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CHANGES IN PATTERNS OF TERRITORIAL DISTRIBUTION OF FOREIGN DIRECT INVESTMENT IN LATIN AMERICAN AND CARIBBEAN REGION

Zmiany w sposobie rozmieszczenia terytorialnego bezpośrednich inwestycji zagranicznych w Ameryce Łacińskiej i regionie Karaibów

Abstract: The aim of this paper is to categorize Latin American and Caribbean countries into broader groups according to the similarities and dissimilarities between them in terms of the level (attractiveness) and determinants of FDI inflows, with regard to the two different periods. In terms of methodology, we employ agglomerative hierarchical clustering technique. The results of cluster analysis indicate that during the decade ending in 2019 there was a change in the attractiveness for FDI at the country level. In 2012, the best-performing clusters in terms of FDI inward flows as a percentage of GDP consisted of Latin American economies with the highest levels of development – Costa Rica, Uruguay, Brazil, Argentina and Chile. These countries exhibited good results in stock of infrastructure, level of human capital and all institutional and political variables, regardless of variables such as natural resource endowments or labour costs. This suggests that the motives of FDI inflows in more advanced Latin American countries were relatively diversified. In 2019, the cluster consisting of Honduras, Nicaragua, El Salvador, Guatemala, the Dominican Republic and Mexico became the most attractive in terms of average FDI inflows as a percentage of GDP. This cluster performs better in locational determinants peculiar to the efficiency-seeking motive of FDI, such as low labour costs, low total tax and contribution rate and high degree of trade openness.

Key words: cluster analysis, foreign direct investment, Latin America and the Caribbean, motives for FDI

INTRODUCTION

Foreign direct investment (FDI), as an essential component of international capital flows, has become a major source of external development finance in many economies, especially developing countries. In general terms, FDI is expected to bring many advantages to recipient countries, such as providing capital for domestic investment, transfer of technology, knowledge and management skills, access to new markets, generating additional tax revenues and it may also improve a host country's balance of payments (O'Brien, Williams 2016). Foreign direct investment also plays an important role in terms of Latin American and Caribbean economies. Over a longer period of time,

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net FDI inflows exceed net personal remittances, which exceed net official development assistance received (World Bank 2020). According to Latin American Economic Outlook (OECD et al. 2019), current account deficits of Latin American and Caribbean countries, with few exceptions especially in Central America and the Caribbean, are mainly financed by FDI. Therefore, foreign investment constitutes the predominant source of foreign capital flows into Latin America.

There has been a vast increase in the amount of FDI inflows in Latin American and Caribbean (LAC) region over the past three decades due to several global- as well as country-specific factors. Latin American and Caribbean countries have experienced strong FDI inflows since the 1990s after the implementation of market-based neoliberal policies. Since then, the motives of FDI and the patterns of its distribution have become even more diverse. Currently, multinational corporations seek natural and labour resources, access to growing markets and greater efficiency in Latin America and the Caribbean. In accordance with existing literature, there are many significant determinants of FDI inflows to Latin America and the Caribbean, including geographical location (proximity to the US), natural resource endowments, market size and its growth potential, stock of infrastructure, skilled but cheap labour, trade openness, macroeconomic and political stability, and many other factors (see for example Dal Bianco, Nguyen 2017, Williams 2015, Montero 2008, Nunes et al. 2006).

Most of existing empirical literature focuses on the determinants of FDI inflows to LAC region and their statistical significance, regardless of the territorial distribution of foreign investment in that region. R. Forte and N. Santos (2015) analyse the regional distribution of FDI flows in Latin America between 2005 and 2011. However, all this literature dates prior to the end of the commodity price boom in 2012, when FDI inflows to Latin America reached their peak. Since then, FDI inflows have declined significantly. Therefore, this paper attempts to contribute to the literature on FDI in LAC region from at least two perspectives – it compares the distribution of FDI at the country level during and after the commodity price boom, and it uses more recent data on foreign investment inflows in Latin America. In addition to that, the present paper seeks to find the regional specifics of recent FDI inflows to Latin America and the Caribbean based on the host countries attractiveness for FDI and main determinants found in empirical literature devoted to this issue.

In this context, the aim of this paper is to categorize the region's countries into broader groups according to the similarities and dissimilarities between them in terms of the level as well as locational determinants of FDI inflows. Taking into consideration the fact that FDI inflows at the country level are heterogeneous and FDI inward stock is highly concentrated in the region's largest economies, we use the ratio of FDI inflows to GDP, as it is expected that larger economies attract more FDI. To classify Latin American and Caribbean economies into relatively homogeneous groups, we employ agglomerative hierarchical clustering technique. Subsequently, we analyse the developments within and among the groups of countries (clusters), with respect to the two distinct periods – before and after the end of the commodity price boom in 2012.

The remainder of this paper is organized as follows. Section 2 presents an overview of FDI flows into Latin America and the Caribbean and their main characteristics. In Section 3, we deal with literature review on locational determinants of FDI inflows to Latin American and Caribbean region with regard to the different motives and strategies of foreign investment activities in that region. The purpose of this section is to identify the principal variables behind FDI inflows. Section 4 presents methodology and the data. Subsequently, Section 5 includes the empirical results. Section 6 concludes the present paper with the main findings.

OVERVIEW OF FDI FLOWS INTO LATIN AMERICA AND THE CARIBBEAN

The flows of foreign direct investment (FDI) into Latin American and Caribbean countries do not constitute a new phenomenon. In the early post-independence period, the stock of domestic capital in Latin American and Caribbean (LAC) region was critical. However, between 1870 and 1914 the

region experienced high economic growth as a consequence of favourable internal developments as well as favourable external environment. FDI, especially from the United Kingdom and later from the United States, augmented domestic investment and became an important external factor of the region's economic growth (Reyes, Sawyer 2020). From the 1930s, the region's economies started to implement state-led import substitution industrialization strategy, in which the participation of FDI was limited in many areas of the economy. P. Kingstone (2018, p. 50) argues that multinational corporations were invited back into Latin America in the next stage of industrial development, starting in the 1950s, which required higher levels of technology, know-how and higher capital investments. Nonetheless, restrictions for FDI persisted in some sectors (i.e., natural resource and infrastructure sectors), where the state-owned enterprises usually had a monopoly position. In this period, inward FDI was mostly motivated by overcoming high tariffs and quotas imposed by Latin American countries and gaining the access to growing domestic markets, such as Argentina, Brazil and Mexico (the ABM countries). This is commonly referred to as tariff-jumping strategy of FDI.

