# 6 FDI DETERMINANTS REVISITED: EXTENSIVE EVIDENCE

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## Abstract

*This paper revisits foreign direct investment determinants in the last two decades on a large sample of countries with different economic backgrounds by using fixed effects panel data analysis. The data sample consists of 97 countries, which are further divided into three categories in order to evaluate the differences in determinants based on the level of economic development. The models are constructed for two time periods (1997-2017 and 2008-2017) to assess whether there are shifts in factors enhancing inward FDI inflows following the economic crisis of 2007 and to take into account the impact of technological endowments and human capital on attracting FDI. The results indicate that trade openness is the most significant factor in enhancing FDI flows during 1997-2017 for the whole sample of countries. The most significant differences reveal that high-income countries are attractive due to their prospects for growth and infrastructure development, while middle-income countries are assessed by investors in a first phase by the quality of their institutions and after that, by the stability of their macroeconomic environments. The most important FDI determinants in low-income countries are trade openness and highly educated labour force.*

***Keywords***: foreign direct investment, panel data analysis, location determinants

**JEL Classification**: C33, F23

## 1. Introduction

Foreign direct investments (FDIs) have for long been seen as the fastest-growing economic activity around the globe (Lucke and Eichler, 2015), with a substantial surge in volume around the beginning of the 1990s. However, the economic crisis of 2007 and the following

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turbulence had a detrimental effect on the global flows of FDIs, which contracted for a third consecutive year in 2019 (UNCTAD, 2019). Developed countries are witnessing the lowest volume of FDI inflows since 2004 while developing ones are still targeted by a relatively similar amount. According to the latest UNCTAD report of 2019, the most successful regions in terms of FDI attraction are those in Africa and Asia.

Despite the tendency of being directed towards developing countries, FDI distribution was never equitable between developed and developing countries, nor was the volume of investments similar. A solid body of literature studied the conditions in the host locations that can explain this unbalanced situation (Singh and Jun 1995; Bénassy-Quéré et al., 2007; Asiedu and Lien, 2011; Popovici and Calin, 2012; Alam and Shah, 2013; Ghazalian and Amponsem, 2018). Such studies, however, suffer from several limitations: a relatively small number of countries in the analysed samples due to data availability (Asiedu, 2002), less focus on developed countries (Dellis et al., 2017) or weak possibilities of comparing the capacity of attracting FDI due to the lack of a framework consisting of similar determinants. Another challenge is the emergence of new location determinants, which, although signalled in the theory, are less considered in the literature especially over the recent years. Dunning (2000) and Nunnenkamp (2002) state that following the globalization process and the development of the global knowledge-based economy, studies should incorporate a more dynamic approach to FDI determinants. Created resources and intangible assets, among which the development of the human capital or institutional quality (Dunning 2000), are key factors that shape the attractiveness of regions. Botric and Skuflic (2006) and Antonakakis and Tondl (2010) confirm the decline of the impact previously attributed to traditional FDI determinants (such as the dimension of the market) and the shift from natural endowments to created resources. Under the emergence of the fourth industrial revolution, such a dislocation could be even more evident, accelerating the shift from market-seeking and resource-seeking FDI to efficiency and strategic resource-seeking FDI. This paper builds on the rich literature on the determinants in attracting FDI. However, it addresses two major gaps found in this literature. Firstly, it allows for a comparison of FDI determinants between countries at different stages of economic development. Secondly, it clarifies the discussion in the literature regarding FDI determinants both before and after the economic crisis (during 1997-2017 and 2008-2017), and it points out that there was a shift in FDI determinants after 2008, although it did not follow the expected evolution from traditional determinants to created resources.

Our approach uses a wide sample of countries evaluated on the longest available period of time under the limits of data constraints. Therefore, we build a panel of 97 countries analysed during 1997-2017. We deepen our analysis to sub-groups of countries clustered on the basis of the level of income for providing a reliable comparison between countries at different stages of development. Our focus is on establishing the relevance for FDI of several traditional determinants that are used in empirical studies. Next, we determine whether there are differences based on the level of economic development. Furthermore, we near our approach to the 2008-2017-timeframe, in order to seize any shifts in FDI determinants and to expand the analysis for including other determinants as proxies for created resources, such as institutional quality, technology availability and skilled human capital. According to our knowledge, there are fewer studies carried out over the last ten years, after the crisis, as compared to the years before the crisis. The robustness of our approach is checked through different empirical methods and proxies for the selected variables.

The paper is organized as follows. Section 2 presents the literature review on FDI determinants, focusing on the differences between countries based on the level of

development. Section 3 explains the methodology and the data used, and Section 4 presents the empirical findings and discusses the results. Concluding observations are provided in Section 5.

## 2. Literature review

The idea of determining the advantages of host locations which could enhance FDI inflows in order to design public policies for attracting foreign investors gained momentum once the positive impact of FDI was felt by domestic companies and employees. The purpose of this section is not to provide a comprehensive literature review on FDI determinants, but rather to identify whether there are differences in factors between developed and developing countries using established categories of FDI determinants.

### *Macroeconomic variables*

Investment is closely related to macroeconomic dynamics and therefore the specific literature contains a large number of studies dealing with the characteristics preferred by investors, by considering key aspects such as the dimension of the market, its degree of openness or its general stability.

The dimension of the market is a traditional FDI determinant, being considered the most frequently used variable for testing FDI hypotheses (Wheeler and Mody, 1992; Antonakakis and Tondl, 2010; Dellis et al., 2017). Market size is usually measured through GDP, per capita income and the size of the population or it is assimilated to the prospects of growth, and the expected positive relationship with FDI is obtained in most of the cases. Studies show that market size is one of the most important factors that investors consider when deciding to enter a foreign market in both the case of developed (Dellis et al., 2017) or transition countries (Busse and Hefeker, 2007; Popovici and Calin, 2014). Developing countries tend to be mostly sought after due to their lower costs. In addition, Busse and Hefeker (2007) and Campos and Kinoshita (2008) argue that the impact of the market dimension is limited if endogeneity is correctly apprehended in econometric models applied for these host locations. Trade openness is a measure for trade liberalization, usually employed for assessing restrictions on capital (Busse and Hefeker, 2007; Goswami and Haider, 2014). The impact of trade openness on FDI may be different, depending on the legislation regarding foreign exchange, the method and level of taxation of capital or the type of investment made: oriented towards the local market or towards export (Wheeler and Mody, 1992; Busse and Hefeker, 2007). It is generally assumed that greater openness of countries will allow the import of technology, which will further improve knowledge diffusion and will increase competitiveness (Siladjic and Mehic, 2015). A positive impact of trade openness is signaled in both advanced economies (Dellis et al., 2017) and developing countries (Singh and Jun, 1995; Campos and Kinoshita, 2008; Sekkat and Veganzones-Varoudakis, 2007). Asiedu (2002) points out that the attractiveness of countries in sub-Saharan Africa is enhanced by trade openness rather than by other factors, such as the return on capital or infrastructure endowments.

