Effects of sustainable monetary and fiscal policy on FDI inflows to EMDE countries*

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Resumo

Os países de Mercados Emergentes e Economias em Desenvolvimento (EMDE) são os principais destinos de Investimento Direto Estrangeiro (IDE). Objetiva-se investigar se a política monetária e fiscal sustentável, por meio de indicadores que refletem as expectativas do compromisso do banco central com uma meta e a sustentabilidade das finanças governamentais, afeta os fluxos de IDE. Com base em uma grande amostra de 75 países EMDE de 1990 a 2019, são fornecidas evidências empíricas por meio de análise de dados em painel de que as políticas macroeconômicas sustentáveis são um impulsionador essencial dos fluxos de IDE. Os resultados mostram que os países EMDE devem aumentar a credibilidade do banco central, diminuir o desequilíbrio fiscal e adotar metas de inflação para aumentar os fluxos de IDE.

Abstract

Emerging Market and Developing Economies (EMDE) countries are the leading destinations of Foreign Direct Investment (FDI). We investigate whether sustainable monetary and fiscal policy through indicators that reflect the expectations of the central bank's commitment to a target and the sustainability of government finance affects FDI inflows. Based on a large sample of 75 EMDE countries from 1990 to 2019, we provide empirical evidence through panel data analysis that sustainable macroeconomic policies are an essential driver of FDI inflows. The findings show that EMDE countries should increase the central bank credibility, decrease the fiscal imbalance, and adopt inflation targeting to enhance the FDI inflows.

Palavras-chave: investimento direto estrangeiro, estabilidade macroeconômica, credibilidade do banco central, dívida pública, risco para o equilíbrio orçamentário, metas de inflação.

Key words: foreign direct investment, macroeconomic stability, central bank credibility, public debt, risk for budget balance, inflation targeting.

Área ANPEC: Área 4 - Macroeconomia, Economia Monetária e Finanças

JEL classification: E63, F21, 023.

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1. Introduction

There is a long tradition in economics of studying the determinants of foreign direct investment (FDI).[1] Although vast literature covers several aspects regarding FDI inflows in the host economy (e.g., markets, assets, natural resources, and efficiency-seeking), the analysis respecting a sustainable macroeconomic policy as a driver of inward FDI is few explored.[2] Since the beginning of the 2000s has been a change in the FDI landscape. Emerging Market and Developing Economies (EMDE) countries have gained relevance, and after 2013 they became the leading destination for FDI (Carril-Caccia and Pavlova, 2018). This period coincides with one fundamental transformation in the conduct of monetary policy: the importance of credibility for low inflation. This new consensus on monetary policy spread out in EMDE countries through inflation targeting after the collapse of fixed exchange rates in the second half of the 1990s (Goodfriend, 2007). Furthermore, one precondition for the success of inflation targeting is a fiscal policy consistent with intertemporal solvency (Mendoza and Ostry, 2008). Therefore, since FDI has an element of risk, the credibility for low inflation and keeping public debt within sustainable bounds are essential to attract FDI to EMDE countries by lowering risks related to the expected value of assets and profits generated abroad.

We analyze whether a sustainable macroeconomic policy is a relevant driver of inward flows of FDI based on a large sample of 75 EMDE countries (according to IMF's classification) from 1990 to 2019.[3] The data covers the period when EMDE countries became important destinations for FDI. We assume, at last instance, that the monetary and fiscal policy aims are a low and stable inflation rate and a sustainable public debt. Specifically, we consider the ability of central banks to anchor inflation expectations to the target (a measure of central bank credibility) and indicators regarding the public debt solvency (risk for budget balance and public debt level) as proxies for sustainable macroeconomic policy. Because we believe an increase in the central bank's credibility and a decrease in the fiscal deterioration as a situation that can improve the climate for investment decisions, we regress FDI directly on our macroeconomic policy indicators. The baseline results show that success in managing monetary and fiscal policies is an essential driver of inward flows of FDI. More precisely, while increasing the central bank's credibility attracts more capital, a weak fiscal position decreases the FDI's inward flows.

Our analysis considers monetary and fiscal aspects related to macroeconomic stability. From the monetary side, the lack of credibility reduces the power of central banks to use the monetary policy effectively to stabilize the economy (Bordo and Siklos, 2016; Seelajaroen, Budsaratragoon, and Jitmaneeroj, 2020). In particular, "credibility is important because it influences public expectations affecting interest and exchange rates and thereby improves the implementation of monetary policy and a lower and stable inflation rate" (de Mendonça and de Guimarães e Souza, 2012, p. 178). Regarding the fiscal side, as stated by the Federal Reserve Board Governor Edward M. Gramlich at a Concord Coalition policy forum in June 2004: "Fiscal policy can have important long-run effects on the health of the economy, particularly through its impact on national saving and the growth of productivity." Specifically, a responsible fiscal policy that avoids unsustainable public debt can boost investments. On the other hand, a bad fiscal stance is one of the main reasons to explain sudden stops in capital flows (Michaud and Rothert, 2018; Cavallo, 2019). In brief, central bank credibility and fiscal solvency indicators are suitable thermometers to see how sustainable monetary and fiscal policy is.

This study is related to the literature on the relevance of macroeconomic stability as a driver of FDI inflows in EMDE countries. However, it is essential to clarify that we are not checking the success of economic policy in stabilizing the economy, but if monetary and fiscal policy based on a sustainable stance are drivers of FDI inflow. Few studies are concerned with the influence of macroeconomic factors on FDI's inward flows. Maryam and Mittal (2020), taking into account the case of BRICs countries over the period 1994 to 2018, as well as Singh and Jun (1995), based on a sample of thirty-one EMDE countries covering 1970 to 1993, found evidence that macroeconomic factors are significant for determining FDI inflows. Particularly regarding the effect of macroeconomic uncertainty on FDI in EMDE economies, the empirical

[1] For an overview of the main theoretical models of FDI, see Faeth (2009).

[2] For a review of the empirical analysis regarding FDI inflows, see Ghazalian and Amponsem (2019).

[3] The concept of "sustainable macroeconomic policy" in this paper is related to the idea of the conduct of macroeconomic policy with a reduced chance of occurring dynamic inconsistency.

evidence shows that it is responsible for a bad climate that hampers FDI (Asamoah, Adjasi, and Alhassan, 2016; and Kinda, 2010).

Our paper stands out from the existing literature in several aspects. Firstly, we use monetary and fiscal indicators as proxies of sustainable macroeconomic policy in the models, which allow us to analyze if they matter to increase inward flows of FDI. In other words, using different measures of central bank credibility and sustainability of government finance makes it possible for us to look in more detail at the exact mechanism through which the sustainability of macroeconomic policy impacts FDI inflows. Secondly, we examine a large sample of EMDE countries covering the entire period when these countries became the leading destination of FDI. Thirdly, we provide empirical evidence to check whether adopting inflation targeting by EMDE countries increased the attraction of FDI. Lastly, we calculate linear and non-linear central bank credibility indexes, which were not previously used for the sample.

We found empirical evidence that supports the view that, in EMDE countries, sustainable monetary and fiscal policies are relevant drivers of FDI inflows. This result differs, for example, from Bird's (1999) view that sound macroeconomic policies are not a dominant factor in explaining capital flows to EMDE countries. Our results are robust to different monetary and fiscal indicators, methods, control variables, and samples. Because we are using an extensive panel data of 75 EMDE economies covering 30 years using macroeconomic data, it is likely that problems related to heteroscedasticity, serial correlation, and cross-dependence among the countries (Reed and Ye, 2011; Pesaran, 2006; and Wooldridge, 2002). We provide empirical analysis using Feasible Generalized Least Squares (FGLS) with country weights and covariance matrices adjusted to deal with these issues. Furthermore, because FDI may suffer the influence of other macroeconomic variables besides central bank credibility and fiscal indicators, endogeneity among the regressors is not negligible. Hence, concerned with the risk of endogeneity in our models, we also provide empirical evidence from the sys-GMM proposed by Blundell and Bond (1998).

The remainder of this paper is organized as follows. Section 2 describes the main variables of interest: FDI inflows and our measures of sustainable macroeconomic policy (monetary and fiscal); moreover, it presents a brief empirical analysis of the relationship between them. Section 3 introduces the empirical specification and estimation strategy we use in the analysis. Section 4 shows the estimation of the models and reports the results. Section 5 concludes.

2. Sustainable macroeconomic policy measures and FDI inflows: a first glance

An essential element for our analysis is measuring sustainable macroeconomic (monetary and fiscal) policy. As measures of sustainable monetary policy, we use central bank credibility indexes. The measures have as a pillar the definition provided by Cukierman and Meltzer (1986, p. 1108), that is, "(…) the absolute value of the difference between the policymaker's plans and the public's beliefs about those plans". This definition of credibility is the cornerstone of several influential studies (Blinder, 2000; Svensson, 2000; and Woodford, 2004), and it reflects the success of central banks in conducting monetary policy. In brief, these indexes have sound theoretical ground and support several applications for analyzing EMDE countries.

The first measure is a linear central bank credibility index, which considers the distance between the inflation expectation and the inflation target with the tolerance intervals announced by the central bank. The credibility index corresponds to one (full credibility) when the inflation expectations are precisely equal to the target. The credibility decreases linearly while the expectations depart from the target. It is scored as zero (without credibility) when expectations exceed the tolerance intervals. In short, the index captures well the "spirit of credibility", that is, "a central bank is credible if people believe it will do what it says" (Blinder, 2000, p. 1422).

We need information about inflation expectations to calculate the central bank credibility for all countries over time. Because most central banks do not make available information regarding inflation expectations, we use a moving average of inflation as a proxy for inflation expectations for the central banks that do not provide this information (see, e.g., de Mendonça and Tiberto, 2017; Tesfaselassie and Schaling, 2010; Johnson, 2003; and Cecchetti and Krause, 2002). Hence, based on inflation measured by the consumer price index extracted from the International Financial Statistics (IFS/IMF), we built inflation expectations for four quarters ahead ($E_t(\pi_{t+4})$) as follows:

(1) $$E_t^{proxy}(\pi_{t+4}) \coloneqq E_t(\pi_{t+4}) \approx \sum_{t=-1}^{t=2} \frac{\pi_t}{4}.$$

We are concerned if the inflation expectation measured through a moving average of observed inflation is a good proxy for the inflation expectation of EMDE countries. Hence, at a country level, we calculate the correlation between the inflation expectations measured according to the equation (1) and the inflation expectations obtained through the Consensus Forecast. The results show that there is a fairly strong positive relationship between them (0.94). In short, we have an indication that the inflation expectation we have built is a good proxy for most EMDE countries.

