Sovereign Ratings, Foreign Direct Investment and Contagion in Emerging Markets: Does Being a BRICS Country Matter?

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Sovereign Ratings, Foreign Direct Investment and Contagion in Emerging Markets: Does Being a BRICS Country Matter?

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Abstract

Using dynamic panel System GMM for 24 EMs over the period 1990-2018, we analyze how changes in sovereign ratings affect FDI inflows to EMs. The study also estimates the contagion effect of a ratings change among any of the BRICS countries on three regions, Europe, the Middle East, and Africa (EMEA) and Latin America and Asia. Third, we estimate the impact of a ratings change on FDI inflows in the presence of two types of crises, the 2007-2009 global financial crisis as well as country-specific crises. The results suggest that sovereign ratings have a statistically significant impact on the flow of FDI to EMs and that the BRICS countries as a bloc exert a statistically significant contagion impact on the FDI inflows into the three regions examined. We also find that the impact of sovereign ratings change on FDI inflows increases in crisis times, both country-specific, as well as the global financial crisis.

JEL Classification Numbers: O16; O43; N20

Keywords: Sovereign Rating; Capital Flows; System GMM; Foreign Direct Investment; Emerging Markets

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I. Introduction

Total gross FDI inflows averaged around 40-60% of aggregate capital flows to EMs since the mid-1990s. FDI flows to EMs surged from an average of US$40 billion annually in the early 1990s to US$300 billion per year in the mid-2000s (Koepke, 2015). Among EMs, the BRICS countries (Brazil, Russia, India, China, and South Africa) arose as major recipients of FDI inflows, and by 2012, FDI inflows into them have reached 20% of total FDI, a more than three-fold increase relative to 6% in 2000 (UNCTAD, 2013)[3] and sharing 2% of the world's FDI inflows in 2019 (UNCTAD, 2019) as shown in Figure 1.

Despite the recurring EM crises in the 1990s, capital flows into EMs continued to rise until the 2007-2009 global financial crisis. With the "Great Retrenchment" that followed, the effects were temporary for EMs relative to advanced economies. In fact, capital inflows to EMs witnessed a speedy recovery, especially to the BRICS countries, which possibly bringing FDI close to the pre-crisis levels.[4]

Figure (1): FDI Inflows in BRICS, and their Share in Global FDI
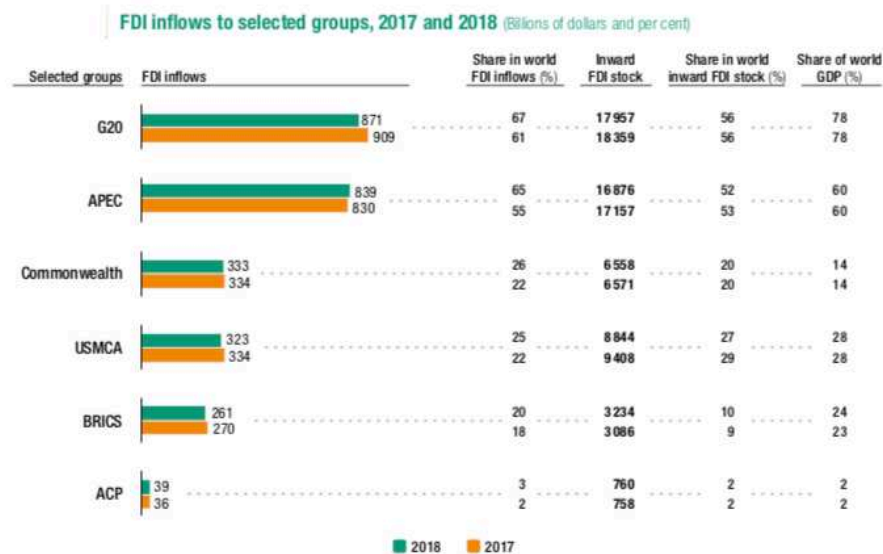
Source: *UNCTAD (2019)*

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[3] One of the most significant episodes of FDI inflows to BRICS occurred over the period 2003-2008 when FDI inflows grew from USD 77 bn to USD 281 billion. China and Russia accounted for the largest share (UNCTAD, 2013).

[4] See Bussiere et. Al. (2016) for more information. Since 2010, however, cross-border financial flows reached a "new average," below 5% of GDP.

Many reasons are behind the rise in capital flows to EMs over the last two decades, particularly since the onset of the global financial crisis, low interest rates, unconventional monetary policies in advanced economies. This made investments in EMs more attractive,[5] in addition to the stronger economic growth of EMs relative to advanced economies. The information provided by credit rating agencies (CRAs) on a country's creditworthiness has made it easier for investors to differentiate between countries when determining their investment decisions and accordingly the presence of CRAs has been another reason highlighted behind the rise in capital inflows into EMs. Emara and El Said (2015) held that the increase in the number of rated countries over time helped increase countries' ability to raise funds at lower costs through accessing international capital markets. [6]

Given the repeated EMs defaults and crises since the 1990s, in addition to the 2007-2009 global financial crisis, CRAs have repeatedly come under scrutiny and a belief that CRAs have helped in deepening crises.[7] The role of sovereign ratings in stimulating EMs' access to international capital markets implies that FDI inflows respond to rating changes (see Emara and El Said, 2015). This response could also be contagious in crisis periods, particularly if the ratings change occurs in one of the big EMs or BRICS that absorb a significant bulk of FDI inflows. [8]

FDI inflows showed the most resilience to changes in global conditions in the last two decades and are relatively less volatile than other types of capital flows.[9] The aim of the study is to analyze how the sovereign ratings upgrades and downgrades affects FDI inflows to EMs and whether a sovereign ratings' change in another region explains the changes in FDI flows in a region. It also examines whether the presence of a crisis, country-specific or otherwise affects the impact of sovereign rating on FDI. The focus on FDI reflects the fact that it has been less volatile than other types of capital flows in the last two decades. [10]

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[5] See for example Fernandez-Arias (1996) and Montiel and Reinhart, (1999).

[6] For more information on the effects of sovereign ratings on investment flows in EMs, see Fitch (2014).

[7] For more information on the instability of EM crises, see Calvo (1998).

[8] This could even be the case despite the fact that FDI contracted the least- relative to other types of EM capital inflows (Koepke, 2015).

[9] See for example Bluedorn, J., Duttagupta, R., Guajardo, J., Tapolova, P. (2013) and UNDP (2013).

