structures.

This comparative advantage-based reasoning has recently been revived by Lin & Chang's (2009) debate on whether development effects are greater by conforming to comparative advantage, or by defying it[4]. Lin (2010) argues that an economy's optimal

[2] Albeit being the two most relevant motivations for FDI in developing countries they are not the sole ones. For a contemporary discussion of FDI motives, see Cuervo-Cazurra, Narula & Un (2015).

[3] Besides this macroeconomic approach, the theoretical literature on why MNEs exist revolves around two microeconomic perspectives. A governance explanation is provided by the "internalization school" (Buckley & Casson, 1976; Rugman, 1980; Hennart, 1982), which predicts that an MNE will emerge when a domestic firm internalizes the cross-border market of an intermediate product, after weighting production costs against transaction, contracting, coordination and monitoring costs of different governance modalities, ranging from full internalization to pure arm's length transaction. However, some influential scholars (Hymer, 1960; Dunning, 1977) argued that simply performing a value-adding activity overseas is not sufficient to transform a domestic firm in an MNE. The firm's internationalization must be underpinned by some type of ownership-specific advantage because when competing in foreign markets, foreign firms face costs that local competitors do not incur. Thus, the "market power" theory of the MNE emphasizes the role played by the control or access to proprietary assets (technology, brands, channels of distribution etc.) in conferring MNEs advantages over its competitors in host countries.

[4] For a comprehensive discussion of the role played by factor endowments in economic development, see Dosi & Tranchero (2019).

industrial structure is endogenous to its comparative advantage, so that upgrading industrial structure follows a change in its endowment structure. Lin & Monga (2011) propose that following comparative advantage is the optimal strategy to optimise capital accumulation[5]. In the same way as in the flying-geese model, FDI may assist development if it is oriented to industries in which the country has comparative advantage, otherwise it can promote inefficiency[6]. The structuralist tradition, on the other hand, views prevailing economic structures acting as obstacles to economic development (Prebisch, 1949)[7]. FDI can reinforce the patterns of comparative advantage, locking-in countries to low productivity activities[8].

2.3. The coevolution of FDI and economic structure

[5] Lin & Monga (2011) suggest that the state should act to identify new industries in which the country may have latent comparative advantage, remove the constraints that impede the emergence of those industries and create the conditions to allow them to become the country's actual comparative advantages, with the countries that have preceded them being a useful reference as to which industries might offer latent comparative advantages. If domestic firms are absent in industries in which the country has latent comparative advantages, the government could adopt specific measures to attract foreign investors that may have incentives to relocate their production to lower-cost locations. Nonetheless, Chang & Andreoni (2016) consider Lin & Monga's (2011) approach inconsistent because it recommends adhering to comparative advantage while recognising the need to deviate from it.

[6] Lin & Monga's (2014) evaluation that Latin American countries' import-substitution strategies failed in achieving structural transformation because they gave priority to the development of the capital-intensive heavy industry, when those economies were capital-poor, is quite similar to Kojima's (2000).

[7] The so-called Latin American structuralism (Prebisch, 1949) divided the world into two groups of countries – the center and the periphery – which differ from each other in terms of technological capabilities. In the periphery, there is a reinforcing mechanism linking technological capabilities and patterns of specialization. Upgrading is obstructed because learning is highly dependent on what the economic agents produce (Porcile, 2019). The low income-elasticity of the products usually exported by developing countries would impose a deterioration of their terms of trade *vis-à-vis* the advanced nations and bind their rate of economic growth consistent with long-run equilibrium in the balance-of-payments. The remedy for this situation would be a development strategy less dependent on international trade, which would focus on the building up of a manufacturing sector that would replace imports by goods produced domestically.

[8] Lee (2013) distinguishes low-income from middle-income countries in respect to the best development strategy. Specialization according to comparative advantage may be advantageous to low-income countries but is less suitable for middle-income countries that have already passed initial stages of growth by technology emulation. In his view, sustained catch-up requires not only an engagement with mature industries, but also an effort to leapfrog into emerging industries that are new to both advanced and developing countries.

MNE activity can influence the economic structures of host economies but it is also affected by structural transformation. The investment development path (IDP) framework (Dunning, 1981; Dunning & Narula, 1996; Narula, 1996; Narula & Dunning, 2010), states that the quantity and the quality of FDI a country receives (and sends abroad) changes as its domestic firms accumulate assets that enhance their capacity to explore economic opportunities and to compete with firms from other countries, the country's location advantages change relatively to other countries' location advantages and the market failures that make hierarchies (internalization) to be preferable to market transactions change. According to the IDP, the relationship between FDI and economic structure follows five stages that are likely to be observed in every country but whose transition points, in terms of the country's level of development, cannot be determined *a priori*, since they depend on several aspects, such as geography, natural resource wealth or institutional development, that are unique to each country.

A stages-of-development approach to the relationship between FDI and economic structure is also present in Ozawa (1992), where three sequential stages of economic development are identified: factor-driven, investment-driven and innovation-driven. Following the logic of the flying-geese model, he advocates a stages-compatible order of sequential structural upgrading, instead of a development strategy that defies comparative advantage. MNEs contribute to development if they help to align the economic structures of countries with their comparative advantages determined by factor endowments.

3. An assessment of empirical studies on the development effects of FDI[9]

[9] FDI and MNE activity are largely regarded as synonyms in the empirical literature. This is because most statistics collected and published by national governments and multilateral institutions are still based on the balance-of-payments definition of FDI – which is confined to equity investments, reinvested earnings and intra-firm loans. However, that equivalence is false since MNEs can engage in cross-border value-adding activities through arrangements that does not necessarily involve FDI such as those related to the control of global value chains (GVCs). Since data on other modes of MNE activity is still scarce and, even when it exists, is hardly comparable across countries, this paper follows the extant literature and considers FDI and MNE activity as synonymous.

Given the lack of quantitative studies relating FDI and structural change, this section focuses on the main findings of two related streams of literature. The first aims to analyze how the presence of foreign MNEs affect the domestic actors in an economy, through linkages, externalities and spillovers, using in most cases firm-level data in a single-country context. The second deals with the relationship between FDI and economic growth, in a cross-country setting. It is important to underline that these micro and macro approaches complement each other – while the latter allows the assessment of the effects of local conditions on the way that FDI foster economic development, the former is needed to investigate the mechanisms through which FDI affect host economies.

3.1 FDI linkages, externalities and spillovers

Considering that MNE affiliates tend to be more productive than their domestic counterparts, which can be largely explained by their differences in terms of size, assets and capabilities[10], aggregate productivity tends to rise when MNEs gain market share in host countries (Melitz, 2003). However, such direct effects of MNE presence have attracted much less academic interest than the indirect effects.

The presence of a foreign MNE in a host country produces external effects on other economic agents, including affiliates of other foreign MNEs and domestic firms, through

[10] For a comprehensive review of the empirical literature on the differences between domestic and foreign-owned firms, see Bellak (2004).

four (main) channels: i) competition[11]; ii) demonstration/imitation[12]; iii) labor turnover[13]; iv) and backward and forward linkages[14]. FDI externalities can be of the pecuniary type – that is, transmitted through prices in the market – or can constitute (non-pecuniary) knowledge externalities, with these two types difficult to disentangle (Castellani, 2012; Belderbos & Mohnen, 2013).

Besides these indirect (and mostly unintentional) effects, domestic firms may be affected by intentional measures undertaken by foreign MNEs to establish linkages with them. Through these linkages[15], MNEs can provide technical, managerial and financial assistance to their suppliers, for example. As the MNE expects a benefit from this type of relationship, it has incentives to create and deepen backward linkages. However, the absorption of knowledge through linkages with foreign MNEs, as well as the

[11] The competition effect produces mostly pecuniary externalities, which may affect competitors (horizontal) as well as suppliers and buyers (vertical), in both product and factor markets. By reducing the monopoly power of domestic firms in some sectors, the entry of MNEs may contribute to enhance allocative efficiency (Caves, 1974). Although it may encourage domestic firms to be more efficient, more competition means fewer opportunities to exploit scale economies, with possible (negative) effects on sectoral productivity (Aitken & Harrison, 1999). The composite effect on competing domestic firms tends to be negative. They may be crowded-out by foreign competitors. However, if higher competition translates into lower prices or increased quality, existing domestic firms in downstream sectors will benefit, and new ones may enter the market (crowding-in effect).

