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Abstract

The main objective of this study is to analyze the relevance of economic and institutional factors in shaping the dynamics of Foreign Direct Investment (FDI). To this end, several econometric analyses are conducted to examine the determinants of FDI inflows. The results indicate that, across a panel of countries, factors such as market size, exchange rate policy, the degree of trade openness, and the quality of public governance—including political stability, adherence to the rule of law, government efficiency, and regulatory quality—are decisive for attracting foreign capital. In the specific case of Brazil, the study reveals that both domestic and external factors significantly influence capital inflows. GDP growth, a more appreciated exchange rate, greater openness to international trade, macroeconomic stability, and a more developed financial market—with improved access to credit—constitute fundamental elements for attracting international investors. Furthermore, a favorable external environment, particularly in periods of buoyant global stock markets, also contributes to increased capital flows to the country.

Keywords: Foreign Direct Investment; Capital flows; Brazil; Reforms

JEL Classification: F21; F23; F41.

1 Introduction

Foreign Direct Investment (FDI) has the potential not only to expand a country's stock of physical capital but also to enhance productivity through the introduction of innovative technologies, the modernization of production processes, and the diffusion of sound management practices. In the context of persistent fiscal constraints, low domestic savings rates, and stagnant public and private investment in strategic sectors, FDI emerges as a relevant alternative for stimulating economic growth, particularly in emerging economies.

In sectors such as energy, transportation, sanitation, telecommunications, and logistics, the participation of foreign investors has proven essential to addressing historical financing gaps, improving service quality, and expanding the economic connectivity of the national territory. Against a backdrop of heightened environmental commitments and rising demand for sustainable investments, foreign capital can also play a relevant role in supporting the transition to a low-carbon economy. Latin American countries (LAC), for example, given their comparative advantages in natural resources and their potential to lead the bioeconomy and renewable energy agenda, are strategically positioned to attract FDI flows directed toward green infrastructure.[1]

Foreign direct investment (FDI) can also play a key role in countries' insertion in global value chains (GVCs). International productive integration is widely recognized as a driver of productivity growth and technological sophistication, particularly in developing economies. Urata and Baek (2022) show that participation in GVCs is positively associated with firm performance, highlighting that Japanese companies inserted in global production networks are systematically more productive than those operating only in domestic markets. In addition, the longer the time spent in global chains, the more robust the productivity gains tend to be. The COVID-19 pandemic has created windows of opportunity for the reconfiguration of international production flows. In fact, the search for greater resilience in supply chains has led to a trend of productive reallocation (nearshoring and friendshoring), with relevant impacts on international trade patterns.[2] In this context, more active policies to attract FDI are indispensable conditions for countries to take advantage of this ongoing reconfiguration and expand their presence in GVCs, generating positive effects on productivity, employment, and innovation.

The objective of the paper is to conduct a comprehensive analysis of the determinants of Foreign Direct Investment (FDI) inflows, employing a range of methodological approaches. First, the study undertakes an empirical examination of the factors influencing FDI attraction across a panel of countries, estimating the significance of both economic and institutional determinants. This stage aims to identify the structural elements that render certain economies more attractive to foreign capital, based on evidence aggregated at the international level. Next, the study focuses

[1] It is estimated that greater international insertion represents between 32% and 39% of the cumulative growth of GDP per capita in Latin America between 1990 and 2010 (Mesquita Moreira, Li and Merchán, 2019).

[2] McKinsey (2021) estimates that between 16% and 26% of global exports — equivalent to values between US$ 2.9 and US$ 4.6 trillion — can be redirected, either to domestic production or to new trading partners, driven by economic, strategic, and geopolitical factors.

specifically on the Brazilian case, with the objective of investigating how economic shocks influence the dynamics of the inflow of foreign investment into the national economy. By integrating multiple levels of analysis and a comprehensive set of FDI determinants, the paper aims to advance the existing literature by incorporating both a comparative international perspective and an in-depth assessment of the Brazilian context. The application of diverse econometric methodologies, employing both panel data and time series techniques, seeks to enhance the robustness of the results and to deepen the understanding of the factors shaping foreign direct investment inflows.

The results indicate that the size of the market is a relevant determinant of the inflow of foreign capital, due to the associated gains in scale. In addition, economies that are more open to international trade and with more appreciated exchange rates tend to attract a greater volume of foreign resources. Institutional aspects related to governance — such as political stability, government efficiency, regulatory quality, and respect for the rule of law — are also crucial factors in the allocation of foreign investments.

In the case of Brazil, the results indicate that GDP growth, exchange rate appreciation and macroeconomic stability — reflected by lower and predictable inflation levels — and lower country risk emerge as robust determinants of the dynamics of foreign capital inflows, as well as a more developed financial market with greater access to credit. In addition, a more benign international environment also plays a relevant role as a driver of foreign direct investment inflows.

The study is organized as follows: Section 2 presents a literature review on the effects of foreign direct investment (FDI) on productivity and discusses the main determinants of foreign capital flows. Section 3 describes the econometric methodologies used in the analysis, detailing the specifications of the models used. Section 4 presents the data and variables considered in the study, with emphasis on the sources and characteristics of the panels analyzed. Section 5 discusses the empirical results. Section 6 concludes.

2 Literature Review

2.1 FDI, Economic Growth and Productivity

Economic theory places the evolution of productivity at the center of explanations for long-term economic growth. In this context, the literature has focused on different policies capable of stimulating productivity gains, among them the attraction of foreign direct investment (FDI). FDI is often pointed out as a vector for technological modernization, diffusion of good business practices and integration of economies into global value chains, all factors that contribute to the increase in total factor productivity. Several empirical studies corroborate this hypothesis, showing that countries with a greater capacity to attract and absorb FDI tend to register greater gains in efficiency and competitiveness. However, although this relationship is widely defended, part of the literature raises reservations about the magnitude and universality of the positive impacts of FDI on economic growth and productivity.[3]

[3] Although almost consensual, some authors dispute the positive effects of FDI on productivity and growth. Sabir et al. (2019) identify negative impacts of FDI on economic development, arguing that the increase in imports can widen the trade deficit and reduce industrial activity. Arslan (2016) suggests that, although urban agglomeration favors economic diversity, the concentration of FDI in specific sectors can weaken this diversity. Similarly, Wang et al. (2021)

The empirical literature has identified a positive and statistically robust relationship between foreign direct investment (FDI) and economic growth. Borensztein, De Gregorio and Lee (1995) demonstrate, based on a comprehensive sample of developing countries, that FDI tends to exert positive effects on GDP growth, if the recipient country has a minimum level of human capital that allows it to efficiently absorb the technologies and management practices brought by foreign companies. The authors also point out that FDI does not replace domestic investment but complements it: the empirical results indicate that FDI stimulates domestic investment, ruling out the hypothesis of a crowding out effect between foreign and domestic capital.

Balasubramanyam, Salisu and Sapsford (1996) argue that FDI can accelerate the growth of recipient countries by improving foreign trade and ensuring the stability of macroeconomic variables. Furthermore, they conclude that FDI flows can effectively boost the economic growth of local investments in developing economies that implement export promotion policies. Sadik and Bolbol (2001) examined that FDI flows positively affected GDP growth and local investment in six Arab countries from 1978 to 1998. In addition, Bengoa (2003) found a positive association between FDI and GDP in 18 South American economies. Sokang (2018) examined that foreign direct investment had a favorable effect on the growth of the East Asian economy, examining data from 2006 to 2016. Akiri, Vehe, and Ijuo (2016) determined the positive impact of FDI on Nigeria's GDP growth from 1981 to 2014.[4]

Specifically for Brazil, Carminati, and Fernandes (2013) find that FDI has a positive effect on GDP. The study finds that an FDI shock has a lingering effect on GDP. Other works would be Laplane and Sarti (1999); Lima Junior and Jayme Junior (2006; 2008); Mattos, Cassuce and Campos (2007); Fernandes and Campos (2008); and De Negri and Laplane (2009). In another line, Borges and Fraga (2021) show that FDI contributed to the reduction of intrasectoral income inequality in Brazilian industry from 2007 to 2014.

2.2 Impact of FDI on productivity

Several empirical studies have identified positive effects of FDI on total factor productivity (TFP), both via direct effects on invested firms and via positive externalities (spillovers) for the rest of the economy (Blomström and Kokko, 1998; Javorcik, 2004). These spillovers can occur through technological imitation, workforce mobility, and the strengthening of local suppliers. However, the intensity of these effects depends on the absorption capacity of the receiving economy, the degree of competition in the markets, and the institutional quality (Alfaro et al., 2010; Harding and Javorcik, 2012).