[10] Bank flows, for instance, which accounted for the principal portion of the total capital flows prior to 2008, have plunged while, FDI flows were hardly impacted, to account for almost 45% of global flows in 2015/2016 (Bussiere et. Al., 2016).

More specifically, the study aims at answering the following questions: How do sovereign rating changes affects FDI inflows to EMs? Can changes in FDI flows in one country be explained by a sovereign rating change in other countries? For the latter question, we focus on ratings changes among the BRICS countries and whether there is a contagion effect to EMs in three other regions: Latin America, Asia, and Central and Eastern Europe, Middle East, and Africa (CEEMEA).   The rest of this paper is divided as follows; section II reviews the relevant literature, section III explains the data used, section IV covers the estimation methodology, section IV documents our results, and section V concludes. The appendix appears at the end of the paper and includes the regression tables and explanation of the sovereign rating variable.

II. LITERATURE REVIEW

The literature on sovereign ratings, capital flows in general, and FDI in particular, as well as contagion, is quite large and gained importance after the 1994 Mexican financial crisis, as highlighted in Emara and El Said (2015). Cantor and Packer (1996) were among the pioneers showing that CRAs provide more information about speculative grade sovereigns than publicly available sources. The study by Reinhart (2002) and Kraussl (2003) emphasized on the importance of sovereign credit ratings for EMs because their volatile nature can affect their accessibility to international capital markets. Below, we highlight the literature on the main determinants of capital flows, with a focus on FDI, and then follow with the literature on sovereign ratings, and financial contagion.

Determinants of Capital Flows

A vast amount of literature focus on the push factors, or external factors, as determinants of capital flows. These push factors normally include GDP growth and interest rates in advanced economies, particularly U.S. interest rates (Calvo, Leiderman and Reinhart , 1993; Fernandez-Arias and Montiel, 1995; Fernandez-Arias, 1996; Calvo and Reinhart, 1996, and Chuhan et al., 1998) and global risk aversion (Milesi-Ferretti and Tille, 2011).[11] On the other hand, pull factors, or country-specific factors, encompass factors such as

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[11] This is particularly the case for pull factors.

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economic performance and market size, proxied by a country's GDP growth rate (Dasgupta and Ratha 2000, and Hernandez, Mellado and Valdes 2001), inflation rates (Ahn et al. 1998), and the stability of exchange rate (Lopez-Mejia 1999). Hernandez, Mellado and Valdes (2001) found that the most important factor affecting the country's private capital flows is its individual characteristics such as economic growth, inflation, and current account deficit. and Alfaro, Kalemli-Ozcan, and Volosovych (2005) found that the level of institutional quality is an important factor affecting capital flows. Koepke (2016) highlights that these variables are more cyclical in nature, short-term, and differ across the varying phases of the business cycle. Other push and pull factors are more structural and long term in nature. Such push factors include portfolio diversification, information and communication technology, the rise of institutional investors, while such pull factors include quality of institutions, quality of institutions, and the role of government in an economy (Koepke, 2016).

Determinants of FDI

Research focusing on the determinants of FDI[12] have been broadly in line with the findings above. FDI was found to be mainly affected by long-term factors governing the real economy, such as market size[13] (Dunning, 1993; Garibalidi et. Al., 2002), more than by short-term financial- and external- fluctuations. Within a push-pull factor framework, domestic output growth has been largely undisputed as one of the leading determinants of FDI inflows (Koepke, 2015; Gastanaga et al., 1998; Hernandez et al. 2001; De Vita and Kyaw 2008). [14] Addison and Heshmati (2003) also found that trade openness and democracy positively affect FDI, while the level of perceived risk and indebtedness adversely affects it.

Other pull factors that exert a significant and positive impact on FDI inflows include low government consumption as a share of GDP,[15] low fiscal deficit (Albuquerque et al. 2005; Garibalidi et. Al., 2002), low inflation rate (Walsh and Yu, 2010; Garibalidi et.

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[12] We are concerned with macro/country-level/exogenous determinants in this chapter. For more information on firm-specific FDI determinants, see Blonigen (2005).
[13] Proxied by GDP growth, or GDP per capita.
[14] Gupta and Ratha (2000) perhaps is an exception, finding that GDP growth had no significant effect on FDI flows.
[15] Proxy for the size of the government in the economy

Al., 2002),[16] and weak currency (Blonigen, 1997). Relatedly, Abbott et al. (2012) found that EMs employing fixed exchange rate regimes preserving currency stability—receive more FDI with flexible exchange rates. Low levels of bureaucracy and corruption also had positive impact on FDI inflows (Gastanaga et al 1998; Biglaiser and DeRouen 2006). However, it is important to note that FDI inflows are less affected relative to portfolio inflows by information frictions and institutional quality (Daude and Fratzscher, 2008).[17] Similarly, the only economic reforms that have played a significant role in driving FDI inflows in Latin America over the period 1980-1996 are trade and financial liberalization and limiting the risk of expropriation (Biglaiser and DeRouen, 2006).[18]

A number of studies have also focused on the role of capital controls as a pull factor and their impact on FDI. Asiedu and Lien (2004) found that the impact of capital controls— restrictions on the capital account, repatriation of export proceeds, and the presence of several exchange rates—on FDI varied by region and changed over time. Since the 1990s, all three types of capital controls have had a significant impact on FDI, with the greatest adverse effect in East Asia and Latin America. Elo (2007) find that increasing capital controls decreases the duration of FDI investments at specific levels of country risk. This is quite relevant as it relates to how FDI responds to capital controls in an environment of changing country risk.[19] Dell'Erba and Reinhardt (2015) focused on financial sector FDI inflows,and found that capital controls increased the probability of increases in financial sector FDI.

As for *push factors*, Koepke (2015) held that push factors mattered the least for FDI but given the interest in global risk aversion with the onset of the global financial crisis, a number of studies have examined the impact of changes in global risk aversion on FDI inflows.[20] Most of these studies have had mixed results. Rey (2015) found a positive correlation between the VIX and FDI inflows[21] into EMs, while Milesi-Ferretti and Tille (2011)[22] found that global risk aversion has a negative impact on FDI however the impact

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[16] Although they found that this mattered more for advanced economies relative to EMs.
[17] both debt and equity
[18] Tax reforms, privatizations, international capital liberalization, and regime type were not found to be significant determinants of FDI.
[19] Moody's sovereign ratings were among their measures for country risk.
[20] Milesi-Ferretti and Tille (2011) held that a risk aversion shock tends to affect capital flows through two main channels; 1) re-assessment of risk, which causes capital flight from more vulnerable economies; and 2) investment contraction and lower global trade.
[21] But it was significantly negatively associated with fluctuations in other types of capital inflows.
[22] They also examined capital flow retrenchment.

is smaller when compared to other types of capital flows. Albuqerque (2005) found no relationship between FDI and global risk aversion.