[12] Production techniques and managerial practices used by the MNE may be more efficient than those used by domestic firms – indeed, the ownership of distinctively superior assets is a necessary condition for the occurrence of FDI according to the market power theory of the MNE (Hymer, 1960; Dunning, 1977). Their use by the MNE "demonstrates" their superior attributes, and local competitors are able to observe and imitate them.

[13] MNEs train their local employees, who accumulate managerial and technical know-how. This acquired knowledge leaks from the MNE when workers move to a collocated competitor or start their own firm. However, MNEs seek to minimise such spillovers often by paying above-market salaries to retain such employees (Fosfuri et. al., 2001), as has been confirmed over the years in countries such as Mexico and Venezuela (Aitken *et al.*, 1996), Indonesia (Lipsey and Sjoholm, 2004) and China (Chen *et al.*, 2011).

[14] The presence of the MNE may affect local firms that can supply inputs or buy their intermediate products. The MNE's production itself increases supply for downstream sectors, possibly bringing prices down. Furthermore, the increased demand created by the MNE may enable domestic suppliers to benefit from scale and specialization economies, ultimately benefiting any firm that use the same inputs, including the MNE's own competitors. Therefore, backward linkages entail positive horizontal productivity externalities, besides the more obvious vertical ones (Rodriguez-Clare, 1996; Markusen & Venables, 1999).

[15] Lall (1980) defines linkages as the "direct relationships established by firms in complementary activities which are external to 'pure' market transactions" (Lall, 1980, p. 204). This definition is narrower than Hirschman's (1958) classic definition of linkages as it precludes any non-intentional effect such as pecuniary externalities.

internalization of true FDI knowledge spillovers, requires costly efforts by host country's domestic firms (Narula & Driffield, 2012; Zanfei, 2012).

The hypothesis that MNEs produce significant external effects on domestic firms has been under intense scrutiny over the last three decades. Empirical findings are quite diverse and, on some issues, inconclusive. What a meta-analysis of productivity spillovers studies (Havranek & Irsova, 2011) shows with some clarity is that the presence of foreign MNEs tends to be associated with substantial improvements in the productivity of their local suppliers. There is also evidence that the survival odds of domestic firms in the Czech Republic and Vietnam (Ayyagari & Kosova, 2010; Kokko & Thang, 2014) is enhanced by the presence of MNEs in downstream industries. Much less clear, however, is the effect of foreign MNEs on the productivity of their domestic buyers. On average, forward vertical spillovers appear economically irrelevant, but there is large variation across countries (Havranek & Irsova, 2011)[16].

Another relevant issue is whether foreign MNEs crowd-out domestic firms (in the same industry) or, on the contrary, their presence produces a crowding-in effect. The available evidence is also quite inconclusive. Studies point to crowding-out in Vietnam (Kokko & Thang, 2014), crowding-in in the Czech Republic (Ayyagari & Kosova, 2010), and no effect at all in Turkey (Taymaz and Ozler, 2007; Ferragina, 2014). The impact seems to vary over time. In the Czech Republic, crowding-out prevails in the short-run, due to increased competition, but as time allows knowledge spillovers to take place, crowding-in becomes the norm (Kosova, 2010). However, we do not yet know what circumstances cause crowding-in to prevail over crowding-out. Some indication on this matter is provided by Munemo (2017). Using country-level data he finds that FDI seems

[16] It must be underlined that empirical studies on FDI spillovers are (generally) incapable of distinguishing between pecuniary externalities, knowledge spillovers and (intentional) knowledge transfers.

to stimulate domestic entrepreneurship in developing countries only when financial development surpasses a certain threshold[17].

The effects of MNEs' presence on the productivity of their domestic competitors tend to be negligible (Irsova & Havranek, 2013). This is not surprising given that negative and positive spillovers transmitted through different channels are likely to cancel each other out. In addition, the available evidence does not suggest any moderating role of country-specific regulations on business, investment, financial or labor issues (Farole & Winkler, 2014). In contrast, the occurrence of export spillovers has been identified for countries as diverse as Chile (Duran & Ryan, 2014), Venezuela (Aitken & Harrison, 1999), China (Chen *et al.*, 2013), Poland (Cieslik & Hagemejer, 2014) and Vietnam (Anwar and Nguyen, 2011)[18].

Regarding structural change, the establishment of linkages with domestic actors is probably the most important indirect effect of the presence of foreign MNEs in host economies[19]. A key issue is whether foreign MNEs behave differently from domestic firms in terms of backward linkages with the domestic economy. Alfaro and Rodriguez-Clare (2004) find that MNE affiliates operating in Brazil, Chile, Mexico and Venezuela source a lower share of their inputs domestically compared to local firms. However, the

[17] It must be underlined, however, that the proxy used does not enable identifying the industries the new domestic firms belongs to.

[18] In the case of China, the presence of foreign MNEs increases the probability of domestic firms' initiation on a new export market (Mayneris & Poncet, 2015) and the survival odds of an export market (Swenson and Chen, 2014). Furthermore, the positive influence seems to be more relevant for penetrating in "difficult" markets, defined as countries with poorer institutional quality and/or tougher import procedures (Mayneris & Poncet, 2011).

[19] Most studies on FDI linkages are still based on qualitative case studies. If, on the one hand, this research technique permits a deeper understanding of the mechanisms of linkage formation and its dynamic evolution, on the other hand it hinders a generalization of the findings since the specificities of each industry or region are hardly found elsewhere. In turn, the quantitative literature on FDI linkages is relatively underdeveloped, probably reflecting the difficulty of collecting reliable data in developing countries. Nonetheless, there are clear limits to quantitative approaches to the study of linkages because it is difficult to measure the transfer of tacit knowledge. For this reason, this section reviews both quantitative and qualitative studies.

value of their domestic purchases of inputs per worker employed is higher than the same ratio observed among domestic firms, except in the case of Mexico. Jordaan (2011) finds that MNE affiliates are more supportive of their suppliers than domestic Mexican firms, particularly in respect to the improvement of suppliers' production processes.

The motivation for FDI is one of the key determinants of linkages and spillovers. In general, domestic-oriented affiliates tend to create more linkages than export-oriented affiliates because they are less dependent on low cost inputs to be competitive (UNCTAD, 2001). However, if FDI is focused on the domestic market but mainly motivated by tariff-jumping, and trade restrictions are limited to final products, a likely side-effect will be an increase of imports of intermediate goods from parent company or other suppliers in home country (Belderbos, 1997; Belderbos & Sleuwaegen, 1998), thus diminishing the potential for linkage creation. Indeed, Belderbos, Capannelli & Fukao (2001) provide evidence that Japanese MNEs' affiliates established to circumvent trade barriers create fewer vertical linkages in the local economy.

The quality of linkages is certainly at least as important as their quantity. The nature of the relationship between foreign affiliates and domestic agents, that is the extent to which resources and knowledge are transferred between them, is key to the enhance the potential for learning, improvement and upgrading (Giroud & Scott-Kennel, 2009). High levels of local sourcing do not necessarily result in technological learning by local suppliers (Ivarsson & Alvstam, 2005). For this reason, Merlevede & Schoors' (2009) finding that backward vertical spillovers are generally positive in Romania but significantly larger among export-oriented industries does not cause surprise, even considering that MNEs in these industries tend to source less inputs locally (UNCTAD, 2001).

Other important issue is the differential linkage impact of different "types" of MNE affiliates. In the context of four European transition economies, Jindra *et al.* (2009) find that the share of inputs sourced locally is positively associated with the affiliates' levels of autonomy, initiative and technological capability. Similarly, Giroud & Mirza (2006) find that MNE affiliates that play a strategic role (R&D or marketing) tend to source more locally than affiliates that solely run a production plant in four Southeast Asian countries. In a study of Taiwanese MNEs investing in the US, China and Southeast Asia, Chen, Chen & Ku (2004) find that investors in a producer-driven network are more likely to build local linkages than their counterparts in buyer-driven networks because the former have more power to promote innovations in the network. According to Driffield & Noor (1999), MNEs in the Malaysian electronics sector that employ significant numbers of local managers and engineers source more locally, what they attribute to the fact that their superior knowledge of local economy reduces transaction costs of trading with local firms in comparison to MNEs that employ large numbers of expatriates. The willingness of MNE affiliates to develop local linkages is also affected by technology sophistication, economies of scale, country experience, geographic proximity to parent firm/other affiliates, and market power (Altenburg, 2000). The business culture of the home country also affects the extent and depth of linkages. Japanese MNEs seem to find it more difficult to establish linkages with domestic firms, but once they do so these tend to be more intense compared to American MNEs (UNCTAD, 2001).