One of the most used indicators for macroeconomic stability and economic health is inflation (Balasubramanyam, 2001; Ghazalian and Amponsem, 2018). Price stability implies a higher certainty towards economic prospects, less investment risk and credibility of governmental policies, which is associated with higher FDI inflows. However, the literature provides mixed results, as studies so far report all the possible combinations between price stability and FDI, without any connection with the level of development. A negative impact of inflation on FDI

is found with both a significant (Edminston, Mudd, and Valev, 2003; Busse and Hefeker, 2007) and an insignificant coefficient (Bellak et al., 2007; Leibrecht and Riedl, 2010). A positive and significant coefficient for inflation is obtained by Garibaldi et al. (2002), Campos and Kinoshita (2003) and more recently by Aziz and Mishra (2015), who invoke endogeneity for explaining this result, as inflation could also point towards other policy factors.

We expect a positive and significant impact of both market dimension and trade openness on FDI. However, we could not anticipate which is the strongest FDI determinant depending on a country's level of development. Based on the studies so far, we anticipate that in the case of developing countries, a low cost of resources is a more important factor than the size of the market. The results regarding the impact of trade openness on FDI are expected to clarify the outcomes obtained so far in the literature. Mixed results for inflation are expected.

## *Endowment with natural resources and infrastructure*

Resource-seeking FDIs are motivated by the interest in accessing physical resources, such as raw materials (Dunning, 1993) or transport and communication infrastructure (Anyanwu, 2012; Villaverde and Maza, 2015). Endowment with natural resources has played an important role in attracting FDI since the start of the industrialization process as it secured the supply of the needed raw materials in greater quantity or with less cost than in the home country. This finding is documented by Antonakakis and Tondl (2010) for Eastern Europe and Central Asia, where the costs for natural resource exploitation are lower (Tuselmann, 1999; Asif and Majid, 2017). Studies also reflect the fact that FDIs, in search for natural resources, tend to be present especially in the abundant resource countries in Africa (Asiedu, 2002; Mohamed and Sidiropoulos 2010; Anyanwu, 2012) or in developing and emerging countries (Nunnenkamp, 2002; Carril-Caccia and Pavlova, 2018).

Infrastructure endowment is a precondition for facilitating investments (Campos and Kinoshita, 2003; Anyanwu, 2012) and reducing the production costs. In testing FDI determinants, the literature differentiates between telecommunication, transport, energy, and social infrastructure. Due to data availability, studies usually include the first two types of infrastructure.

The development of the telecommunications infrastructure is a factor of significant importance for FDI in developing countries, regardless of their location (Antonakakis and Tondl, 2010; Bellak et al., 2007; Bénassy-Quéré et al., 2007; Asiedu and Lien, 2011). Peres, Ameer, and Xu (2018) find a positive and significant impact of infrastructure in both developed and developing countries, expressed as the number of telephone lines per 100 inhabitants. On the other hand, Alam and Shah (2013) disagree that FDI inflows are depending on the quality of the infrastructure in OECD countries. Bellak et al. (2007) find that information and communication infrastructure is more important for foreign investors than transport or electricity generation capacity in Central and Eastern European countries. The effect of the quality of transport infrastructure on FDI is less assessed due to data availability, but a positive relationship is pointed out in Sun, Tong, and Yu (2002) or Merlevede and Schoors (2005).

Based on the studies so far, we consider that the endowment with natural resources is mostly sought after in developing and low-income countries. Variables related to infrastructure, both transport and communication facilities, are expected to be significant in attracting FDI irrespective of the level of economic development.

## *Institutions*

The importance of institutions in attracting FDI has started to be studied more intensely since the late 1990s. The general assumption is that institutions and good institutional quality have a key role in shaping an attractive environment for FDI (Dunning, 2004; Busse and Hefeker, 2007; Lucke and Eichler, 2015; Asif and Majid 2017) due to reducing transaction costs and uncertainty. In other cases, enhanced by specific economic and social conditions (such as the transition process to market economy), institutional development became the most important aggregate determinant of FDI. By contrast, a recent study of Sabir et al. (2019) indicates a higher importance of institutional quality in developed countries, following a GMM approach based on data for 1996-2016. On the opposite spectrum, Dellis et al. (2017) consider that the positive relationship between FDI and the quality of institutions is made clear through the results of the studies on developing countries, but that there is less clear-cut empirical evidence for OECD countries. On the same note, Kayalvizhi and Thenmozhi (2017) support the dependence of FDI on the institutional environment in emerging countries.

The conclusion is that the results of the linkages between institutions and FDI are mixed. This is particularly so when different facets of institutional quality are investigated. Using panel regressions for 65 host countries from 1995 to 2009, Lucke and Eichler (2015) find that host developed countries with a strong democracy, more corruption, and less political stability than the home country are sought after by investors. By contrast, in developing countries, a lower level of corruption is desired, while the markets should be free and provide less regulatory burden than in home countries. Using a panel data approach for 110 countries over 2002-2012, Peres, Ameer, and Xu (2018) document that the quality of institutions and especially the rule of law and control of corruption are more important for developed countries than for developing ones. However, a clear picture of the impact of the institutional environment on FDI in advanced economies is hard to gauge, as such studies are usually carried out for developing countries and less so for developed economies (Dellis et al. 2017).

Basemera et al. (2012) show that ratings concerning economic and financial risks and corruption are significant in FDI diffusion in East Africa, while the importance of governance, law and order is relatively low during 1987-2008. Anyanwu (2012) finds that rule of law enhancement and financial development have a negative effect on FDI inflows in African countries during 1996-2008.

High-developed countries typically have higher levels of institutional quality. Therefore, we expect the proxies for institutional quality to be significant in developing countries, where a leap in quality could improve FDI flows. However, based on the existing literature, there is no clear explanation about which feature of institutional quality is the most important for a country, given its income levels. We expect this study to shed more light on this gap.

## *Technology and skilled labour*

Technology, innovation and skilled labour are included in the asset and efficiency-seeking determinants of FDI. A positive impact on FDI is expected, as the search for technological and skill-endowed locations will be amplified due to increasing complexity and technology intensity which affect production processes (Palit and Nawani, 2007). Moreover, the adoption of technology and the capacity for innovation of host locations are associated with increased competitiveness, which will further entail new flows of FDI (Kayalvizhi and

Thenmozhi, 2017). Due to these reasons, factors associated with technology and innovation could be as important for attracting FDI in both developed and developing countries.