Further work examined output growth in advanced economies as a push factor but have been inconclusive. De Vita and Kyaw (2008) obtained mixed results,[23] depending on the model employed, while Gupta and Ratha (2000) found no significant impact. Albuquerque et al. (2005 and 2002) found both a negative and positive[24] relationship, respectively, between global growth and FDI into EMs, but found that asset return indicators have no impact on FDI inflows because of their long-term nature, given FDI's lack of volatility. World Bank (1997) and Reinhart and Rogoff (2003) found that asset return volatility discourages FDI.

Using fixed effects approach, the study of Reinhardt, Ricci, and Tressel (2013) found that in financially open economies, less developed EMs usually have net capital inflows.[25] This result applied for FDI when capital flows are disaggregated, as well. Albuquerque (2005) found that global factors are more important than domestic factors in determining the variations in FDI flows. Forbes (2012) held that countries are more prone to contagion if they are more dependent on trade (relative to GDP) and have banking systems that are leveraged, but are not prone to contagion simply if they have larger capital inflows. Using SURs, Forbes and Warnock (2012) found that variability in global risk is statistically significantly related with variability in capital flow. The study also found minimal links between capital controls and the probability of capital flows surging or stopping.

As for contagion, Eichengreen, Rose, and Wyplosz (1997), and Glick and Rose (1999) found that trade links are the main channels through which financial crises become contagious.[26] In a panel study on Latin American countries, Chuhan, Claessens, and Mamingi (1993) found that bond flows were more responsive than equity flows to any change in country's credit rating. Soon after, Calvo and Reinhart (1996) found evidence of "large neighbor effects" on capital flows to and from Latin America from 1970 to 1993.

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[23] A SVAR context yielded a positive relationship, but in alternative specifications, they found a negative but insignificant relationship.
[24] The positive relationship was mainly related to vertical FDI flows, that is, investments related to an integrated international supply chain that meets external demand (Koepke, 2015), whereas horizontal FDI to be affected more by pull factors/macroeconomic fundamentals.
[25] More advanced economies experienced net capital outflows.
[26] For more information on the literature that surveyed contagion, see Emara and El Said (2015).

One of the most recent studies that attempt to capture sovereign ratings, capital flows, and contagion was that of Chen et. al (2016), who studied the impact of a sovereign rating changes and found that due to financial and trade linkages any rating revisions lead to significant output spillover effects within the same quarter of the ratings change. The authors attribute spillovers to both direct and indirect financial and trade linkages between event and non-event countries.

Country-specific studies on the impact of sovereign ratings and FDI showed that a positive relationship between FDI inflows and ratings upgrades in the case of Turkey (Bayar and Kilic, 2014) and Romania (Popa, 2012), while rating downgrades in South Africa adversely affect FDI inflows (Mugobo and Mutize, 2016).

III. DATA[27]

The study analyzes the impact of a set of pull factors and a set of push factors on the flow of FDI to a sample of EMs. The data set includes 24 EMs over the period 1990-2018, where table 1 provide a list of countries in our sample.

Table 1 –List of EMs included in the Sample

1	Argentina	13	Malaysia
2	Brazil	14	Mexico
3	Chile	15	Peru
4	China	16	Philippines
5	Columbia	17	Poland
6	Czech Republic	18	Russia
7	Egypt	19	Singapore
8	Greece	20	South Africa
9	Hong Kong	21	South Korea
10	Hungary	22	Thailand
11	India	23	Turkey
12	Indonesia	24	Venezuela

The dependent variable in the model is FDI (as a percent of GDP) and the set of independent variables consists of the current account balance as a percent of GDP, the real interest rate, inflation rate, real GDP growth rate, Standard and Poor's sovereign ratings,

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[27] The data that support the findings of this study are openly available in the World Bank Database at https://datacatalog.worldbank.org/dataset/world-development-indicators.

the weighted average of the G-7[28] real GDP growth rate, and the weighted average of the G-7 real interest rate. The data set is extracted from the World Development Indicators of the World Bank's database.

Table 2 provides a detailed list of the variables used, definition, unit of measurement, and data source.

Table 2 Definitions of Variables

Variable Name	Definition	Unit of Measurement	Data Source
Foreign direct investment, net inflows (% of GDP)	The sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP.	Percent of GDP	World Development Indicators.
Sovereign debt rating	The capacity and willingness of a government to meet its obligations in full and on time. It is the risk facing an investor who holds debt securities issued by that government which in turn reflects its credit worthiness.	AAA = 24, AA+ = 23,.., D = 1[29]	Standard & Poor website.
Inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average	Annual Percent	World Development Indicators.
Real Interest Rate	The lending interest rate adjusted for inflation as measured by the GDP deflator.	Percent	World Development Indicators.
Current Account Balance (% of GDP)	The sum of net exports of goods and services, net primary income, and net secondary income.	Percent	World Development Indicators.
Growth of real per capita GDP	Growth rate of real GDP per capita (constant 2000 US$).	Annual Percent	World Development Indicators.
G-7 real GDP growth rate	Weighted average by GDP per capita of real GDP per capita for the G-7 countries. (Authors' computation.)	Percent	World Development Indicators.
G-7 real interest rate	Weighted average by GDP per capita of real GDP per capita for the G-7 countries. (Authors' computation.)	Percent	World Development Indicators.
Capital Controls Index	An index which includes restrictions on equity flows, bond flows, money markets, collective investments, local purchases by non-residents, purchases abroad by residents, and others.	Index	Fernandez et. Al. (2015).

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[28] France, Canada, Italy, Germany, U.S., U.K. and Japan.
[29] AAA, AA+, AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-, B+, B, B-, CCC+, CCC, CCC-, CC, C, RD, SD, D. For detailed definition on each rating classification check S&P website https://www.standardandpoors.com/en_US/web/guest/article/-/view/sourceId/504352.