From the late 1970s until the early 1990s, the flows of FDI into LAC region were substantially low due to the turmoil in global economy, poor economic performance and political instability in Latin America (Reyes, Sawyer 2020). Latin American debt crisis of the early 1980s represented a turning point in adoption of a new development paradigm by moving away from import substitution industrialization to neoliberalism. The removal of barriers to foreign capital inflows, privatization of state-owned companies and other neoliberal policies, together with economic and political stabilization in the region have allowed to attract more FDI. According to ECLAC (1998), trade and financial liberalization and economic deregulation led to new strategies pursued by foreign investors in LAC region in the 1990s, such as the search for raw materials (e.g., minerals in Chile), the access to national and subregional markets, the access to domestic markets for services, and search for greater efficiency through internationally integrated production systems (e.g., automotive industry in Mexico). Therefore, the motives of FDI inflows to LAC region have become more diverse.

Available data reveals that FDI has become more important source of capital inflows in Latin American and Caribbean countries during the 1990s. Figure 1 reports that FDI inward stock in Latin America and the Caribbean more than tripled between 1990 and 1999. In 1990, FDI as a percentage of Latin American and Caribbean GDP was less than 0.8 percent. At the peak, in 1999, the share of FDI in the region's GDP accounted for more than 4.5 percent (World Bank 2020). According to ECLAC (1998), the chief mechanism for attracting FDI in the first half of the 1990s was privatization of state-owned assets. Privatization of state-owned enterprises also continued in the second half of the 1990s. However, private capital flows into LAC region decreased considerably during a "lost half-decade" of 1998–2002 (Reid 2017, p. 147). This was induced by external factors, such as Asian and Russian crisis and later dotcom crash, and the economic recession in some Latin American economies, such as Argentina and Brazil.

The period from 2003 to 2012, except for the 2008–09 global financial crisis, was a golden decade for Latin American economies accompanied by considerably high FDI inflows (see Fig. 1). After the collapse of Lehman Brothers, capital flows dropped, but they soon regained increasing trend. Moreover, the levels of inward FDI in 2010 exceeded the amounts of inward FDI before the crisis, as can be seen in Figure 1. Since the production and export of natural resources and agricultural commodities have always been an important part of Latin American economies, the sharp and sustained rise in world commodity prices in the period of 2003–2012 resulted in high region's economic growth and strong foreign investment influx (Reid 2017, p. 3). Therefore, high international prices for raw materials spurred investments in natural resource extraction and processing, especially in South American sub-region (ECLAC 2012). J.A. Ocampo (2017) asserts that the commodity price boom initiated in 2003 and lasted for about a decade led to a "re-primarization" of some economies in the region, including the structure of their exportation as well as the predominant target sector of inward FDI. On the other hand, this led to a weakening of manufacturing sectors in several Latin American economies. The sectoral re-composition of inward FDI flows towards manufacturing and services was launched

after the end of the commodity price boom (ECLAC 2019, p. 31). Recently, services and manufacturing sectors are the major target sectors for foreign capital.

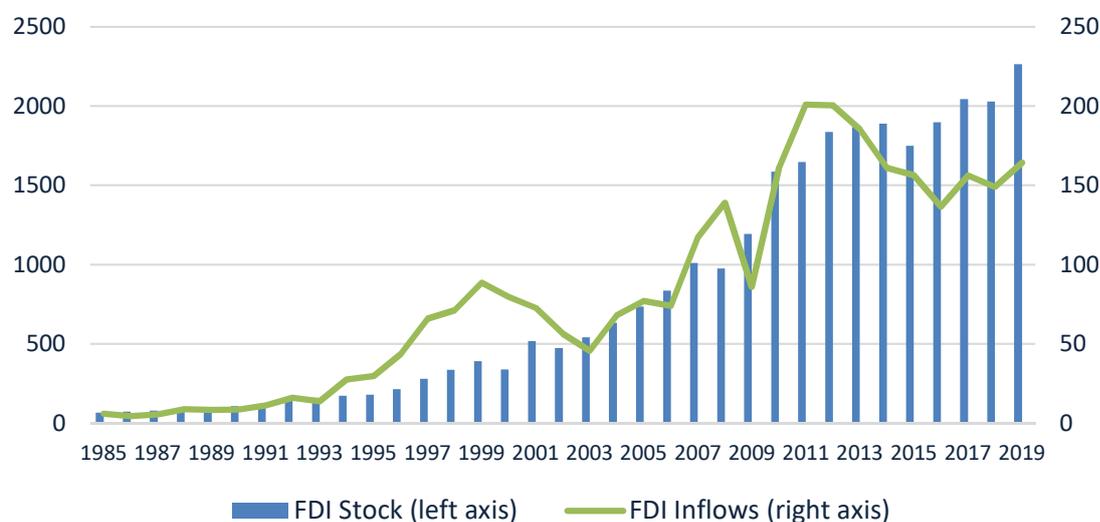


Fig. 1. Inward FDI stock and FDI inflows in Latin America and the Caribbean between 1985 and 2019, expressed in billions of US\$ at current prices
Source: Authors' own elaboration, using UNCTAD data

Ryc. 1. Wartość oraz napływ BIZ w Ameryce Łacińskiej i na Karaibach w latach 1985–2019 wyrażone w miliardach USD w cenach bieżących
Źródło: opracowanie własne na podstawie danych UNCTAD

Figure 1 depicts that FDI inflows towards Latin America and the Caribbean were sharply decreasing between 2012 and 2016. The main explanation consists in low commodity prices after the end of the commodity price boom, which translated into lower investment in extractive and natural resource industries. In general terms, the flows of FDI are also affected by the global business cycle, economic conditions as well as performance of the largest investors in the region. The predominant sources of FDI in LAC region are concentrated in the United States and the European Union. The US investments prevail in Mexico and Central America, while the European investments have a strong position in South America, mainly in the Southern Cone countries (ECLAC 2019, p. 40). In accordance with Figure 1, FDI flows to Latin American countries decreased in 2018 due to trade disputes, geopolitical tensions and the 2017 US tax reform that prompted US parent companies to repatriate large amounts of earnings held with foreign affiliates (OECD 2019). Therefore, FDI inflows to Latin American and Caribbean region have become volatile and heavily dependent on external environment given by the world commodity price cycles, international uncertainty, global economic developments and economic performance in the major source countries.