Saurav and Kuo (2020) review the different transmission mechanisms through which foreign direct investment (FDI) impacts countries' productivity. Although the authors recognize that the aggregate effect of foreign capital tends to be positive, they

highlight that directing FDI to isolated sectors can generate excessive dependence and reduce competition, with adverse effects on growth. However, as discussed throughout the present study, these conclusions are limited by methodological constraints and the scarcity of robust empirical evidence.

[4] There is a vast literature on the subject for several countries. Sunde (2017) for South Africa, Sothan (2017) for Cambodia, Seyoum, Wu and Lin (2015) for African countries, Zhao, and Du (2007) for China.

emphasize the heterogeneity of the magnitude and significance of this impact, depending on the specific characteristics of the firms and/or economic sectors. The study highlights that the direct effect of FDI on productivity is consistently positive, especially due to the intensification of technology transfer, as well as the diffusion of technical and managerial capacities in the receiving economies. In addition, the greater availability of financial resources leads firms to invest more in activities that accelerate productivity growth, such as research and innovation. This aspect would be more relevant in developing countries where financial constraints are more pronounced. The authors indicate that the impact of FDI on firms differs when observing the vertical and horizontal interactions between them.

The literature indicates that suppliers of inputs to multinationals (vertical upstream relationship) have a higher productivity growth. Havranek and Irsova (2011) covering 47 countries and 57 studies find robust evidence that upstream vertical effects are positive and significant. The authors argue that this positive impact can occur in diverse ways. Multinationals can affect the productivity of their domestic suppliers through the direct transfer of technologies and production techniques (Javorcik 2004; Paus and Gallagher 2008). Direct assistance may include management and worker training, improvement of production inputs, and additional financing (Crespo and Fontoura 2007; Javorcik 2008). The literature points out that multinationals are more likely to share technology and knowledge with their domestic suppliers, given the incentive to improve supplier performance and quality (Blalock and Gertler 2008; Pack and Saggi 2001). In addition, multinationals indirectly induce productivity improvements in suppliers, imposing higher requirements for the quality of products and services. Finally, if FDI increases demand for locally produced intermediate goods, this can help domestic producers achieve economies of scale by diluting fixed costs, moving down the average cost curve.

The literature indicates that the effects of downstream vertical interaction with domestic buyers — on the productivity of firms present mixed results in the context of the inflow of foreign direct investment (FDI). Studies such as Blomström and Kokko (1998), Nguyen et al. (2008) and Wei, Liu, and Wang (2008) show that it is rare for multinational companies to provide training or direct support to their local buyers, with the aim of improving domestic distribution networks and logistics chains. However, foreign companies , because they have superior technological capabilities, tend to offer higher quality products, which are becoming more widely available in the market. Domestic firms that can access these intermediary goods and services provided by affiliates of multinationals can thus benefit from more efficient and sophisticated inputs.

On the other hand, the horizontal effects resulting from the intensification of competition between domestic and foreign companies are also ambiguous. Saurav and Kuo (2020) point out that the so-called "competition effect" is often statistically insignificant, and in some cases negative. Domestic companies with greater capacity for technological absorption and greater productive sophistication tend to benefit from the presence of international competitors. By contrast, firms with less technological intensity often lose market share and face human capital evasion, with

skilled workers migrating to foreign firms established in the country.

2.3 Determinants of Foreign Direct Investment[5]

In addition to the correlation between FDI, economic growth and productivity, the literature analyzes different economic and institutional determinants of FDI. Overall, the literature concludes that foreign investors consider a broad set of variables in their investment decisions. Economic factors traditionally associated with attracting FDI include the size and growth of the domestic market, the exchange rate, macroeconomic stability, the level of trade openness, and the availability of physical infrastructure and credit. Dunning (1988), in his eclectic paradigm (OLI), highlights that the size of the market and the relative costs of production are key elements in the decision of multinational companies. Later empirical studies, such as Chakrabarti (2001) and Asiedu (2002), confirm that economies with large markets, monetary stability, and a predictable macroeconomic environment tend to attract more foreign capital.

In addition to economic fundamentals, institutional and political factors play an increasing role in the FDI allocation decision. The quality of institutions, the level of legal certainty, political stability and the predictability of rules are crucial elements for the risk assessment of international investors (Globerman and Shapiro, 2003; Busse and Hefeker, 2007). Countries with greater government efficiency, corruption control mechanisms, and transparent regulatory frameworks are more likely to attract sustainable FDI flows. In contexts of political or institutional uncertainty, even economies with solid fundamentals may face a contraction in investments.

In macroeconomic terms, the size of the market is relevant to FDI flows, as companies seek opportunities in economies that have a large and growing consumer market. A larger market offers greater potential for demand and, consequently, greater possibilities for profit. In addition, a robust domestic market can also create scale effects, reducing production and distribution costs. In this way, countries with significant domestic markets tend to attract more foreign investment, since they offer more attractive growth prospects and financial returns. Macroeconomic stability would also be a crucial factor in investors' decisions. More economically stable countries would receive a greater flow of foreign capital. Matos, Cassuce and Campos (2007) found that the inflation rate was a significant variable for the inflow of capital into Brazil.

Another macroeconomic variable with a potential impact on Foreign Direct Investment (FDI) flows is the exchange rate. However, the literature does not present a consensus regarding the direction and magnitude of this effect, reflecting different theoretical arguments about the relationship between the exchange rate level and the attractiveness of foreign capital. On the one hand, some studies suggest that a depreciated exchange rate makes domestic assets relatively cheaper, thus increasing the country's attractiveness to foreign investors. In addition, the exchange rate depreciation increases the international competitiveness of the economy, boosting the export sector and, consequently, stimulating the inflow of FDI aimed at export-oriented production.

[5] The present work does not aim to present a set of empirical studies on the subject. Sahiti, Ahmeti and Ismjli (2018) and Tocar (2018) present surveys covering the main empirical works and their results.

Froot and Stein (1991), based on a model that incorporates imperfections in financial markets, argue that the devaluation of the local currency increases the relative wealth of foreign investors relative to domestic investors, allowing them to make more aggressive bids for local assets — which would contribute to the increase in FDI flows. The authors thus conclude that currency devaluations would serve to attract foreign capital. On the other hand, other authors point out that a more appreciated exchange rate can signal more solid economic fundamentals and greater growth opportunities, which could also attract foreign capital. Campa (1993), for example, argues that a valued domestic currency increases the expectation of future profits of foreign firms focused on the domestic market, increasing investment incentives.

In summary, the effect of the exchange rate on FDI depends mostly on the motivation of the investment. When the objective is to serve the domestic market, FDI and international trade work as substitutes: an exchange rate appreciation tends to attract FDI due to the increase in the purchasing power of local consumers. When investment is focused on production for export, FDI and trade are complementary, and exchange rate appreciation tends to reduce investment flows, given the loss of external competitiveness. In this case, the depreciation of the currency of the host country tends to stimulate FDI, by reducing the relative cost of capital and increasing the attractiveness of productive investments aimed at exports.

Udomkerdmongkol et. al. (2009) argue that stable exchange rate management can be crucial to attracting FDI. In the study, the authors analyze the impact of the exchange rate on the flow of foreign direct investment (FDI) from the United States to 16 emerging countries between 1990 and 2002. Three effects of exchange rates were found: Level - A devalued currency would attract FDI; Expectations - Expectations of changes in exchange rates would have an impact on FDI (anticipation of currency devaluation would postpone FDI); and volatility – (a very volatile exchange rate would discourage FDI).

Countries that are more open to international trade would also receive a higher volume of FDI, as they would be better able to participate in global value chains. A better infrastructure would also be an FDI attractor. Countries with better logistics capacity, reliable energy sources and better communication facilities would have lower production and transaction costs, thus influencing the incentives for attracting FDI to the country. A better business environment would stimulate FDI. Countries with a lower tax burden and a more streamlined tax system would attract more FDI. Finally, countries with more developed financial markets and greater access to credit for firms would have directed more FDI resources. The development of the financial system acts as a facilitating mechanism for the adoption of innovative technologies in the domestic economy. Thus, the provision of credit and efficient financial services through the financial system can facilitate technology transfer and induce the efficiency of spillovers. Human capital is also found by the literature as a factor that would influence FDI. A highly skilled workforce is more inclined to adapt to the latest changes. Noorbakhsh and Paloni (2001), Mateev (2009), Arbatli (2011) and Du et al. (2012) find that greater human capital would have a positive impact on FDI.