Some international central bank credibility indexes like Cecchetti and Krause (2002) sets an inflation target of 2% for all countries. However, a target of 2% is unreal for most EMDE countries. To mitigate this problem, we consider the mode of the inflation target and the respective tolerance intervals of the countries in the sample. It is important to note that the use of the statistical mode is able to capture the levels for setting the inflation targets and the tolerance intervals suitable to the aim of low and stable inflation based on the practice of EMDE inflation-targeting countries. Specifically, for the case of countries that adopted inflation targeting over the period under analysis, we collect the inflation targets and their tolerance intervals from the Inflation Reports of each country. As pointed out by Andersson and Berg (1995), private agents take more than one year to feel a change in the monetary policy; hence, before adopting inflation targeting, we consider the mode of the first three years regarding inflation targets and the respective tolerance intervals. We consider the statistical mode of the inflation-targeting countries used in the sample as a proxy for the targets and tolerance intervals for the case of non-inflation targeting countries.

Therefore, using the information regarding inflation expectations for four quarters ahead ($E_t(INF_{t+4})$), the inflation target (INF^*), and the tolerance intervals (upper bound = INF^U and lower bound = INF^L), the linear central bank credibility index (*CREDL*) of each country (i) at time t is a result of:

(2) $CREDL_{i,t} =$

$$\begin{cases} 1 & \text{if} \quad E_t(INF_{i,t+4}) = INF^*_{i,t+4} \\ 1 - \frac{1}{INF^U_{i,t+4} - INF^*_{i,t+4}}\left[E_t(INF_{i,t+4}) - INF^*_{i,t+4}\right] =]0,1[& \text{if} \quad INF^*_{i,t+4} < E_t(INF_{i,t+4}) < INF^U_{i,t+4} \\ 1 - \frac{1}{INF^L_{i,t+4} - INF^*_{i,t+4}}\left[E_t(INF_{i,t+4}) - INF^*_{i,t+4}\right] =]0,1[& \text{if} \quad INF^L_{i,t+4} < E_t(INF_{i,t+4}) < INF^*_{i,t+4} \\ 0 & \text{if} \quad E_t(INF_{i,t+4}) \geq INF^U_{i,t+4} \text{ or } E_t(INF_{i,t+4}) \leq INF^L_{i,t+4} \end{cases}$$

Our second measure of central bank credibility has the same elements as earlier. However, there is an essential difference between them. The loss of credibility is the same in the linear credibility index. Independently if the inflation expectations are close to the target or far from the target, a difference of 1 pp has the same impact on the result. On the other hand, the non-linear central bank credibility index shows a different outcome. The non-linear index considers that the impact of a disagreement of, for example, 1 pp between expectations and the target implies a lower loss of credibility when expectations are close to the target. Hence, we calculate the non-linear credibility index (*CREDNL*) as:[4]

(3) $CREDNL_{i,t} =$

$$\begin{cases} 1 & \text{if} \quad E_t(INF_{i,t+4}) = INF^*_{i,t+4} \\ \frac{\sqrt{\left[INF^*_{i,t+4} - INF^U_{i,t+4}\right]^2 - \left[E_t(INF_{i,t+4}) - INF^*_{t+4}\right]^2}}{INF^U_{i,t+4} - INF^*_{t+4}} =]0,1[& \text{if} \quad INF^*_{i,t+4} < E_t(INF_{i,t+4}) < INF^U_{i,t+4} \\ \frac{\sqrt{\left[INF^*_{i,t+4} - INF^L_{i,t+4}\right]^2 - \left[E_t(INF_{i,t+4}) - INF^*_{t+4}\right]^2}}{INF^*_{t+4} - INF^L_{i,t+4}} =]0,1[& \text{if} \quad INF^L_{i,t+4} < E_t(INF_{i,t+4}) < INF^*_{i,t+4} \\ 0 & \text{if} \quad E_t(INF_{i,t+4}) \geq INF^U_{i,t+4} \text{ or } E_t(INF_{i,t+4}) \leq INF^L_{i,t+4} \end{cases}$$

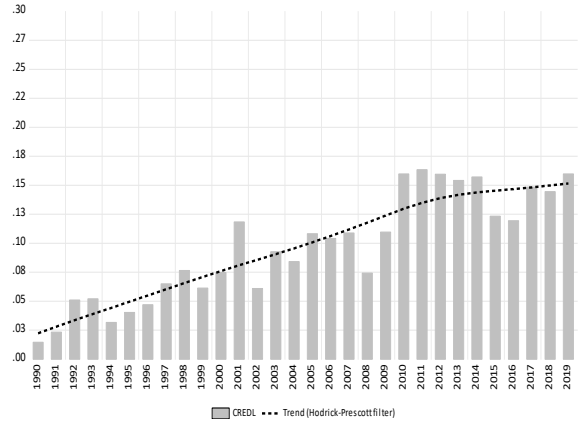
In a preliminary way, we show the monetary policy performance (i.e., the yearly average of central bank credibility) based on the cross-country average for both linear and non-linear indexes over time.[5] Figure 1 shows that both indexes exhibit a trend of increasing over time, which, in turn, suggests that ability of central banks to anchor inflation expectations to the target is improving. It is important to note that although credibility still had not reached a high level, the increase in central bank credibility over time is undeniable. While the average of the first five years of the sample gives us an average of *CREDL* equal to 0.035 and *CREDNL* of 0.054, the last five years' average corresponds to 0.139 and 0.234, respectively. In brief, the central bank credibility quadruplicated over the period.

[4] For an example of the application of this index to an emerging economy, see de Mendonça and Almeida (2019).

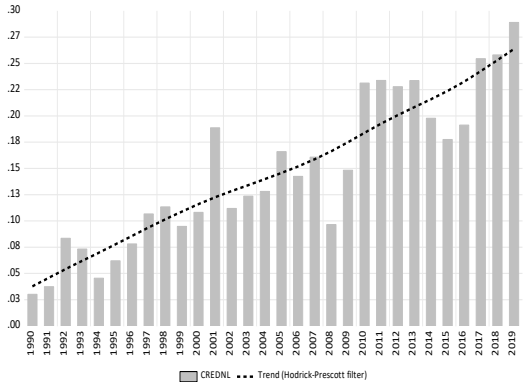
[5] Tables A.1 and A.2 (appendix) show the list of countries in the sample and the descriptive statistics of all variables, respectively.

Figure 1 - *Monetary policy sustainability*

Linear central bank credibility



Non-linear central bank credibility



Note: The bars correspond to the cross-country average of 75 EMDE countries over time.

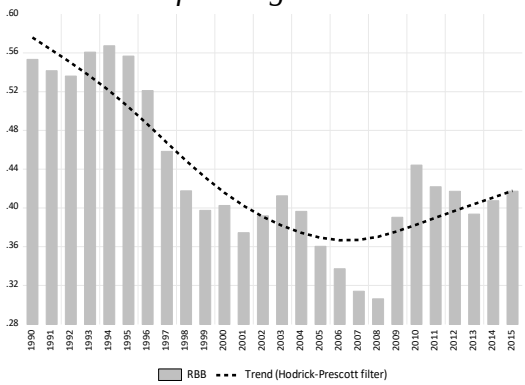
We use two proxy measures to see if the fiscal policy is sustainable in the countries: the risk for budget balance and the general government gross debt. We assume that the country's fiscal sustainability is higher as the risk for budget balance and general government gross debt decreases. The measure of risk for budget balance is gathered from the International Country Risk Guide (Budget Balance Points). It corresponds to the estimated central government budget balance (including grants) for a given year in the national currency expressed as a percentage of the estimated GDP for that year in the national currency. The index is scored with ten points when the budget balance is higher or equal to 4% GDP, and it is scored with zero points when the budget balance is lower or equal to -30%. Each interval [0, 0.9] regarding the budget balance (% GDP) corresponds to 0.5 risk points. To simplify our interpretation, we normalized the risk for budget balance (*RBB*), varying from zero (lowest risk level) to one (highest risk level) through:[6]

$$(4) \qquad RBB_{i,t} = \frac{10 - \text{Budget Balance Points}_{i,t}}{10}, \qquad 0 \leq RBB_{i,t} \leq 1.$$

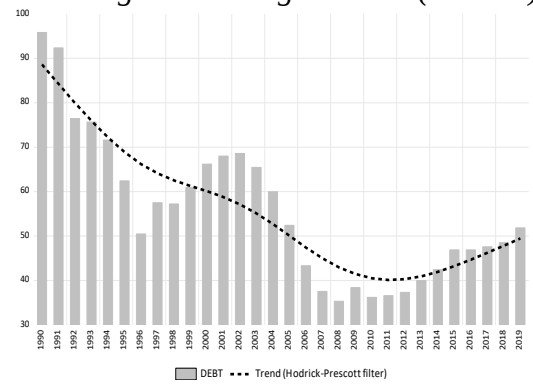
The second measure of fiscal sustainability is the public debt level as a percentage of GDP (*DEBT*). As pointed out by IMF (2002), when the level of debt in EMDE countries exceeds 60% of GDP, it decreases the chance of debt sustainability considerably. Hence, we collected the data from the World Economic Outlook/International Monetary Fund regarding the general government gross debt as a percent of GDP, which consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future. This indicator includes debt liabilities in the form of SDRs, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable (IMF, 2001). Figure 2 shows that both *RBB* and *DEBT* present a decreasing trend over time, indicating that the average of the EMDE countries is improving the fiscal conditions.

Figure 2 - *Fiscal policy sustainability*

Risk for budget balance



General government gross debt (% GDP)



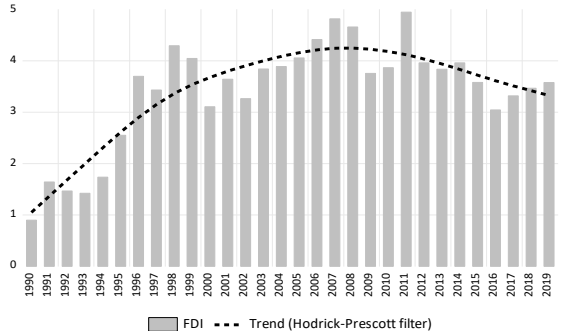
Note: The bars correspond to the cross-country average of 75 EMDE countries over time.