V. MODEL SPECIFICATION & METHODOLOGY

The first part of the estimation methodology examines the impact of changes in sovereign debt ratings on the flow of FDI as a percent of GDP. Second, we analyze the possible contagion effect from the BRICS countries to other EMs in the sample. Third, the contagious effect of each of the five BRICS countries on three regions namely Asian[30], EMEA[31], and Latin American[32] countries are analyzed. Finally, the study analyzes the effect of the changes in rating on the flow of FDI in the presence of two types of crises; global financial crisis of 2007 and country's crisis.

To perform the first part of the model specification, the following dynamic panel regression model examines the impact of changes in sovereign debt ratings on the flow of FDI (as a percent of GDP[33]),

$$FDI_{i,t} = \alpha + \rho FDI_{i,t-1} + \beta X_{i,t-1} + \delta Z_{i,t-1} + \lambda R_{i,t-1} + \varepsilon_{i,t} \qquad (1)$$

$$i = 1, 2,...N, \ t = 1990,...T$$

Where FDI_{it} denotes the ratio of net inflows from foreign investors to GDP, of country i at time t, FDI_{it-1} is the AR(1) endogenous variable, X_{it-1} is the vector of pull factors, Z_{it-1} is the vector push factors, R_{it-1} is the sovereign debt rating, and ε_{it} is the error term of the regression.

The vector of pull factors includes the current account balance as a share of GDP, the real interest rate, inflation rate, real GDP growth rate, current account as a share of GDP, and Standard and Poor's sovereign debt ratings where the change in the rating is as defined in Gande and Parsley (2003). The vector of push factors contains two variables namely the weighted average of the G-7 real GDP growth rate and the weighted average of the G-7 real interest rate.

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[30] Asian region includes nine countries namely China, Hong Kong, India, Indonesia, Malaysia, Philippines, Singapore, South Korea, and Thailand.
[31] Europe, Middle East, and Africa (EMEA) region includes eight countries namely Czech Republic, Egypt, Greece, Hungary, Poland, Russia, South Africa, and Turkey.
[32] Latin America region includes seven countries namely Argentina, Brazil, Chile, Columbia, Mexico, Peru, and Venezuela.
[33] To control for country size.

The FDI model is estimated using dynamic panel System GMM proposed by Arellano and Bover (1995), Blundell and Bond (1998), and Blundell, Bond, and Windmeijer (2000). This methodology combines together Equation (1) with Equation (2) below,

$$
\begin{aligned}
\left(FDI_{i,t} - FDI_{i,t-1}\right) \\
= \alpha + \rho\left(FDI_{i,t-1} - FDI_{i,t-2}\right) + \beta\left(X_{i,t-1} - X_{i,t-2}\right) + \delta(Z_{i,t-1} - \delta Z_{i,t-2}) \\
+ \lambda(R_{i,t-1} - R_{i,t-2}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1})
\end{aligned} \tag{2}
$$

where the additional moments conditions for the equation in levels are as follows,

$$
E\left[\Delta\, FDI_{i,t}\varepsilon_{i,t}\right] = 0, For\ t = 2, \dots, T
$$
$$
E\left[\Delta\, M_{i,t}\varepsilon_{i,t}\right] = 0, For\ t = 2, \dots, T \tag{3}
$$

where $M_{i,t}$ is the set of all the explanatory variables of Equation (1) except the push factors, $Z_{i,t}$.

Using dynamic panel regression model, the following model is estimated to analyze how moving from a speculative rating grade to an investment grade affects the flow of FDI to EMs. The model is estimated by adding a dummy variable for rating, $DR_{i,t-1}$, that takes 1 for investment grade and 0 for speculative grade, as shown in Equation (4) where a speculative grade is defined as a rating of BBB- or below[34].

$$
FDI_{i,t} = \alpha + \rho FDI_{i,t-1} + \beta X_{i,t-1} + \delta Z_{i,t-1} + \lambda DR_{i,t-1} + \varepsilon_{i,t} \tag{4}
$$

Next, the following model is formed and used to estimate the contagion effect from the BRICS countries to other EMs in the sample,

$$
FDI_{i,t} = \alpha + \rho FDI_{i,t-1} + \beta X_{i,t-1} + \delta Z_{i,t-1} + \sigma\sum_{j=1}^{N} R_{j,t-1} + \varepsilon_{i,t} \tag{5}
$$

where the dependent variable, vectors of push and pull factors are the same as before while replacing the rating variable with the weighted average of the BRICS countries' rating controlled for country size and denoted by the variable $\sum_{j=1}^{N} R_{j,t}$. This variable is used to

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[34] See linear transformation table in Appendix II.

estimate the extent to which a sovereign ratings downgrade (upgrade) in the BRICS countries affects FDI to flow out of (into) other EMs in the sample. In addition, the study analyzes the contagious effect of each of the five BRICS countries on three regions namely Asian[35], EMEA[36], and Latin American[37] countries. To do so, Equation (5) is estimated for each of the five BRICS countries in a turn to test the extent to which rating changes affect the flow of FDI in the three regions namely Asia, EMEA, and Latin America.

The last part of the methodology analyses the impact of the changes in ratings on the flow of FDI in the presence of two types of crises; the global financial crisis and country's specific crisis by adding a dummy variable $D_{i,t}$ to the model, as shown in Equation (6), to account for the two types of crises each one in a turn. For instance, to account for the global financial crisis the dummy variable takes 1 for the years 2007 to 2009 and zero otherwise and to account for country's specific crisis the dummy variable takes 1 for country i at time t of the crisis and zero otherwise.

$$FDI_{i,t} = \alpha + \rho FDI_{i,t-1} + \beta X_{i,t-1} + \delta Z_{i,t-1} + \lambda R_{i,t-1} + \theta D_{i,t-1}$$

$$+ \vartheta(D_{i,t-1} * R_{i,t-1}) + \varepsilon_{i,t} \qquad (6)$$

The total effect of a crisis, whether global financial crisis or country's crisis, is estimated by adding up the coefficient λ to the coefficient ϑ and their statistical significance is determined by from their variances and covariance of the variables $D_{i,t-1}$ and $R_{i,t-1}$.