In terms of institutional and political factors, the literature argues that countries with

greater political stability, greater economic freedom, lower level of corruption, and less bureaucracy would attract a higher volume of FDI. These factors would affect investors' costs and the protection of their interests, influencing investment decisions. The political stability of a country would create a favorable environment for foreign investments, as it would offer predictability, legal certainty, and reduce political and regulatory uncertainty. Thus, political stability would be a key factor to be considered when analyzing FDI dynamics and its impact on a country's economic development. Stability of government, internal and external conflicts, and corruption, in addition to the quality of democracy and respect for the law are relevant to the flow of FDI (Busse and Hefeker, 2007). Control of corruption, government effectiveness, freedom of expression and accountability have a significant effect on FDI flows. Developing countries with limited corruption control and poor government effectiveness tend to receive less FDI (Kurul and Yalta, 2017). Kolstad and Vilanger (2008) studied the determinants of FDI for the service sector. The authors realized that institutional quality and democracy are more relevant to this sector than investment risks in general or political stability. Holmes et al. (2013) find that regulatory quality – the way governments exert control over organizations – has a significant impact on FDI. A low regulatory quality with greater control over the activities of organizations would negatively influence FDI.

3 Methodology and Data

3.1 Methodology

The empirical analysis of this study is divided into two complementary stages. In the first, a panel of countries is examined with the objective of identifying the main determinants of foreign direct investment (FDI), focusing on economic, institutional, and political factors. In the second stage, a specific application is made to the Brazilian case, with emphasis on the effects of economic shocks on the entry of FDI into the country.

3.1.1 Panel data

The empirical strategy employed in the first part is based on the estimation of panel data models . The general specification of the model can be represented as follows:

$$y_{it} = \beta_0 + X_{it}\beta_1 + Z_{it}\beta_2 + \alpha_i + \lambda_t + \varepsilon_{it} \quad (3.1)$$

Where:

• y_{it} is the dependent variable for country i at time t. In the work we will use the logarithm of Foreign Direct Investment (FDI). The Foreign direct investment, net inflows (BoP, current US$) series will be used. FDI net inflow is the amount of foreign capital that enters a country in each period.

• β is a vector of coefficients,

• X_{it} is a vector of economic variables (e.g., GDP, trade openness, inflation, exchange rate);

• Z_{it} is a vector of institutional and political variables (e.g., institutional quality, political stability, corruption control, government effectiveness);

• α_i represents country-specific effects, which allows controlling for unobserved heterogeneities between countries over time;

• λ_t captures common global shocks over time; *εit* is the idiosyncratic error term.

The choice of the model is justified by the hypothesis that the unobserved characteristics of countries — such as institutional culture, or geography — can systematically affect the ability to attract FDI, and that these characteristics are potentially correlated with explanatory variables. Estimates will be performed using robust techniques to heteroscedasticity and serial autocorrelation, with standard errors grouped by country. As a robustness test, models with random effects and estimates via Generalized Method of Moments (GMM) will also be considered, when appropriate.

3.1.2 Time series analysis for Brazil

The previous approach looked at the relevance of distinct factors in a sample of countries. However, the relative importance of each determinant may vary between countries, which makes a specific analysis necessary for the Brazilian case. In this context, the use of time series is more appropriate since it allows the use of data more frequently and allows a more detailed investigation of the dynamics of Foreign Direct Investment (FDI) in the country.

The work will use as a basic result, the ARDL methodology (Pesaran, Shin, and Smith, 2001).[6] The methodology is used to estimate the long-term relationship between the variables. The method is used even if the variables are I(0), I(1), or a combination of the two. Consider the following ARDL(*p, q1,q2...,qk*) model that can be represented as follows as an unconstrained error correction vector (UECM):

$$\Delta y_t = \gamma_0 + \lambda\left(y_{t-1} - \sum_{j=1}^{k} \theta_j x_{jt-}\ \right) + \sum_{i=1}^{p-1} \alpha_i \Delta y_{t-i} + \sum_{j=1}^{k} \sum_{l=0}^{q_j-1} \delta_{jl} \Delta x_{jt-l} + \varepsilon_t \qquad (3.2)$$

- Δ it is the operator of first difference;
- λ is the adjustment error coefficient;
- $\left(y_{t-1} - \sum_{j=1}^{k} \theta_j x_{jt-1}\right)$ represents the long-term relationship (cointegration term);
- $\alpha_i \; and \; \delta_{jl}$ capture short-term dynamics;
- ε_t is the error term.

The expression $\left(y_{t-1} - \sum_{j=1}^{k} \theta_j x_{jt-1}\right)$ is the cointegration vector, i.e., a linear combination between the variables that is stationary, even if each individual variable is integrated by order one (I(1)). The test is performed using the F-statistic of joint significance of the lagged terms. Critical values for the F-test are provided by Pesaran et al. (2001), and consist of:

• A minimum value assuming that all variables are stationary (I(0)).
• An upper bound assuming that all are non-stationary (I(1)).
• If *F* -statistic > upper bound ⇒ reject *H0*: There is cointegration.

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[6] The autoregressive distributed lag (ARDL) model has been used for decades to model the relationship between economic variables in a single-equation time series setting. Its popularity stems from the fact that the cointegration of non-stationary variables is equivalent to an error correction (EC) process, and the ARDL model has a reparameterization in the EC form (Engle and Granger, 1987; Hassler and Wolters, 2006). The ARDL model is particularly useful in small samples and has several advantages over traditional cointegration methods. Among them, the possibility of jointly modeling stationary and non-stationary variables stands out, in addition to allowing robust inferences about the existence of long-term equilibrium relationships even in the presence of distinct lags between the explanatory variables. The existence of a long-term relationship/cointegration can thus be evaluated. A threshold testing procedure is available to make conclusive inferences without knowing whether variables are zero-order or one-order integrated, I(0) or I(1), respectively (Pesaran, Shin, and Smith, 2001).

• If *F* -statistic < lower bound ⇒ does not reject *H0*: there is no cointegration.
• If *F* -statistic assumes a value between the limits ⇒ the result is inconclusive.

As an exercise of robustness to make a comparison with the existing literature possible especially for the Brazilian case, a VAR model will also be estimated to analyze the relationship between economic shocks and the inflow of foreign capital into the country.[7] The basic specification is given by the equation:

$$Y_t = C + \sum_{i=1}^{p} A_i Y_{t-i} + BX_t + U_t \quad (3.3)$$

Where:

• Y_t is an M×1 vector of endogenous variables.
• C is a vector M × 1 of intercepts.
• Ai is a matrix M × M of autoregressive coefficients of order p.
• X is a vector of exogenous variables.
• B is a vector of coefficients.
• $U_t \sim$ N (0, Σ_u) is the error of the reduced form.

Following the estimation of (3.3), the impulse response will be analyzed to understand the dynamics between FDI and the shocks in the variables. In vector autoregressive (VAR) models, the impulse response function describes the dynamic reaction of the system's endogenous variables to exogenous shocks (or "impulses") on one or more variables.

3.2 Data

3.2.1 Panel of Countries

The empirical analysis uses an unbalanced panel of developing and developed countries, covering the period from 2010 to 2023, based on the availability of annual data. The selected variables reflect both the economic fundamentals and institutional and political aspects pointed out by the literature as determinants of foreign direct investment (FDI). Key data sources include the World Bank's World Development Indicators (WDI), the Worldwide Governance Indicators (WGI), UNCTAD, and the Penn World Table.

The work intends to analyze a complete set of factors that would be determinants of FDI. Based on the empirical literature discussed above, the following variables are included in the analysis :

1. **FDI** - Represents the net flows of foreign direct investment. Source: UNCTAD/WDI.[8]
2. **Market size –** The country's GDP per capita data will be used. Source: Data from the World Bank National Accounts and OECD National Accounts, annual data expressed in dollars, in constant values (2015 US$).
3. **Inflation** - The consumer inflation rate (CPI) series will be used. Source: International Monetary Fund, International Financial Statistics.
4. **Exchange Rate** - The nominal exchange rate series calculated against the U.S. dollar

[7] Mattos, Cassuce and Campos (2007), Peres and Yamada (2014), Silveira, Samsonescu and Triches (2017) and Kogut (2021) conducted a time series analysis for the Brazilian case.
[8] Available at https://databank.worldbank.org/source/world-development-indicators.

will be used. Source: International Monetary Fund, International Financial Statistics.[9]

5. **Trade openness** - The ratio between the sum of exports and imports over the country's GDP will be used as an indicator of the international insertion of the economy. Source: International Monetary Fund, International Financial Statistics.

6. **Access to Credit** - Domestic credit for the private sector - Variable used as a proxy for the development of the financial market. Source: International Monetary Fund, International Financial Statistics and data archives, and GDP estimates from the World Bank and the OECD.