In this study, the dependent variable of interest is the foreign direct investment inward flows as a proportion of the GDP (*FDI*). We gathered information regarding *FDI* from UNCTADstat. According to

[6] Due to data constraints, the period considered for the risk for budget balance goes from 1990 to 2015.

the definition in the World Investment Report – UNCTAD (2014, p. 3): "Foreign direct investment is defined as an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise or affiliate enterprise or foreign affiliate)". Figure 3 shows that the average FDI inflows to EMDE countries increased dramatically in the second half of the 1990s and have remained around this level since then.

Figure 3 - *FDI inward flows % GDP*



Note: The bars correspond to the cross-country average of 75 EMDE countries over time.

3. Data and methodology

The size of the domestic market is one of the main determinants of foreign direct investment (Kravis and Lipsey, 1982; Wheeler and Mody, 1992; Billington, 1999). Empirical studies show that economic growth reflects better market opportunities and greater attractiveness for foreign direct investment (Asiedu, 2006; Zhang, 2008; Al Nasser, 2010; Jiménez, 2011; Boateng et al., 2015). Hence, we control the effect of the domestic market size on foreign direct investment, including the gross domestic product growth rate (*GDP*) in the models. Because an increase in the money supply can increase the liquidity of the economy and, consequently, positively affect foreign direct investment by making the cost of funding cheaper, we introduce the monetary aggregate (*MONEY*) in the models (Harford, 2005; and Resende, 2008). Finally, we also consider the effect of the exchange rate (*ΔEXCH*) on foreign direct investment in the models. The exchange rate depreciation reduces local production costs in terms of foreign currency, encouraging foreign direct investment flow due to its greater profitability (Froot and Stein, 1991; Klein and Rosengren, 1994; and Blonigen, 1997). Therefore, in order to observe the impact of the main independent variables of the models (our measures of monetary and fiscal policy sustainability) on FDI inflows in EMDE countries, our baseline specification is given by:

$$FDI_{i,t} = \beta_{0i} + \beta_1 Macro\ Policy\ Sustainability_{i,t-1} + \beta_2 GDP_{i,t-1} + \beta_3 MONEY_{i,t-1} + \beta_4 \Delta EXCH_{i,t} + \beta_5 X_{i,t-1} + \varepsilon_{i,t}, \quad (5)$$

where: $FDI_{i,t}$ corresponds to the foreign direct investment inward flows (% GDP) to the country *i* in year *t*. *Macro Policy Sustainability* corresponds to the following indicators: linear central bank credibility index (*CREDL*), non-linear central bank credibility index (*CREDNL*), risk for budget balance (*RBB*), or general government gross debt - % GDP (*DEBT*); *i=1,..., 75* is the cross-section unit (countries); *t=1,2, ..., 30* is the time index (annual frequency); $\varepsilon_{i,t}$ is the stochastic error term; β_{0i} represents a vector of country-specific factors. *GDP* is the gross domestic product in billions of U.S. dollars at constant (2015) prices. *MONEY* is a proxy for broad money (% GDP), available from the World Development Indicators/World Bank (WDI/WB). It represents the sum of currency outside banks, demand deposits other than those of the central government, the time, savings, foreign currency deposits of resident sectors other than the central government, bank and traveler's checks, and other securities such as certificates of deposit and commercial paper. *EXCH* is the official exchange rate (local currency units relative to the U.S. dollar), determined by the national authority or legally determined in the foreign exchange market (data available from IFS/IMF). In general, the regressors are lagged one period to control possible contemporary effects.[7]

Regarding the vector of control variables in the model (*X*), we gathered from the literature several

[7] For example, a shock not observed in $\varepsilon_{i,t}$, which affects foreign direct investment in period *t*, could also affect the inflation expectations and thereby influence both linear and non-linear central bank credibility indexes.

determinants of foreign direct investment, such as real interest rate (*RIR*), financial openness (*KAOPEN*), trade openness (*TRADE*), and global macroeconomic uncertainty (*VIX*)). *RIR* is the real interest available from WDI/WB - the lending interest rate adjusted for inflation as measured by the GDP deflator (see Billington, 1999; and Culem, 1988). *KAOPEN* is the country's degree of capital account openness measured by Chinn and Ito (2006, 2008). It is based on binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (see Belgibayeva and Plekhanov, 2019; Combes et al., 2019). *TRADE* is calculated using data from the WDI/WB, and it corresponds to the sum of imports and exports divided by GDP (Boateng et al., 2015; Ghazalian and Amponsen, 2019; and Asiedu, 2002). *ΔVIX* is the CBOE volatility index and represents a proxy for global macroeconomic uncertainty, which is the popular measure of the implied volatility of S&P 500 index options (see Asamoah, Adjasi, and Alhassan, 2016; Solomon and Ruiz, 2012; Sung and Lapan, 2000).

In equation (5), the β_1 coefficient measures the effect on FDI inflows due to a shock on the macroeconomic policy sustainability. Because we are considering different monetary and fiscal policy sustainability measures in the model, the sign of the coefficients regarding the relationship with the FDI is not the same. Monetary policy sustainability reflects the monetary authority's ability to anchor inflation expectations to the inflation target. The lack of control over inflation reduces the real value of gains in local currency for corporates with inflows of FDI. Hence, we expect that the coefficient, which measures the effect of the monetary policy sustainability ($\beta_1^{monetary}$) from both central bank credibility indexes, is positive. Concerning the fiscal policy sustainability effect on FDI inflows, both indicators (risk for budget balance and general government gross debt) represent a thermometer for the expectation of fiscal deterioration. An increase in risk for budget balance and general government gross debt represents a decrease in fiscal sustainability, which, in turn, harms the climate for investment. Thus, the coefficient for the relationship between these variables and the FDI inflows (β_1^{fiscal}) would be negative.

We use a panel data analysis based on a sample of 75 EMDE countries covering the period 1990 to 2019. We consider a sample of 75 countries constrained by data availability regarding all variables in the model. Moreover, as mentioned earlier, the 1990s represent a change in the mentality of the conduct of economic policies, which combines the concern of central banks with low and stable inflation and a fiscal policy committed to intertemporal solvency (Goodfriend, 2007; Mendoza and Ostry, 2008).

Macroeconomic studies using long panel data suggest that using the fixed-effects model is a good option. However, in the presence of cross-dependence among countries, the fixed effects model is not robust due to the possibility of biased and inconsistent estimators. Unobserved components and characteristics common to covariates can result in the interdependence between cross-sections (de Hoyos and Sarafidis, 2006; Sarafidis and Wansbeek, 2012; Wooldridge, 2002). Following Pesaran (2004), we perform a cross-section dependence test (CD test) to deal with this issue. The null hypothesis of cross-section independence between countries is rejected for most variables, revealing that the countries in the sample have common components that cannot be neglected. Therefore, to control the potential problems in the regressions and thus generate robust standard errors, we estimate the models using Feasible Generalized Least Squares (FGLS) with adjustment in the covariance matrices as proposed by Arellano (1987) and White (1980).

Because there is a possibility of a relationship among the macroeconomic variables in the models, and FDI can influence them, the risk of endogeneity cannot be ruled out. A well-known solution to endogeneity is using instrumental variables (Bond, Hoeffler, and Temple, 2001). Hence, we control the potential concern of endogeneity of FDI with the regressors in the models using internal instruments (Bengoa and Sanchez-Robles, 2003; Basu and Guariglia, 2007; de Vita and Kyaw, 2009; Feeny, Iamsiraroj, and McGillivray, 2014). Arellano and Bond (1991) proposed using data in the first difference and the lagged value of endogenous variables as instruments. However, the Difference Generalized Method of Moments has a bias (for large and small samples) and low precision (Blundell and Bond, 1998). Moreover, Arellano and Bover (1995) and Staiger and Stock (1997) show that using lagged values of the endogenous variables in levels can generate weak instruments. Therefore, to improve the efficiency of the estimated parameters, the System of Generalized Method of Moments (Sys-GMM) "combines the standard set of equations in first-differences with suitably lagged levels as instruments, with an additional set of equations in levels with

suitably lagged first-differences as instruments" (Bond, Hoeffler, and Temple, 2001, p. 9). In short, besides the FGLS method, we also provide empirical evidence using the Sys-GMM method.

4. Empirical results

This section first conducts FGLS and Sys-GMM regressions of the relationship between each macroeconomic policy sustainability measure (*CREDL*, *CREDNL*, *RBB*, and *DEBT*) and FDI inflows taking into account the full sample of countries and time based on equation (5). To check which macroeconomic policy (monetary or fiscal) is more relevant to determining the FDI inflows in EMDE countries, we include both sustainability measures in the regressions and re-estimate the models. Besides, we extend our analysis by providing evidence regarding the effect of macroeconomic policy sustainability on FDI inflows based on subsamples of inflation-targeting countries and non-inflation targeting countries.

As a robustness analysis, we provide new regressions containing an alternative fiscal measure when the gross public debt/GDP ratio exceeds 70% (a "safe" level) and introduce control variables regarding financial stability, international liquidity, and governance indicators. In addition, because inflation expectations are an essential component of our central bank credibility measures, we provide robust analysis based on a subsample of countries and time, considering expectations gathered from a different data source: the Consensus Forecast database.

4.1. Impact of monetary and fiscal policy sustainability on FDI inflows

Tables 1 and 2 show that the coefficients on central bank credibility (*CREDL* and *CREDNL*) are positive and statistically significant in almost all models. The findings confirm the assumption that $\beta_1^{monetary} > 0$ in equation (5). This result is in line with the view that management of the monetary policy focused on low and stable inflation with a good ability of the central bank to anchor inflation expectations provide a fertile climate for the attraction of investment. In general, the coefficients on *CREDL* are higher than on *CREDLN*. This finding suggests that when the central banks are concerned with any deviation of the inflation expectations to the target (give the same weight for the risk of losing credibility when expectations are close or far from the target), the gain for the attraction of the FDI is greater.

Tables 3 and 4 show that sustainable fiscal policy matters for FDI inflows. Both coefficients on our fiscal measures (*RBB* and *DEBT*) are statistically significant in all models. As expected, the coefficients on both *RBB* and *DEBT* are negative ($\beta_1^{fiscal} < 0$ in equation (5)), and thus it is possible to conjecture that an increase in the fiscal risk regarding a worsening in the budget balance, as well as a deterioration in the public debt sustainability, reduces FDI flows from the foreign country.