V. ESTIMATION RESULTS

Using the Arellano-Bond System GMM estimation methodology, the model is estimated under nine specifications where FDI is regressed on the set of independent variables. This estimation methodology is best at dealing with simultaneous causality and possible correlation between country's fixed effects and the set of explanatory variables.The set of instruments used in the model is valid. More specifically, the set of instruments passed the

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[35] Asian region includes nine countries namely China, Hong Kong, India, Indonesia, Malaysia, Philippines, Singapore, South Korea, and Thailand.
[36] Europe, Middle East, and Africa (EMEA) region includes eight countries namely Czech Republic, Egypt, Greece, Hungary, Poland, Russia, South Africa, and Turkey.
[37] Latin America region includes seven countries namely Argentina, Brazil, Chile, Columbia, Mexico, Peru, and Venezuela.

relevance test and the overidentification test as computed by the Hansen test and its p-value.

Table 3 shows the estimation results of the FDI model, where our results build further on Emara and El Said (2015)[38] by including a capital controls index among our set of explanatory variables while testing for the impact of sovereign ratings changes on FDI. Column (1) confirms that the AR(1) term is positive and statistically significant as expected. In Column (2), when the lagged GDP growth rate is added to the regression, the coefficient of the lagged FDI remains positive and statistically significant. The results of this column show that the coefficient of GDP growth is also significant where a one percent increase leads to about 0.20 percent (of GDP) increase in FDI. Once again, this confirms the literature that held that domestic output growth is one of the leading determinants of FDI flows, as shown by Gastanaga et al. (1998), Hernandez et al. (2001), and Koepke (2015).

In Column 3 (Table 3), the lagged sovereign ratings variable is added to the regression, where a one notch rating upgrade results in about 0.19 percent (of GDP) increase in FDI. The coefficients on lagged FDI and GDP growth remained statistically significant after the addition of ratings, as our main variables of interest. To our knowledge, few studies have focused mainly on the link between FDI and sovereign ratings, but our results are in line with those of Kim and Wu (2008), who found that an improvement in sovereign ratings increases FDI into EMs.

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[38] Selected results from Emara and El Said (2015) will be highlighted.

Table 3: Foreign Direct Investment and Sovereign Rating
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond Dynamic Panel System GMM.

VARIABLES	(1) FDI	(2) FDI	(3) FDI	(4) FDI	(5) FDI	(6) FDI	(7) FDI	(8) FDI	(9) FDI
FDI_{it-1}	0.507***	0.536***	0.422***	0.420***	0.427***	0.428***	0.401***	0.411***	0.412***
	(0.174)	(0.161)	(0.146)	(0.144)	(0.142)	(0.140)	(0.130)	(0.126)	(0.125)
GDP Growth $_{it-1}$		0.202**	0.128	0.169*	0.175*	0.176*	0.231**	0.159	0.124
		(0.0872)	(0.0793)	(0.0927)	(0.103)	(0.0945)	(0.105)	(0.106)	(0.0857)
Rating it-1			0.188***	0.198***	0.212***	0.214***	0.316***	0.313***	0.325***
			(0.0519)	(0.0566)	(0.0609)	(0.0699)	(0.0867)	(0.0846)	(0.0934)
Inflation it-1				-0.000711***	-0.0235*	-0.0236*	0.0255	0.0218	0.0384
				(0.000204)	(0.0123)	(0.0126)	(0.0265)	(0.0282)	(0.0384)
Real Interest Rate $_{it-1}$					-0.00040	-0.00114	0.00329	-0.0185	-0.0102
					(0.0162)	(0.0193)	(0.0203)	(0.0309)	(0.0295)
Current Account $_{it-1}$						-0.0103	-0.0673	-0.0547	-0.0546
						(0.0896)	(0.0979)	(0.0903)	(0.0899)
Capital Control Index $_{it-1}$							-0.0405**	-0.0424**	-0.0395**
							(0.0185)	(0.0187)	(0.0169)
G-7 Growth $_{it}$								0.368*	0.458*
								(0.189)	(0.236)
G-7 Real Interest $_{it}$									-0.180
									(0.162)
Observations	648	648	597	536	479	479	433	433	433
Number of countries	24	24	24	24	23	23	23	23	23
Arellano-Bond Test									
Order 1 p-value	0.0896	0.0883	0.0863	0.0919	0.0948	0.0951	0.0939	0.0951	0.0943
Order 2 p-value	0.1701	0.1875	0.2262	0.2251	0.2297	0.2257	0.2472	0.2292	0.2223
Hansen p-value		0.280	0.494	0.444	0.196	0.207	0.645	0.279	0.441

Notes: *** , ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively
Numbers in round parentheses (.) are the robust standard errors.

Column 4 shows the regression whereby inflation is included as a proxy for macroeconomic stability (Walsh and Wu, 2010). The coefficient of the lagged inflation rate shows an expected negative and statistically significant impact on FDI, where a 1 percent increase in inflation leads to 0.001 percent drop in FDI. While this is a small coefficient, this result is suggestive of a link between inflation and FDI inflows are linked, while when other studies found no significant link, even at the 10% level (see Arbatli, 2011 for example). Columns (5) and (6) of Table 3 shows that adding the lagged real interest rate and lagged current account balance as a percent of GDP do not have a statistical significant impact on FDI, highlighting the fact that market size matters more in our sample, even though we expect a positive relationship between real interest rates and FDI (Addison and Heshmati, 2003).[39] The insignificant result of the current account balance in Column (6) aligns with the literature on the non-robust evidence between widening current account deficit as a measure of increased financial need (or as a measure of country risk) and the different types of capital flows in EMs (Koepke, 2015).

When we add the lagged capital controls index to the regression in Column 7, our results show that a one-unit increase in this index leads to a drop in FDI of around 0.041 percent of GDP, an expected result, at the five percent significance level. This is in line with Asiedo and Lien (2004), who show that capital controls adversely affect FDI, with the results most significant during the 1990s relative to the 1970s and 1980s. Elo (2007) also found similar results whereby more capital controls decreases the duration of FDI investments at specific levels of country risk.[40] It is important to note that Column 6 of Table 3 from Emara and El Said (2015) displays the results without the capital controls index where we can see that the coefficient of GDP growth is more than double (0.547) that of Table 3 in the presence of capital controls.

As of Column 8, we introduce our push factors into the model, whereby we add the weighted average of the G-7 real GDP growth rate to the regression, which shows a

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[39] Our portfolio results in Emara and El Said (2015) also show that real interest rates, as well as the (nominal) policy rates were not a significant determinant of portfolio inflows, but the interest rate differential- in nominal terms- mattered. [More importantly, there little evidence of a link between the current account balance and FDI in this context, although Fry et al. (1995) held that a large current account deficit could worsen a country's investment climate, thereby adversely affecting FDI.