7. **Tax burden** - The tax burden of countries will be calculated by the ratio between government revenue and GDP. Source: World Development Indicators.

8. **Human Capital** - The country's human capital will be measured by the average education of workers available by the World Bank's Human Capital Indicator and the Penn World Tables.

9. **Governance** - Data from The Worldwide Governance Indicators (WGI) project will be used. These are annual country data, produced by the World Bank, which bring six dimensions of analysis. The six dimensions of the WGI Project are as follows:

   (a) **Voice and Accountability**: the possibility for citizens to choose rulers, as well as the perception of freedom of expression, association, and the press, for example.

   (b) **Political Stability and Absence of Violence/Terrorism**: perception of the likelihood of political instability or political violence, including terrorism.

   (c) **Government Efficiency**: measures the quality of public services and the degree of independence of these services from political pressure. It also measures the quality of formulation and implementation and public policies.

   (d) **Regulatory quality**: evaluates the ability of the government to formulate and implement policies for private sector development;

   (e) **Rule of Law**: captures trust and social commitment to the rule of law, particularly related to the enforcement of contracts, property rights, police, courts, and perceptions of crime and violence.

   (f) **Control of Corruption**: the perception of the extent to which public power is exercised for private interests, including small or large forms of corruption, as well as the capture of the state by the elite and private interests.

3.2.2 Time series analysis for Brazil

In the second stage of the empirical analysis, the study focuses on the Brazilian case, with the objective of examining the sensitivity of foreign direct investment (FDI) flows to the occurrence of economic shocks. The database for this stage is composed of quarterly series for the Brazilian economy, covering the period from 1995 to 2024, according to data availability. Primary sources include the Central Bank of Brazil (Bacen), the Brazilian Institute of Geography and Statistics (IBGE), and the Secretariat of Foreign Trade (Secex). FDI statistics were obtained from the Central Bank's time series system[10] available on a quarterly basis.

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[9] The real exchange rate will only be used as an exercise in robustness, as it is only available to a small number of countries in a more restricted period, which would make it difficult to interpret the results.

[10] Available at https://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries

Following the empirical literature, the following variables, already discussed above, will be used. Foreign direct investment (FDI), GDP growth, consumer inflation (IPCA), nominal or real exchange rate, exchange rate volatility, government revenues over GDP as a proxy for the tax burden built through data from the National Treasury and access to credit used is the ratio of total credit in the national financial system over GDP provided by the Central Bank. Exchange rate volatility is calculated using a GARCH model with daily data. Finally, EMBI+ is used as a proxy for the country's risk. The external variables included are the evolution of the US S&P 500 stock index and its implied volatility (VIX) as a proxy for investors' risk aversion and the 10-year interest rate in the US to analyze how the international scenario would affect FDI.

4 Results

4.1 Panel of countries[11]

Table 1 presents different econometric specifications for the estimation of the equation (3.1). The central specifications of the text -(1) and (2)- use fixed and random effects. Specifications 3 and 4 are made, respectively, for high- and lower-middle-income countries. Specification 5 estimates a dynamic panel. All estimates include temporal dummies to control for the effect of global shocks common to all countries. Table 1 presents the results.

Table 1 : Estimation Results - Determinants of FDI

	Dependent Variable: Log (FDI)				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
GDP	1.17∗	0.92∗	1.47∗	1.92∗	0.46∗∗∗
	(0.025)	(0.034)	(0.55)	(0.33)	(0.24)
Inflation	0.048	0.045	0.020	0.048	0.054
	(0.035)	(0.035)	(0.069)	(0.042)	(0.046)
Exchange Rate	-0.096∗	-0.056∗	-0.094	-0.071∗∗	-0.025∗
	(0.003)	(0.002)	(0.016)	(0.031)	(0.0042)
Trade Openness	0.99∗	0.99∗	0.71∗∗	1.04∗	0.87∗
	(0.19)	(0.11)	(0.31)	(0.26)	(0.31)
Access to Credit	0.017	-0.075	0.032	-0.504	0.006
	(0.016)	(0.13)	(0.022)	(0.320)	(0.036)
Governance Index	0.020∗	0.098∗	0.025	0.020∗	0.026∗∗
	(0.006)	(0.031)	(0.016)	(0.071)	(0.012)
Constant	-9.70	-2.99∗	-18.6	-27.7∗	-9.23
	(6.31)	(0.83)	(14.7)	(7.75)	(6.18)
Estimation	FE	RE	FE	FE	AB
Countries	152	152	High (53)	Lower-middle (99)	152
Observations	1697	1697	574	1123	1697
R^2	0.763	0.771	0.628	0.726	0.752
Hausman	0.0004				

Table 1: Panel data estimation for FDI determinants. GDP is the country's GDP per capita. Trade openness is the ratio between imports plus exports (% GDP); Exchange rate is the nominal exchange rate against a basket of currencies. Inflation is the rate of consumer inflation (CPI). Access to credit is measured by the ratio of credit to firms (% GDP); Governance Index stands for the World Governance Index. *, ** and *** represent, respectively, statistical significance at 1%, 5% and 10%. Hausman is the Hausman test.

[11] In all specifications the variables are in logarithms.

The results presented in Table 1 indicate the existence of a robust relationship between the size of the market and the attraction of foreign direct investment (FDI). In all regressions, the GDP coefficient is positive and statistically significant. Countries with a larger consumer market and greater potential for scale tend to attract more foreign investment. Macroeconomic instability, represented by the inflation rate, did not show statistical significance in the regressions. On the other hand, the nominal exchange rate was statistically significant for the sample, especially for middle- and low-income countries. The results suggest that a more depreciated (appreciated) domestic exchange rate discourages (encourages) foreign direct investment. In this context, there are indications that the domestic factor prevails over the factor related to international trade. A more appreciated exchange rate tends to boost FDI, indicating that, on average, the objective of foreign capital is to meet domestic market demand. The appreciation of the national currency attracts FDI flows due to the increase in the purchasing power of local consumers. This effect is particularly significant in low- and middle-income countries and is not observed in higher-income economies.

The results presented in Table 1 indicate that the greater the degree of trade openness, the greater the attraction of foreign direct investment (FDI). This finding shows that trade barriers tend to inhibit investment by foreign companies, since they hinder the country's insertion in global value chains — either as an export hub, or by limiting access to imported inputs. This finding acquires special relevance in the current international context, marked by an increase in trade tensions and the adoption of tariffs between traditional partners, configuring a scenario of trade war.

Table 2: Correlation between governance variables (WGI)

Correlation Matrix						
	Political Stability	**Voice and Accountability**	**Efficiency of the Government**	**Quality Regulatory**	**Rule of Law**	**Control of Corruption**
Political Stability	1.00					
Voice and Accountability	0.720	1.00				
Efficiency of the Government	0.715	0.692	1.00			
Quality Regulatory	0.676	0.718	0.928	1.00		
Rule of Law	0.795	0.785	0.922	0.900	1.00	
Control of Corruption	0.789	0.774	0.895	0.855	0.938	1.00

Table 2: Estimation of the correlation between the component variables of the World Governance Index.

Table 1 also highlights the importance of governance in attracting foreign capital. The better the level of governance, as measured by the World Governance Index (WGI), the greater the volume of foreign direct investment (FDI). On the other hand, low levels of governance function as a disincentive to foreign investment. Finally, it is observed that access to credit is not a relevant determinant in the decision of foreign companies to invest in the countries analyzed.

Table 2 shows the high covariance between the indicators, the correlation between the component variables of the governance index is high — above 0.65, reaching up to 0.94 , which can lead to problems of multicollinearity in the estimates. Thus, table 3 presents the results of the estimation using the disaggregated components of the Global Governance Index, bringing both the joint estimate of all components and separate estimates by indicator. The results reinforce the robustness of previous analyses. Market size, exchange rate and degree of trade openness remain statistically significant as determinants of foreign direct investment (FDI). Specification (1), which considers all indicators simultaneously, reveals that only the variable associated with the rule of law is statistically significant. This indicates that the greater the respect for the law, the greater the attraction of foreign capital, suggesting that investors attribute relevant weight to the observance of the rule of law in the decision to allocate resources.

When the variables are included in isolation, it is observed that, in addition to the rule of law, political stability, government efficiency, and regulatory quality are also statistically significant. These results highlight the importance of institutional factors in attracting foreign capital. Greater political stability, better quality regulation and a more efficient government function as elements of attraction to foreign investment and are considered relevant in investors' decision-making. As shown in Tables 1 and 3, these institutional factors have an even greater weight in low- and middle-income developing countries.