In fact, there is a current debate on whether technological progress is equally important in both developed and developing countries. Emerging economies could become attractive locations for harnessing foreign capital due to their efforts in reducing the technological gap as compared to advanced countries (Kayalvizhi and Thenmozhi, 2017). This research demonstrates that technology is essential in attracting FDI in 22 advanced and emerging economies over 1996-2014. In this case, technology is assessed using the number of patents, research and development, scientific articles, high-tech exports, intellectual property rights, technology absorption and technology readiness. Palit and Nawani (2007) use a composite index including the capacity of innovation and technological readiness. Based on a FGLS model for 14 developing countries in South-Eastern Asia during 1994-2003, it finds that the technological activity index is statistically significant and positive in relation to FDI.

On the other hand, Carril-Caccia and Pavlova (2018) deny a similar interest in technological intensity in emerging markets compared to that manifested by foreign investors in the EU. Villaverde and Maza (2015) use research and development expenditure and personnel, high technology employment and human capital to assess technological progress and establish a positive impact on FDI in EU regions over 2000-2006.

A skilled and educated labour force is another requirement, especially for harnessing technological capabilities, further absorbing technology and addressing innovation growth. The quality of the labour market is a key factor that impacts a country's development. Noorbakhsh et al. (2001) evaluate how the level of human capital in host countries may affect the geographical distribution of FDI. The empirical findings highlight that human capital is one of the most important determinants of FDI inflows in developing countries and its importance has grown over time. Human capital related variables are frequently included in studies and a positive relationship with FDI is expected (Carstensen and Toubal, 2004). However, the results are not always significant, as pointed out by Campos and Kinoshita (2003), Lopez (2010), Lucke and Eichler (2015) or Ghazalian and Amponsem (2018), who consider the percentage of population enrolled in secondary education and indicate a potential collinearity with other variables. However, the number of studies focused on the impact of technology and skilled labour in attracting FDI is low, and further research is required to draw a solid conclusion.

Our intuition is that a positive and significant relationship between FDI, technology and human capital will be present, regardless of the level of economic development. In this context, developing countries could pledge on making efforts for retrieving the economic gap and investing in technology and improving the quality of human resources for accelerating this process.

## *Methodology and data*

Our empirical approach aims to identify FDI determinants on a sample of 97 countries and to establish whether there are differences in the factors that attract foreign investors based on the development level of the host location. In addition, we test if FDI determinants have changed after the economic crisis with a specific focus on establishing the importance of institutional quality, technology and high-skilled human capital. In comparison to most studies that are usually centred on a division between developed and developing countries, we prefer to have a more in-depth overview of FDI determinants based on the income level of the host countries. Therefore, we divide our sample into 38 high-income, 50 middle-

income and 9 low-income countries, following the UN classification (2014). The list of countries is provided in Appendix. A similar division is performed by Sabir et al. (2019) and Hayat (2019).

In a similar manner to most studies dealing with an akin research question (Mathur and Singh, 2013; Lucke and Eichler 2015), we use panel regressions in order to test for FDI determinants. We start from the basic model described in Equation (1):

$$y_{i,t} = a + b_1 X_{i,t} + b_2 Z_{i,t} + b_3 W_{i,t} + \delta_i + e_{i,t} \tag{1}$$

where *y* is the dependent variable, measured as the inward FDI flows received by country *i* at time *t*, with *i* = 1, …, *N*, and *t* = 1, …, *T*, *a* is the constant term, X is a vector of macroeconomic variables and demographic characteristics of the host country which include some of the most used variables as FDI determinants in the literature, Z is a vector encompassing the variables expressing institutional quality and W captures the proxies for technological and human capital endowments, $\delta_i$ is the individual error component and $e_{i,t}$ is the random disturbance, $e_{i,t} \sim$ IID(0, $\sigma_u^2$). The fixed or random effects are chosen following specific statistical tests. To the baseline model including macroeconomic variables, endowment with natural resources and communication infrastructure, we gradually add the variables encompassing the quality of institutions and those expressing the endowment with technology and skilled human capital in order to avoid correlation biases.

In the first phase, our analysis is carried out for 1997-2017, being focused on evaluating the impact of the macroeconomic variables, endowment with natural resources, communication infrastructure and institutional quality on FDI inflows. In the second phase, we narrow our observed period to 2008-2017 in order to assess whether there are changes in FDI determinants following the economic crisis in 2007, and to take into account the impact of technological endowments and human capital on attracting FDI. Data were available only during this timeframe the whole sample of countries. A similar approach is found in Kayalvizhi and Thenmozhi (2017).

Our dependent variable is FDI inflows, expressed in million US dollars at current prices, which was deflated by the US GDP deflator (2005 = 100). In the baseline model, we will test the impact of the most used variables in the literature for establishing FDI determinants. These variables are forming the X vector of variables. We use the GDP growth rate (GDPG) as a proxy for market size, indicating whether an expanding economy attract FDI inflows (Aziz and Mishra, 2015). As we cannot use GDP for rendering the size of the market due to collinearity with FDI, we are employing population (POP) in order to express the market-seeking motivations of foreign investors. For expressing the freedom of the market, we use trade openness (OPEN), calculated as the GDP share of the sum of exports and imports. As the variables count for the restrictions over capital (Busse and Hefeker, 2007), we expect that the greater the commercial opening, the more attractive the host location will be to foreign investors. Inflation (CPI), expressed as the annual average growth rate of the consumer price indices, is a proxy for macroeconomic stability. Therefore, we expect a negative relationship with FDI, but we also take into account the results of previous studies, which found a positive impact of inflation on FDI (Garibaldi et al., 2002; Campos and Kinoshita, 2003; Aziz and Mishra, 2015).

FDI resource-seeking behaviour is investigated through two variables that capture the endowment with natural resources of host locations: the share in total merchandise exports of fuel (FUEL) and ore (ORE). We expect a positive relationship between the variables expressing the natural resource export intensity and FDI, in line with the results of most

studies, but with differences depending on the countries' level of development, as stated in the literature.

The variables expressing the development of the communication infrastructure are a proxy for efficiency-seeking FDI. In line with other studies on FDI determinants, we use the number of mobile cellular subscriptions per 100 inhabitants (MOB) and the quality of overall infrastructure as a proxy for transport infrastructure (INFR). For both of them, we envisage a positive impact on FDI.