The breadth and depth of the linkages forged by MNEs in developing countries – as well as the extent to which potential spillovers materialize – are also contingent on the characteristics of the domestic sector. Chief among these seems to be the absorptive capacity of domestic firms, or their ability to internalize knowledge created by others (Narula & Marin, 2003). Spillovers need to be internalized and this is not a costless

process (Narula & Driffield, 2012). As highlighted by Ivarsson & Alvstam (2005), even embodied elements of technology can only be used at best practice levels if they are complemented by tacit elements that need to be developed locally, what means that investment in physical capital is not sufficient to upgrading. Available evidence (Görg & Strobl, 2001; Narula & Marin, 2003; Blalock & Simon, 2009; Castillo *et al*., 2014) indicates that firms with higher absorptive capacity indeed benefit more from foreign presence. The inadequacy of considering domestic firms as a homogeneous group is underlined by Pavlinek & Zizalova's (2016) study on the Czech automotive industry: although the presence of foreign car assemblers benefits most domestic firms in backward industries through demonstration effects, low absorptive capacity prevents most domestic firms from benefiting from direct knowledge transfer from MNEs.

Host countries' characteristics influence the type of activities conducted by MNE affiliates, and thus limit or enhance the potential for linkages development (Lall & Narula, 2004). In a study of Japanese electronic MNEs, Belderbos, Capannelli & Fukao (2001) find that host country's quality of infrastructure and the size of local components industry positively affect the extent of backward linkages. Local content requirements positively affect the level of local procurement, as expected, but do not affect the procurement from domestically owned suppliers[20]. The presence of supporting institutions that provide, for example, training and quasi-public goods, is a key determinant of the strength of the linkages between MNEs and suppliers, as they affect the building of absorptive capacity of local firms (Rasiah, 2003). When such institutions are absent, MNEs may prefer to integrate vertically or source inputs from abroad.

[20] Interestingly, high local content requirements exert a deterrent effect on foreign investment by Japanese MNEs. However, Japanese MNEs are more likely than American MNEs to bring their home country suppliers with them when investing in a production plant abroad (Hackett & Srinivasan, 1998).

From a developmental point of view, changes in business culture and practices fostered by MNEs in developing countries are particularly important. As shown by Okada (2004), the introduction by MNEs of performance-based contracts with stringent requirements promoted changes in the patterns of skill development of indigenous suppliers in the Indian automotive industry (Okada, 2004). Duanmu & Fai (2007) emphasise that as technical and managerial techniques are transferred by MNEs to their local suppliers, the business ideology of the suppliers evolves because MNEs need to explain and convince them why those techniques are important.

Case studies help to clarify the evolutionary nature of linkages between MNEs and domestic firms. From their study of the electronics industry in China, Duanmu & Fai (2007) identify three stages of the relationship development: initiation, development and intensification. Transition between them depends fundamentally on the upgrading of domestic suppliers' capabilities and the increase of mutual trust. Moving from the second to the third stage also involves changes in the motivation of FDI – increasingly strategic asset-augmenting instead of solely low-cost labor-seeking – as the local suppliers convert themselves into partners in technology development. A similar evolutionary pattern appears in Giroud (2007), who finds that, as local suppliers' capabilities improve owing to knowledge transfer from MNEs, domestic firms in Malaysia engage in new joint tasks with MNEs, such as joint design of inputs.

Summing up, it can be said that the presence of foreign MNEs potentially affects both the macro and micro structures of host economies, although the materialization of such potential depends on several factors, most of which very context-specific. MNEs' operations generate demand for inputs, skills and capabilities, thus opening up opportunities to the emergence of new backward industries. Similarly, their production can be utilized by domestic actors as inputs in new forward industries. The provision of

direct assistance, as well as the occurrence of (unintentional) knowledge spillovers, may generate productivity gains for domestic firms, thus enhancing their competitiveness and survival odds. The presence of foreign MNEs also induces intra-industry firm selection and market share reallocation (Alfaro & Chen, 2018), giving rise to productivity differentials across industries. The combined effects on the micro (industry-level) structures ultimately affects the macro structure.

3.2 FDI and economic growth

There is a substantial empirical literature on the relationship between inward FDI and GDP growth. Most studies find a positive correlation between these variables, particularly among developing countries. Nonetheless, such an association might not be taken for granted, as it is likely to depend on key characteristics of host countries.

Particularly relevant is Balasubramanyam *et al.*'s (1996) finding that, in the period 1970-1985, FDI contributed to growth only in developing countries that followed an export promotion strategy, while developing countries that persisted with import-substitution strategy did not reap the benefits of FDI in terms of enhanced growth. In outward-oriented economies, economic policy was largely trade-neutral, FDI was driven mainly by factor prices and, thus, fostered economic efficiency. In inward-oriented countries FDI, was motivated by trade barriers. Excessive protection led to x-inefficiencies and misallocation of resources.

Another influential study is Borensztein *et al.* (1998). Their results show a positive correlation between FDI and GDP growth within a sample of developing countries, but the size of the effect is dependent on the availability of human capital in the host economy. This suggests that a country needs adequate absorptive capacity to be able to benefit from the inflow of superior technologies brought along by foreign investors.

Another factor that seems to moderate the effect of FDI on GDP growth is the level of financial development of the host country. Alfaro *et al*. (2004) and Durham (2004) find that a positive association between FDI and economic growth only takes place among countries that have reached a minimum level of financial development. This suggests that potential FDI externalities rarely materialize when local entrepreneurial development is restricted by limited access to credit markets (Alfaro *et al.* 2009)[21].

Some studies analyze whether the institutional environment influences the relationship between FDI and economic growth. Alguacil, Cuadros & Orts (2011) find that the FDI-growth nexus is stronger among a group of low and lower-middle income countries when the Economic Freedom index is lower. They justify their finding on the basis that in these economies the shortage of capital means that FDI is the only option to increase the rate of accumulation. In these countries FDI would be less likely to crowd-out domestic investment. Jude & Levieuge (2017) employ several measures of institutional quality and find a positive association between FDI and GDP growth only for countries above certain thresholds of institutional quality. However, the effect of FDI on growth seems to be independent of the levels of political stability and control of corruption. Harms & Meon (2012) distinguish FDI flows in the form of greenfield projects from mergers and acquisitions (M&As). While greenfield FDI has a positive impact on GDP growth among developing countries, M&As has no effect. They fail to find any moderating role to control of corruption and political rights.

Despite the relevance of the cited studies, a few econometric issues cast doubt on their findings. Blonigen & Wang (2005) question the adequacy of pooling data from advanced and developing economies in the same sample, as done by Alfaro *et al*. (2004) and

[21] According to Javorcik & Spatareanu's (2009) study, credit-constrained domestic firms are hindered from becoming MNE suppliers in Czech Republic.

Durham (2004), among others[22]. Studies have also indicated that the causality between FDI and growth can be mutual (Basu *et al.*, 2003; Li & Liu, 2005; Hansen & Rand, 2006) or even reverse, as found by Basu *et al.* (2003) for a group of relatively closed developing economies. Another problem that is often overlooked, but was pointed out by Choe (2003), is the overwhelming influence of outliers on the results of cross-country growth regressions. Finally, the restrictive structure imposed in most econometric specifications may exert a big influence on the results. Indeed, FDI is found to exert no effect (Carkovic & Levine, 2005) or even to be harmful to growth (Herzer, 2012) when country-specific heterogeneous effects are accounted for. Possibly the most important lesson to be extracted from the extant literature is that the relationship between FDI and growth cannot be captured by a single regression coefficient because it seems to be quite heterogeneous across countries. This is precisely the conclusion of Kottaridi & Stengos (2010, p. 866-7), who after estimating a semi-parametric model, affirm that "it appears that the way FDI affects growth differs across and within countries. The relationship seems to be complex and the impact varies according to a country's level of FDI. (…) parameter heterogeneity may exist in the sense that the effect of a change in a particular variable is not the same. (…) In other words, there exists a different FDI-growth nexus in different countries".

4. A new look on the relationship between FDI and structural change

The empirical literature reviewed in previous section is intended to enhance the understanding of the development effects of FDI, although the issue of structural change is seldom addressed directly. The apparent disinterest on the topic has certainly been influenced by the lack of adequate FDI data at the industry level – or even the sector level

[22] When replicating Borensztein *et al.*'s (1998) study with a sample that includes advanced countries, Blonigen & Wang (2005) fail to find the positive effects of FDI on growth found in the original study that included only developing countries.