Regarding the other variables present in the baseline model, that is, *GDP*, *MONEY*, and *ΔEXCH*, the findings agree with the literature on the subject (Wheeler and Mody, 1992; Jiménez, 2011; Boateng et al., 2015; Klein and Rosengrenm, 1994; Blonigen, 1997; Harford, 2005; and Resende, 2008). The positive sign and significance in most models confirm that the size of the domestic market, liquidity, and the exchange rate depreciation may stimulate FDI inflows. Concerning the control variables related to openness, we observe that both financial openness and trade openness are positive and significant, which in turn aligns with the view that an increase in these variables strengthens the business-friendly economic climate (Liargovas and Skandalis, 2012; Belgibayeva and Plekhanov, 2019; Combes et al., 2019). Finally, the coefficients on *RIR* and *ΔVIX* are negative and significant in all GMM models, which aligns with the perspective that an increase in the cost of borrowing, as well as in the uncertainty, disheartens foreign firms from investing (Billington, 1999; Solomon and Ruiz, 2012; and Asamoah, Adjasi, and Alhassan, 2016).

The FGLS and Sys-GMM regressions results, when we consider pairs of the monetary and fiscal indicators in the models, are in table 5. In general, the findings show that monetary and fiscal policy sustainability is relevant to FDI inflows. As observed earlier, the linear central bank credibility index produces significant and higher coefficients than the non-linear central bank credibility index. Once again, this result suggests that the strict combat to deviations of inflation from the target is relevant to attracting foreign investors. Concerning the fiscal indicators, both *RBB* and *DEBT* are negative and significant. Therefore, the results confirm the need for the policymakers to be committed to controlling inflation and avoiding the risk of fiscal imbalance to increase the FDI inflow.

Table 1

Effects of monetary policy sustainability (linear central bank credibility index) on FDI inflows – FGLS and Sys-GMM

	FGLS					Sys-GMM				
Regressors	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**
$FDI_{i,t-1}$						0.3371***	0.3659***	0.3632***	0.3239***	0.3263***
						(0.0037)	(0.0040)	(0.0047)	(0.0045)	(0.0047)
$GDP_{i,t-1}$	5.0624***	4.4690***	3.7739***	2.6627**	2.6819**	0.2231***	0.2091***	0.1927***	0.1565***	0.1532***
	(1.0678)	(1.0712)	(1.0303)	(1.2499)	(1.2523)	(0.0114)	(0.0146)	(0.0156)	(0.0167)	(0.0177)
$MONEY_{i,t-1}$	0.0164***	0.0155***	0.0145***	0.0139***	0.0139***	0.0089***	0.0135***	0.0127***	0.0142***	0.0137***
	(0.0008)	(0.0007)	(0.0007)	(0.0006)	(0.0006)	(0.0002)	(0.0002)	(0.0003)	(0.0002)	(0.0003)
$\Delta EXCH_{i,t}$	0.0114	0.0073	0.0124	0.0112	0.0120	0.0474*	0.0783**	0.0652*	0.0620*	0.0743**
	(0.0093)	(0.0118)	(0.0155)	(0.0146)	(0.0146)	(0.0263)	(0.0376)	(0.0363)	(0.0336)	(0.0345)
$RIR_{i,t-1}$		-0.0010	-0.0023	-0.0023	-0.0022		-0.0332***	-0.0317***	-0.0291***	-0.0284***
		(0.0048)	(0.0052)	(0.0057)	(0.0059)		(0.0023)	(0.0020)	(0.0031)	(0.0034)
$KAOPEN_{i,t-1}$			1.1543***	1.2398***	1.2416***			1.0689*	1.1080*	1.2963**
			(0.2957)	(0.3437)	(0.3442)			(0.6287)	(0.5675)	(0.5412)
$TRADE_{i,t-1}$				0.0204***	0.0198***				0.0177***	0.0191***
				(0.0054)	(0.0053)				(0.0019)	(0.0034)
$\Delta VIX_{i,t-1}$					-0.0003					-0.0239***
					(0.0060)					(0.0021)
$CREDL_{i,t-1}$	0.3290**	0.1857*	0.1908**	0.3054**	0.3010*	1.4078***	1.1351***	0.7003***	1.5595***	0.9305***
	(0.1483)	(0.1003)	(0.0870)	(0.1538)	(0.1568)	(0.1721)	(0.3140)	(0.2550)	(0.3060)	(0.3209)
N. Observations	1926	1696	1689	1652	1652	1149	1142	1142	1141	1141
Adjusted R^2	0.438	0.507	0.519	0.539	0.537					
F-statistic	20.259***	23.047***	23.732***	24.832***	24.345***					
N. inst./N. cross sec.						0.547	0.587	0.587	0.587	0.587
J statistic (*p-value*)						44.960 (0.145)	43.915 (0.235)	41.023 (0.298)	42.934 (0.198)	42.569 (0.177)
AR(1) (*p-value*)						-0.538 (0.000)	-0.542 (0.000)	-0.539 (0.000)	-0.534 (0.000)	-0.537 (0.000)
AR(2) (*p-value*)						0.024 (0.405)	0.031 (0.281)	0.026 (0.361)	0.022 (0.420)	0.026 (0.351)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroscedasticity consistent covariance matrix was applied in regressions. Robust standard errors between parentheses. FGLS - Feasible Generalized Least Squares with country weights and correction of standard errors for heteroscedasticity (using White's method). Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is a panel of 75 EMDE countries from 1990 to 2019.

Table 2

Effects of monetary policy sustainability (non-linear central bank credibility index) on FDI inflows – FGLS and Sys-GMM

	FGLS					Sys-GMM				
Regressors	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**
$FDI_{i,t-1}$						0.2971***	0.3234***	0.3052***	0.2580***	0.3108***
						(0.0100)	(0.0076)	(0.0055)	(0.0064)	(0.0051)
$GDP_{i,t-1}$	5.2055***	4.5269***	3.8070***	2.8209**	2.8311**	0.2363***	0.2169***	0.2325***	0.1662***	0.1239***
	(1.0499)	(1.0434)	(1.0093)	(1.2159)	(1.2147)	(0.0199)	(0.0212)	(0.0136)	(0.0166)	(0.0200)
$MONEY_{i,t-1}$	0.0162***	0.0155***	0.0144***	0.0138***	0.0137***	0.0046***	0.0071***	0.0109***	0.0107***	0.0124***
	(0.0008)	(0.0007)	(0.0007)	(0.0006)	(0.0005)	(0.0004)	(0.0005)	(0.0004)	(0.0005)	(0.0006)
$\Delta EXCH_{i,t}$	0.0115	0.0062	0.0101	0.0105	0.0112	0.1355*	0.1201*	0.1350**	0.1241**	0.0796**
	(0.0095)	(0.0123)	(0.0165)	(0.0152)	(0.0152)	(0.0752)	(0.0719)	(0.0645)	(0.0555)	(0.0340)
$RIR_{i,t-1}$		-0.0010	-0.0019	-0.0023	-0.0022		-0.0260***	-0.0241***	-0.0216***	-0.0233***
		(0.0048)	(0.0052)	(0.0057)	(0.0058)		(0.0021)	(0.0021)	(0.0026)	(0.0031)
$KAOPEN_{i,t-1}$			1.1847***	1.2685***	1.2734***			1.1630**	0.9131*	0.9495*
			(0.2935)	(0.3403)	(0.3407)			(0.5765)	(0.5475)	(0.5269)
$TRADE_{i,t-1}$				0.019***	0.0191***				0.0190***	0.0236***
				(0.0053)	(0.0051)				(0.0019)	(0.0033)
$\Delta VIX_{i,t-1}$					-0.0006					-0.0286***
					(0.0058)					(0.0025)
$CREDNL_{i,t-1}$	0.1673*	0.0795	0.0879	0.1286	0.1258	0.4582**	0.4584**	0.4408**	0.4721**	0.3428*
	(0.0884)	(0.0664)	(0.0718)	(0.1073)	(0.1094)	(0.2234)	(0.2178)	(0.1938)	(0.1904)	(0.2008)
N. Observations	1942	1708	1701	1661	1661	1160	1159	1153	1148	1159
Adjusted R^2	0.450	0.506	0.509	0.537	0.535					
F-statistic	21.406***	23.133***	23.002***	24.787***	24.285***					
N. inst./N. cross sec.						0.560	0.560	0.627	0.627	0.587
J statistic (*p-value*)						41.365 (0.286)	39.897 (0.301)	43.699 (0.317)	42.299 (0.330)	41.869 (0.197)
AR(1) (*p-value*)						-0.529 (0.000)	-0.534 (0.000)	-0.529 (0.000)	-0.521 (0.000)	-0.531 (0.000)
AR(2) (*p-value*)						0.023 (0.425)	0.024 (0.395)	0.023 (0.427)	0.012 (0.667)	0.014 (0.618)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroscedasticity consistent covariance matrix was applied in regressions. Robust standard errors between parentheses. FGLS - Feasible Generalized Least Squares with country weights and correction of standard errors for heteroscedasticity (using White's method). Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is a panel of 75 EMDE countries from 1990 to 2019.