One of the most evident trends associated with FDI in Latin America and the Caribbean is the strong territorial concentration of foreign investment. In accordance with Figure 2, countries with the largest FDI stock (the accumulated value of past FDI flows) within LAC region are Brazil, Mexico, Chile, Colombia, Peru and Argentina. These six economies accounted for roughly 85% of Latin American and Caribbean FDI inward stock in 2019 (UNCTAD 2020). This implies that most of FDI is located in the region's largest economies. Brazil with FDI inward stock of 641 billion US\$ accounted for about 28% of the total Latin American and Caribbean stock of FDI, while Mexico with FDI inward stock of 628 billion US\$ accounted for more than 27% of all FDI accumulated in LAC region in 2019 (UNCTAD 2020). Brazil and Mexico, as the two most important markets for FDI, have more diversified export structures than other LAC countries, large and expanding domestic markets, they are endowed with abundant natural resources and they are part of trade agreements at

the regional level (USMCA in Mexico, MERCOSUR in Brazil). This allows them to attract FDI into natural-resource and agricultural sectors, manufacturing industries as well as services. However, the patterns of FDI flows into these two countries differ slightly. P.G. Castro et al. (2013) find that the market-seeking motive for FDI prevails in Brazil, while the efficiency-seeking motive seems to be the dominant strategy of multinational corporations in Mexico.

From a sub-regional perspective, Panama and Costa Rica represent the two main recipients of FDI in Central America (Figure 2). However, the motives and sectors of foreign investment in these two economies are distinguishable. In Costa Rica, the majority of FDI is directed to manufacturing sector, including production of more sophisticated goods, services and infrastructure sector, while in Panama, most FDI goes to financial services, including the country's role as an offshore financial centre, logistics sector and transportation (ECLAC 2018). Within the Caribbean sub-region, the Dominican Republic is the largest recipient of FDI which concentrated 60% of all FDI in the sub-region in 2019, excluding the offshore financial centres (see Fig. 2). Central American countries and the Dominican Republic, which follow the same development patterns enjoying preferential access to the US market, experience the increasing investments in manufacturing (e.g., medical equipment and electronics industry) and services for export (ECLAC 2018).

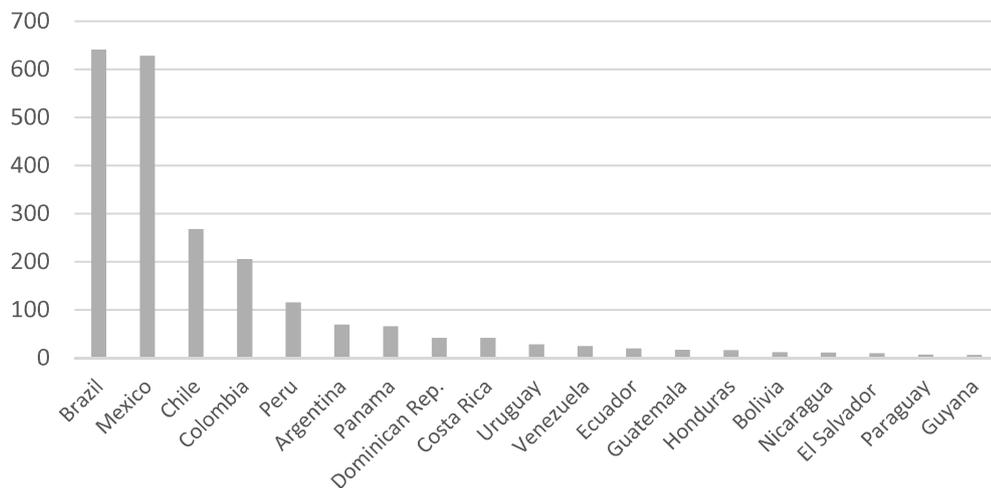


Fig. 2. FDI inward stock in 2019 by Latin American and Caribbean recipient countries, expressed in billions of US\$ at current prices

Source: Authors' own elaboration, using UNCTAD data

Ryc. 2. Wartość BIZ w 2019 w krajach-biorcach pomocy zagranicznej w Ameryce Łacińskiej i na Karaibach wyrażona w miliardach USD w cenach bieżących
Źródło: opracowanie własne na podstawie danych UNCTAD

In South America, the only two landlocked countries, Paraguay and the Plurinational State of Bolivia, have accumulated the lowest FDI inward stock within the sub-region (see Figure no. 2). According to the World Investment Report (UNCTAD 2019), FDI flows to Bolivia have always been small relative to the size of the economy due to restrictive regulations that discourage private investment in high-potential sectors. Paraguay intends to overcome the disadvantage of relatively small domestic market through FDI strategy based on numerous export-processing maquilas (UNCTAD 2019, p. 73). On the other hand, South American economies such as Chile, Colombia and Peru, which have traditionally received the significant inflows of FDI to natural resources sector, belong to the countries with the largest stock of FDI in this sub-region (see Fig. 2). To sum up, inward FDI flows at the country level are heterogeneous and the stock of region's FDI is highly concentrated in small group of the countries due to external as well as country-specific factors.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

According to the eclectic paradigm developed by J.H. Dunning (2001), the flows of FDI, their scope and territorial distribution, can be explained by three sets of factors summarized in ownership, location and internalization advantages. Since we investigate the regional distribution of inward FDI flows within LAC region, this section deals with the location advantages of international production, which are given by a host country's ability to attract FDI. In this context, country-specific advantages of a host country play an important role. The multinational corporations usually invest in the host countries where it is possible to combine firm-specific advantages with country-specific advantages. H.R. Zhang (2016) asserts that country-specific advantages are all kinds of proprietary resources that a host country has, and they come mainly from two aspects: resource endowment and institutional factors. The host-country determinants of FDI inflows may be grouped in different categories, such as trade- and market-related determinants, macroeconomic variables, resource-related factors, and political, legal and institutional determinants.