[40] Elo's country risk parameter was financial distress. Other than through decreasing durations, FDI investors may decide not to enter at all into the results of that study.

statistically significant robust impact on net FDI inflows to EMs. In Column 9 our second push factor, the G-7 real interest rate shows an insignificant effect on net FDI inflows to EMs.[41] This result aligns with the majority of the literature, which finds an unclear relationship between interest and FDI in EMs (World Bank, 1997; Montiel & Reinhard, 1999; Hernandez, Mellado & Valdes, 2001; De Vita & Kyaw, 2008; Koepke, 2015), and that pull factors mattered more for FDI.[42]

For all regressions, the Arrelano-Bond test fails to reject the presence of serial correlation of order 1 but rejects it for order 2. And the Hansen test confirms that the overidentifying restrictions are correctly specified

Table 4 shows more parsimonious models of the impact of ratings on FDI. Column 1 of the table shows the full model with all regressors included. Column 2 reports the results for a smaller model where the three insignificant regressors in Table 3 – inflation, real interest rate, and current account – are removed from the regression. The results show no significant change in the coefficients of the remaining variables in terms of signs and statistical significance. The third specification (Column 3) shows the model with excluding only the capital control index from the regression, and the results again show no significant change in the remaining coefficients. The last specification (Column 4) reports the results after dropping inflation, real interest rate, current account, and capital control index from the regression, the results show that the coefficients of lagged FDI, real GDP growth, sovereign rating, G-7 real growth rate, and G-7 real interest rate are statistically significant. Albuquerque et al. (2005) present an exception to the push-factor literature above, which accords with Table 4[43]. In a sample of advanced and emerging economies they found the average G3 interest rate negatively affects FDI inflows. Opposite to this result, Gupta and Ratha (2000) find that international interest rate has a positive significant impact on FDI flows, so the results on push factors in the context of FDI is varied. Given the lower significance of push factors in the FDI literature, we do not include further push factors,

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[41] Similar results for the two push factors were obtained in the simpler, published version Emara and El Said (2015).
[42] Cerutti et al. (2017) reached a similar conclusion, holding that the explanatory power of push factors, particularly monetary policy, is limited, both in absolute terms, and in relation to pull factors, as is shown above.
[43] Table 4 also showed that the coefficient of the lagged inflation rate shows a statistically insignificant impact on FDI, in line with a number of other studies.

such as global risk aversion, which is normally highlighted as one of the most important push factors but was not found to have an impact on FDI based on the literature.[44]

Table 4: FDI & Rating - Parsimonious Model
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond Dynamic Panel System GMM.

VARIABLES	(1) FDI	(2) FDI	(3) FDI	(4) FDI
FDI $_{it-1}$	0.412***	0.419***	0.434***	0.428***
	(0.125)	(0.140)	(0.132)	(0.140)
GDP Growth $_{it-1}$	0.124	0.0671	0.0727	0.0511
	(0.0857)	(0.0811)	(0.0863)	(0.0760)
Rating it-1	0.325***	0.228***	0.244***	0.210***
	(0.0934)	(0.0678)	(0.0807)	(0.0612)
Inflation it-1	0.0384		0.00868	
	(0.0384)		(0.0221)	
Real Interest Rate $_{it-1}$	-0.0102		-0.00643	
	(0.0295)		(0.0238)	
Current Account $_{it-1}$	-0.0546		-0.0241	
	(0.0899)		(0.0857)	
Capital Control Index $_{it-1}$	-0.0395**	-0.0102		
	(0.0169)	(0.00928)		
G-7 Growth $_{it}$	0.458*	0.404**	0.504**	0.431**
	(0.236)	(0.190)	(0.241)	(0.185)
G-7 Real Interest $_{it}$	-0.180	-0.142	-0.321*	-0.205*
	(0.162)	(0.120)	(0.178)	(0.122)
Observations	433	533	479	597
Number of countries	23	24	23	24
Arellano-Bond Test:				
Order 1 p-value	0.0943	0.0883	0.0939	0.0867
Order 2 p-value	0.2223	0.2226	0.2029	0.2079
Hansen p-value	0.441	0.387	0.117	0.478

Notes: ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively
Numbers in round parentheses (.) are the robust standard errors.

The results of Arellano-Bond test for autocorrelation in differenced residuals and the results of all regressions suggest no autocorrelation in second order. Additionally, the Hansen test results confirm that over-identifying conditions are correctly specified.

In Table 5 we use the parsimonious model and we add a dummy variable for rating that takes 1 for investment grade and 0 for speculative grade, where a speculative grade is defined as a rating of BBB- or below. As expected, the results show that a movement from a speculative to an investment grade increases FDI by about 2.38% as a percent of GDP.

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[44] Arbatli (2011) found correlation was limited to times of crisis between 2006 and 2008, when FDI inflows declined, but the decline was not necessarily VIX related.

Table 5: Investment v.s Speculative Grade: Rating on FD
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond
Dynamic Panel System GMM.

VARIABLES	(1) FDI
FDI $_{it-1}$	0.459***
	(0.162)
GDP Growth $_{it-1}$	0.120
	(0.0834)
Dummy Rating it-1	2.383**
	(1.132)
Capital Control Index $_{it-1}$	0.00837
	(0.00540)
G-7 Growth $_{it}$	0.356**
	(0.180)
G-7 Real Interest $_{it}$	-0.0378
	(0.0881)
Observations	533
Number of countries	24
Arellano-Bond Test	
Order 1 p-value	0.0867
Order 2 p-value	0.2075
Hansen p-value	0.704

*Notes: ***, ** and * denotes statistical significance at the 1%, 5%
and 10% levels respectivelyNumbers in round parentheses (.) are the
robust standard errors.*

To further analyze the impact of rating on FDI, Table 6 in Appendix I estimates the contagion effect of the BRICS countries on the different countries of our sample. The BRICS Rating variable is simply a weighted average of the five countries weighted by their real GDP. As the results suggest, in all the nine specifications, BRICS as a region exert a positive statistically significant contagion effect on EMs in the sample. The results show that a one-classification increase in the rating of BRICS countries leads to 2.83% increase in the flow of FDI as a percent of GDP for remaining EMs in the sample.