Table 3

Effects of fiscal policy sustainability (risk for budget balance) on FDI inflows – FGLS and Sys-GMM

	FGLS					Sys-GMM				
Regressors	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**
$FDI_{i,t-1}$						0.3340***	0.3631***	0.2849***	0.2262***	0.3253***
						(0.0076)	(0.0080)	(0.0068)	(0.0070)	(0.0078)
$GDP_{i,t-1}$	3.9202***	4.0284***	3.3460***	2.2133*	2.2420*	0.1862***	0.1670***	0.2267***	0.1737***	0.1112***
	(1.0445)	(1.0527)	(1.0061)	(1.2397)	(1.2321)	(0.0178)	(0.0173)	(0.0177)	(0.0186)	(0.0174)
$MONEY_{i,t-1}$	0.0148***	0.0143***	0.0129***	0.0120***	0.0120***	0.0093***	0.0126***	0.0138***	0.0142***	0.0119***
	(0.0008)	(0.0008)	(0.0008)	(0.0005)	(0.0005)	(0.0003)	(0.0004)	(0.0004)	(0.0004)	(0.0005)
$\Delta EXCH_{i,t}$	0.0120	0.0085	0.0153	0.0170	0.0231	0.1106*	0.1070*	0.1239*	0.0979*	0.0991**
	(0.0117)	(0.0140)	(0.0187)	(0.0162)	(0.0145)	(0.0651)	(0.0585)	(0.0730)	(0.0540)	(0.0458)
$RIR_{i,t-1}$		-0.0066	-0.0071	-0.0051	-0.0047		-0.0360***	-0.0270***	-0.0226***	-0.0288***
		(0.0059)	(0.0058)	(0.0057)	(0.0058)		(0.0029)	(0.0031)	(0.0025)	(0.0043)
$KAOPEN_{i,t-1}$			1.2618***	1.3177***	1.3310***			1.2209**	1.0722**	1.2749**
			(0.2842)	(0.3214)	(0.3223)			(0.6052)	(0.5241)	(0.6055)
$TRADE_{i,t-1}$				0.0202***	0.0197***				0.0207***	0.0223***
				(0.0051)	(0.0049)				(0.0020)	(0.0038)
$\Delta VIX_{i,t-1}$					-0.0077					-0.0403***
					(0.0061)					(0.0024)
$RBB_{i,t-1}$	-2.0049***	-1.6193***	-1.5168***	-1.1451***	-1.2048***	-2.4948***	-2.3773***	-1.8061***	-1.4397***	-2.5891***
	(0.3256)	(0.3580)	(0.3386)	(0.3155)	(0.3261)	(0.1186)	(0.2052)	(0.2258)	(0.1869)	(0.2664)
N. Observations	1761	1550	1542	1513	1513	1112	1112	1083	1078	1107
Adjusted R^2	0.474	0.519	0.533	0.547	0.544					
F-statistic	21.347***	22.156***	23.010***	23.518***	23.006***					
N. inst./N. cross sec.						0.573	0.573	0.600	0.600	0.573
J statistic						42.711 (0.276)	40.829 (0.306)	43.181 (0.259)	43.025 (0.229)	35.283 (0.407)
AR(1)						-0.535 (0.000)	-0.540 (0.000)	-0.539 (0.000)	-0.529 (0.000)	-0.536 (0.000)
AR(2)						0.006 (0.834)	0.007 (0.820)	0.015 (0.621)	0.004 (0.893)	0.005 (0.854)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroscedasticity consistent covariance matrix was applied in regressions. Robust standard errors between parentheses. FGLS - Feasible Generalized Least Squares with country weights and correction of standard errors for heteroscedasticity (using White's method). Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is a panel of 75 EMDE countries from 1990 to 2019.

Table 4

Effects of fiscal policy sustainability (public debt) on FDI inflows – FGLS and Sys-GMM

	FGLS					Sys-GMM				
Regressors	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**	**Model 9**	**Model 10**
$FDI_{i,t-1}$						0.3503***	0.3720***	0.4077***	0.3618***	0.3704***
						(0.0042)	(0.0049)	(0.0054)	(0.0048)	(0.0050)
$GDP_{i,t-1}$	3.7157***	3.9962***	3.6857***	2.5334**	2.5982**	0.1523***	0.1494***	0.1453***	0.1341***	0.0799***
	(1.1305)	(1.1198)	(1.1359)	(1.2739)	(1.2876)	(0.0120)	(0.0148)	(0.0175)	(0.0155)	(0.0167)
$MONEY_{i,t-1}$	0.0199***	0.0188***	0.0190***	0.0197***	0.0203***	0.0153***	0.0150***	0.0143***	0.0165***	0.0147***
	(0.0018)	(0.0020)	(0.0020)	(0.0022)	(0.0023)	(0.0002)	(0.0004)	(0.0004)	(0.0004)	(0.0005)
$\Delta EXCH_{i,t}$	0.0059	0.0006	0.0027	0.0016	0.0062	0.1022*	0.1039*	0.0779**	0.0577*	0.0787***
	(0.0122)	(0.0151)	(0.0164)	(0.0163)	(0.0147)	(0.0584)	(0.0533)	(0.0364)	(0.0326)	(0.0279)
$RIR_{i,t-1}$		-0.0082	-0.0081	-0.0088	-0.0079		-0.0319***	-0.0278***	-0.0245***	-0.0309***
		(0.0051)	(0.0051)	(0.0061)	(0.0062)		(0.0023)	(0.0034)	(0.0047)	(0.0101)
$KAOPEN_{i,t-1}$			0.4471	0.5193	0.5238			3.2667***	2.2665***	2.9757***
			(0.3515)	(0.4236)	(0.4297)			(0.8564)	(0.7826)	(0.9227)
$TRADE_{i,t-1}$				0.0217***	0.0209***				0.0153***	0.0060**
				(0.0054)	(0.0052)				(0.0019)	(0.0028)
$\Delta VIX_{i,t-1}$					-0.0117*					-0.0714***
					(0.0065)					(0.0065)
$DEBT_{i,t-1}$	-0.0092***	-0.0069**	-0.0072**	-0.0075**	-0.0082***	-0.0086***	-0.0069***	-0.0052***	-0.0072***	-0.0081***
	(0.0024)	(0.0027)	(0.0027)	(0.0030)	(0.0031)	(0.0001)	(0.0002)	(0.0003)	(0.0004)	(0.0012)
N. Observations	1645	1492	1487	1447	1447	1145	1145	1180	1175	1178
Adjusted R^2	0.537	0.567	0.570	0.586	0.587					
F-statistic	25.483***	25.762***	25.584***	26.263***	26.114***					
N. inst./N. cross sec.						0.573	0.573	0.560	0.560	0.520
J statistic						46.729 (0.157)	42.771 (0.237)	44.751 (0.125)	42.848 (0.142)	35.245 (0.234)
AR(1)						-0.489 (0.000)	-0.492 (0.000)	-0.510 (0.000)	-0.501 (0.000)	-0.498 (0.000)
AR(2)						0.002 (0.941)	0.004 (0.890)	0.023 (0.384)	0.018 (0.486)	0.011 (0.680)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroscedasticity consistent covariance matrix was applied in regressions. Robust standard errors between parentheses. FGLS - Feasible Generalized Least Squares with country weights and correction of standard errors for heteroscedasticity (using White's method). Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is a panel of 75 EMDE countries from 1990 to 2019.

In order to quantify how an improvement in the macroeconomic policy sustainability affects FDI inflows, we consider the effect of a shock of 10% of the value relative to the average of *CREDL*, *CREDLN*, *RBB*, and *DEBT* on *FDI*. We calculate the shocks based on the average of the coefficients with the statistical significance of the variables of interest mentioned above from both *FGLS* and *Sys-GMM* regressions in table 5. In other words, we compute the effects of the average values of the measures of macroeconomic policy sustainability and *FDI* using the average of the statistically significant coefficients in the models. We observe that a 10% increase in *CREDL* and *CREDLN* increases 0.17% in the average *FDI*. Regarding the fiscal measures, we observe that their impact on *FDI* is higher than we observed in monetary indicators. An increase of 10% in *RBB* and *DEBT* decreases the average *FDI* by -2.25% and -1.56%, respectively.

The IT regime demands a commitment to price stability, increased monetary policy transparency, and the absence of irresponsible fiscal policy (Mishkin, 2000). Therefore, it is probable that EMDE economies, which adopted IT, have a more sustainable macroeconomic than non-IT countries. Hence, we can conjecture that a sustainable monetary and fiscal policy in EMDE inflation-targeting countries has higher power for FDI attraction. The empirical evidence regarding this subject is too small, and the results are inconclusive. Vasileva (2018), based on a panel data analysis of 71 countries from 1985 to 2013, finds that adopting inflation targeting leads to increased FDI flows to EMDE countries. In contrast, Ambaw and Sim (2018), based on a panel data analysis of 46 EMDE countries from 1990 to 2006, find no evidence that adopting an inflation-targeting regime would be more effective in encouraging FDI inflows.

To check whether the inflation-targeting EMDE countries attract more FDI inflows than non-IT, we split our sample of countries into inflation-targeting countries (IT) and non-inflation targeting countries (non-IT). We re-run the regressions based on the baseline specification (equation 5) with pairs of the monetary and fiscal indicators in the models.[8] Because the coefficients in the previous regressions from FGLS and Sys-GMM do not present significant discrepancies regarding the sign and statistical significance and we cannot neglect the possibility of endogeneity in the models, we provide evidence using Sys-GMM method (see table 6). The J-statistic, AR(1) and AR(2) tests do not point out the existence of overidentification and autocorrelation problems.

The regressions in table 6 show that the monetary policy sustainability from both central bank credibility indexes has a higher relevance for increasing FDI inflows in the case of IT countries. The coefficients on *CREDL* and *CREDLN* are greater for the sample of IT than in non-IT countries. Concerning the effect of higher fiscal policy sustainability on FDI inflows, we also detect that the benefit is higher in the case of IT countries. The absolute values of the coefficients on *RBB* and *DEBT* are lower for the IT sample than in non-IT countries.

The attraction of FDI to EMDE countries with inflation targeting is significant. We confirm this perception by analyzing the impact of a shock of 10% of the value relative to the averages of *CREDL*, *CREDLN*, *RBB*, and *DEBT* on *FDI*. Considering the average of the coefficients regarding the macroeconomic policy sustainability measures in table 6, we compute the shocks using the samples of IT and non-IT countries. Based on these results, we calculate the difference between them. A shock of 10% on *CREDL* and *CREDLN* for IT countries increases greater than for non-IT countries, 1.065 pp and 0.829 pp in the average *FDI*, respectively. The advantage of IT compared to non-IT countries is also perceptible for fiscal measures. The negative impact of an increase in 10% of *RBB* and *DEBT* on the average *FDI* in the case of IT countries is 0.013 pp and 0.482 pp lower than in non-IT countries, respectively.