This paper emphasizes the role of institutions in attracting FDI. Therefore, we use several variables that capture the state of institutional quality using the data provided by the Heritage Foundation and the World Bank's Worldwide Governance Indicators, which are forming the Z vector of determinants. The advantage of these indicators is that they usually cover all the countries and provide comparable data. The index of economic freedom (HER), computed by the Heritage Foundation, is a measure of the ability of a country to create free markets in which competitiveness is enhanced based on property rights. We also use the six institutional indicators grouped under the World Bank's Worldwide Governance Indicators (WGIs) in order to better capture the multi-faceted construct of institutional quality: voice and accountability (VCC), political stability (PST), government effectiveness (GEF), regulatory quality (RGQ), rule of law (RLW) and control of corruption (COR). As each indicator is expressed on a scale from weak to strong institutional performance, we expect that a positive relationship with FDI indicates that good institutions are attractive for foreign investors. We use variables of institutional quality from both sources for robustness checks. The explanation for each indicator is provided in Table 1. Such indicators are used either individually in similar studies (Mengistu and Adhikary, 2011; Alam and Shah, 2013; Lucke and Eichler, 2015), or in the form of composite indices (Kayalvizhi and Thenmozhi, 2017; Sabir et al., 2019). We prefer to use them individually to better assess the differences between the groups of countries. Moreover, in this way we intend to cover a gap in the literature, as highlighted by Dellis et al. (2017), who notices that only a few studies are investigating the quality of institutions in advanced economies and the Euro area. As until 2001 such indicators were provided once every two years, we use interpolations for the missing data, a procedure also employed by Lucke and Eichler (2015).

We use several proxies to assess the technology and innovation of host locations, grouped in the W vector of variables. TECH is a measure for technological development, indicating the capacity of a host location to provide access to the latest technologies, while INNOV measures the capacity for innovation of a country. SUP provides the dimension of the quality of local suppliers. SCI is a variable that expresses the availability of scientists and engineers, pointing towards the importance of highly skilled human capital in facilitating access to technologies. All these variables express executives' opinions, following the surveys carried out by the World Economic Forum and derived from different editions of the Global Competitiveness Report. In addition, we add several variables for capturing the impact of skilled labour on foreign investors. Besides the usual variables expressing skilled labour, such as the secondary (SEC) and tertiary (TER) education enrolment, measured as a percentage of gross enrolment ratio, we also use the quality of the education system (EDU) as a proxy for the overall standard of human capital.

Table 1 provides a brief description of the variables, indicating the measurement unit and the source. Some of the variables were log-transformed for reducing skewness in data (FDI, OPEN, SUP, EDU).

**Table 1**

**List of variables**

| Variable | Indicator | Data sources |
|---|---|---|
| *Dependent variable* | | |
| FDI | Inward FDI flows, US Dollars at current prices in millions, adjusted with inflation | UNCTAD |
| *Independent variables* | | |
| GDPG | GDP annual average growth rate | UNCTAD |
| POP | Annual growth rate of population | World Bank |
| OPEN | Sum of exports and imports as % of GDP | World Bank |
| CPI | Annual average growth rate of consumer price indices | UNCTAD |
| MOB | Mobile cellular subscriptions per 100 people | World Bank |
| FUEL | Fuel exports as % of merchandise exports | World Bank |
| ORE | Ores and metals exports as % of merchandise exports | World Bank |
| VCC | Voice and accountability index | Kaufmann and Kraay (2019) |
| PST | Political stability and absence of violence index | Kaufmann and Kraay (2019) |
| GEF | Government effectiveness index | Kaufmann and Kraay (2019) |
| RLW | Rule of law index | Kaufmann and Kraay (2019) |
| COR | Control of corruption index | Kaufmann and Kraay (2019) |
| RGQ | Regulatory quality index | Kaufmann and Kraay (2019) |
| HER | Index of economic freedom | Heritage Foundation |
| SUP | Local supplier quality, index, 1-7 (best) | Global Competitiveness Report |
| SCI | Availability of scientists and engineers, index, 1-7 (best) | Global Competitiveness Report |
| SEC | Secondary education enrollment, gross % | Global Competitiveness Report |
| TER | Tertiary education enrollment, gross % | Global Competitiveness Report |
| EDU | Quality of the education system, 1-7 (best) | Global Competitiveness Report |
| TECH | Availability of latest technologies, index, 1-7 (best) | Global Competitiveness Report |
| INNOV | Capacity for innovation, index, 1-7 (best) | Global Competitiveness Report |
| INFR | Quality of overall infrastructure, index, 1-7 (best) | Global Competitiveness Report |

In testing for unit roots, we mainly rely on the Harris and Tzavalis (1999) panel unit root test. A similar approach is conducted in Dellis et al. (2017). We also confront our results with those obtained by applying Levin, Lin and Chu (2002) and the Im–Pesaran–Shin W-tests (Im et al., 2003) tests (results are available upon request). Following the results, we cannot reject the null hypothesis that the series contain unit roots in the case of MOB, COR, VCC, SEC, LAB, INNOV, therefore we use the first difference, while we employ the rest of the variables in levels, as the null hypothesis is rejected this time. We cover several steps for identifying the most suited model for FDI inflows. Following the results under the Breusch-Pegan multiplier test and F-test, we established that pooled OLS estimation is not applicable in our case; therefore, we step further in identifying the appropriateness of either a fixed or random-effect model. The Hausman (1978) test statistics rejects the null hypothesis, which states that the random-effects model is the preferred one, therefore we will relate to a fixed-effects model.

According to Plümper et al. (2005) and Siladjic and Mehic (2015), we further check for heteroskedasticity and autocorrelation in our data. The results of the modified Wald test in fixed effect regression confirm the presence of heteroskedasticity. In this case, while the

coefficients of the estimates are not affected, the standard errors could be biased, which influences the interpretation of our final results. In addition, based on the Wooldridge test for autocorrelation in panel data, we also find autocorrelation in our panels, which causes biased standard errors, the property of the best linear unbiased estimator (BLUE) is violated and the coefficients are no longer asymptotically efficient (Siladjic and Mehic, 2015). In order to obtain viable results, we compute the t-statistics by using robust SEs clustered on the country pair level (Bénassy-Quéré et al., 2007; Lucke and Eichler, 2015). In order to avoid multicollinearity problems, we gradually introduce the variables in the model, based on the results provided by the correlation matrix (which is available upon request). We have also developed alternative estimations for considering cross-section dependence and heterogeneity, such as the Hoechle (2007) robust standard errors for panel regressions with cross-sectional dependence, developed based on Driscoll-Kraay standard errors estimator (due to page limits, the results are available upon request).

## *Results and discussions*

Table 2 reports the results for 1997-2017 starting from the baseline model, to which the institutional quality variables are added. As we obtain high correlation among these variables, similar to Bénassy-Quéré et al. (2007), Dellis et al. (2017), Sabir et al. (2019), we cannot include all of them in a single equation. Therefore, we compute different equations for each indicator. For improving the visibility of our calculations, we report the results only for the models in which the coefficient of the institutional variable was significant. We notice high robustness of the other variables, as the sign and the statistical significance of the coefficients remain the same, no matter the added institutional quality variables. As the Hausman test indicated the use of the fixed effects (FE) model, the results under the FE specification are reported. Table 3 provides the results for similar specifications, but this time for the 2008-2017 timeframe, in order to reflect the impact of the economic crisis.