The literature on FDI usually identifies four different motives for investment: market-seeking, resource-seeking, efficiency-seeking and strategic asset-seeking FDI (Dunning 2001). The purpose of resource-seeking (vertical) FDI is to gain access to a host country's resources, such as raw materials, cheap labour or any other advantageous factor of production. In terms of market-seeking (horizontal) FDI, the multinational corporations intend to penetrate the local markets of host countries in order to acquire new customers and meet local demand. The determinants of market-seeking FDI are closely linked to a host country's market size and its growth potential, the structure of local market, as well as the access to regional markets via membership in a regional trading bloc. P. Nunnenkamp (2001) asserts that regional integration increases market size of a host country and thus promotes FDI inflows. Tariff-jumping or export-substituting FDI is a variant of market-seeking FDI that allows a foreign company to overcome trade barriers by locating production within the target market (Demirhan, Masca 2008). The efficiency-seeking FDI is motivated by creating new sources of competitiveness for companies and strengthening existing ones (Nunnenkamp 2001). Therefore, this type of FDI is strongly influenced by cost differences among countries, economies of scale, level of human capital (skilled labour), quality of infrastructure, business environment and other determinants. According to V. Botrić and L. Škufljić (2006), the efficiency-seeking FDI covers both resource- and market-seeking motives for FDI. J.H. Dunning (2001) argues that strategic asset-seeking FDI aims to protect or augment a multinational company's core competencies. Therefore, this type of FDI requires high-quality physical and human infrastructure and favourable political and commercial stance towards foreign investments.

The main variable within the category of market-related determinants of FDI inflows is traditionally market size. A. Montero (2008) asserts that the host countries with large domestic markets, such as the ABM countries, tend to consume more goods and thus the multinational enterprises may exploit larger economies of scale. The size of market is usually expressed by gross domestic product (GDP), GDP per capita and rarely by population size. Furthermore, the growth in market size, as measured by annual GDP growth rate, indicates a maturing market that may support growing economies of scale, even for high value-added goods (Tuman, Emmert 2004). From another point of view, a lower level of GDP per capita may indicate lower labour costs, which are relevant to efficiency-seeking FDI. Researchers such as M. Amal et al. (2010) and M.D. Ramirez (2010) find that FDI inflows to Latin America and the Caribbean are positively and significantly related to the size of local markets. On the other hand, G. Biglaiser and K. DeRouen (2006) find that real GDP per capita had a significant but negative impact on FDI inflows to Latin America between 1980 and 1996, suggesting that multinational corporations were motivated by lower labour costs. Market size is the principal determinant for market-seeking (horizontal) FDI, nevertheless it can be irrelevant for other types of FDI.

Trade-related factors of inward FDI flows are most often covered by the degree of trade openness calculated as the ratio of trade in goods and services (exports + imports) to GDP. O.G. Aziz

and A.V. Mishra (2015) assert that a more open economy attracts more FDI because trade openness reflects a host country's willingness to accept foreign investment. Additionally, trade liberalization and engagement in regional trade agreements, which usually reduce or eliminate certain barriers to investment and afford protection for the investors, also tend to reflect a host country's openness to FDI inflows. As already mentioned, trade liberalization is an important factor for export-oriented or efficiency-seeking motives for FDI. However, there may be a negative relationship between FDI inflows and the level of trade openness in terms of tariff-jumping strategy of FDI that aims to overcome trade barriers (Demirhan, Masca 2008). K. Williams (2015), M. Amal et al. (2010) and R.M. Quazi (2007) find that Latin American countries with higher degree of trade openness attract more FDI. Therefore, a positive relationship between the degree of trade openness and FDI inflows is expected.

Many studies deal with macroeconomic variables affecting FDI flows, such as inflation rate, government or external debt, tariff and tax rates, interest rate, exchange rate regime and other factors. The inflation rate is used as a proxy for the macroeconomic stability and thus high levels of inflation rate predict macroeconomic instability and higher degree of economic uncertainty (e.g., in terms of future profits). This is supported by M. Bengoa and B. Sanchez-Robles (2003) who argue that high inflation rates in Latin American and Caribbean countries discourage FDI inflows and they are a symptom of the lack of fiscal and monetary discipline. The effect of exchange rate on FDI inflows is ambiguous and strongly dependent on the motives for investment. On the one hand, the depreciation of a host country's currency makes its assets less expensive relative to assets in a home country (Walsh, Yu 2010). On the other hand, the appreciation of a host country's currency may enhance the market-seeking FDI due to an increase in the purchasing power of citizens (Forte, Santos 2015). S. Dal Bianco and C.T.L. Nguyen (2017) find that exchange rate volatility has a negative and significant effect on FDI inflows to LAC countries, and hence FDI entering the region tends to be vertical rather than horizontal.

Resource-related or endowment variables constitute the broadest category of FDI determinants. This category generally involves natural resource endowments, level of human capital, labour costs, level of financial development, stock and quality of infrastructure. Domestic financial development, usually proxied by domestic credit to private sector, is a driver for economic growth providing better business opportunities for companies (Kinda 2010). Therefore, a higher level of financial development in the host country may attract more FDI inflows. O.M. Nasser and X.G. Gomez (2009) find that FDI inflows to Latin America are significantly and positively correlated with the level of private credit provided by the banking sector, so that FDI is mainly directed into financially developed countries of LAC region. The natural resource endowments belong to the most important country-specific advantages of many Latin American and Caribbean recipient countries. However, L.C. Nunes et al. (2006) ascertain that the level of natural resources had no important effects on FDI inflows to Latin American countries in the 1990s. It is important to note that the natural resources sector became an essential determinant of FDI inflows during the boom in commodity prices in the 2000s (ECLAC 2012).

According to M.D. Ramirez (2010), developing countries with adequate economic, physical and social infrastructure in the form of paved roads, ports, airports, cheap energy supplies or skilled labour are more likely to attract more FDI inflows. The quality and availability of infrastructure is particularly relevant for resource- and efficiency-seeking motives for FDI. K. Williams (2015) and many others find that Latin American countries with larger stock of infrastructure attract more foreign investment. In general terms, the host countries with lower labour costs attract more FDI given the possibility to reduce total production costs, especially in terms of export-oriented and efficiency-seeking FDI in manufacturing of labour-intensive goods. R. Forte and N. Santos (2015) assert that a more skilled labour force improves its productivity and the tendency towards higher technology and innovation. S. Dal Bianco and C.T.L. Nguyen (2017) find that human capital is a key determinant of FDI inflows to Latin America and the Caribbean, and therefore a better educated labour force

attracts more FDI into this region. Thus, cheap but skilled and productive labour force seems to be an important locational advantage of Latin American and Caribbean countries.