4.2. Robustness analysis

Overall, the previous section's findings point out that sustainable monetary and fiscal policy are relevant drivers of FDI inflows. This section provides robustness to the previous analysis from several aspects. First, we extended our analysis by providing a different measure of fiscal stress in the models. We consider an alternative fiscal measure when the gross public debt/GDP ratio exceeds 70%, corresponding to the "safe" level (e.g., David, Nguyen-Duong, and Selim, 2022; IMF, 2020). In other words, we take into account the effect of fiscal stress. Precisely, this fiscal indicator allows us to see if a high probability of a

[8] We label countries that adopt inflation targeting at some point over the period under analysis as inflation targeters for the entire sample (see table A.1 - appendix).

crisis affects the FDI inflows. Hence, instead of using *RBB* or *DEBT*, we introduced a dummy variable (*FISCAL*) that assumes a value equal to 1 for a public debt/GDP higher than 70% and a value equal to 0 otherwise in the model. Second, to take into account the effect of the financial market on FDI inflows, we included in the regressions two indicators: financial stability (*Z-score*) and international liquidity (*LIQ*) – see table 7. Third, because governance can affect the FDI's inward flows, we introduce pairs of governance indicators (control of corruption – *CCORR*, political stability – *POLSTAB*, government effectiveness – *GOVEF*, and regulatory quality - *REGQUAL*) in the regressions – see table 8. Finally, because our monetary measure of macroeconomic policy sustainability is based on central bank credibility indexes, which use synthetic inflation expectations from equation (1), we provide new evidence using expectations gathered from the Consensus Forecast database. Specifically, constrained by our access to the data from Consensus Forecast (28 EMDE countries from 2004 to 2017), we re-estimated the baseline models considering a couple of the monetary and fiscal indicators using this subsample (table 9).

Although we did not perform a dynamic model in FGLS specifications in the previous section, and thus they are not subject to the Nickell (1981) bias problem, the number of periods in our subsamples decreased considerably. Therefore, because we have a number of individuals considerably greater than the number of periods, Sys-GMM models are the natural choice to carry out the regressions (Roodman, 2009).

The Sys-GMM regressions in tables 7, 8, and 9 do not have overidentification and autocorrelation problems (see J-statistic, AR(1), and AR(2)). In addition, the sign on the coefficients of the control variables agrees with the theoretical view. Regarding the variables from the financial market and governance, the findings agree with the view that an improvement in them are drivers to stimulate FDI inflows. We highlight that the estimation results confirm that sustainable macroeconomic policy improves the attraction of FDI for EMDE countries. Independent of the credibility index used, the coefficients on FDI are positive and significant in all models. Moreover, fiscal measures have negative and significant coefficients. In other words, a worsening perception of fiscal conditions wrecks the attraction of FDI.

5. Concluding remarks

Analyzing the macroeconomic determinants of FDI inflows is mandatory for EMDE countries. EMDE countries became the leading destination of FDI flows from the 1990s. Concomitant to this fact, responsible monetary and fiscal policy became a consensus to promote macroeconomic stability. We analyzed whether the monetary and fiscal sustainability through indicators that reflect the expectations of the central bank's commitment to an inflation target and the sustainability of government finance affects the FDI inflows to EMDE countries.

Our analysis shows that, in EMDE countries, both the sustainability of monetary and fiscal policy is crucial to promoting the attraction of FDI flows. The findings show that an increase of 10% in central bank credibility can increase FDI inflows by about 0.17%. In comparison, a worsening in the risk of budget balance and an increase in public debt of 10% reduces the average of FDI inflows by -2.25% and -1.56%, respectively. Besides the relevance of monetary and fiscal policy sustainability, we provide empirical evidence that agrees with previous literature regarding the relevance of several drivers for FDI inflows. We found that an increase in GDP, monetary aggregate, exchange rate, and financial and trade openness enhances the attraction of FDI inflows. On the other hand, an increase in the interest rate and uncertainty decreases the entrance of FDI. In addition, we provide evidence that adopting inflation targeting by EMDE countries improves the attraction of FDI compared to non-inflation targeting countries.

This analysis is especially useful for adopting macroeconomic policy guidelines for improving the attraction of FDI inflows in EMDE countries. We extended the literature bringing evidence regarding the effect of a sustainable monetary and fiscal policy stance. We provide robust evidence using different control variables, samples, and methods, which are unequivocal to point out that central bank credibility and the concern with fiscal imbalance directly impact FDI inflows. In brief, our analysis permits us to recommend some macroeconomic guidelines to enhance the attraction of FDI inflows. The expectation channel is essential to improve the influence of monetary policy. Central banks should anchor inflation expectations for low and stable inflation. To enhance fiscal policy effect, governments need to consider the budget constraint. Governments should adopt measures to improve the public debt profile and fiscal insurance. Besides, adopting inflation targeting seems to provide a good framework for attracting FDI.

Table 5

Effects of monetary and fiscal policy sustainability on FDI inflows – FGLS and Sys-GMM

	FGLS				Sys-GMM			
Regressors	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
$FDI_{i,t-1}$					0.3133***	0.2650***	0.3436***	0.2260***
					(0.0111)	(0.0090)	(0.0054)	(0.0063)
$GDP_{i,t-1}$	0.0199*	0.0212*	0.0230*	0.0251*	0.1409***	0.0715***	0.0751***	0.0947***
	(0.0123)	(0.0119)	(0.0131)	(0.0131)	(0.0189)	(0.0206)	(0.0218)	(0.0242)
$MONEY_{i,t-1}$	0.0120***	0.0118***	0.0202***	0.0203***	0.0133***	0.0122***	0.0123***	0.0248***
	(0.0005)	(0.0005)	(0.0023)	(0.0023)	(0.0005)	(0.0005)	(0.0005)	(0.0004)
$\Delta EXCH_{i,t}$	0.0232*	0.0222	0.0056	0.0030	0.0947*	0.1011**	0.0680*	0.0992***
	(0.0142)	(0.0148)	(0.0142)	(0.0160)	(0.0489)	(0.0392)	(0.0368)	(0.0292)
$RIR_{i,t-1}$	-0.0038	-0.0037	-0.0084	-0.0084	-0.0249***	-0.0201***	-0.0334***	-0.0442***
	(0.0058)	(0.0058)	(0.0064)	(0.0063)	(0.0055)	(0.0034)	(0.0102)	(0.0071)
$KAOPEN_{i,t-1}$	1.4353***	1.4538***	0.4520	0.5071	1.3013**	1.7905***	3.2270***	1.7206***
	(0.3177)	(0.3173)	(0.4351)	(0.4372)	(0.5533)	(0.6190)	(1.0449)	(0.5997)
$TRADE_{i,t-1}$	0.0190***	0.0184***	0.0213***	0.0210***	0.0202***	0.0478***	0.0221***	0.0539***
	(0.0053)	(0.0051)	(0.0053)	(0.0052)	(0.0047)	(0.0037)	(0.0039)	(0.0028)
$\Delta VIX_{i,t-1}$	-0.0056	-0.0058	-0.0107	-0.0111*	-0.0335***	-0.0343***	-0.0704***	-0.0431***
	(0.0059)	(0.0057)	(0.0067)	(0.0064)	(0.0031)	(0.0032)	(0.0064)	(0.0048)
$CREDL_{i,t-1}$	0.3125*		0.1320		0.8917**		0.5945**	
	(0.1692)		(0.1618)		(0.4156)		(0.2640)	
$CREDNL_{i,t-1}$		0.1093		0.0025		0.3795*		0.3852*
		(0.1261)		(0.1056)		(0.2133)		(0.2282)
$RBB_{i,t-1}$	-1.1366***	-1.1364***			-2.7629***	-2.0953***		
	(0.3260)	(0.3337)			(0.3296)	(0.2887)		
$DEBT_{i,t-1}$			-0.0081**	-0.0083***			-0.0088***	-0.0166***
			(0.0031)	(0.0031)			(0.0012)	(0.0009)
N. Observations	1476	1485	1423	1432	1094	1103	1167	891
Adjusted R^2	0.547	0.544	0.591	0.588				
F-statistic	22.467***	22.337***	25.788***	25.570***				
N. inst./N. cross sec.					0.587	0.573	0.507	0.627
J statistic					35.186 (0.412)	37.908 (0.255)	34.664 (0.180)	45.316 (0.164)
AR(1)					-0.540 (0.000)	-0.529 (0.000)	-0.499 (0.000)	-0.516 (0.000)
AR(2)					-0.010 (0.721)	-0.007 (0.806)	0.011 (0.673)	0.003 (0.931)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroscedasticity consistent covariance matrix was applied in regressions. Robust standard errors between parentheses. FGLS - Feasible Generalized Least Squares with country weights and correction of standard errors for heteroscedasticity (using White's method). Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is a panel of 75 EMDE countries from 1990 to 2019.

Table 6

Effects of monetary and fiscal policy sustainability on FDI inflows – inflation targeting versus *non-inflation targeting countries*

	inflation-targeting countries				***non-inflation targeting countries***			
Regressors	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
$FDI_{i,t-1}$	0.2718***	0.2194**	0.2831***	0.1697*	0.3263***	0.2932***	0.3137***	0.3103***
	(0.0974)	(0.1019)	(0.0896)	(0.0836)	(0.0057)	(0.0138)	(0.0025)	(0.0113)
$GDP_{i,t-1}$	0.1498**	0.1582***	0.1382**	0.1448***	0.1687***	0.1474***	0.1959***	0.1810***
	(0.0592)	(0.0480)	(0.0619)	(0.0441)	(0.0133)	(0.0205)	(0.0125)	(0.0169)
$MONEY_{i,t-1}$	6.3922***	2.3213**	4.8517***	3.1524***	0.0059***	0.0107***	0.0206***	0.0710***
	(1.6262)	(0.8679)	(1.1546)	(0.9111)	(0.0002)	(0.0004)	(0.0002)	(0.0014)
$\Delta EXCH_{i,t}$	0.1105*	0.1513*	0.0968**	0.1112***	0.8754**	0.5991***	0.2799***	0.2644**
	(0.0613)	(0.0809)	(0.0374)	(0.0318)	(0.3955)	(0.0909)	(0.0876)	(0.1042)
$CREDL_{i,t-1}$	3.7524***		1.4906***		1.2261***		0.4510***	
	(0.5201)		(0.4299)		(0.1723)		(0.1362)	
$CREDNL_{i,t-1}$		2.3207***		0.6807**		1.4037**		0.3238*
		(0.6286)		(0.2696)		(0.5811)		(0.1781)
$RBB_{i,t-1}$	-3.4472***	-4.0021**			-4.2835***	-5.1510***		
	(1.1143)	(1.4994)			(0.1184)	(0.2610)		
$DEBT_{i,t-1}$			-0.0113*	-0.0171**			-0.0184***	-0.0199***
			(0.0066)	(0.0073)			(0.0001)	(0.0003)
N. inst./N. cross sec.	0.917	0.917	0.917	0.917	0.647	0.686	0.686	0.706
J statistic	20.560	12.380	20.242	19.455	31.666	31.473	37.156	35.399
p-value	(0.196)	(0.717)	(0.209)	(0.246)	(0.245)	(0.343)	(0.142)	(0.228)
AR(1)	-0.534	-0.485	-0.482	-0.422	-0.496	-0.485	-0.499	-0.476
p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	0.062	0.048	0.079	-0.040	0.014	0.005	0.038	-0.013
p-value	(0.338)	(0.445)	(0.128)	(0.442)	(0.690)	(0.890)	(0.270)	(0.708)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroscedasticity consistent covariance matrix was applied in regressions. Robust standard errors between parentheses. Constant is included in the models but not reported for convenience. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The samples are 24 inflation-targeting countries and 51 non-inflation targeting countries from 1990 to 2019, respectively.