We find strong evidence that growing markets attract FDIs. We report a positive and significant coefficient of GDPG for both intervals and all groups of countries, except for the low-income economies. The result is consistent with the previous literature, which points towards the market-seeking behaviour of FDI. In the case of a mixed sample of countries these include Saini and Singhania (2018), for high-income countries Dellis et al. (2017) and in the case of developing and middle-income countries Nonnenberg and de Mendonça (2004) or Demirhan and Masca (2008).

We emphasize that the impact of GDPG on attracting FDI decreases as the income of the countries becomes smaller. Therefore, the economic perspectives have higher importance for foreign investors in high-income countries, followed by middle-income countries, while in the group of low-income countries the coefficient of GDPG is not significant at all, neither for the 1997-2017 interval, nor for 2007-2017. The result is even more predictable if we consider the interpretation for GDPG provided by Busse and Hefeker (2007), namely a factor indicating the extent of returns on investment. A similar lack of impact of GDPG in the case of less developed countries is obtained by Asiedu (2002) on a sample of African countries. Besides, Saini and Singhania (2018) find a positive and significant impact of GDP growth on a sample of developed economies, but not for developing ones.

Table 3

**FDI determinants during 1997-2018**

| | All countries | | | | | High-income countries | | Middle-income countries | | | | | Low-income countries | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pop | 0.078 | 0.079 | 0.073 | 0.066 | 0.067 | 0.138 | 0.135 | 0.049 | 0.053 | 0.020 | 0.021 | 0.006 | -0.149 | -0.145 | 0.093 |
| | (1.22) | (1.25) | (1.15) | (1.07) | (1.1) | (1.37) | (1.34) | (0.74) | (0.8) | (0.29) | (0.29) | (0.09) | (-1.47) | (-1.47) | (0.75) |
| gdpg | 0.021*** | 0.021*** | 0.021*** | 0.022*** | 0.027*** | 0.040** | 0.040** | 0.018** | 0.019** | 0.018** | 0.020** | 0.024* | -0.011 | -0.016 | -0.011 |
| | (2.67) | (2.68) | (2.74) | (2.82) | (3.53) | (2.64) | (2.61) | (2.04) | (2.09) | (2.29) | (2.35) | (2.89) | (-0.33) | (-0.4) | (-0.39) |
| eopen | 0.776*** | 0.763*** | 0.696*** | 0.723*** | 0.640** | 1.138* | 1.109* | 0.267 | 0.254 | 0.197 | 0.238 | 0.183 | 2.665*** | 2.678*** | 2.003*** |
| | (3) | (2.95) | (2.86) | (2.93) | (2.54) | (2.01) | (1.97) | (0.86) | (0.81) | (0.69) | (0.82) | (0.64) | (3.98) | (3.96) | (4.32) |
| cpi | 0.001 | 0.001 | 0.001 | 0.0001 | 0.001 | 0.071** | 0.070** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | -0.006 | -0.005 | -0.008 |
| | (0.07) | (0.06) | (0.65) | (1.29) | (1.33) | (2.38) | (2.36) | (-1.04) | (-0.98) | (-0.13) | (0.92) | (1.04) | (-0.58) | (-0.51) | (-1.13) |
| d.mob | 0.016*** | 0.016*** | 0.015566*** | 0.0154*** | 0.016*** | 0.016** | 0.016** | 0.014*** | 0.014*** | 0.014*** | 0.014*** | 0.014*** | 0.029* | 0.028* | 0.034** |
| | (4.38) | (4.38) | (4.3) | (4.27) | (4.47) | (2.62) | (2.64) | (3.43) | (3.41) | (3.57) | (3.32) | (3.43) | (2.06) | (1.98) | (2.59) |
| ore | 0.020*** | **0.020***** | 0.023119*** | 0.021*** | 0.019*** | 0.033* | 0.032** | 0.010 | 0.010 | 0.013 | 0.012 | 0.011 | 0.008 | 0.009 | 0.006 |
| | (2.73) | (2.78) | (3.24) | (3.16) | (2.81) | (1.81) | (1.74) | (1.27) | (1.26) | (1.66) | (1.52) | (1.43) | (0.74) | (0.86) | (0.68) |
| fuel | 0.002 | 0.002 | 0.002962 | 0.003 | 0.001 | 0.016 | 0.016 | -0.003 | -0.003 | -0.003 | -0.001 | -0.004 | -0.001 | 0.001 | 0.003 |
| | (0.23) | (0.24) | (0.43) | (0.48) | (0.21) | (1.28) | (1.28) | (-0.34) | (-0.35) | (-0.3) | (-0.17) | (-0.47) | (-0.02) | (0.03) | (0.09) |
| d.cor | | | | | | | | | -0.382* | | | | 1.063* | | |
| | | | | | | | | | (-1.71) | | | | (2.2) | | |
| d.vcc | | -0.427** | | | | | -0.722 | | | | | | | | |
| | | (-2.46) | | | | | (-2.28) | | | | | | | | |
| gef | | | 0.651*** | | | | | | | 0.802*** | | | | | |
| | | | (3.36) | | | | | | | (4.21) | | | | | |
| rgq | | | | 0.769*** | | | | | | | 0.943*** | | | | |
| | | | | (3.91) | | | | | | | (5.45) | | | | |
| her | | | | | 0.036678*** | | | | | | | 0.045*** | | | 0.084** |
| | | | | | (3.42) | | | | | | | (4.55) | | | (2.97) |
| const | 3.800*** | 3.851*** | 3.874*** | 3.700*** | 2.057* | 2.695 | 2.832 | 5.905*** | 5.951*** | 6.310*** | 6.055*** | 3.622*** | -5.364 | -5.430* | -8.262*** |
| | (3.53) | (3.58) | (3.76) | (3.57) | (1.79) | (1.08) | (1.14) | (4.82) | (4.79) | (5.62) | (5.3) | (2.87) | (-1.84) | (-1.86) | (-3.5) |
| F test | 9.35*** | 8.81*** | 9.06*** | 9.36*** | 10.41*** | 8.64*** | 8.21*** | 7.34*** | 6.44*** | 12.61*** | 11.96*** | 8.05*** | 31.22*** | 204.5*** | 78.36*** |
| Obs | 1970 | 1970 | 1970 | 1970 | 1959 | 752 | 752 | 1029 | 1029 | 1029 | 1029 | 1021 | | 188 | 185 |