– for a relatively lengthy period and for a reasonable number of developing countries. In such a scenario, resorting to aggregate FDI data may be considered an acceptable alternative. The main objective of the empirical exercise presented in this paper is to investigate whether MNE activity can be associated to structural change in developing countries hosting the activities and under what circumstances. More specifically, it examines the potential influence of FDI on the move of the labor force from the traditional sector to the modern sector of the economy.

The literature reviewed in section 2 proposes, on the one hand, that FDI can promote structural change when it conforms to comparative advantages. On the other hand, the older structuralist tradition (*a la* Prebisch) argues that prevailing economic structures are impediments to overcoming underdevelopment. Empirically examining either view is difficult given the data limitations. It would require an FDI database that classifies investments at the individual establishment level according to the main factors of production employed. A specific manufacturing plant can require quite different factors of production depending on the activities that are performed in the country. Upstream activities such as R&D are intensive in skilled labor, while other manufacturing processes are intensive in physical capital, or semi-skilled labor. However, no available databases provide this level of detail, as investments are only distinguished by broad industry classifications. Given the available data, the best that can be done is a sectoral classification distinguishing FDI into the traditional sector, the manufacturing sector and the non-manufacturing modern sector. Thus, the main hypotheses to be tested in the following analysis are whether the development impact of FDI depends on its sectoral concentration and whether this relationship varies according to the stage of development of the country, as suggested by the stages-of-development approaches to FDI, such as Ozawa's (1992) framework and the IDP. In addition, the paper builds on the empirical

literature reviewed in section 3.2 to identify other factors that may help to explain the differences in the FDI-structural change nexus across countries.

4.1. The empirical model

The analysis is undertaken in two steps. In the first step, a panel time-series method is employed to estimate country-specific long-run coefficients relating FDI to employment in the modern sector. In the second step, a set of variables is employed to explain the cross-country differences verified in the first step. This procedure seems preferable to a standard panel data estimation with interaction terms because it is much more in the spirit of the IDP framework, which highlights the idiosyncratic nature of the relationship between the level of MNE activity associated with a country and its level of economic development (Narula, 1996; Narula & Dunning, 2010). Furthermore, empirical studies (Kottaridi & Stengos, 2010; Herzer, 2012) that allow for heterogeneity beyond simple interaction terms have shown that the FDI-growth nexus varies substantially across countries.

Since there is no formal theoretical model explicitly relating the share of employment in the modern sector to MNE activity in a country, an empirical model is specified based on the usual aggregate production function. With the employment share of the modern sector replacing output in the left-hand side, this leads to equation 1:

$$\frac{MODEMP_{it}}{WAP_{it}} = \alpha_i + \delta_i t + \beta_1 \ln\left(\frac{FDI_{it}}{WAP_{it}}\right) + \beta_2 \ln\left(\frac{DK_{it}}{WAP_{it}}\right) + \beta_3 \ln(HC_{it}) + u_{it} \quad \text{(equation 1)}$$

The rationale of the model is the following: in dual economies, economic growth comes from two sources: i) increases in capital/labor ratios and technological progress in the modern sector; ii) labor force movements from the stagnant traditional sector to the modern sector. Even considering that additions to the physical capital and human capital

stocks as well as technological upgrading tend to be labor-saving, it is assumed that the widening of the productivity gap tends to drain factors of production from the traditional to the modern sector, as pointed out by Lewis (1954)[23]. Thus, as pulling factors dominate pushing factors in driving labor out of the traditional sector, it can be assumed that the same factors that determine the aggregate output level are likely to determine the level of employment in the modern sector. However, this association is not automatic. Rapid economic growth can take place with negligible labor movements – this is usually what happens when a developing country discovers large oil reserves[24]. Thus, the way that FDI and other growth determinants affect the employment structure depends on how they affect the demand for labor of the leading industries in the modern sector.

The working age population is used as denominator in calculating the modern sector share in employment (instead of the number of persons employed) because official employment statistics rarely capture the large contingent of subsistence workers in developing countries. The same variable is used to bring the FDI stocks and domestic capital stocks to a "per worker" basis. In respect to human capital, the paper follows the approach proposed by Hall & Jones (1999), in which human capital stock per working age person is an exponential function of average years of schooling, where the function ϕ(s) reflects the efficiency of a unit of labor with *s* years of schooling relative to one with no schooling, and its derivative is the return to schooling estimated in a Mincerian regression.

$$HC_{it} = e^{\phi(s_{it})} \qquad \text{(equation 2)}$$

[23] The historical experience of today's developed countries indeed indicates that, at least in initial development stages, technological advancement in the manufacturing sector drives labor movement out of (traditional) agriculture (Alvarez-Cuadrado & Poschke, 2011).

[24] Employment is used instead of output because it better captures the dual economy nature of developing countries.

The empirical model also includes country-specific constants and time trends (*t*) to reflect country-specific factors not captured by the explanatory variables. Ideally, equation 1 should include some measure of technology because structural change is likely to be affected by technological upgrading. Nonetheless, there is no simple way to measure the technological level of a country, particularly for developing countries where technological upgrading is based much more on imitation rather than on innovation. In microeconomic studies, total factor productivity (TFP) is often used as a measure of technological gap. However, its use in cross-country analysis is even more controversial than in the firm-level context because the residuals of the aggregate production function reflects not only technological level, but allocative and productive efficiency as well as the economic structure of the countries.

4.2 Data

The dataset used in the analysis is comprised by 28 developing countries over the period 1980-2010. Definitions of the variables as well as their respective sources are presented in table 1.

Table 1 - Description of variables and sources

Variables	Description	Source of data
MODEMP	Employment in the modern sector *Number of persons engaged*	Groningen Growth and Development Centre
WAP	Working age population *Number of persons aged 15 to 64*	World Development Indicators
FDI	FDI stock *Data on FDI/GDP is used to estimate FDI stock at PPP*	United Nations Conference on Trade and Development
DK	Domestic physical capital stock *Data on total physical capital stock and on FDI is used to estimate DK at PPP*	Penn World Table 9.0 (total physical capital stock)
HC	Human capital per working age person *Index based on average years of schooling of the WAP and returns to education* *A unit is subtracted from the Penn World Table HC index so that HC=0 when average years of schooling=0*	Penn World Table 9.0
credit/GDP	Financial development *Credit to the private sector/GDP*	World Development Indicators
trade/GDP	Openness to trade *(Exports+imports)/GDP*	World Development Indicators
control of corruption	Control of Corruption *Indicator that ranges from -2.5 to +2.5* *Higher values mean lower perceived corruption*	Worldwide Governance Indicators
FDI manufacturing	Manufacturing ratio in FDI	FDI Markets
FDI non-manufacturing modern sector	Non-manufacturing modern sector ratio in FDI	FDI Markets
FDI traditional sector	Traditional sector ratio in FDI *Data on capital expenditure of projects registered in FDI Markets database is used* *The database covers the period 2003-2010* *For a considerable part of the projects, capital expenditure is estimated by FDI Markets team*	FDI Markets

Given the inadequacy of the data for some key concepts used in the empirical exercise, a few adaptations are needed. First, what constitutes the traditional sector and the modern sector of an economy has to be redefined because the classical structuralist definition (Lewis, 1954) is not reflected in the available statistics, which disaggregate economic activity according to conventional industry-level classification. According to the definition adopted in this paper – which follows closely Lavopa & Szirmai (2014; 2019), who distinguish industries based on a few key characteristics such as their potential for scale economies and technological upgrading – the modern sector comprises all the

economic activity undertaken in mining, manufacturing, utilities, construction, transport, storage and communication, finance, insurance, real estate and business services. In turn, the traditional sector comprises all the economic activity undertaken in agriculture, trade, restaurants and hotels, government services, and community, social and personal services. This redefinition clearly bears some degree of arbitrariness since, for example, highly mechanized export-oriented agriculture exists in developing countries and cannot be labelled traditional in the structuralist sense. However, as the focus of the empirical exercise is on employment, the distortions are less relevant than they would be in the case of output.

For the estimation of equation 1, countries' total physical capital stocks are divided into domestically-owned physical capital and foreign-owned physical capital. Since there is no data on the latter, FDI stocks are used as proxy, while domestic-owned capital stocks are obtained by subtracting FDI stocks from the total physical capital stocks. Using this criterion in a conventional growth regression in which the investment rate belongs to the set of explanatory variables could be problematic because FDI flows do not necessarily translate into capital formation (Farla, Crombrugghe & Verspagen, 2016). The concept of FDI relates to international financial flows and the respective statistics are drawn from the balance of payments, not from national accounts. Part of these financial flows is used to acquire existing assets instead of creating new ones. However, as the explanatory variables of this empirical exercise refer to capital stocks instead of flows, the potential measurement errors are attenuated because even acquired productive assets add to the stock of foreign-owned physical capital.