Table 3: Estimation Results - Determinants of FDI

	Dependent Variable: Log (FDI)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
GDP	1.15	1.26*	1.24*	1.17*	1.17*	1.22*	1.27*
	(0.26)	(0.236)	(0.26)	(0.26)	(0.25)	(0.26)	(0.26)
Inflation	0.050	0.042	0.046	0.046	0.046	0.042	0.046
	(0.036)	(0.036)	(0.036)	(0.036)	(0.034)	(0.036)	(0.036)
Exchange Rate	-0.088**	-0.079**	-0.082**	-0.083	-0.085*	-0.081*	-0.084*
	(0.032)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
Trade Openness	1.02*	0.94***	0.97*	0.99*	0.97*	0.96*	0.94**
	(0.19)	(0.19)	(0.20)	(0.19)	(0.19)	(0.19)	(0.19)
Access to Credit	-0.034	-0.008	0.053	-0.002	0.003	0.005	0.005
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Voice and Accountability	-0.36	0.43					
	(0.53)	(0.46)					
Political Stability	0.42		0.68**				
	(0.32)		(0.31)				
Government Efficiency	0.32				0.97**		
	(0.50)				(0.41)		
Regulatory Quality	0.12						0.85***
	(0.53)						(0.49)
Rule of Law	0.12***			0.15*			
	(0.006)			(0.005)			
Control of Corruption	0.17					0.61	
	(0.42)					(0.42)	
Constant	-8.85	-11.1***	-10.5***	-11.4***	-9.31	-10.6	-11.4***
	(6.39)	(6.31)	(6.31)	(6.34)	(6.34)	(6.33)	(6.32)
Estimation	FE	FE	FE	FE	FE	FE	FE

Countries	152	152	152	152	152	152	152
Observations	1697	1697	1697	1697	1697	1697	1697
R^2	0.76	0.77	0.77	0.76	0.77	0.76	0.77

Table 3: GDP is the country's GDP per capita. Trade openness is the ratio between imports plus exports (% GDP); Exchange is the nominal exchange rate against a basket of currencies. Inflation is the rate of consumer inflation (CPI). Access to Credit is measured by the ratio of credit to firms (% GDP). *, ** and *** represent, respectively, statistical significance at 1%, 5% and 10%.

4.1.1 Other determinants of Foreign Direct Investment

As discussed in the literature review, the tax burden, the level of human capital and the quality of infrastructure can also be relevant determinants in attracting foreign capital. At the same time, some authors argue that the real exchange rate would be a more appropriate indicator of a country's competitiveness, compared to the nominal exchange rate. However, data on these variables are not available for all countries throughout the period analyzed. The results presented in Table 4 incorporate these variables for the period from 2016 to 2023, covering a smaller number of countries than the original sample.

Table 4 : Estimation Results - Determinants of FDI

	Dependent Variable: Log (FDI)					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
GDP	0.94*	0.96*	0.97*	0.91*	0.91*	1.19*
	(0.045)	(0.041)	(0.058)	(0.068)	(0.049)	(0.12)
Inflation	-0.084	-0.012	0.011	0.026	0.012	-0.043
	(0.14)	(0.22)	(0.096)	(0.057)	(0.011)	(0.032)
Nominal Exchange Rate	-0.0033	-0.0041***	-0.0059**	-0.0048***		
	(0.0025)	(0.0023)	(0.0025)	(0.0025)		
Real Exchange Rate					0.0038	-0.015***
					(0.0043)	(0.0091)
Trade Openness	0.77*	0.89*	0.12*	0.80*	0.83*	0.12*
	(0.13)	(0.13)	(0.017)	(0.16)	(0.15)	(0.023)
Access to Credit	-0.097	-0.0056	-0.0041	0.0010	-0.0017	-0.0028
	(0.107)	(0.016)	(0.0029)	(0.0024)	(0.0021)	(0.0037)
Governance Index	0.013*	0.012*	0.0096***	0.015*	0.021*	0.032*
	(0.004)	(0.004)	(0.0054)	(0.0056)	(0.0049)	(0.011)
Tax Burden		-0.90				-0.034
		(0.69)				(0.18)
Infrastructure				0.078		-1.13*
				(0.264)		(0.41)
Human Capital			0.079			0.078
			(0.18)			(0.35)
Constant	-3.69*	-3.83*	-4.09*	-3.54*	-3.64*	-6.29*
	(1.08)	(1.01)	(1.34)	(1.39)	(1.34)	(2.70)
Countries	151	143	124	13	81	65
Observations	1092	1025	550	329	584	115
R^2	0.785	0.799	0.783	0.784	0.825	0.840

Table 4: Panel estimation for FDI determinants. Trade openness is the ratio between imports plus exports (% GDP); Nominal Exchange Rate is the nominal exchange rate against a basket of currencies. Real Exchange Rate is the real effective exchange rate of the World Development Indicators. Access to Credit is measured by the ratio of credit to firms (% GDP); Governance stands for the World Governance Index. Infrastructure is the World Bank's Logistics Performance Index. Human Capital is the human capital index of the Penn World Table. Tax burden is government revenue as a proportion of GDP according to the World Development Indicators and Public Finances in Modern History database - IMF. *, ** and *** represent, respectively, statistical significance at 1%, 5% and 10%.

The results presented in table 4 indicate the robustness of the previous results. The size of the market represented by GDP, the nominal exchange rate, the degree of

openness of the economy and the level of governance remains statistically significant regardless of the period considered and the inclusion of other variables.

Regarding the other variables analyzed, there is no robust evidence of an association consistent with the attraction of foreign direct investment (FDI). Similarly to the behavior of the nominal exchange rate, the real exchange rate had a negative impact on FDI flows only in Specification (6), which is based on a smaller sample, which limits the generalization of the results. The tax burden, in turn, showed the expected signal – suggesting that higher levels of taxation would tend to discourage the inflow of foreign capital – but the estimated coefficients did not show statistical significance in any of the specifications reported in Table 4. A similar result was identified for the human capital index: although economic theory predicts that higher levels of human capital contribute to the attraction of FDI, the data, although pointing in this direction, did not demonstrate statistical significance. Finally, the physical infrastructure index showed statistical significance only in Specification (6), but this effect was not robust in the face of changes in the model or the inclusion of different controls, which limits its empirical validity. But they indicate that better infrastructure can be important in attracting foreign capital.

4.2 Time series analysis of the determinants of FDI for Brazil

The previous analysis focused on the different determinants of foreign direct investment for a panel of countries. In this section, an analysis in time series for the Brazilian economy will be carried out . The results allow a more detailed analysis of the Brazilian case and its specificities. Unlike the previous analysis, the analysis is performed with quarterly data, which allowed the addition of some variables, but made it impossible to evaluate variables whose availability is annual. The analysis is conducted between the first quarter of 1995 and the fourth quarter of 2024.

Table 5: Results of the ARDL Bounds test (Pesaran, Shin and Smith (2001)
H0: No Long-Term Relationship

Statistic-F =7.367 **Statistic-t =-4.744**		
Accept if F < critical value for regressor I(0) Reject if F > critical value for regressor I(1) Accept if t > critical value regressor I(0) Reject if t < critical value regressor I(1)		
	I(0)	**I(1)**
Growth	2.45	3.52
Nominal Exchange Rate	2.86	4.01
CPI	3.25	4.49
Trade Openness	3.74	5.06
Taxes	-2.57	-3.66
Access to Credit	-2.86	-3.99
Country risk	-3.13	4.26
Exchange Rate Volatility	-3.43	-4.60

Table 5: Test results for the existence of a long-term relationship between the variables. They are considered 8 regressors in the long-term relationship. Critical values are calculated from Pesaran, Shin and Smith (2001) for case 5. Trade openness is the ratio between imports plus exports (% GDP); the Nominal Exchange Rate is the nominal exchange rate against a basket of currencies. Access to Credit is the ratio of credit to firms (% GDP); Taxes are government revenue as a proportion of GDP according to the National Treasury. Country

risk is the EMBI+ index. Exchange Rate Volatility is the volatility of the exchange rate estimates by a GARCH process. The results are similar if the critical values are obtained using the methodology of Kripfganz and Schneider (2020).

Initially, unit root tests were performed in series[12]. The results indicate that the nominal and financial exchange rate series - SP500, VIX and Treasury - are non-stationary in their levels. The Foreign Direct Investment, opening and credit series show stationary results with a deterministic trend. However, all variables are stationary in first differences. This result points to the robustness of the ARDL method that combines stationary and non-stationary variables, appropriate for the Brazilian case.