The terms such as good governance, political stability, low level of perceived corruption, protection of property rights and the rule of law indicate that the host countries provide a stable investment climate on FDI (Biglaiser, DeRouen 2006). This is supported by M. Amal et al. (2010) who find that political stability has a positive and significant effect on FDI inflows to Latin America, as political stability creates a favourable business environment for long-term projects such as FDI. B.A. Blonigen (2005) argues that weak institutions and poor governance increase the costs of doing business and reduce profits due to higher level of corruption as well as the tendency towards poor infrastructure and inadequate provision of public goods. To cover institutional and political variables, researchers such as M. Amal et al. (2010), P. Jadhav (2012), R. Forte and N. Santos (2015) and several others use the Worldwide Governance Indicators (WGI) published by the World Bank, which consist of six individual governance indicators: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law and control of corruption.

Following the review of empirical literature on locational determinants of FDI inflows to LAC region, we identify variables that most affect the decision-making of foreign investors. Based upon these variables, we determine the patterns of FDI distribution in Latin American region and compare the evolution of host countries attractiveness over the two distinct periods.

DATA AND METHODOLOGY

Regarding methodology, we use cluster analysis as the aim of this paper is to classify countries into broader groups according to the similarities and dissimilarities between them in terms of the level as well as locational determinants of FDI inflows. The cluster analysis can be defined as a set of techniques that classifies cases (variables or observations) into groups, clusters, which are relatively homogeneous within themselves and relatively heterogeneous between each other (Yim, Ramdeen 2015). Therefore, there exist a high similarity between the cases in each cluster and a low similarity between the cases in different clusters. The clustering technique enables us to find relatively homogenous groups of countries, and then to examine the patterns of FDI distribution in Latin America and the Caribbean before and after the end of the commodity price boom in 2012. Despite the fact that cluster analysis is rarely used in empirical literature on FDI, the researchers such as T.Y. Hon et al. (2005) apply the clustering method to classify Chinese regions into broader groups and then present the similarities and dissimilarities in their socioeconomic environment. In addition to that, T.T. Yu and M.M. Zhang (2007) also employ cluster analysis in order to investigate the regional distribution of FDI in China. R. Forte and N. Santos (2015) examine the FDI performance of Latin American countries using cluster analysis. They find three clusters in 2011 and just two clusters in 2005.

Cluster analysis algorithms can be divided into hierarchical and non-hierarchical, while the former one is subdivided into agglomerative and divisive clustering algorithms (Hansen, Jaumard 1997). At the beginning of agglomerative hierarchical clustering, each case (observation) forms its own individual cluster, and subsequently similar cases are merged together until every case is grouped into one single cluster (Yim, Ramdeen 2015). Therefore, agglomerative clustering procedure begins with each observation (i.e., country) in a separate group and then it combines the two observations which are closest together to form a new group until the required number of clusters remains. We employ agglomerative hierarchical method of clustering because we intend to obtain a dendrogram as the output of cluster analysis. Furthermore, this method allows us to determine an appropriate number of clusters during the clustering process.

Regarding the method of clustering, we use Ward's method where the dissimilarity between two clusters is defined to be the loss of information from joining the two clusters. Loss of information

is found by measuring the increase in the error sum of squares, or the sum of squared deviations of each pattern from the centroid for the cluster (King 2015, p. 44). This method is appropriate for quantitative variables. We employ the squared Euclidean distance as a measure of distance or similarity between the cases. In general, as the distance between the two cases decreases, their similarity should respectively increase (Yim, Ramdeen 2015). The squared Euclidean distance is the most commonly used distance metric in terms of Ward's method of clustering. According to P.K. Hopke and G.S. Casuccio (1991), the squared Euclidean distance (SED) between cases i and j can be defined as:

$$SED_{ij} = \sum_{k=1}^m (x_{ik} - x_{jk})^2$$

where m refers to the number of measured variables, x_{ik} is the value of the k th variable for the i th datum point and x_{jk} is the value of the k th variable for the j th datum point.

The set of observations includes 16 Latin American and Caribbean countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Peru and Uruguay. We do not include offshore financial centres. Venezuela and some other Latin American and Caribbean countries are not incorporated due to the absence of relevant data for cluster analysis.

The main criteria to categorize Latin American and Caribbean countries into clusters are FDI inflows and a set of trade and market-related, macroeconomic, resource-related and institutional variables affecting FDI inflows the most. We identify the major locational determinants of FDI inflows to LAC region based upon the review of empirical literature on FDI in that region. A wide range of variables is included in the cluster analysis in order to cover the different motives behind FDI inflows, and then to discuss the patterns of FDI distribution within the region. Regarding FDI as a measure of a host country's attractiveness, we use average FDI inflows as a percentage of GDP over a period of five years (2008 – 2012 and 2015 – 2019) in order to avoid year-to-year volatility in FDI inflows. The ratio of FDI inflows to GDP is commonly used in literature as it takes into account the relationship between the amount of inward investment flows and the size of the economy. The data on FDI are obtained from UNCTAD database. In accordance with T.Y. Hon et al. (2005), we standardize the values of all variables before clustering in order to avoid the problems caused by scale differences.

Concerning macroeconomic stability or instability, we use the inflation rate measured by the annual growth rate of the GDP implicit deflator, which shows the rate of price change in the economy as a whole (World Bank 2020). The tax rate, proxied by total tax and contribution rate as a percentage of profit, is used as another macroeconomic variable affecting FDI inflows. It measures the amount of taxes and mandatory contributions payable by businesses after accounting for allowable deductions and exemptions as a share of commercial profits (World Bank 2020). The data on inflation rate and total tax and contribution rate come from the World Bank's World Development Indicators. As for market-related determinants of FDI inflows, we use market size and market size growth. GDP per capita at current prices in US dollars is used as a proxy for market size. The annual percentage growth rate of GDP is chosen as a proxy for market size growth which predicts an increasing potential of a host country's internal market, and therefore higher aggregate demand as well as higher demand for investment. The data on market-related variables come from the World Bank's World Development Indicators. Regarding trade-related determinants of FDI, we use the degree of trade openness calculated as a ratio of the sum of exports and imports of goods and services to GDP. The data on trade openness come from UNCTAD database.