4.3 Results

The coefficient of interest in equation 1 is β_1. A positive β_1 means that a higher level of FDI/WAP is associated with a higher level of MODEMP/WAP. Thus, if a higher share

of the modern sector in employment is assumed as a welcome structural change (Lavopa & Szirmai, 2014; 2019), a positive β_1 can be interpreted as a signal that FDI contributes to economic development.

As statistical tests suggest that all the variables in equation 1 have a unit root and are cointegrated[25], using conventional panel data estimators is not recommended as they may produce spurious results. Instead, the panel dynamic ordinary least squares (PDOLS) estimator proposed by Pedroni (2001)[26] is used to estimate the long-run (cointegration) relationship of the variables. Table 2 shows the results of the PDOLS estimation of equation 1. The mean-group estimator, which simply averages the individual countries' coefficients, indicates a positive association between FDI and employment structural change across the sample of developing nations. Doubling the FDI/WAP ratio would imply, on average, an increase of half a percentage point in the MODEMP/WAP ratio.

Table 2 - PDOLS estimation of equation 1 - Group mean

variable	coefficient	t-stat
ln (FDI/WAP)	0.00548	8.35
ln (DK/WAP)	0.02574	8.50
ln (HC)	0.05129	1.31

Notes: Data is time-demeaned. DOLS regression includes one lead and one lag differences of the explanatory variables.

Table 3 displays the country-specific β_1's. They indicate the existence of marked differences in the long-run relationship between FDI and employment structure across countries. In some countries, like Colombia, Malaysia and Thailand, the semi-elasticity is quite high – an increase of 17% in FDI/WAP would suffice to increase the long-run

[25] For space reasons, panel unit root tests and panel cointegration tests are not presented here but are available with the authors.

[26] A remarkable advantage of the PDOLS is that it grants more flexibility to account for heterogeneous cointegrating vectors across countries than other estimation techniques that usually impose a unique cointegration vector for every country. In addition, by including lead and lag differences of the regressors, the PDOLS account for serial correlation and endogeneity of the regressors. This feature is important in the present context because, as underlined by the IDP framework, FDI affects economic structure but is also determined by it. However, a disadvantage of the PDOLS estimator is the fact that it assumes cross-sectional independence – what means no correlation between the residuals of different individuals – except for common time effects (time dummies).

MODEMP/WAP ratio in these countries by one percentage point. On the other hand, for half of the sampled countries, the estimated β_1 is negative.

Table 3 - PDOLS estimation of equation 1 - Country-specific β1's

Country	Initial MODEMP/WAP	β_1	t-stat	Country	Initial MODEMP/WAP	β_1	t-stat
Argentina	0.242	-0.02550	-1.32	Malawi	0.061	0.04290	4.27
Bolivia	0.159	0.04513	0.84	Malaysia	0.193	0.06837	9.68
Botswana	0.079	-0.00364	-0.24	Mauritius	0.204	0.04419	16.43
Brazil	0.244	0.03694	3.37	Mexico	0.204	-0.00159	-0.42
Chile	0.182	-0.03775	-1.32	Morocco	0.116	-0.02168	-1.69
China	0.154	-0.00526	-2.15	Nigeria	0.102	0.01661	1.25
Colombia	0.173	0.05969	2.91	Peru	0.136	0.01688	7.49
Costa Rica	0.168	-0.03862	-1.81	Phillipines	0.145	0.01322	1.83
Egypt	0.120	-0.03582	-10.12	Senegal	0.054	-0.02590	-10.42
Ethiopia	0.021	0.00660	1.10	South Africa	0.204	-0.00480	-2.52
Ghana	0.166	-0.03524	-4.40	South Korea	0.210	-0.02021	1.90
India	0.090	0.02389	8.31	Tanzania	0.034	0.01081	1.71
Indonesia	0.105	0.01760	1.89	Thailand	0.110	0.06262	26.60
Kenya	0.057	-0.03214	-3.09	Venezuela	0.207	-0.02379	-2.11
				Group mean		0.00548	8.35

To investigate the causes of such heterogeneity, OLS regressions are estimated, in which country features enter as explanatory variables for the (PDOLS regression) country-specific β_1's (hereafter called BETAs). The choice of variables follows mainly the empirical literature on the FDI-growth nexus and includes financial development (credit to the private sector/GDP), openness to trade ((exports + imports)/GDP), human capital and control of corruption[27]. Considering that the space for marginal increases in the MODEMP/WAP ratio is larger the lower the initial level is, the values observed in 1980 are also included in the OLS regression. To test the hypothesis that the development effects of FDI depends on its sectoral concentration, the shares of manufacturing and non-manufacturing modern sector in total FDI are included.

Whenever possible, the variables are averaged for the whole 1980-2010 period, to better reflect the average conditions faced in the countries. However, in a few cases, assumptions about the variable's behavior over the entire period are needed due to data

[27] The other individual components of the Worldwide Governance Indicators were also tested, with qualitatively similar results, although not always statistically significant. As they are strongly correlated, only the results for the variable control of corruption are presented here.

limitations. In the case of the variable control of corruption, the indicator for 1996 – the first year available for all countries in the sample – is used. For the sectoral concentration of FDI, the procedure adopted is more complex and, certainly, more controversial – for this reason, the results need to be interpreted cautiously. Since several countries of the sample do not have FDI statistics disaggregated by sector covering the period under analysis, the only possible source of this kind of data is *FDI Markets*, a database of global greenfield FDI projects maintained by the Financial Times group. However, this database started only in 2003, what means that it does not cover three quarters of the period analyzed. In the following estimation, it is assumed that the sectoral distribution of FDI among the manufacturing sector, the non-manufacturing modern sector and the traditional sector in the period 1980-2010 was similar to the distribution of greenfield FDI projects among the same sectors in the period 2003-2010. It is also assumed that data on individual projects' capital expenditure is reliable, even though for many projects this indicator is not based on reported information but estimated econometrically by *FDI Markets* based on information about similar projects[28].

Given that there are only 28 observations, a parsimonious model is desirable in order to preserve degrees of freedom. So, initially, a series of estimations is run with each explanatory variable entering individually in the regression. Then, a couple of models is estimated with all the variables entering together, differing from each other only by the FDI variable included. Finally, since the "right" model is unknown, all the possible combinations of explanatory variables are examined and the best-fitted model is selected according to Akaike information criterion (AIC). The results are presented in table 4.

[28] Using the number of projects instead could seem a better alternative since this variable would be less prone to measurement error. However, as the fixed capital per project tends to vary considerably across sectors, this procedure would tend to underestimate the real share of the extractive sector, while overestimating the share of the tertiary sector.

Table 4 - Determinants of the long-run relationship between FDI and employment structure (β1's)

	model 1	model 2	model 3	model 4	model 5	model 6	model 7	model 8	model 9	model 10
constant	0.005	0.013	-0.005	-0.011	0.003	0.005	0.000	-0.031	-0.009	-0.033
	(0.34)	(0.45)	(-0.47)	(-0.87)	(0.47)	(0.31)	(0.00)	(-0.84)	(-0.19)	(-2.15)
initial MODEMP/WAP	0.001							0.103	0.087	
	(0.01)							(0.66)	(0.56)	
HC		-0.004						-0.017	-0.014	
		(-0.27)						(-0.72)	(-0.58)	
credit/GDP			0.027					0.031	0.032	0.036
			(1.26)					(1.18)	(1.22)	(1.55)
trade/GDP				0.034				0.049	0.046	0.039
				(1.45)				(1.74)	(1.64)	(1.58)
control of corruption					-0.010			-0.027	-0.026	-0.024
					(-1.02)			(-2.07)	(-1.92)	(-2.22)
FDI manufacturing						0.001		0.036		
						(0.03)		(0.86)		
FDI non-manufacturing							0.011		-0.023	
modern sector							(0.31)		(-0.53)	
R-squared	0.00	0.00	0.06	0.07	0.04	0.00	0.00	0.28	0.27	0.25
AIC	-108.4	-108.5	-110.1	-110.6	-109.5	-108.4	-108.5	-107.7	-107.1	-112.5

Note: t-statistics in parentheses.