*Note: \*\*\*, \*\*, \* indicates a significance at a 1%, 5% and 10% confidence interval. Standard Errors are reported in parentheses.*

The trade openness variable is positive and significant in most specifications and the impact on FDI is the highest among all the variables we used. Therefore, trade liberalization appears to be more important for foreign investors than the growth potential of the markets. Lucke and Eichler (2015) find a positive impact of trade openness on FDI for the full sample of 65 developed and developing countries, while Nonnenberg and de Mendonça (2004) support the same result for their sample of 38 developing economies over 1975–2000 and Demirhan and Masca (2008) confirm a similar behavior for the 2000-2004 interval. The impact of trade openness on FDI is even higher in low-income countries, for both intervals, confirming the importance foreign investors give to open economies. A similar positive sign is also found in Anyanwu (2012). Saini and Singhania (2018) indicate a positive and significant relationship between FDI and trade openness only for the nine developing countries taken into account during 2004-2013; the variable is not significant for the developed countries. We obtain a similar result for the high-income countries, but in addition we report even a negative sign.

In most cases, the impact of CPI on attracting FDI is not significant. The only exceptions are those of the high-income group for the 1997-2017 interval, where a positive relationship is established between inflation and FDI inflows, and of the middle-income countries during 2007-2017, in which we obtain the expected negative sign between the two variables. The literature provides mixed results for the interaction between FDI and CPI and a positive and significant coefficient for CPI is also signaled by Garibaldi et al. (2002), Campos and Kinoshita (2003) or Aziz and Mishra (2015). This may be potentially because inflation could be related to other policy factors that affect FDI. On the other side, Lucke and Eichler (2015) are among the few who have managed to find a negative relationship between inflation and FDI in both developed and developing countries.

For the 1997-2017 timeframe we generally find positive coefficients for both ORE and FUEL but less significant than expected. In the case of the whole sample of 97 countries, foreign investors are attracted by the abundance of ore minerals but not by countries rich in fuel. Moreover, we find a positive impact of ORE in high-income countries, but not in developing countries, contrary to the results indicating the concentration of foreign investments in emerging or low-income countries obtained in several studies (Nunnenkamp, 2002; Anyanwu, 2012). Our result is more in line with Lucke and Eichler (2015), who find a negative relationship with natural resources, concluding that abundant countries receive less FDI.

The situation changes, however, when we focus on the 2008-2017 interval, as both coefficients of natural resources become insignificant for the whole sample of countries, including the high and middle-income nations (similar to the lack of significance also found by Lopez (2010). Instead, the result obtained for the low-income countries seems more in line with recent studies, as the coefficient of fuel is positive and significant. We do not find statistical significance for ORE. Anyanwu (2012) states that natural resources have a huge role in attracting FDI, and oil-exporting countries in Africa attract more FDI than the others. Mohamed and Sidiropoulos (2010) use the percentage of fuel exports in total merchandise exports and find a positive and significant impact on FDI for African countries observed between 1984 and 2003. However, Bokpin et al. (2015) show that FDI inflows depend on the type of natural resource in 49 African countries, which could explain our results for the low-income states. A similar result is provided by Asiedu and Lien (2011) for 112 developing countries, who explain FDI distribution in locations that are abundant in natural resources on the basis of the degree of democracy in the host country.

The dependence on good communication infrastructure is documented by the results obtained in almost all specifications. The coefficient of MOB is significant in all groups of countries for 1997-2017 and for the high-income group of countries starting with 2008. Our

results are in line with those of Demirhan and Masca (2008), Asiedu and Lien (2011), or Lucke and Eichler (2015). For 10 OECD member states, Alam and Shah (2013) show a positive and significant relationship between infrastructure (measured as the number of telephone lines per 100 people) and FDI during 1985-2009, while Mengistu and Adhikary (2011) find a positive and significant relationship in a mixed sample of developing and developed Asian countries.

For middle and low-income nations, although we generally obtain the positive expected sign, the coefficient is not significant, which further affects the results for the whole sample of countries during 2008-2017. Mathur and Singh (2013) find a negative but insignificant impact of telephone lines in developing economies. One of the explanations for our result could reside in the fact that, after the crisis, other factors become more important for foreign investors, such as the endowments with technology and skilled human capital, as we will explain below. However, other studies are pointing to similar results. For low-income countries, Mohamed and Sidiropoulos (2010) obtain a similar insignificant result when using the number of telephone line subscriptions per thousand persons as a proxy for infrastructure. Campos and Kinoshita (2003) observe that there is an important difference between transition economies in Eastern Europe and Baltic countries in terms of infrastructure. In their case, the communication infrastructure is significant in attracting FDI only in the case of the second group of economies.

Transport infrastructure (INFR) is significant for FDI for the whole and middle-income samples of countries starting with 2008. The results of our study confirm previous findings. Goodspeed et al. (2006) conclude that the level of development of a country has a different impact on shaping infrastructure development as a factor for attracting foreign investors. Leibrecht and Riedl (2010) state that infrastructure has a particular impact on attracting FDI especially in developing and transition countries, while Goodspeed et al. (2009) point that FDI flows are more sensitive to infrastructure in developing host countries than in developed ones.

There are only two exceptions where coefficients are not significant, both of them in the period after the crisis. In the baseline model, the coefficient of MOB becomes insignificant for middle-income countries although we obtain the expected sign, and the model specifications for the low-income countries become volatile, as we scarcely find significant variables in attracting FDI in the 2008-2017 interval, except for trade openness and fuel exports. We could thus assume that the economic crisis and the subsequent turbulences strongly affected the trust of the investors in these economies. In addition, we conclude that FDI seeking natural resources are the apanage of low-income countries or African countries in this group than of all developing countries, as the impact in middle-income countries is not significant in attracting FDI. It seems that investments looking for efficiency went down, while those exploiting natural resources and especially fuel have remained constant. The capacity to export such resources is also important, as the trade openness coefficient continues to be significant.

Only a part of the institutional quality variables has a significant impact on FDI. Their influence is manifested in the models applied for the larger sample of years (1997-2017) and especially for middle and low-income countries. During these years the above-mentioned countries saw major transformations of their economies and institutional environments, enhanced by different circumstances such as the creation and adhesion to free trade agreements (Donnenfeld, 2003) at regional levels in different parts of the world, or major economic reforms (Carstensen and Toubal, 2004). The major economic crisis in 2007-2008 affected both the investment capacity of investors in developed and emerging countries and

their trust in the capacity of the host locations to generate returns on their investments. The quality of the institutional environment became less important for foreign investors, who had to ensure the profitability of their investments.