Equation (3.3) is estimated using the ARDL method with the inclusion in some cases of a dummy variable for the period of the global financial crisis and pandemic. The international variables SP500, VIX and 10-year treasury yield are considered exogenous, given that the Brazilian economy is not expected to have a significant impact on these variables. Table 5 shows the result of the test on the existence of a long-term relationship between the variables.[13] The result presented in table 5 indicates that the null hypothesis of the non-existence of a long-term relationship is rejected for the model. Thus, one can proceed to the estimation of the model as shown in table 6.

The results presented in table 6 indicate that, although in all specifications the growth rate of the economy has a positive relationship with the inflow of foreign capital, this relationship was statistically significant only in some specifications. Subsequent analyses have attempted to delve deeper into the relationship between GDP and FDI.

Table 6 : Estimation Results - Determinants of FDI - Brazil

	Dependent Variable: Log (FDI)							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Growth	1.14**	0.91	0.83	0.22	0.22	0.24	0.48	0.082
	(0.52)	(0.56)	(0.53)	(0.36)	(0.25)	(0.25)	(0.52)	(0.20)
Nominal Exchange Rate	-0.17	-0.55	-0.43	-0.92**	-0.71**	-0.65**	-0.82	-0.92*
	(0.17)	(0.57)	(0.55)	(0.39)	(0.28)	(0.30)	(0.59)	(0.16)
Inflation	-0.082*	-0.073*	-0.075*	-0.062*	-0.060*	-0.061*	-0.044**	-0.056**
	(0.018)	(0.020)	(0.020)	(0.016)	(0.010)	(0.011)	(0.020)	(0.010)
Trade Openness	6.33**	6.10**	5.48**	12.2*	20.6*	21.6*	8.42*	19.1*
	(3.10)	(2.88)	(2.70)	(2.79)	(3.36)	(3.65)	(3.00)	(2.73)
Access to Credit	2.14*	1.50	1.74***	1.36**	1.42*	1.51*	1.32*	1.08*
	(0.43)	(0.98)	(0.95)	(0.67)	(0.46)	(0.48)	(0.61)	(0.26)
Tax Burden	0.048	-0.006	0.69	0.73	0.59	0.52	1.12	0.55
	(0.84)	(0.79)	(0.57)	(0.61)	(0.49)	(0.33)	(0.61)	(0.43)
Country Risk	-0.52**	-0.57*	-0.57*	-0.94*	-1.20*	-1.23*	-0.54**	-1.18*
	(0.20)	(0.20)	(0.19)	(0.19)	(0.17)	(0.17)	(0.23)	(0.16)
Exchange Rate Volatility	-0.12	-0.08	-0.12	-0.004	-0.025	-0.030	-0.032	-0.0091
	(0.093)	(0.097)	(0.095)	(0.06)	(0.044)	(0.045)	(0.10)	(0.040)
SP500				0.31*	0.56*	0.55*	0.32**	0.49*

[12] The Augmented Dick-Fuller, Phillip-Perron and Dick-Fuller GLS tests were performed. The results are available if demanded. Not included to save space. All variables in logarithm except inflation rate.

[13] The number of optimal lags (p and q) was always chosen through the Akaike (AIC) and Bayesian (BIC) selection criteria to verify the results, as shown in all tables.

				(0.13)	(0.14)	(0.15)	(0.14)	(0.13)
VIX					0.15	0.16	0.031	0.14
					(0.98)	(0.92)	(0.085)	(0.087)
Treasury						0.052	-0.007	0.029
						(0.082)	(0.081)	(0.079)
Constant	-3.82***	-3.78***	-4.98**	-14.9*	-32.0*	-33.2*	-7,898	-29.5*
	(2.23)	(2.24)	(2.09)	(3.47)	(6.01)	(5.68)	(2.36)	(4.45)
Obs.	120	120	120	120	120	120	120	120
R^2	0.62	0.62	0.62	0.68	0.68	0.68	0.60	0.65
R^2 adj.	0.57	0.57	0.56	0.60	0.60	0.59	0.54	0.56
Criteria	AIC	AIC	BIC	AIC	AIC	AIC	BIC	AIC
Dummy Crisis	No	Yes	Yes	Yes	Yes	Yes	Yes	No

Table 6: Results of the long-term relationship between the variables. Trade openness is the ratio between imports plus exports (% GDP); Nominal Exchange Rate is the nominal exchange rate against a basket of currencies. Access to Credit is the ratio of credit to firms (% GDP); Tax burden is government revenue as a proportion of GDP according to the National Treasury. Country risk is the EMBI+ index. Exchange Rate Volatility is the volatility of the exchange rate estimates by a GARCH process. SP500 is the evolution of the US stock index. Treasury is the yield on the 10-year U.S. Treasury bond. VIX is the implied volatility of the SP500. *, ** and *** represent, respectively, statistical significance at 1%, 5% and 10%.

Unlike the results found by Carminati and Fernandes (2013) and by Matos, Cassuce and Campos (2007), Table 6 reveals a robust relationship between the nominal exchange rate and the net flow of Foreign Direct Investment (FDI). The devaluations of the domestic currency have a negative impact on FDI inflows — a result that has also been identified in studies relating to other countries. Lily et al. (2014), for example, observed that in economies such as Singapore, Malaysia, and the Philippines, domestic exchange rate appreciation was associated with an increase in FDI flows. In these cases, exchange rate appreciation would tend to attract foreign capital, especially when foreign investment is focused on the domestic market, and not on export purposes – or even when it represents a reduction in operating costs for investing companies. In the Brazilian case, the absence of a positive response to successive exchange rate devaluations may indicate that such movements were not enough to position the country as an attractive export base. The results suggest that FDI has been concentrated mainly in sectors focused on the domestic market, especially in the services sector, where most of the revenues are denominated in Reals. In this context, an appreciation of the Brazilian currency would tend to benefit such activities, reinforcing the country's attractiveness for investments oriented to domestic consumption.

The results presented in table 6 confirm that the economic instability represented by the inflation rate and the country risk represents a barrier to foreign capital. The greater the economic instability, the lower the inflow of foreign direct investment (FDI). This result is robust in almost all specifications. A similar result was found by Mateus, Cassuce and Campos (2007) for Brazil. Thus, both monetary and fiscal policy must be conducted in an aligned manner to maintain a safe economic environment for foreign investors.

Economies that are more open to foreign trade receive a greater inflow of foreign capital. Table 6 confirms that the greater the country's participation in the international market through a greater flow of trade, the greater the inflow of FDI.

There is a positive relationship between the degree of openness and the inflow of foreign direct investment. The tax burden, on the other hand, does not have a statistically significant impact on FDI. As discussed by Carminati and Fernandes (2014), this result indicates that taxes are not a capital attraction factor, as investments may be receiving subsidies to counterbalance the tax burden.

The results presented in Table 6 confirm the relevance of the development of the financial market in attracting Foreign Direct Investment (FDI). The credit to GDP ratio has a positive and statistically significant impact on the inflow of foreign capital. Ang (2008) argues that the development of the financial system acts as a mechanism that facilitates the adoption of innovative technologies in the domestic economy. In this way, the supply of credit and efficient financial services can favor technology transfer and enhance the effects of productivity spillovers. Finally, regarding the attraction factors of FDI, the results also indicate that, although exchange rate volatility exerts a negative impact on capital flows, this effect is not statistically significant.

The flow of foreign capital depends not only on attractive internal factors, but also on driving factors of a global nature. Periods of higher growth in the world economy, combined with lower risk aversion and lower long-term interest rates, tend to lower the opportunity cost for global investors, stimulating increased investment in emerging economies. Table 6 analyzes the relevance of these external factors on Foreign Direct Investment (FDI) flows to Brazil. The results indicate that periods of appreciation of the U.S. stock market exert a positive and statistically significant impact on the inflow of FDI into the country, showing that the availability of foreign savings is conditioned, in part, by the economic conditions prevailing in the financing economies.

4.2.1 Robustness Exercises

Table 7 presents some exercises to analyze the robustness of the results. As discussed earlier, the nominal exchange rate may not be an adequate indicator to measure the degree of competitiveness of the domestic economy. Specification (1) shows the results using the real exchange rate instead of the nominal rate. The results found did not change, corroborating that an appreciation of the domestic currency is beneficial in relation to the flow of foreign direct investment.