The explanatory power of the simple regressions (1-7) is very low. When other factors are controlled for, openness to trade and financial development seems to strengthen the FDI-structural change nexus, but only the former variable is statistically significant. In turn, the sectoral composition of FDI seems to have little relevance to that relationship[29]. Likewise, the ability of FDI to promote structural change does not seem to be affected by a country's level of human capital. This result, however, should be taken cautiously because the PDOLS regression already included human capital among the regressors and this may have captured most of its effect on structural change. The variable control of corruption appears as significant, with a negative sign. Finally, the initial MODEMP/WAP level does not seem to affect BETAs significantly. According to AIC, the best fitted model contains three explanatory variables: financial development, openness to trade and control of corruption.

[29] When the shares of manufacturing and non-manufacturing modern sector in FDI are aggregated in a single variable, it remains statistically insignificant.

All the models presented in table 4 implicitly assume that the FDI-structural change nexus does not differ substantially at different stages of development. However, the importance of the factors included in the second step of the analysis may change as countries climb the development ladder. Stages-of-development approaches to FDI indeed suggest that the type of investment a country attracts as well as its development effect tend to vary as a country becomes richer. To test this hypothesis, models 3 to 7 are re-estimated, with countries divided into two groups, according to their initial MODEMP/WAP levels (below/above median). The results are presented in table 5.

Table 5 - Determinants of the long-run relationship between FDI and employment structure (β1's) - Testing the homogeneity of coefficients across subsamples

Sample	model 3A credit/ GDP	model 4A trade/ GDP	model 5A control of corruption	model 6A FDI manufacturing	model 7A FDI non-manufacturing modern
initial MODEMP/WAP below median	0.048	0.030	-0.002	0.102	-0.083
	(1.08)	(0.66)	(-0.08)	(2.08)	(-1.65)
initial MODEMP/WAP above median	0.028	0.037	-0.017	-0.078	0.082
	(0.97)	(1.25)	(-1.21)	(-1.77)	(1.86)
F-statistic (equality of coefficients)	0.15	0.02	0.46	7.46	6.06
all countries (Table 4)	*0.027*	*0.034*	*-0.010*	*0.001*	*0.011*
	(1.26)	*(1.45)*	*(-1.02)*	*(0.03)*	*(0.31)*

Notes: t-statistics in parentheses. Coefficients of the group dummies not shown.

In the cases of financial development, openness and control of corruption, the F-statistics cannot reject the hypothesis that both groups of countries have the same coefficient. Nonetheless, for the FDI variables, the differences between the two groups are clear, as demonstrated by the F-statistics. Among countries at initial stages of development, the FDI-structural change nexus is stronger when FDI is more concentrated in the manufacturing sector. In contrast, within the group of countries at more advanced stages of development, a higher concentration of FDI in the non-manufacturing modern sector is conducive to a stronger FDI-structural change nexus.

In view of these findings, new models, that allow for different effects of the FDI concentration variable depending on the development stage of the countries, are

estimated. Table 6 presents the best fitted models according to AIC. Both models 11 and 12 improves the AIC statistic obtained in model 10. The signs of the FDI concentration coefficients do not change and their size and significance are not much impacted by the inclusion of other variables (when compared to models 6 and 7 in table 5). Once again F-statistics reject the equality of the FDI concentration coefficients of the two groups of countries, for both models. A higher concentration of FDI in manufacturing seems to strengthen the FDI-structural change nexus at initial stages of development, but not at more advanced development stages. The opposite seems to occur when the FDI is more concentrated in non-manufacturing modern sector. Controlling for the share of FDI in the traditional sector, in model 13, does not fundamentally change the results. In comparison to model 10, the inclusion of the FDI concentration variables increases the size and the statistical significance of the financial development coefficient but has the opposite effect on the openness coefficient.

Table 6 - Determinants of the long-run relationship between FDI and employment structure (β1's)

	model 11	model 12	model 13
constant	-0.006	-0.075	0.003
	(-0.25)	(-2.73)	(0.09)
dummy initial MODEMP/WAP below median	-0.078	0.095	-0.073
	(-3.15)	(2.81)	(-2.27)
credit/GDP	0.050	0.048	0.051
	(2.34)	(2.14)	(2.33)
trade/GDP	0.033	0.035	0.032
	(1.53)	(1.54)	(1.42)
control of corruption	-0.025	-0.021	-0.022
	(-2.43)	(-1.79)	(-1.79)
FDI manufacturing			
initial MODEMP/WAP below median	0.126		0.116
	(2.97)		(2.55)
initial MODEMP/WAP above median	-0.072		-0.080
	(-1.73)		(-1.75)
FDI non-manufacturing modern sector			
initial MODEMP/WAP below median		-0.102	
		(-2.24)	
initial MODEMP/WAP above median		0.079	
		(1.69)	
FDI traditional sector			
initial MODEMP/WAP below median			-0.085
			(-0.72)
initial MODEMP/WAP above median			-0.057
			(-0.40)
F-statistic (equality of FDI coefficients)	12.26	9.11	2.91
p-value	0.00	0.01	0.03
R-squared	0.54	0.48	0.55
AIC	-119.8	-116.7	-116.8

Notes: t-statistics in parentheses. When FDI in the traditional sector is included (as in model 13), models 11 and 12 are econometrically equivalent.

The fact that the cross-country growth literature is plagued by outlier-driven results is well-known[30]. Since the empirical model used here is inspired by the aggregate production function, there is a considerable risk that the results obtained are driven by outliers. To check this possibility, a sensitivity analysis is performed on models 11 and 12. One-by-one, each country observation is excluded and the models re-estimated with the remaining countries. It should be underlined, however, that this sensitivity analysis is merely illustrative because the exclusion of any alleged outlier from the OLS regression would imply its exclusion from the PDOLS regression as well, a procedure that would

[30] For example, the estimated effect of a bunch of macroeconomic variables such as inflation, openness and government consumption on growth is demonstrated by Easterly (2005) to be driven by outliers, usually a few countries with extremely bad policies and negative growth.

affect the BETAs used as dependent variables in the OLS regression. The results are presented in tables 7 and 8.

For the FDI concentration variables, it must be underlined, first, that the equality of coefficients between the two groups of countries is always rejected. Among the countries at initial stages of development, Nigeria is the only country that seems to affect the coefficients of FDI concentration substantially. Its inclusion in the sample weakens the effect. Therefore, the positive association between FDI in manufacturing and BETAs within this group does not seem to be driven by outliers. In the other group, Colombia is very influential. When this country is excluded from the sample, the FDI concentration variable becomes insignificant for the countries at higher development stage in both models. However, the influence of Colombia is counterbalanced by Brazil and Malaysia, in model 11, and Brazil and Mexico, in model 12.

It seems clear that the effect of openness on BETA is strongly affected by the inclusion of Malaysia in the sample. When this country is excluded, the coefficient drops to almost zero. Although Brazil and Colombia affect the coefficient in the opposite direction, even their combined effect is insufficient to counterbalance the effect of Malaysia. Thus, the actual effect of openness on BETA is likely to be smaller than the one estimated with the full sample.

In the case of financial development, there seems to be two outliers affecting the results, pushing into opposite directions. The inclusion of China lowers the coefficient while the inclusion of Ghana increases it. However, the coefficient of financial development is always positive and remains significantly different from zero in almost all the cases reported in tables 7 and 8.

The control of corruption coefficient seems to be less affected by individual countries, except for Venezuela. When this country is excluded from the sample, the coefficient becomes more negative.