Table 7 - *Effects of monetary and fiscal policy sustainability on FDI inflows* (*financial stability and international liquidity*)

Regressors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
$FDI_{i,t-1}$	0.6121***	0.6130***	0.6831***	0.6413***	0.7399***	0.5724***	0.6994***	0.6663***	0.8528***	0.8265***	0.6910***	0.7497***
	(0.0439)	(0.0436)	(0.0488)	(0.0536)	(0.0565)	(0.0748)	(0.0590)	(0.0417)	(0.0419)	(0.0490)	(0.0493)	(0.0424)
$GDP_{i,t-1}$	0.1096***	0.0727**	0.0954**	0.0782*	0.0979***	0.0674*	0.0057	0.0593*	0.0949***	0.0953**	0.0954***	0.0864***
	(0.0383)	(0.0302)	(0.0366)	(0.0417)	(0.0312)	(0.0379)	(0.0543)	(0.0303)	(0.0333)	(0.0418)	(0.0316)	(0.0270)
$MONEY_{i,t-1}$	4.9028*	2.8018*	6.1752*	3.2170**	2.5791	3.6870*	0.5558	0.4520	4.0138*	3.7278**	2.3460	0.0771
	(2.5696)	(1.4808)	(3.1381)	(1.2620)	(2.4779)	(2.0319)	(2.0112)	(1.5924)	(2.4016)	(1.6921)	(2.9387)	(1.2844)
$\Delta EXCH_{i,t}$	0.1146**	0.0955**	0.2066**	0.3200***	0.1536***	0.4159***	0.2349***	0.2725***	0.1842**	0.2439**	0.2225**	0.2823**
	(0.0542)	(0.0465)	(0.0809)	(0.1046)	(0.0543)	(0.1476)	(0.0754)	(0.0616)	(0.0779)	(0.0939)	(0.0988)	(0.1190)
$CREDL_{i,t-1}$	0.7497**		0.6051*		0.4952*		2.8858*		0.5605*		2.6235*	
	(0.3336)		(0.3174)		(0.2874)		(1.6868)		(0.3200)		(1.3309)	
$CREDNL_{i,t-1}$		1.3848*		0.6658*		0.8179*		4.1617***		0.8341*		1.7420*
		(0.7989)		(0.3696)		(0.4190)		(1.2627)		(0.4894)		(1.0301)
$RBB_{i,t-1}$	-5.3355***	-5.5823***					-3.3984***	-4.9948***				
	(1.9647)	(1.4813)					(1.1234)	(1.1867)				
$DEBT_{i,t-1}$			-0.0128**	-0.0085***					-0.0279***	-0.0116***		
			(0.0062)	(0.0021)					(0.0041)	(0.0044)		
$FISCAL_{i,t-1}$					-0.6077**	-0.5656*					-0.8955**	-0.7906*
					(0.2798)	(0.2886)					(0.4428)	(0.4633)
$Z\text{-}Score_{i,t-1}$							-0.2047***	-0.2075**	-0.1864***	-0.2066***	-0.1885***	-0.1622***
							(0.0534)	(0.0826)	(0.0552)	(0.0596)	(0.0535)	(0.0519)
$LIQ_{i,t-1}$	0.0325***	0.0234**	0.0316*	0.0527***	0.0378**	0.0572***						
	(0.0101)	(0.0100)	(0.0182)	(0.0089)	(0.0158)	(0.0190)						
N. inst./N. cross sec.	0.373	0.413	0.400	0.360	0.427	0.320	0.347	0.440	0.400	0.333	0.360	0.387
J statistic	19.363	24.003	20.172	21.862	23.172	23.887	18.930	29.162	17.334	19.623	18.335	21.815
p-value	(0.562)	(0.461)	(0.631)	(0.348)	(0.567)	(0.122)	(0.461)	(0.304)	(0.792)	(0.354)	(0.565)	(0.471)
AR(1)	-0.548	-0.550	-0.543	-0.492	-0.581	-0.498	-0.552	-0.535	-0.558	-0.541	-0.520	-0.503
p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	-0.085	-0.085	-0.036	-0.038	-0.012	-0.028	-0.094	-0.100	-0.043	-0.054	-0.006	-0.028
p-value	(0.127)	(0.116)	(0.495)	(0.392)	(0.816)	(0.495)	(0.111)	(0.107)	(0.475)	(0.354)	(0.887)	(0.538)

Table 8 - *Effects of monetary and fiscal policy sustainability on FDI inflows* (*governance indicators*)

Regressors	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
$FDI_{i,t-1}$	0.6315***	0.6510***	0.6720***	0.6617***	0.4272***	0.6686***	0.4594***	0.4505***	0.4577***	0.4150***	0.3764***	0.4229***
	(0.0506)	(0.0424)	(0.0420)	(0.0369)	(0.0161)	(0.0386)	(0.0422)	(0.0488)	(0.0346)	(0.0093)	(0.0453)	(0.0400)
$GDP_{i,t-1}$	0.0710**	0.0594*	0.0928***	0.0618**	0.0643***	0.0517**	0.0362**	0.0389*	0.0386***	0.0438***	0.0375**	0.0356*
	(0.0274)	(0.0324)	(0.0292)	(0.0242)	(0.0165)	(0.0207)	(0.0152)	(0.0212)	(0.0122)	(0.0141)	(0.0175)	(0.0192)
$MONEY_{i,t-1}$	4.5181*	1.2384	6.7945**	6.1751***	1.1082	0.4485	0.3009	0.8003	1.1039	0.6336	0.2195	0.2957
	(2.6844)	(2.2265)	(2.6331)	(2.1584)	(1.5148)	(1.8031)	(1.3852)	(1.5255)	(1.1253)	(0.8268)	(1.8120)	(1.4614)
$\Delta EXCH_{i,t}$	0.0867	0.1723**	0.2161	0.3291**	0.1414***	0.2736***	0.0671*	0.1282***	0.0888***	0.0639***	0.0195	0.0178
	(0.1704)	(0.0788)	(0.1433)	(0.1482)	(0.0469)	(0.0929)	(0.0383)	(0.0386)	(0.0325)	(0.0201)	(0.0279)	(0.0228)
$CREDL_{i,t-1}$	2.5726*		1.6101*		1.2862***		1.9586***		0.6907*		1.1051**	
	(1.3993)		(0.9555)		(0.4505)		(0.7369)		(0.4107)		(0.5051)	
$CREDNL_{i,t-1}$		3.2532*		2.2771*		1.0595*		2.0500**		0.6777*		0.8731**
		(1.6818)		(1.2727)		(0.5897)		(0.6093)		(0.3769)		(0.4210)
$RBB_{i,t-1}$	-3.4106***	-5.7170***					-3.3635***	-2.8589***				
	(0.8004)	(1.7468)					(0.8790)	(1.3082)				
$DEBT_{i,t-1}$			-0.0111***	-0.0281***					-0.0223**	-0.0176**		
			(0.0031)	(0.0017)					(0.0101)	(0.0075)		
$FISCAL_{i,t-1}$					-1.3125***	-0.7557***					-2.3905*	-2.5920**
					(0.4859)	(0.1902)					(1.3059)	(1.1377)
$CCORR_{i,t-1}$	4.2800***	3.6045*	4.0030**	3.5589*	2.0593**	2.3628*						
	(1.2535)	(1.9924)	(1.8436)	(1.9441)	(0.9609)	(1.3688)						
$POLSTAB_{i,t-1}$	2.4079***	1.8090**	1.6478***	1.2855**	0.7482*	0.7777*						
	(0.7235)	(0.8786)	(0.5602)	(0.5835)	(0.4296)	(0.4623)						
$GOVEF_{i,t-1}$							2.9580**	3.8759*	2.7886**	4.3188***	0.9593	2.6683*
							(1.3178)	(2.1534)	(1.3028)	(1.2957)	(1.0092)	(1.4439)
$REGQUAL_{i,t-1}$							3.1269*	5.0545***	3.0041***	3.0294**	1.0637	0.8624
							(1.6801)	(1.6485)	(1.0739)	(1.1655)	(1.4410)	(0.9215)
N. inst./N. cross sec.	0.347	0.427	0.387	0.400	0.520	0.467	0.520	0.520	0.547	0.587	0.427	0.440
J statistic	15.841	23.718	20.941	16.522	38.059	28.456	23.221	27.851	30.822	33.034	23.033	19.751
p-value	(0.604)	(0.478)	(0.462)	(0.789)	(0.179)	(0.388)	(0.841)	(0.629)	(0.576)	(0.610)	(0.518)	(0.760)
AR(1)	-0.531	-0.550	-0.543	-0.520	-0.524	-0.504	-0.549	-0.514	-0.540	-0.509	-0.497	-0.489
p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	-0.084	-0.074	-0.018	-0.046	0.028	-0.005	-0.089	-0.103	-0.003	-0.037	-0.022	-0.056
p-value	(0.102)	(0.180)	(0.717)	(0.347)	(0.554)	(0.889)	(0.187)	(0.116)	(0.963)	(0.527)	(0.670)	(0.249)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. White's heteroscedasticity consistent covariance matrix was applied in regressions. Robust standard errors between parentheses. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is a panel of 75 EMDE countries from 2000 to 2019.