In terms of resource-related determinants of FDI inflows, we employ the following variables: natural resource endowments, financial development, stock of infrastructure, level of human capital and labour costs. Natural-resource endowment is proxied by the ratio of mining and quarrying to GDP. The data on mining and quarrying come from CEPALSTAT. We use domestic credit to

private sector by banks (as percentage of GDP) as a proxy for domestic financial development. The data on financial development are from the World Bank's World Development Indicators. To measure the level of human capital, we use a percentage of the population (ages 25 and older) with at least some secondary education. The data on human capital come from the UNDP Human Development Reports. Labour costs are expressed as the minimum monthly wage for a full-time worker in US dollars reported by Doing Business. As a proxy for the stock of infrastructure, we use the mobile cellular subscriptions per 100 people obtained from the World Bank's World Development Indicators.

To cover political and institutional determinants of FDI, we use three variables such as political stability and absence of violence, the rule of law and control of corruption, which represent three out of six individual indicators constituting the Worldwide Governance Indicators (WGI). Political stability and absence of violence measures perceptions of the likelihood of political instability and political motivated violence, including terrorism. The rule of law captures perceptions of the quality of contract enforcement, property rights, the police and the courts, as well as the likelihood of crime and violence. Control of corruption reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption (Kaufmann et al. 2010). The aggregate WGI indicators, as measured in percentile rank terms, range from 0 (lowest) to 100 (highest) rank, with higher values corresponding to better outcomes (Kaufmann et al. 2010).

RESULTS

The results of cluster analysis for the years 2012 and 2019 are reported in the dendrogram in Figures 3 and 4, respectively. In 2012, the procedure of clustering created four clusters from the sixteen observations at a distance of 10 (see Fig. 3). Cluster 1 consists of Colombia, Peru, Ecuador and Bolivia. Cluster 2 contains El Salvador, Guatemala, Paraguay, Honduras, Nicaragua, the Dominican Republic and Mexico. Cluster 3 consists of Costa Rica, Uruguay, Brazil and Argentina. Cluster 4 is made up of only Chile. Table 1 reports the average values of all variables within each cluster, as well as the overall average of all observations (countries) in 2012 and 2019.

In 2012, cluster 1 was the worst-performing group of countries in terms of average FDI inflows as a percentage of GDP, despite the abundance of a wide range of natural resources (Table 1). According to Table 1, cluster 1 was characterized by the poor performance in terms of political stability and absence of violence, as this variable ranged well below the regional average. Cluster 1 is relatively well endowed with cheap and skilled labour force as well as natural resources, on the one hand, and it comprises relatively small domestic markets with low share of manufacturing in total exports, on the other. Therefore, the resource-seeking motive of FDI seems to be predominant in terms of cluster 1 in 2012. In the same year, cluster 2 performed better in comparison with cluster 1, but the average value of FDI inward flows as a percentage of GDP was still below the overall average of all countries (Table 1). Cluster 2 consists of Central American countries, Mexico, the Dominican Republic and Paraguay. According to Table 1, these countries performed well regarding the determinants peculiar to the efficiency-seeking motive of FDI, such as low labour costs, low total tax rate (as a percentage of profits) and high degree of trade openness. This may be supported by the small size of domestic markets, except for Mexico, and the high share of manufactured exports in the total exports.

According to Table 1, cluster 3 had better performance in terms of FDI inward flows as the cluster's average is above the average value of all countries in 2012. Cluster 3 had good results in the size of domestic markets, the level of human capital, the stock of infrastructure, as well as political and institutional variables. Cluster 3 seems to have more diversified patterns of FDI inflows, since it comprises the largest South American markets (Brazil and Argentina) and two smaller markets such

as Uruguay and Costa Rica. This is probably due to the relatively high level of development which made these countries attractive for foreign investors. In 2012, Chile itself formed a distinct cluster because it ranked first in numerous variables, including market size and its growth, financial development, human capital, availability of infrastructure and control of corruption. In addition to that, Chile is well endowed with abundant natural resources. Chile represented the most attractive cluster in terms of FDI inflows as a percentage of GDP, since FDI inward flows were well above the overall average of all countries in 2012 (Table 1).

Table 1. Average values of variables within clusters and overall average in 2012 and 2019

Tabela 1. Średnie wartości zmiennych w klastrach oraz średnia całkowita w 2012 r. i 2019 r.

| Variable | Year | Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 | All countries |
|-----------------------------------|------|-----------|-----------|-----------|-----------|---------------|
| FDI inward flows (as % of GDP) | 2012 | 3.35 | 3.55 | 4.03 | 8.83 | 3.95 |
| | 2019 | 2.37 | 3.37 | 2.73 | 1.57 | 2.76 |
| Market size | 2012 | 5 717.79 | 4 611.03 | 12 634.37 | 15 351.55 | 7 564.83 |
| | 2019 | 6 212.38 | 5 253.87 | 14 443.46 | 9 912.28 | 7 627.51 |
| Market size growth | 2012 | 5.20 | 3.18 | 2.31 | 5.32 | 3.60 |
| | 2019 | 1.46 | 1.67 | 1.12 | -2.09 | 1.25 |
| Trade openness | 2012 | 58.00 | 76.43 | 46.52 | 67.61 | 63.79 |
| | 2019 | 46.26 | 69.32 | 57.19 | 32.32 | 56.09 |
| Inflation rate | 2012 | 4.23 | 4.23 | 10.79 | 1.13 | 5.68 |
| | 2019 | 2.00 | 3.33 | 4.03 | 50.62 | 5.92 |
| Total tax rate | 2012 | 53.55 | 41.34 | 64.73 | 78.70 | 52.58 |
| | 2019 | 54.37 | 45.87 | 44.70 | 106.30 | 52.61 |
| Natural resources | 2012 | 12.73 | 2.23 | 1.96 | 12.51 | 5.43 |
| | 2019 | 5.36 | 1.79 | 3.35 | 3.97 | 3.56 |
| Manufacturing | 2012 | 10.18 | 46.41 | 37.27 | 13.64 | 33.02 |
| | 2019 | 14.30 | 53.57 | 29.46 | 16.55 | 32.01 |
| Financial development | 2012 | 36.08 | 33.79 | 37.35 | 104.28 | 39.66 |
| | 2019 | 53.48 | 41.71 | 69.80 | 15.96 | 49.78 |
| Human capital | 2012 | 51.10 | 41.13 | 52.75 | 74.30 | 48.60 |
| | 2019 | 56.85 | 46.63 | 63.60 | 57.20 | 54.31 |
| Labour costs | 2012 | 206.23 | 172.53 | 359.58 | 0 | 216.93 |
| | 2019 | 327.70 | 306.33 | 536.77 | 936.70 | 396.95 |
| Stock of infrastructure | 2012 | 100.99 | 105.65 | 135.31 | 137.59 | 113.89 |
| | 2019 | 108.88 | 100.88 | 144.05 | 130.87 | 113.85 |
| Political stability | 2012 | 22.04 | 36.09 | 58.29 | 57.82 | 39.48 |
| | 2019 | 32.38 | 29.68 | 67.14 | 43.33 | 38.57 |
| Rule of law | 2012 | 27.11 | 24.95 | 54.34 | 88.73 | 36.83 |
| | 2019 | 31.89 | 21.96 | 75.80 | 37.02 | 36.72 |
| Control of corruption | 2012 | 36.97 | 28.17 | 64.69 | 90.99 | 43.42 |
| | 2019 | 34.94 | 22.44 | 82.37 | 53.37 | 40.29 |