Table 7 - Sensitivity analysis of model 11 to the presence of outliers

Country excluded	Variable										Test of the equality of FDI coefficients		R-squared
	Credit/GDP		Trade/GDP		Control of Corruption		FDI manufacturing initial MODEMP/WAP below median		FDI manufacturing initial MODEMP/WAP above median		F-statistic	p-value	
Argentina	0.048	(2.21)	0.031	(1.37)	-0.025	(-2.32)	0.126	(2.91)	-0.074	(-1.75)	12.00	0.00	0.53
Bolivia	0.049	(2.28)	0.034	(1.54)	-0.023	(-2.18)	0.124	(2.89)	-0.067	(-1.58)	10.91	0.00	0.52
Botswana	0.050	(2.13)	0.033	(1.41)	-0.025	(-2.14)	0.126	(2.89)	-0.072	(-1.69)	11.57	0.00	0.53
Brazil	0.053	(2.89)	**0.046**	(2.41)	-0.025	(-2.87)	0.125	(3.46)	**-0.096**	(-2.65)	20.57	0.00	0.67
Chile	0.050	(2.29)	0.034	(1.49)	-0.026	(-2.12)	0.127	(2.88)	-0.073	(-1.70)	11.40	0.00	0.50
China	**0.060**	(2.61)	0.029	(1.32)	-0.028	(-2.64)	0.129	(3.05)	-0.066	(-1.60)	12.03	0.00	0.56
Colombia	0.045	(2.23)	**0.043**	(2.01)	-0.026	(-2.66)	0.127	(3.14)	**-0.033**	(-0.72)	7.62	0.01	0.55
Costa Rica	0.044	(1.96)	0.035	(1.60)	-0.023	(-2.08)	0.123	(2.87)	-0.072	(-1.73)	11.77	0.00	0.52
Egypt	0.052	(2.38)	0.031	(1.38)	-0.024	(-2.29)	0.114	(2.45)	-0.074	(-1.77)	10.19	0.00	0.52
Ethiopia	0.050	(2.29)	0.034	(1.53)	-0.025	(-2.34)	0.127	(2.92)	-0.072	(-1.71)	11.84	0.00	0.54
Ghana	**0.039**	(1.77)	0.039	(1.82)	-0.027	(-2.62)	0.128	(3.08)	-0.066	(-1.62)	12.27	0.00	0.55
India	0.049	(2.30)	0.036	(1.55)	-0.025	(-2.40)	0.122	(2.74)	-0.071	(-1.67)	10.66	0.00	0.53
Indonesia	0.050	(2.29)	0.033	(1.50)	-0.026	(-2.38)	0.127	(2.91)	-0.071	(-1.68)	11.76	0.00	0.54
Kenya	0.050	(2.45)	0.035	(1.67)	-0.029	(-2.83)	0.117	(2.84)	-0.066	(-1.66)	11.12	0.00	0.57
Malawi	0.052	(2.36)	0.032	(1.43)	-0.025	(-2.35)	0.113	(2.28)	-0.074	(-1.75)	9.37	0.01	0.52
Malaysia	0.044	(2.10)	**0.003**	(0.09)	-0.020	(-1.89)	0.122	(2.97)	**-0.090**	(-2.15)	14.57	0.00	0.52
Mauritius	0.050	(2.27)	0.033	(1.45)	-0.025	(-2.35)	0.126	(2.90)	-0.069	(-1.29)	8.94	0.01	0.51
Mexico	0.055	(2.39)	0.031	(1.40)	-0.023	(-2.11)	0.124	(2.86)	-0.086	(-1.81)	12.14	0.00	0.54
Morocco	0.050	(2.28)	0.034	(1.50)	-0.026	(-2.33)	0.128	(2.75)	-0.071	(-1.67)	11.37	0.00	0.52
Nigeria	0.056	(2.70)	**0.022**	(1.04)	-0.021	(-2.08)	**0.169**	(3.59)	-0.082	(-2.05)	16.65	0.00	0.60
Peru	0.050	(2.28)	0.033	(1.46)	-0.025	(-2.38)	0.129	(2.79)	-0.072	(-1.69)	11.26	0.00	0.53
Phillipines	0.050	(2.28)	0.034	(1.53)	-0.025	(-2.39)	0.128	(2.92)	-0.072	(-1.69)	11.84	0.00	0.54
Senegal	0.049	(2.27)	0.033	(1.48)	-0.024	(-2.27)	0.122	(2.76)	-0.073	(-1.72)	11.26	0.00	0.52
South Africa	0.055	(2.27)	0.029	(1.24)	-0.024	(-2.18)	0.124	(2.87)	-0.075	(-1.76)	11.98	0.00	0.54
South Korea	0.051	(2.33)	0.034	(1.52)	-0.025	(-2.41)	0.126	(2.92)	-0.064	(-1.45)	10.41	0.00	0.53
Tanzania	0.051	(2.34)	0.034	(1.53)	-0.025	(-2.37)	0.126	(2.91)	-0.073	(-1.73)	11.95	0.00	0.54
Thailand	0.048	(1.91)	0.033	(1.48)	-0.025	(-2.31)	0.125	(2.79)	-0.071	(1.67)	10.70	0.00	0.48
Venezuela	0.047	(2.37)	0.036	(1.79)	**-0.031**	(-3.07)	0.132	(3.34)	-0.074	(-1.91)	15.24	0.00	0.60
None	0.050	(2.34)	0.033	(1.53)	-0.025	(-2.43)	0.126	(2.97)	-0.072	(-1.73)	12.26	0.00	0.54

Notes: t-statistics in parentheses. Changes in coefficient higher than 20 percent are highlighed in bold.

Table 8 - Sensitivity analysis of model 12 to the presence of outliers

Country excluded	Variable										Test of the equality of FDI coefficients		R-squared
	Credit/GDP		Trade/GDP		Control of Corruption		FDI non-manufacturing modern sector initial MODEMP/WAP below median		FDI non-manufacturing modern sector initial MODEMP/WAP above median		F-statistic	p-value	
Argentina	0.047	(2.02)	0.033	(1.39)	-0.020	(-1.69)	-0.102	(-2.19)	0.081	(1.69)	8.89	0.01	0.47
Bolivia	0.047	(2.05)	0.036	(1.54)	-0.020	(-1.67)	-0.101	(-2.18)	0.071	(1.45)	7.53	0.01	0.46
Botswana	0.049	(2.01)	0.034	(1.39)	-0.022	(-1.59)	-0.103	(-2.19)	0.078	(1.60)	8.55	0.01	0.48
Brazil	0.051	(2.58)	**0.048**	(2.34)	-0.020	(-1.98)	-0.101	(-2.54)	**0.103**	(2.48)	14.79	0.00	0.61
Chile	0.048	(2.09)	0.035	(1.45)	-0.021	(-1.52)	-0.102	(-2.16)	0.079	(1.65)	8.41	0.01	0.44
China	0.057	(2.35)	0.031	(1.34)	-0.024	(-1.96)	-0.105	(-2.29)	0.073	(1.54)	8.64	0.01	0.50
Colombia	0.043	(1.96)	**0.045**	(1.96)	-0.024	(-2.12)	-0.107	(-2.42)	**0.031**	(0.58)	4.64	0.04	0.49
Costa Rica	0.043	(1.78)	0.037	(1.59)	-0.019	(-1.57)	-0.101	(-2.17)	0.076	(1.61)	8.34	0.01	0.45
Egypt	0.051	(2.20)	0.032	(1.35)	-0.019	(-1.61)	-0.085	(-1.64)	0.083	(1.75)	7.07	0.02	0.46
Ethiopia	0.048	(2.12)	0.037	(1.59)	-0.020	(-1.71)	-0.107	(-2.29)	0.081	(1.70)	9.27	0.01	0.49
Ghana	**0.037**	(1.61)	0.041	(1.82)	-0.022	(-1.95)	-0.105	(-2.36)	0.076	(1.67)	9.54	0.01	0.50
India	0.047	(2.03)	0.039	(1.64)	-0.022	(-1.81)	-0.098	(-2.09)	0.077	(1.63)	8.08	0.01	0.49
Indonesia	0.048	(2.09)	0.035	(1.50)	-0.021	(-1.73)	-0.103	(-2.18)	0.079	(1.64)	8.69	0.01	0.48
Kenya	0.048	(2.24)	0.037	(1.70)	-0.026	(-2.24)	-0.098	(-2.25)	0.069	(1.53)	8.29	0.01	0.52
Malawi	0.053	(2.28)	0.033	(1.41)	-0.020	(-1.72)	-0.082	(1.63)	0.083	(1.77)	7.00	0.02	0.48
Malaysia	0.043	(1.88)	**0.011**	(0.35)	-0.017	(-1.37)	-0.098	(-2.17)	0.089	(1.90)	9.87	0.01	0.44
Mauritius	0.048	(2.10)	0.033	(1.36)	-0.022	(-1.79)	-0.103	(-2.21)	0.071	(1.37)	7.43	0.01	0.46
Mexico	0.054	(2.24)	0.033	(1.39)	-0.017	(-1.36)	-0.098	(-2.10)	**0.100**	(1.82)	9.38	0.01	0.49
Morocco	0.049	(2.14)	0.033	(1.42)	-0.019	(-1.60)	-0.098	(-2.09)	0.082	(1.73)	8.74	0.01	0.48
Nigeria	0.055	(2.58)	0.023	(1.01)	-0.016	(-1.42)	**-0.172**	(-3.14)	0.092	(2.09)	14.46	0.00	0.57
Peru	0.048	(2.09)	0.036	(1.51)	-0.021	(-1.74)	-0.100	(-2.06)	0.079	(1.65)	8.16	0.01	0.48
Phillipines	0.048	(2.09)	0.037	(1.57)	-0.022	(-1.80)	-0.110	(-2.27)	0.078	(1.64)	9.13	0.01	0.49
Senegal	0.047	(2.09)	0.035	(1.49)	-0.019	(-1.61)	-0.098	(-2.11)	0.082	(1.73)	8.76	0.01	0.48
South Africa	0.053	(2.06)	0.032	(1.27)	-0.020	(-1.58)	-0.100	(-2.14)	0.082	(1.70)	8.82	0.01	0.48
South Korea	0.049	(2.12)	0.036	(1.52)	-0.022	(-1.79)	-0.103	(-2.21)	0.071	(1.40)	7.53	0.01	0.47
Tanzania	0.049	(2.10)	0.035	(1.51)	-0.021	(-1.72)	-0.101	(-2.13)	0.080	(1.67)	8.61	0.01	0.48
Thailand	0.045	(1.69)	0.035	(1.47)	-0.021	(-1.69)	-0.100	(-2.09)	0.077	(1.61)	7.82	0.01	0.41
Venezuela	0.046	(2.22)	0.038	(1.78)	**-0.026**	(-2.33)	-0.108	(-2.56)	0.090	(2.06)	12.43	0.00	0.56
None	0.048	(2.14)	0.035	(1.54)	-0.021	(-1.79)	-0.102	(-2.24)	0.079	(1.69)	9.11	0.01	0.48