HER is one of the proxies for the institutional quality which is positive and significant in most of the models for the 1997-2017 interval, except for the high-income countries and for the group of the middle-income economies in 2008-2017. The results obtained so far in the literature are mixed. For the full country sample, including 65 developed and developing countries evaluated from 1995 to 2009, Lucke and Eichler (2015) establish that the Freedom variable provided by the Heritage Foundation is significant for FDI. In addition, the variable is significant for developing countries, but not for developed ones. On the contrary, Saini and Singhania (2018) report a lack of significance for the freedom index in developing countries, but a significant impact for developed ones between 2004 and 2013.

We also find regulatory quality (RGQ) as a significant FDI determinant for the whole sample of countries, as in Lucke and Eichler (2015), and the medium-income countries. In addition, a positive and significant relationship is established between FDI and government effectiveness (GEF), which is also a significant determinant for medium-income countries. A high level of corruption will deter investments in low-income countries (which is similar to the results found by Basemera et al., 2012), but will attract those in medium-income countries. Such a result could have two explanations. On the one hand, it draws attention that in countries with large market access, or which have significant growth perspectives or are abundant in resources, the focus on these advantages is more important than the quality of institutions. On the other hand, it aligns to the stream of literature which suggests that corruption in certain locations is assumed and dealt with, either because those are the remaining available locations (Gammeltoft and Fasshauer, 2017), or because, in the case of emerging economies such as China, which are backed by the government, the profit is not the main motivation of the foreign investment (Buckley et al., 2007).

A less expected result is the negative and significant relationship between FDI and VCC for the whole sample and the high-income countries for the 21 years. It reflects the fact that less free locations in terms of expression, media, association, and selection of the government are rather preferred by foreign investors. This could emerge following the foreign investors' quest for locations with a lower level of democracy. A lack of significance for VCC is also found by Mengistu and Adhikary (2011) in 15 Asian economies for the 1996–2007 period. On the contrary, the result provided by Lucke and Eichler (2015) for VCC is either positive and significant related to FDI, or not significant, depending on the empirical specification.

The institutional quality variables after the economic crisis turned out not to be significant for foreign investors, with a few exceptions. PST and RGQ remain important in attracting FDI for the whole sample of 97 countries, while PST and HER are significant in increasing FDI flows in middle-income countries. We did not find significant institutional variables for high and low-income countries for this interval, but this could also derive from the reduced number of degrees of freedom, as the number of observations decreases as a result of limiting the analyzed timeframe.

The impact of institutional quality indicators on FDI are generally dependent on the level of development of the host location, on the analyzed period of time and region, and are highly mixed. For example, Alam and Shah (2013) do not find any evidence that political stability enhanced FDI inflows in OECD countries during 1985-2009. On the other hand, Mengistu and Adhikary (2011) find a positive and significant impact of political stability, government effectiveness, rule of law and control of corruption in 15 Asian economies. Except for the

rule of law, we find similar results in our study, but with variations depending on the sample of countries.

Instead, other variables turn out to be more important than institutional determinants for the 2008-2017 interval. The results that document the impact of the variables expressing the technology and human capital endowment are reported in Table 3.

The impact of skilled labour and education on FDI is evidenced through the positive and significant coefficients of SEC, EDU and SCI for the entire sample of countries. This suggests that foreign investors are looking for both skilled people with average studies and specialists, such as scientists and engineers who are able to use and create new technology. At the same time, the quality of the education system is a factor for enhanced FDI inflows. Nonnenberg and de Mendonça (2004) also find a positive effect of the level of schooling on FDI for their panel of 38 developing economies, while Sekkat and Veganzones-Varoudakis (2007) and Mengistu and Adhikary (2011) show a similar relationship between FDI and the secondary school enrolment ratio.

There are differences between countries related to the endowments with skilled human capital. While the population with secondary studies is the main interest of investors in high-income countries, those in middle-income economies are rather interested in the quality of the whole education system. The insignificance of other education variables for these countries could be because there is not a high variance among these countries, as there are already high levels of highly educated human capital Kinoshita and Campos, 2006).

Finally, in low-income countries, a higher number of scientists and engineers and the population with tertiary studies will direct larger inflows of FDI. This could be a consequence of the fact that highly skilled human capital originating in the host location is needed for the sectors targeted by foreign companies and for dealing with technological and R&D requirements. According to Noorbakhsh et al. (2001), FDI in developing countries started to target more sophisticated industries, with developed technologies, which further require more skilled human capital. The explanation is justified in our case, as the coefficient of the latest technology (TECH) is positive and significant for both middle and low-income countries. We do not obtain a significant coefficient for developed countries, but such a result could be the consequence of the fact that technology is relatively more homogeneous across high-income countries. The positive and significant relationship between TECH and FDI for the whole sample of countries confirms the above explanation and emphasizes the importance of technology in attracting FDI. A similar result is obtained by Kayalvizhi and Thenmozhi (2017). However, contrary to the results obtained in their study, we do not find that the capacity of innovation could attract FDI in any group of countries.

Table 3

**FDI determinants during 2008-2017**

| | All countries | | | High-income countries | | Middle-income countries | | | Low-income countries | |
|---|---|---|---|---|---|---|---|---|---|---|
| pop | -0.093 | -0.126 | -0.114 | -0.124 | -0.119 | -0.212 | -0.281 | -0.212 | -0.030 | 0.094 |
| | (-0.71) | (-0.97) | (-0.91) | (-0.86) | (-0.82) | (-1.28) | (-1.68) | (-1.34) | (-0.07) | (0.24) |
| gdpg | 0.027** | 0.025** | 0.025** | 0.047** | 0.046** | 0.018 | 0.017 | 0.018* | 0.009 | 0.008 |
| | (2.49) | (2.36) | (2.34) | (2.16) | (2.08) | (1.65) | (1.61) | (1.71) | (0.21) | (0.2) |
| eopen | 0.558* | 0.646** | 0.585** | -0.570 | -0.576 | 0.715** | 0.889** | 0.699** | 1.444*** | 1.279*** |
| | (1.86) | (2.22) | (2.03) | (-0.65) | (-0.66) | (2.04) | (2.67) | (2.07) | (5.08) | (5.43) |
| cpi | -0.004 | 0.000 | -0.003 | 0.036 | 0.036 | -0.021** | -0.013 | -0.019** | 0.002 | 0.005 |
| | (-0.36) | (0.01) | (-0.28) | (0.8) | (0.8) | (-2.5) | (-1.22) | (-2.69) | (0.11) | (0.32) |
| d.mob | 0.006* | 0.006 | 0.006 | 0.014* | 0.014* | 0.001 | 0.001 | 0.001 | -0.002 | 0.001 |
| | (1.7) | (1.61) | (1.53) | (1.71) | (1.78) | (0.42) | (0.3) | (0.43) | (-0.22) | (0.09) |
| ore | 0.001 | -0.001 | 0.001 | 0.029 | 0.027 | 0.016 | 0.016 | 0.015 | -0.005 | -0.004 |
| | (0.07) | (-0.06) | (0.1) | (1.07) | (1.01) | (1.24) | (1.36) | (1.17) | (-0.33) | (-0.31) |
| fuel | 0.008 | 0.009 | 0.009 | 0.035 | 0.034 | 0.002 | 0.003 | 0.003 | 0.050* | 0.050* |
| | (1.51) | (1.54) | (1.65) | (1.52) | (1.51) | (0.53) | (0.67) | (0.81) | (1.98) | (1.99) |
| pst | | 0.354** | | | | | 0.463** | | | |
| | | (2) | | | | | (2.54) | | | |
| rgq | | | 0.569** | | | | | | | |
| | | | (2) | | | | | | | |
| her | | | | | -0.014 | | | 0.036** | | 0.046 |
| | | | | | (-0.53) | | | (2.18) | | (1.42) |
| const | 5.164*** | 4.817*** | 4.825*** | 10.467*** | 11.498*** | 4.507V | 4.008V | 2.353 | -0.478 | -2.926 |
| | (4.14) | (4.01) | (4.06) | (2.82) | (3.2) | (3.18) | (2.99) | (1.4) | (-0.28) | (-1.05) |
| F test | 3.26*** | 3.62*** | 4.65*** | 3.44*** | 3.05*** | 2.92*** | 5.03*** | 3.37*** | 25.72*** | 672.77*** |
| Obs | 841 | 841 | 841 | 318 | 318 | 442 | 442 | 442 | 81 | 79 |