Table 9

Effects of monetary and fiscal policy sustainability on FDI inflows (*Consensus forecast*)

Regressors	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
$FDI_{i,t-1}$	0.1145	0.1292*	0.0035	0.0259	0.0410	0.0322	0.2333***	0.2456***
	(0.0865)	(0.0750)	(0.0712)	(0.0589)	(0.1019)	(0.1210)	(0.0833)	(0.0849)
$GDP_{i,t-1}$	0.3931***	0.3626***	0.2581***	0.2208***	0.3229***	0.2143***	0.0710*	0.0661*
	(0.0993)	(0.1057)	(0.0719)	(0.0658)	(0.0715)	(0.0341)	(0.0374)	(0.0334)
$MONEY_{i,t-1}$	3.0751	2.7180	2.1694	8.3390**	4.0563	4.5523	7.2759**	7.7147**
	(2.5558)	(3.8502)	(2.8578)	(3.3800)	(3.7093)	(4.2617)	(3.0335)	(2.8016)
$\Delta EXCH_{i,t-1}$	0.0968***	0.0904***	0.0677**	0.0607***	0.1069***	0.1016***	0.0060	0.0205
	(0.0122)	(0.0142)	(0.0271)	(0.0124)	(0.0258)	(0.0369)	(0.1305)	(0.0738)
$CREDL_{i,t-1}{}^{a}$	5.2140***		0.6680*		5.5003***		0.7648*	
	(0.8882)		(0.3868)		(1.2289)		(0.4292)	
$CREDNL_{i,t-1}{}^{a}$		3.0952***		0.5921**		2.9489**		0.6511*
		(0.3856)		(0.2576)		(1.1506)		(0.3459)
$RBB_{i,t-1}$			-10.8896***	-11.2093***				
			(2.4914)	(1.9458)				
$DEBT_{i,t-1}$					-0.0521*	-0.0613*		
					(0.0298)	(0.0309)		
$FISCAL_{i,t-1}$							-3.0732**	-2.3289**
							(1.1417)	(0.9583)
N. inst./N. cross sec.	0.857	0.857	0.821	0.786	0.893	0.857	0.893	0.857
J statistic	13.391	10.234	15.774	15.567	18.859	14.257	14.565	13.635
p-value	(0.818)	(0.947)	(0.540)	(0.483)	(0.466)	(0.712)	(0.750)	(0.752)
AR(1)	-0.440	-0.462	-0.520	-0.502	-0.391	-0.414	-0.557	-0.563
p-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AR(2)	0.207	0.201	0.215	0.211	0.164	0.177	0.183	0.180
p-value	(0.144)	(0.148)	(0.128)	(0.134)	(0.251)	(0.196)	(0.216)	(0.220)

Note: Marginal significance levels: (***) denotes 0.01, (**) denotes 0.05, and (*) denotes 0.1. Robust standard errors between parentheses. Sys-GMM – uses the two-step of Arellano and Bover (1995) without time effects. Tests for AR(1) and AR(2) check for the presence of first-order and second-order serial correlation in the first-difference residuals. The sample is a panel of 28 EMDE countries from 2004 to 2017. *a* using Consensus Forecast database.

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Appendix

Table A.1 - *List of countries*

Code	*Country name*	*Code*	*Country name*	*Code*	*Country name*
AGO	Angola	GMB	Gambia	NIC	Nicaragua[a]
ALB	Albania[b]	GNB	Guinea-Bissau	PAN	Panama[a]
ARG	Argentina[a,b]	GNQ	Equatorial Guinea	PER	Peru[a,b]
ARM	Armenia[b]	GTM	Guatemala[a,b]	PHL	Philippines[a,b]
AZE	Azerbaijan	GUY	Guyana	PNG	Papua New Guinea
BFA	Burkina Faso	HND	Honduras[a]	POL	Poland[a,b]
BGD	Bangladesh	HRV	Croatia	PRY	Paraguay[a,b]
BGR	Bulgaria, Republic of	HTI	Haiti	ROM	Romania[a,b]
BHR	Bahrain	HUN	Hungary[a,b]	RUS	Russian Federation[a,b]
BHS	Bahamas, The	IDN	Indonesia[a,b]	SEN	Senegal
BLR	Belarus	IND	India[a]	SLE	Sierra Leone
BOL	Bolivia[a]	JOR	Jordan	SUR	Suriname
BRA	Brazil[a,b]	KEN	Kenya	SYR	Syrian Arab Republic
BWA	Botswana	KWT	Kuwait	TGO	Togo
CHL	Chile[a,b]	LKA	Sri Lanka[b]	THA	Thailand[a,b]
CHN	China, People's Rep. of[a]	LTU	Lithuania	TTO	Trinidad and Tobago
CIV	Côte d'Ivoire	MAR	Morocco	TZA	Tanzania
CMR	Cameroon	MDA	Moldova[b]	UGA	Uganda[b]
COG	Congo	MEX	Mexico[a,b]	UKR	Ukraine[a,b]
COL	Colombia[a,b]	MLI	Mali	URY	Uruguay[a]
CRI	Costa Rica[a]	MOZ	Mozambique	VEN	Venezuela[a]
DOM	Dominican Republic[a,b]	MWI	Malawi	VNM	Vietnam
DZA	Algeria	MYS	Malaysia[a]	ZAF	South Africa[a,b]
EGY	Egypt[b]	NER	Niger	ZAR	Zaire
GAB	Gabon	NGA	Nigeria	ZMB	Zambia

Note: (a) Corresponds to the countries used in the subsample period (2004-2017). (b) Inflation-targeting countries. Source for classification of inflation targeting countries: Central Bank News (http://www.centralbanknews.info/p/inflation-targets.html) and national central banks.

Table A.2 - *Description of the variables, sources of data, and descriptive statistics*

Variable name	Variable description	Data source	Mean			Standard deviation			Minimum			Maximum			Observations		
			S1	*S2*	*S3*	*S1*	*S2*	*S3*	*S1*	*S2*	*S3*	*S1*	*S2*	*S3*	*S1*	*S2*	*S3*
CCORR	Control of Corruption	WGI	n.a.	-0.46	n.a.	n.a.	0.64	n.a.	n.a.	-1.81	n.a.	n.a.	1.59	n.a.	n.a.	1425	n.a.
CREDL	Linear central bank credibility	Devised by authors based on de Mendonça (2007) and de Mendonça and Tiberto (2017)	0.10	0.12	0.26	0.18	0.20	0.33	0.00	0.00	0.00	0.94	0.94	1.00	2114	1445	371
CREDNL	Non-linear central bank credibility	Devised by authors based on de Mendonça and Almeida (2019)	0.15	0.18	0.41	0.26	0.28	0.43	0.00	0.00	0.00	1.00	1.00	1.00	2133	1464	371
DEBT	General government gross debt (% GDP).	WEO/IMF	51.13	48.27	40.66	34.94	32.28	18.84	0.09	0.47	3.88	260.96	260.96	117.12	1775	1474	392
RBB	Risk for budget balance	Devised by authors - International Country Risk Guide	0.43	0.39	0.35	0.17	0.16	0.11	0.00	0.00	0.00	1.00	0.95	0.81	1887	1200	336
ΔEXCH	Local currency units relative to the U.S. dollar. Annual average divided by 100 (yearly variation).	IFS/IMF	0.28	0.22	0.13	2.31	1.64	1.89	-21.58	-12.99	-12.99	71.04	18.97	15.24	2144	1421	364
FDI	Foreign Direct Investment Inward Flows (% GDP).	UNCTAD	3.42	3.85	3.45	5.26	4.96	2.68	-14.37	-14.37	-11.62	90.46	55.50	14.86	2223	1492	392
GDP	The annual growth rate of the Gross Domestic Product: Total US Dollars at constant prices 2015 in billions.	UNCTAD	3.82	4.23	4.35	5.77	4.67	3.81	-52.78	-32.45	-18.68	66.92	51.77	15.02	2146	1422	364
LIQ	Global Liquidity Indicators in EMDE (% y.o.y).	BIS	n.a.	5.72	n.a.	n.a.	10.68	n.a.	n.a.	-9.41	n.a.	n.a.	30.38	n.a.	n.a.	1500	n.a.
GOVEF	Perceptions of the quality of public services in general and the credibility of the government's commitment to such policies.	WGI	n.a.	-0.25	n.a.	n.a.	0.66	n.a.	n.a.	-2.36	n.a.	n.a.	1.54	n.a.	n.a.	1425	n.a.
KAOPEN	Financial openness of the country.	Chinn and Ito (2006, 2008)	0.43	0.47	0.57	0.35	0.36	0.34	0.00	0.00	0.00	1.00	1.00	1.00	2185	1495	392
MONEY	Broad money (% GDP).	WDI	0.62	0.74	0.60	5.52	6.72	0.34	0.02	0.02	0.23	183.47	183.47	2.08	2146	1445	379
POLSTAB	Perceptions of the likelihood of political instability	WGI	n.a.	-0.38	n.a.	n.a.	0.76	n.a.	n.a.	-2.97	n.a.	n.a.	1.28	n.a.	n.a.	1425	n.a.
REGQUAL	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	WGI	n.a.	-0.35	n.a.	n.a.	0.65	n.a.	n.a.	-2.08	n.a.	n.a.	1.31	n.a.	n.a.	1425	n.a.
RIR	Lending interest rate adjusted for inflation as measured by the GDP deflator.	WDI	6.68	6.64	5.89	14.53	10.08	8.55	-97.62	-60.80	-18.91	93.94	93.91	44.63	1884	1337	383
TRADE	Sum of imports and exports in relation to GDP.	Devised by authors - WDI	77.01	78.78	75.88	42.73	38.00	36.93	13.75	20.72	22.10	531.74	351.10	210.37	2171	1444	389
ΔVIX	CBOE Volatility Index – market's expectation of stock market volatility over the next 30-day period (yearly variation).	CBOE	-0.26	-0.41	-0.33	4.68	5.27	5.73	-9.07	-9.07	-9.07	15.20	15.20	15.20	2175	1425	364
Z-score	Probability of default of a country's commercial banking system.	GFD	n.a.	15.09	n.a.	n.a.	9.71	n.a.	n.a.	0.02	n.a.	n.a.	70.97	n.a.	n.a.	1330	n.a.

Note: IFS/IMF - International Financial Statistics/International Monetary Fund; WDI - World Development Indicators/World Bank, WGI - Worldwide Governance Indicators/World Bank, GFD - Global Financial Development/World Bank, BIS – Bank for International Settlements, WEO - World Economic Outlook/ International Monetary Fund, UNCTAD - United Nations Conference on Trade and Development, and CBOE - Chicago Board Options Exchange. *S1* is the total sample period 1990-2019. *S2* is the sub-sample period 2000-2019. *S3* is the sub-sample period 2004-2017.