Notes: t-statistics in parentheses. Changes in coefficient higher than 20 percent are highlighed in bold.

4.4 Discussion

The findings confirm that the development effects of FDI are highly country-specific (as in Kottaridi & Stengos (2010) and Herzer (2012)), thus justifying the choice for the two-step approach. Such heterogeneity seems to be associated with the stage of development of the countries and the type of FDI they receive, as suggested by the stages-of-development approaches to FDI such as the IDP and Ozawa's (1992). At initial development stages, the effects of FDI on the employment structure are larger when FDI is more concentrated in the manufacturing sector. At later development stages, the effects are larger when FDI is more concentrated in the non-manufacturing modern sector. This

occurs because the development effects of FDI projects are affected by the endowments and capabilities a country has, which in turn are associated with its development stage. Although the data only allows a very rough classification of FDI projects, it can be said that FDI is more likely to promote structural change when there is a certain alignment of the type of FDI to the stage of development of the country.

The extent to which openness favors a higher effect of FDI on structural change is quite uncertain. Although the main results suggest a positive effect, sensitivity analysis shows that they are considerably affected by one outlier. When Malaysia is excluded from the sample, the effect of openness disappears. However, this result is not surprising. Indeed, Balasubramanyam *et al.*'s (1996) early finding that FDI promoted growth in outward-oriented countries but not in inward-oriented countries in the period 1970-1985 have not been confirmed by studies that used more recent data such as Carkovic & Levine (2005) and Herzer (2012), which find no moderating role for trade openness in the FDI-growth relationship.

The theoretical argument that the materialization of the potential indirect effects of FDI depends on the level of development of the local financial market is corroborated by the empirical analysis. Indeed, the FDI-structural change nexus seems to be stronger the higher the financial development of the country. This result, which is shown to be robust to outliers, corroborates Alfaro *et al.* (2004) and Durham (2004).

Finally, the finding that the FDI-structural change nexus is stronger where the control of corruption is lower may seem quite odd at first sight as it could suggest that corruption is good for development. However, this conclusion needs to be refined. Studies using both firm-level (Javorcik & Wei, 2009) as well as country-level (Habib & Zurawicki, 2002; Hakkala, Norback & Svaleryd, 2008) data indicate that corruption has a detrimental effect on inward FDI. Thus, a possible interpretation for this unexpected finding is that

higher levels of corruption may discourage FDI but, once it has taken place, the returns tend to be higher in less business-friendly environments because the risk of crowding out domestic investment is lower. Indeed, this resembles the justification put forth by Alguacil, Cuadros & Orts (2011)[31].

5. Conclusions

In 1988, John Dunning, a pioneer in the field of international business studies, wrote that:

> *One of the lacunae in the literature on international business is a dynamic approach to its role in economic development. What we believe is needed is a reinterpretation of W. W. Rostow's model of the economic growth process – first presented in the late 1950s (Rostow, 1959) – and an extension of Hollis Chenery's analysis of transitional growth and world industrialization (Chenery, 1977, 1979) explicitly to incorporate the various modalities of international economic involvement* (Dunning, 1988).

Since then, important contributions were made in several directions. In the theoretical/conceptual area, endogenous growth models made way for differentiating the development impact of foreign investment *vis-à-vis* domestic investment. Ozawa (1992) incorporated FDI into a stages approach to the process of development. The IDP framework, first proposed by Dunning in 1981, was refined in a series of contributions (Dunning & Narula, 1996; Narula, 1996; Narula & Dunning, 2010) which described the complex evolving relationship between MNE activity and economic structure.

Considerably less progress was observed within the literature concerned specifically with structural change in terms of incorporating MNEs and FDI in a meaningful way.

[31] It is also worth to cite a study done by D'Amelio, Garrone & Piscitello (2016), which finds that (aggregate) FDI promotes access to electricity in Sub-Saharan Africa and the effects seems to be stronger where the institutions are weaker.

Recent contributions such as Lin (2010) still devote a secondary role to MNEs in structural change. In such a scenario, it is not surprising that empirical studies on FDI and structural change are almost non-existent. For this reason, one of the objectives of this paper was to review the extant literature on related issues regarding FDI and development as to provide insights to a more direct treatment of the question.

The emergence of new comprehensive datasets in the last three decades enabled researchers to put many hypotheses about the development effects of FDI under scrutiny. Old ideas about MNE linkages and spillovers were tested using firm-level data. Comparable macroeconomic data enabled investigations of the FDI-growth nexus in a cross-country perspective. The main message of both streams of literature is that FDI has the potential to catalyse development, but actual outcomes are contingent on several factors, such as the absorptive capacity of domestic firms and the level of development of local financial markets.

This paper adds to the empirical literature by providing a more direct assessment of the relationship between FDI and structural change. The main hypotheses tested were whether the development impact of FDI depends on its sectoral concentration and whether this relationship varies according to the stage of development of the country. An unconventional two-stages econometric approach was adopted in order to better reflect both the theoretical proposition (IDP) and the empirical finding that the FDI-growth nexus is highly country-specific. In the first stage, long-run coefficients relating FDI to the employment structure were estimated for each country using a panel-times series method (PDOLS). In the second stage, a set of variables (some of which borrowed from the empirical literature on FDI and growth) were employed to explain the cross-country differences in the FDI-structural change nexus.

The results indicate that the FDI-structural change nexus is quite heterogeneous across countries. FDI is shown to be positively associated with increases in the modern sector's share in employment in some countries but negatively associated in others. The second stage indicates that the degree of matching between the stage of development of a country and the type of FDI it receives affects the capacity of FDI to promote structural change, a finding that is consistent with stages-of-development approaches to FDI. At initial stages of development, a higher concentration of FDI in manufacturing strengthens the FDI-structural change nexus. At later stages of development, a higher concentration of FDI in the non-manufacturing modern sector is more strongly associated with structural change. This finding suggests that there are crucial differences in the ability of countries to provide the capabilities required in these broadly defined sectors. In addition, cross-country differences in the FDI-structural change nexus are associated with the financial development and the (lack of) control of corruption of the countries, but no evidence is found for a relationship with trade openness.

Although FDI is generally welcomed by developing countries, governments should consider, when formulating their policies to attract MNE activity – which are often synonyms to subsidies – that the extent to which FDI promotes structural change will depend on the alignment between the type of investments a country receives and its stage of development. Some activities may require capabilities that are in short supply in developing countries, thus reducing the effects of the MNE presence. Initiatives that contribute to expand and deepen local financial markets may increase the potential development effects of FDI. Even though FDI is not a *sine-qua-non* for development, it seems to be particularly relevant for developing countries with poor business environments. Higher concessions to foreign investors may be justified in this context given the lower risk of crowding out domestic investment.

The study has some important limitations. The estimations are not underpinned by a formal theoretical model – instead the empirical specification was borrowed from the economic growth literature. The full set of variables belonging to the theoretical and empirical models remains unknown. There are also data-related issues, in particular the lack of accuracy of the FDI concentration variables and the small sample that could be used in the analysis. Substantial efforts to improve FDI data, making it comparable across countries at more disaggregated levels, are essential to advance the research agenda on FDI and structural change in developing countries.

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