Source: authors' elaboration
Źródło: opracowanie własne

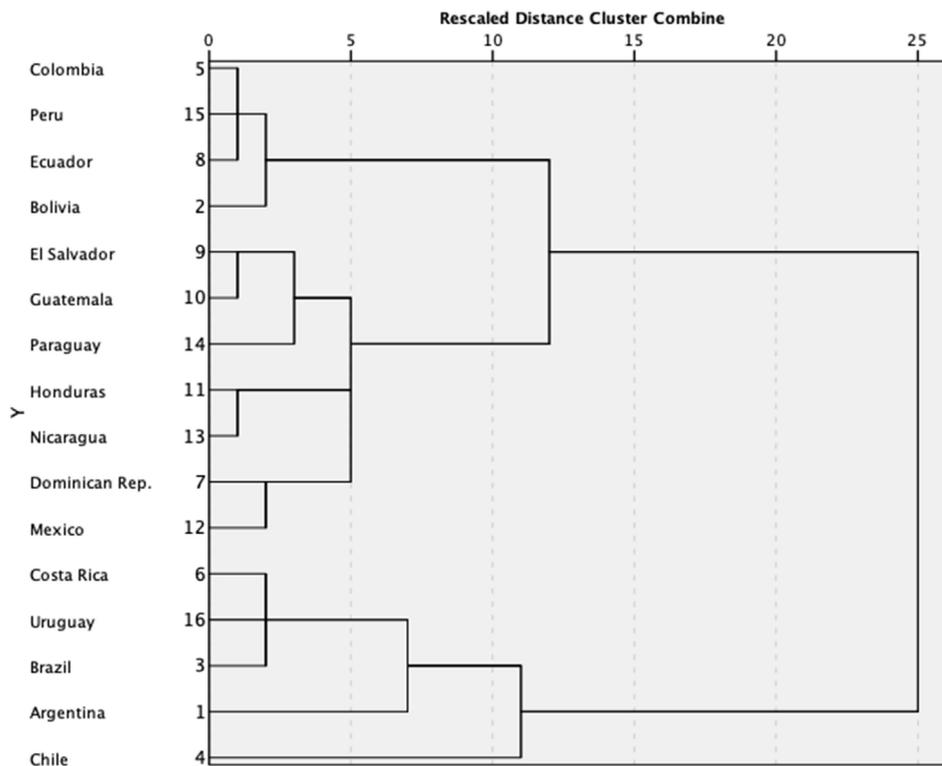


Fig. 3. The output of cluster analysis – dendrogram (2012)

Source: Authors' own, using SPSS

Ryc. 3. Wyniki analizy klastrow – dendrogram (2012)

Źródło: opracowanie własne

To sum up, the best-performing clusters in 2012, which are clusters 3 and 4, consisted of Latin American economies with the highest levels of development as measured with GDP per capita, regardless of natural resource endowments (i.e., Costa Rica and Uruguay). According to Table 1, these clusters performed better in terms of the stock of infrastructure, level of human capital and all institutional and political variables. This indicates well-diversified motives for FDI flows in more advanced Latin American countries during the period of commodity price boom.

We obtain four clusters in 2019 by making a horizontal cut in the dendrogram at the distance of 10 (Figure 4). Cluster 1 contains Brazil, Colombia, Peru, Bolivia, Ecuador and Paraguay. Cluster 2 is made up of Honduras, Nicaragua, El Salvador, Guatemala, the Dominican Republic and Mexico. Cluster 3 consists of Costa Rica, Uruguay and Chile. Cluster 4 is represented only by Argentina. In 2019, Argentina has a cluster all by itself due to economic and financial tensions accompanied by the deterioration of many variables, such as GDP growth rate, inflation rate and the level of financial development (Table 1). A high macroeconomic instability most likely led to a decline in FDI inflows to Argentina in 2019 as compared with the previous period as well as with other clusters that are more attractive for FDI in 2019.

Between 2012 and 2019, Brazil and Paraguay left the better performing clusters and joined cluster 1, which continues to have the average FDI inflows below the average of all countries in 2019. Therefore, it seems that the motives of FDI inflows in cluster 1 have become slightly diversified since the end of the commodity price boom in 2012. However, the strong dependence on natural resources in certain countries of cluster 1 makes it difficult to boost FDI inflows, since this cluster became less attractive for foreign investment after the end of the price boom in natural resources. Cluster 2, consisting of Central American economies, Mexico and the Dominican Republic, has become the most attractive group of countries in terms of FDI inward flows as a percentage of GDP (Table 1). Cluster

2 continues to perform better in terms of a set of determinants relevant to the efficiency-seeking motive for FDI, such as relatively high degree of trade openness, low labour costs and relatively low total tax and contribution rate. Cluster 3 that consists of Latin American economies with the highest level of development, such as Chile, Uruguay and Costa Rica, has become less attractive regarding FDI inflows as a percentage of GDP. This is especially true for Uruguay which experienced negative values of average FDI inward flows as a percentage of GDP in the five-year period prior to 2019. Table 1 shows that cluster 3 continues to have good results in variables such as market size, financial development, human capital, the stock of infrastructure, political stability, the rule of law and control of corruption.