*Note: \*\*\*, \*\*, \* indicates a significance at a 1%, 5% and 10% confidence interval. Standard Errors are reported in parentheses.*

# Conclusions

In this paper, we empirically examined FDI determinants on a sample of 97 countries considering two intervals, namely 1997-2017 and 2008-2017, in which a special focus was added on the quality of institutions, technology and human capital endowments. In searching for an in-depth overview of FDI determinants, our initial sample of countries was divided into three sub-groups based on the development level, thus evaluating high, middle and low-income countries. While there are, in general, some similar common FDI determinants, such as GDP growth, trade openness or communications infrastructure, the statistical significance for the rest of the variables is volatile and depends on the development level or the period of time in which the analysis is carried out. We also give evidence for a shift in FDI determinants, although not every time in accordance with the expected evolution from traditional determinants to created resources.

Our results indicate that trade openness is the most significant factor in attracting FDI during the 1997-2017 interval. Other determinants enhancing FDI are the growth perspectives represented by GDPG, the development of the communications infrastructure and the abundance of ore resources. Among the institutional quality variables, economic freedom, the effectiveness of the government and the regulatory quality have an important potential in shaping a more favorable environment for FDI, while too high levels of voice and accountability (i.e. freedom of expression, media, association and political decision making) could deter investors. The consequences of the crisis lead to less importance directed towards the abundance of the resources or the quality of institutions. However, trade openness, GDPG, infrastructure development, and regulatory quality are the variables which continue to be significant. This time, more importance is given to locations with high political stability, as compared to the previous situation. On the contrary, variables expressing efficient and strategic-asset endowments are significant in increasing FDI inflows. The availability of the latest technology and high quality of the local supplier encourages FDI. We also find that locations where skilled labor, including scientists and engineers, and a high-quality education system are present increase the attractiveness for FDI. This emphasizes the importance of highly skilled labor force in dealing with the adaptation, implementation, and production of new technologies.

The profile of high-income countries shows an even higher impact of trade openness in attracting FDI, with a similar positive impact of GDPG and infrastructure development. We find that countries rich in ore resources have more chances to attract FDI during 1997-2017 and we identify a positive relationship between FDI and CPI, which could be due to endogeneity. The situation changes after the crisis, as only GDPG and mobile infrastructure remain significant variables. No proxy of institutional quality or technology availability has a significant impact on FDI, but this could be a consequence of the fact that there are not large variations between countries. The variables that shape, however, the host location attractiveness for FDI, are the quality of local suppliers and the share of population with secondary studies.

Middle-income countries are attractive for FDI due to the quality of institutions, which has the highest impact on FDI inflows, and to a less extent by the market growth perspectives and the telecommunication development for the 1997-2017 interval. Government effectiveness, regulatory quality, and economic freedom are the variables shaping the institutional environment, while a higher level of corruption also enhances FDI. The situation changes after the economic crisis. Foreign investors are more concerned about the stability at both macroeconomic and institutional levels, as the degree of inflation becomes a warning

signal for foreign investors, while political stability becomes attractive. Growth perspectives are considered only if they could be guaranteed by economic freedom, therefore we obtain a significant result for GDPG only when we add HER to the model. The quality of the overall education system and the availability of the latest technologies are also important factors for attracting FDI. In addition, while the telecommunication infrastructure becomes insignificant after this period (potentially as a result of less heterogeneity among countries), the quality of overall transport infrastructure has a positive and significant impact on FDI.

Finally, the attractiveness of low-income countries during 1997-2017 is strongly shaped by their level of openness, the capacity to provide access to telecommunication infrastructure and to ensure a free economic environment with a low degree of corruption. Starting with 2008, while the interest in high trade liberalization remains significant, we see a reorientation of investors' interests towards countries abundant in fuel resources. Moreover, highly educated labor force is expected, a result which is strengthened by three variables with a significant impact on FDI: the availability of scientists and engineers, population with tertiary studies and the quality of the education system. Furthermore, the availability of technology will improve the chances of these economies to further attract FDI inflows.

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# Appendix

List of the countries used in the study:

**High-income countries**: Australia, Austria, Bahrain, Barbados, Belgium, Canada, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Kuwait, Latvia, Netherlands, New Zealand, Norway, Poland, Portugal, Saudi Arabia, Singapore, Slovak Republic, Slovenia, Spain, Swede, Switzerland, United Kingdom, United States.

**Middle-income countries**: Albania, Algeria, Argentina, Armenia, Azerbaijan, Bolivia, Brazil, Bulgaria, Cameroon, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Georgia, Ghana, Guatemala, Guyana, Honduras, India, Indonesia, Jamaica, Jordan, Kazakhstan, Lithuania, Malaysia, Mauritius, Mexico, Morocco, Nigeria, North Macedonia, Pakistan, Panama, Paraguay, Peru, Philippines, Romania, Russian Federation, Senegal, South Africa, Thailand, Tunisia, Turkey, Ukraine, Uruguay, Vietnam.

**Low-income countries**: Benin, Burkina Faso, Kyrgyz Republic, Madagascar, Malawi, Rwanda, Tanzania, Uganda, Zambia