To analyze how the changes in the rating of one country might affect the flow of FDI in other EMs, Table 7 in Appendix I shows that the changes in the rating of each of the five BRICS countries has a significant contagion effect on the rest of the EMs. For instance, a one-classification increase in the rating of Brazil leads to 0.24% increase in the flow of FDI as a percent of GDP for EMs in the sample. This number is equal to 0.13%, 0.22%, 0.16%, and 0.16% for the case of Russia, India, China, and South Africa, respectively.

Next, to study the contagion effect of each BRICS countries on different regions, the sample is divided into three regions namely Asia, EMEA, and Latin America. Table 8 in Appendix I reports the results of the regional contagious effect for each one of the five BRICS countries. As the results show, the changes in sovereign rating in Brazil leads to an increase in net FDI inflows to the three regions with the highest increase is in the Asian countries where a one-classification increase in Brazil's rating results in 0.38% increase in FDI as a percent of GDP flown to Asian economies.

Similar to the results of Brazil, Russia's rating exerts an important contagious impact on the flow of FDI to the three regions under analysis. The highest impact is however on Asian countries where a one classification increase in Russia's rating leads to about 0.23 percent increase in FDI as a percent of GDP and the least impact is on the Latin American countries where the same increase in rating leads to only about 0.06% increase in FDI as a percent of GDP. In the case of India, a ratings change has a statistical positive significant impact on the three regions with the highest contagious effect is on the Asian countries and the least on Latin American countries. More specifically, a one-classification increase in India's rating leads to about 0.41% and 0.12% increase in FDI to Asian countries and Latin American countries, respectively.

Similarly, China has a statistically significant regional contagious effect with the highest effect on the Asian countries and the least on the Latin American countries. As the table shows, a one-classification increase in China's rating leads to about 0.27% and 0.08% increase in FDI to Asian countries and Latin American countries, respectively. Finally, the results of South Africa's regional contagious effect suggest, this country's rating increase has a positive statistically significant impact on the flow of FDI to the three regions with the highest impact is on the Asian countries and the least on the Latin American countries. More specifically, a one unit increase in the rating index leads to about 0.31% and 0.08% increase in FDI to Asian countries and Latin American countries, respectively. Again, for all regressions, the Arrelano-Bond test fails to reject the presence of serial correlation of order 1 but rejects it for order 2. And the Hansen test confirms that the overidentifying restrictions are correctly specified.

The last part of the analysis examines the effect of rating variability on FDI flows during two crises; global financial crisis of 2007-2009 and country's crises over the period of the study. To measure the total effect of a crisis is calculated as explained in section IV.

As expected, the results of Tables 9 in Appendix I suggest that the global financial crisis of 2007 has an important effect on net inflow of FDI flows to EMs. The computation of the total effect of the crises on FDI flows shows a positive and a statistically significant coefficient, where a one-classification decrease in the rating leads to about 0.23% decrease in FDI during the times of no crisis versus 0.43% in times of the crisis.

Finally, Table 10 in Appendix I shows the impact of rating in the presence of a country-specific crisis.[45] As the results show, a ratings change has a greater impact on the flow of FDI in times of a country's crisis, to an even greater extent than the impact shown in in Table 9, during the global financial crisis. For instance, a one-classification decrease in the index results in a reduction in FDI flows by about 0.56% during a country-specific crisis respectively, but only 0.23% at other times. Both effects are statistically significant. Once again, this confirms the importance of country fundamentals, more than changes in global conditions, in affecting FDI flows.

VI. CONCLUSION

Using dynamic panel System GMM for 24 EMs over the period 1990-2018, the results suggest that sovereign ratings are an important factor for the flow of FDI into EMs. For the full sample, our estimation results confirm that a one notch increase in sovereign ratings leads to about 0.33% increase in FDI as a percent of GDP. Our results for the full sample also show that moving from a speculative to an investment grade implies an increase in FDI by about 2.38% as a percent of GDP.

Additionally, analyzing the impact of the change in sovereign debt rating in BRICS as a region on the FDI flowing to the non-BRICS EMs, our estimation results shows a positive statistically significant impact of the rating changes on the FDI flowing to the non-BRICS EMs. More specifically, the results confirm that a rating decrease in the BRICS region leads to a fall of 0.28% in the FDI flowing to the non-BRICS EMs. Focusing on the

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[45] Such as the Mexican, Asian, or Brazilian crises of the 1990s.

impact of the rating of each of the BRICS countries on the rest of the non-BRICS EMS, the results show that this effect ranges from 0.13% for Russia to 0.24% for Brazil.

Additionally, the estimation results also show that the effect of the changes in the ratings of each of the five BRICS countries on the non-BRICS EMS divided into three regions – Asia, EMEA, and Latin America – the results shows that a rating decrease in each of the five BRICS countries displays a negative and statistically significant impact on FDI flowing into EMs in all three regions with the highest impact witnessed in Asia. This effect ranges from 0.41% for the case of India to 0.23% for the case of Russia.

Finally, our results show that the presence of a financial crisis, whether country-specific or otherwise, increases the magnitude of the impact of a sovereign rating change on FDI flows. Specifically, a one-notch decrease in sovereign rating during the times of a global financial crises crisis reduces FDI inflows relative to the impact during tranquil times by about 0.20%. This effect is higher for the presence of a country-specific crisis where FDI inflows fall by about 0.56% one-notch decrease in sovereign rating.

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APPENDIX I

Table 6: BRICS Contagion Effect: Foreign Direct Investment and Sovereign Rating
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond Dynamic Panel System GMM.