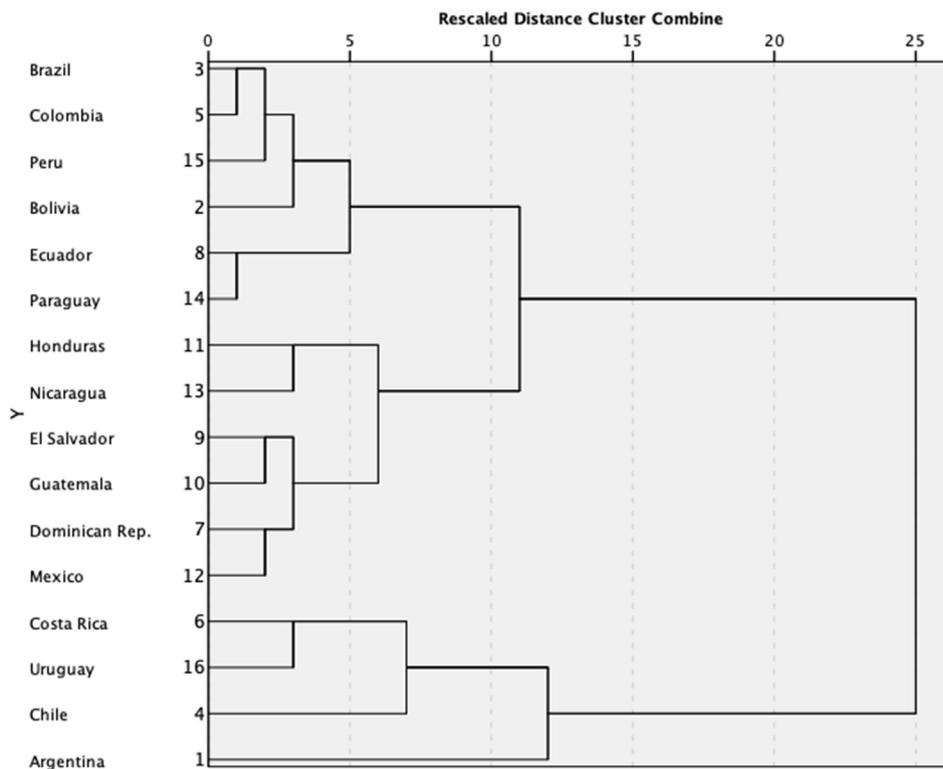


Fig. 4. The output of cluster analysis – dendrogram (2019)

Source: Authors' own elaboration, using SPSS

Ryc. 4. Wyniki analizy klastrow – dendrogram (2019)

Zródło: opracowanie własne

CONCLUSION

The aim of this paper was to categorize the region's countries into broader groups according to the similarities and dissimilarities between them in terms of the level or, in other words, attractiveness (FDI inflows as % of GDP) and locational determinants of FDI inflows. We identified the major locational determinants based upon the review of empirical literature on FDI inflows to Latin America and the Caribbean. To reach the aim of this paper, we applied agglomerative hierarchical method of clustering in which the set of observations was made up of 16 Latin American and Caribbean countries.

From territorial point of view, the results of cluster analysis confirm the dominant patterns of FDI inflows, but they also indicate some other specifics of FDI regional distribution in Latin Ameri-

ca and the Caribbean in the decade ending in 2019. On the one hand, the efficiency-seeking motive of FDI in manufacturing and more recently in services continues to dominate in Central American subregion, Mexico and the Caribbean. On the other hand, the patterns of FDI inflows to South America seem to be more diverse. The resource-seeking motive for FDI, especially in terms of seeking for natural resources and cheap labour, still has a strong position in the Andean countries (Bolivia, Colombia, Ecuador, Peru) and Paraguay. However, Latin American countries with relatively higher level of economic, social, institutional and political development, such as Chile, Argentina, Brazil, Uruguay, but also Costa Rica, reveal more diversified motives for FDI inflows. A mixture of several motives and strategies of foreign investment activities seems to be present in more advanced LAC countries.

In 2012, during the commodity price boom, the two best-performing clusters were made up of Latin American countries with the highest levels of development in terms of GDP per capita (Costa Rica, Uruguay, Brazil, Argentina, Chile), regardless of natural resource endowments, degree of trade openness and labour costs. These countries performed better in terms of the stock of infrastructure, level of human capital and all institutional and political variables. This suggests that the motives of FDI inflows to more advanced Latin American economies were relatively diversified during the period of the commodity price boom. Even though the abundance of natural resources traditionally belongs to crucial determinants of FDI inflows to LAC region, the cluster consisting of Colombia, Peru, Ecuador and Bolivia was the worst-performing cluster in terms of average FDI inflows as a percentage of GDP in 2012. In 2019, the cluster consisting of Honduras, Nicaragua, El Salvador, Guatemala, the Dominican Republic and Mexico has the best results in terms of average FDI inflows as a percentage of GDP. These countries perform well in locational determinants peculiar to the efficiency-seeking motive for FDI, such as low labour costs, low total tax rate and high degree of trade openness. The efficiency-seeking FDI in this cluster can be supported by the small size of domestic markets, except for Mexico, and the high share of manufactured exports in their total exports. This implies that natural resource endowments and large domestic markets are not essential prerequisites for becoming more attractive to foreign investors.

Regarding policy implications, Latin American and Caribbean countries with better performance in the set of determinants relevant to efficiency-seeking motive for FDI, particularly higher degree of trade openness and lower total tax rate, are more likely to attract larger FDI inflows. The results of cluster analysis also indicate that the structural changes in production patterns, in particular the shift from the reliance on exploitation and exportation of primary commodities towards higher value-added manufacturing and services, may help to boost FDI inflows to LAC region, since the countries with higher share of manufactures in total merchandise exports perform better in terms of FDI inflows as a percentage of GDP. However, this paper has some limitations, such as the use of aggregate FDI data that do not reflect potential concentration of foreign direct investment in specific sectors or territories within a host country.

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