Table 7 : Estimation Results - Determinants of FDI - Brazil

Dependent Variable: Log (FDI)							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Growth	0.210 (0.24)	1.30** (0.55)	0.029 (0.31)	1.30** (0.55)	-0.021 (0.28)	1.02** (0.40)	1.02** (0.47)
Real Exchange Rate	-0.72* (0.29)			1.08** (0.50)	-0.98** (0.38)		-0.79** (0.44)
Nominal Exchange Rate		0.65*** (0.35)	-0.69*** (0.39)			-1.50* (0.28)	
Inflation	-0.060* (0.010)	-0.042* (0.014)	-0.024*** (0.013)	-0.067* (0.022)	-0.023** (0.012)	-0.062* (0.018)	-0.075* (0.018)
Trade Openness	21.3* (3.60)	6.72 (4.38)	10.4* (2.49)	11.2** (5.39)	9.80* (2.26)	21.9* (4.80)	28.9* (6.27)
Access to Credit	1.49* (0.44)	2.91* (0.78)	0.23 (0.56)	4.18* (1.03)	-0.15 (0.52)	0.94** (0.49)	2.18* (0.79)
Tax Burden	0.53 (0.44)	-2.03 (1.48)	0.82 (0.80)	-3.52** (1.59)	0.75 (0.73)	0.78 (0.55)	0.73 (0.54)

Country Risk	-1.21**	-0.38**	-0.90*	-0.79**	-0.79*	-1.61*	-1.74*
	(0.089)	(0.18)	(0.27)	(0.35)	(0.20)	(0.29)	(0.30)
Exchange Rate Volatility	-0.026	-0.087	-0.034	-0.112***	-0.031	-0.046	-0.11
	(0.044)	(0.063)	(0.13)	(0.065)	(0.12)	(0.082)	(0.089)
SP500	0.62*	1.58*	0.68***	1.75*	0.66**	0.40**	0.60*
	(0.15)	(0.51)	(0.39)	(0.43)	(0.28)	(0.19)	(0.21)
VIX	0.22	-0.17	0.16	-0.26	0.27	0.13	0.23
	(0.89)	(0.31)	(0.15)	(0.27)	(0.17)	(0.12)	(0.21)
Treasury	0.085	0.093	-0.0036	-0.43	0.0064	0.029	0.11
	(0.079)	(0.44)	(0.092)	(0.52)	(0.089)	(0.11)	(0.10)
Observations	120	60	60	60	60	120	120
R^2	0.68	0.87	0.77	0.87	0.78	0.67	0.64
R^2 adjusted	0.57	0.73	0.68	0.73	0.67	0.58	0.55
Criteria	AIC	AIC	AIC	AIC	AIC	AIC	AIC
Dummy Crisis	Yes	No	No	No	No	Yes	Yes

Table 7: Results of the long-term relationship between the variables. Trade openness is the ratio between imports plus exports (% GDP); Nominal Exchange Rate is the nominal exchange rate against a basket of currencies. Real Exchange Rate is the real effective exchange rate of the World Development Indicators. Access to Credit is the ratio of credit to firms (% GDP); Tax Burden is government revenue as a proportion of GDP according to the National Treasury. Country risk is the EMBI+ index. Exchange Rate Volatility is the volatility of the exchange rate estimates by a GARCH process. SP500 is the evolution of the US stock index. Treasury is the yield on the 10-year U.S. Treasury bond. VIX is the implied volatility of the SP500. *, ** and *** represent, respectively, statistical significance at 1%, 5% and 10%.

Studies such as those by Carminati and Fernandes (2013) and Matos, Cassuce and Campos (2007) present divergent results in relation to the impact of the exchange rate on Foreign Direct Investment (FDI). These authors argue that exchange rate depreciation would favor the attraction of foreign capital, by increasing the country's competitive advantage. The Specifications (2) to (5) divide the sample into two periods of equal duration: from 1995Q1 to 2009Q4 and from 2010Q1 to 2024Q4. Specifications (2) and (4) refer to the first period, while Specifications (3) and (5) apply to the subsequent period. The results indicate the occurrence of a structural change in the Brazilian economy over time. Between 1995 and 2009, the exchange rate presented a positive and statistically significant coefficient, corroborating the findings of the authors, with elasticity like that estimated by Matos, Cassuce and Campos (2007). However, between 2010 and 2024, the effect of the exchange rate became negative and statistically significant, and this behavior is what prevails in the complete sample. This result may reflect the loss of relevance of the industry in the gross domestic product and the strengthening of the services sector, as well as the direction of foreign capital flows to sectors such as infrastructure. In these cases, currency devaluation represents a risk factor, given that many of these companies have liabilities in foreign currency and revenues denominated in local currency. This result remains robust even when the real exchange rate is used instead of the nominal rate.

Specifications (6) and (7) use, in place of the total Foreign Direct Investment (FDI), only the variable referring to capital participation, excluding intercompany loans. The results previously obtained remain robust, with no significant changes. Overall, the results are consistent across the different specifications. It is noteworthy that the GDP growth rate remains statistically significant in the period from 1995 to 2009, while the variable related to credit loses statistical significance in the period from 2010 to 2024 — which may reflect a possible structural improvement in the Brazilian financial

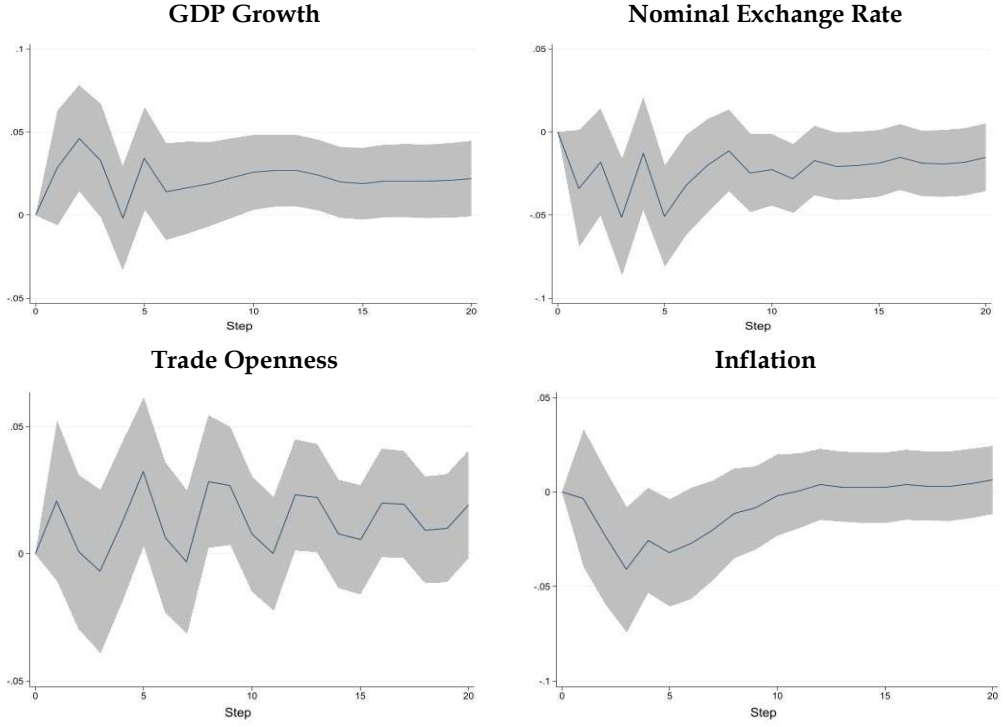
system.

4.2.2 VAR analysis

As described, this work uses an autoregressive vector (VAR) model to analyze the robustness of the results, with special attention to the impact of shocks in the selected variables on Foreign Direct Investment (FDI). Initially, the procedures usually adopted in the literature define the optimal structure of the econometric model. The selection of the number of lags was based on the criteria of Akaike (AIC), Schwarz (BIC) and Hannan-Quinn (HQ), whose results indicated the choice of a VAR with four lags. The structural identification of the shocks was conducted by means of Cholesky decomposition, assuming the external variables as exogenous. Figures 1 and 2 present, respectively, the functions of subsequent and cumulative impulse responses — the latter being representative of the total impact over the quarters.

The results presented in Figures 1 and 2 confirm the positive relationship between economic growth and Foreign Direct Investment (FDI). A positive shock to the GDP growth rate results in greater attraction of foreign capital. It is observed that this effect is highly persistent, remaining positive for more than twenty quarters, which reinforces the importance of the country achieving sustainable growth. The results also indicate that measures aimed at the development of the financial market — represented by the credit to GDP ratio — have a positive impact on FDI flows. Similarly, positive shocks to the degree of trade openness also translate into increased foreign investment . It is also noteworthy that the impact of a shock on economic growth is of greater magnitude and persistence compared to the other factors analyzed, evidencing its relevance for attracting foreign capital.

Figure 1: Result of the response of Foreign Direct Investment to variable shocks obtained through VAR - Brazil (1995Q1 - 2024Q4)



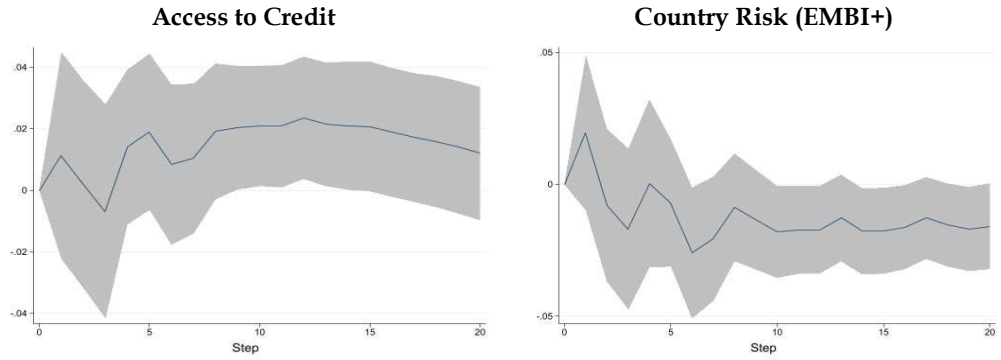
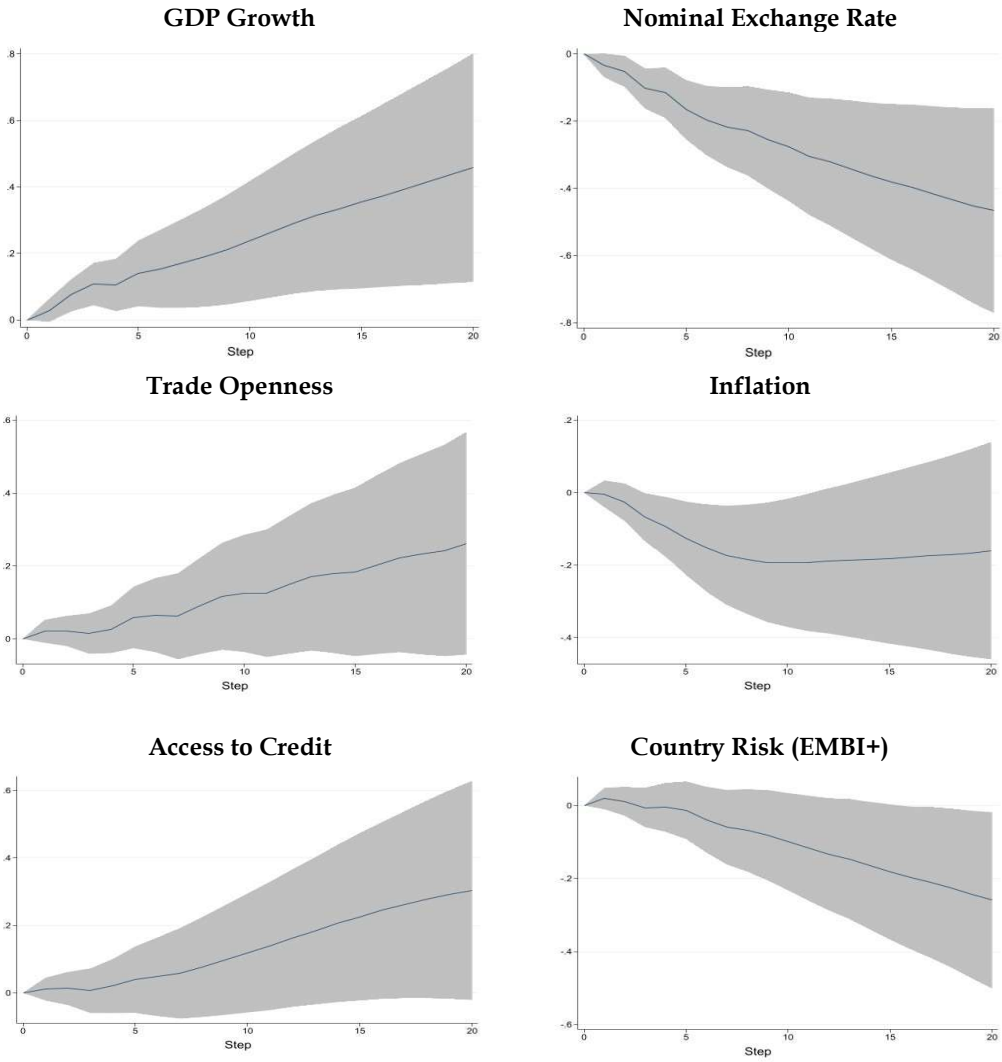


Figure 2: Cumulative FDI response to shocks - Brazil (1995Q1 - 2024Q4). Result of the cumulative response of Foreign Direct Investment to variable shocks obtained through VAR.



The results presented in Figures 1 and 2 confirm that macroeconomic stability is a necessary condition for greater attraction of foreign capital. Both increases in the inflation rate and increases in country risk cause a persistent drop in the flow of Foreign Direct Investment (FDI). International investors tend to associate economic

instability with adverse effects on invested capital, which reduces companies' growth expectations and, consequently, discourages new investments.

The response of Foreign Direct Investment (FDI) to exchange rate shocks is particularly noteworthy. Figures 1 and 2 corroborate the previous analyses by showing the negative effect of exchange devaluations on the inflow of foreign capital. A more devalued exchange rate leads to a persistent and statistically significant drop in FDI flows into the country. This is a relevant issue for the design of economic policy. Although currency devaluation can benefit exporting companies, especially in economies strongly inserted in global value chains, the Brazilian case imposes important limitations. The country still has a marginal participation in global production chains, especially in the manufacturing sector, and faces significant capital needs to finance its infrastructure. This poses a dilemma: a depreciated exchange rate can, at the same time, favor exporting sectors and discourage foreign investment in sectors aimed at the domestic market — such as services and infrastructure — whose revenue is mostly denominated in local currency. In this context, initiatives that seek to mitigate the exchange rate risk for these sectors are desirable, to increase the country's attractiveness to international investors.

6 Conclusions

The set of results presented in this study indicates that the country has room for the implementation of reforms with high potential to attract foreign capital, thus boosting productivity and economic growth. The findings show that economies with better governance — especially those with greater political stability, regulatory quality, government efficiency, and respect for the rule of law — tend to receive higher volumes of Foreign Direct Investment (FDI). In addition, macroeconomic stability, greater openness to international trade and the development of the financial market are crucial factors for the expansion of foreign capital flows. These elements, when combined, contribute to the creation of a more favorable environment for investment and to the strengthening of the foundations of sustainable growth.

Reforms play a key role in creating an enabling environment for attracting foreign direct investment, reducing structural barriers, increasing transparency, and improving the business climate. The study shows that macroeconomic stability, regulatory clarity, trade openness, as well as advances in public governance, are among the main factors that influence investors' perception of a country's attractiveness. When implemented consistently, these reforms signal a credible commitment to long-term economic development, reducing perceived risk and encouraging the continued inflow of foreign capital.

In addition, reforms that align domestic institutions with the best international practices strengthen investor confidence and promote greater efficiency in resource allocation. Changes that increase legal certainty, simplify the procedures for starting and operating companies, and ensure effective dispute resolution mechanisms contribute significantly to improving the business environment. These measures not only attract new investments but also stimulate reinvestment by foreign companies already installed. Ultimately, a strategy based on structural reforms that encompass both economic fundamentals and institutional quality is essential to increase

countries' competitiveness in the global competition for capital.

The study also shows that exchange rate risk is a crucial factor in the decision of foreign investors, as it directly affects the expected profitability of investments. In recent years, abrupt depreciations in the exchange rate have generated significant losses for some sectors with special attention to the infrastructure sector. Exchange rate depreciation can increase the cost of imported input and compromise financing contracts in foreign currency, increasing the perception of risk. To mitigate these effects and attract more FDI, it is essential that the country adopts consistent macroeconomic policies, maintains adequate international reserves, strengthens the credibility of monetary and exchange rate policy and, in the short term, creates hedging instruments for companies to reduce the exchange risk of their balance sheets.

The study indicates that future research on the determinants of foreign direct investment (FDI) by sector represents a promising agenda to deepen understanding of the specific factors that influence the allocation of foreign capital in different segments of the economy. While aggregate studies offer an overview of the constraints of FDI, sectoral analyses allow us to identify important nuances — for example, the relative weight of infrastructure, workforce qualification, regulatory stability, or access to inputs can vary significantly between sectors such as manufacturing, agribusiness, financial services, or technology. More granular investigations can also reveal how public policies, tax incentives, and regulatory frameworks affect the attractiveness of strategic sectors, contributing to the design of more effective strategies to attract investments. In addition, research that combines quantitative data with qualitative case studies can capture institutional and informal factors often overlooked in more aggregated approaches.

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