VARIABLES	(1) FDI	(2) FDI	(3) FDI	(4) FDI	(5) FDI	(6) FDI	(7) FDI
FDI $_{it-1}$	0.443***	0.442***	0.458***	0.459***	0.445***	0.453***	0.452***
	(0.148)	(0.145)	(0.144)	(0.144)	(0.138)	(0.129)	(0.131)
GDP Growth $_{it-1}$	0.178**	0.238**	0.255**	0.262**	0.287**	0.157	0.165
	(0.0903)	(0.111)	(0.120)	(0.114)	(0.127)	(0.115)	(0.105)
BRICS Rating it-1	0.170***	0.182***	0.183***	0.190***	0.253***	0.283***	0.283***
	(0.0533)	(0.0581)	(0.0569)	(0.0629)	(0.0796)	(0.0856)	(0.0840)
Inflation it-1		-0.000152	0.000280*	0.000248	0.0182	0.0118	0.00705
		(0.000181)	(0.000165)	(0.000160)	(0.0332)	(0.0360)	(0.0420)
Real Interest Rate $_{it-1}$			0.0486*	0.0459*	0.0586*	-0.00381	-0.00834
			(0.0268)	(0.0252)	(0.0311)	(0.0324)	(0.0290)
Current Account $_{it-1}$				-0.0289	-0.0494	-0.0441	-0.0448
				(0.0958)	(0.105)	(0.0968)	(0.0962)
Capital Control Index $_{it-1}$					-0.0252	-0.0350*	-0.0362*
					(0.0200)	(0.0210)	(0.0190)
G-7 Growth $_{it}$						0.658**	0.637**
						(0.280)	(0.311)
G-7 Real Interest $_{it}$							0.0435
							(0.104)
Observations	510	464	402	402	341	341	341
Number of countries	19	19	18	18	18	18	18
Arellano-Bond Test							
Order 1 p-value	0.0927	0.0997	0.1041	0.1029	0.1076	01088	0.1104
Order 2 p-value	0.2201	0.2194	0.2186	0.2195	0.2256	0.1906	0.1922
Hansen p-value	0.435	0.505	0.201	0.118	0.720	0.387	0.99

Notes: ***, **, * and *' denotes statistical significance at the 1%, 5%, 10%, and 15% levels respectively
Numbers in round parentheses (.) are the robust standard errors.

Table 7: BRICS Contagion Effect per Countries: Foreign Direct Investment and Sovereign Rating
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond Dynamic Panel System GMM.

VARIABLES	(1) FDI	(2) FDI	(3) FDI	(4) FDI	(5) FDI
FDI $_{it-1}$	0.440***	0.454***	0.447***	0.447***	0.453***
	(0.148)	(0.157)	(0.150)	(0.151)	(0.148)
GDP Growth $_{it-1}$	0.0986	0.103	0.0794	0.0886	0.0808
	(0.0827)	(0.0951)	(0.0812)	(0.0802)	(0.0771)
Capital Control	-0.0141*	-0.00105	-0.00663	-0.00609	-0.00346
Index $_{it-1}$	(0.00744)	(0.00624)	(0.00626)	(0.00572)	(0.00817)
G-7 Growth $_{it}$	0.414**	0.419**	0.420**	0.396**	0.409**
	(0.199)	(0.194)	(0.198)	(0.191)	(0.183)
G-7 Real Interest $_{it}$	0.0107	0.171**	-0.122	-0.0510	-0.0223
	(0.0824)	(0.0822)	(0.101)	(0.0896)	(0.0769)
Brazil Rating it-1	0.241***				
	(0.0697)				
Russia Rating it-1		0.131***			
		(0.0341)			
India Rating it-1			0.215***		
			(0.0618)		
China Rating it-1				0.158***	
				(0.0478)	
South Africa Rating it-1					0.155***
Observations	515	515	515	515	515
Number of countries	23	23	23	23	23
Arellano-Bond Test					
Order 1 p-value	0.0916	0.0930	0.0938	0.0934	0.0997
Order 2 p-value	0.2261	0.2122	0.2197	0.2159	0.2019
Hansen p-value	0.345	0.695	0.605	0.493	0.551

Notes: ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively.
Numbers in round parentheses (.) are the robust standard errors.

Table 8: Countries of the BRICS Regional Effect: Sovereign Ratings on FDI
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond Dynamic Panel System GMM.

VARIABLES	(1) Asian	(2) EMEA	(3) Latin
Brazil Rating$_{it-1}$	0.381**	0.211**	0.129***
	(0.154)	(0.0837)	(0.0210)
Observations	203	182	130
Number of countries	9	8	6
Arellano-Bond Test:			
Order 1 p-value	0.1105	0.2705	0.0723
Order 2 p-value	0.0542	0.3007	0.6533
Hansen p-value	0.594	0.748	0.883
Russia Rating$_{it-1}$	0.228**	0.176**	0.0632***
	(0.0937)	(0.0687)	(0.0117)
Observations	203	159	153
Number of countries	9	7	7
Arellano-Bond Test:			
Order 1 p-value	0.1157	0.2678	0.0635
Order 2 p-value	0.0706	0.2980	0.1820
Hansen p-value	0.566	0.917	0.413
India Rating$_{it-1}$	0.408**	0.195***	0.118***
	(0.158)	(0.0730)	(0.0316)
Observations	180	182	153
Number of countries	8	8	7
Arellano-Bond Test:			
Order 1 p-value	0.1140	0.02710	0.0578
Order 2 p-value	0.0468	0.2970	0.6101
Hansen p-value	0.641	0.921	0.871
China Rating$_{it-1}$	0.272**	0.139**	0.0826***
	(0.115)	(0.0552)	(0.0273)
Observations	180	182	153
Number of countries	8	8	7
Arellano-Bond Test:			
Order 1 p-value	0.1096	0.2718	0.0530
Order 2 p-value	0.0490	0.2955	0.5442
Hansen p-value	0.673	0.862	0.923
South Africa Rating$_{it-1}$	0.310**	0.185***	0.0780***
	(0.132)	(0.0564)	(0.0138)
Observations	203	159	153
Number of countries	9	7	7
Arellano-Bond Test:			
Order 1 p-value	0.1178	0.2772	0.0662
Order 2 p-value	0.0540	0.2907	0.4461
Hansen p-value	0.502	0.971	0.555

Notes: ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively
Numbers in round parentheses (.) are the robust standard errors.

Table 9: Global Financial Crisis Effect: Foreign Direct Investment and Sovereign Rating
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond Dynamic Panel System GMM.

VARIABLES	(1) FDI	(2) FDI
FDI $_{it-1}$	0.419***	0.418***
	(0.139)	(0.140)
GDP Growth $_{it-1}$	0.0695	0.0707
	(0.0818)	(0.0816)
Rating it-1	0.237***	0.234***
	(0.0716)	(0.0707)
Capital Control Index $_{it-1}$	-0.00992	-0.00921
	(0.00926)	(0.00945)
G-7 Growth $_{it}$	0.366**	0.364**
	(0.177)	(0.176)
G-7 Real Interest $_{it}$	-0.148	-0.148
	(0.122)	(0.122)
Crisis Dummy $_{t-1}$	-0.318	-3.497
	(0.234)	(3.043)
Crisis Rating Interaction $_{it-1}$		0.193
		(0.182)
Total Effect of Rating		0.426*
And Crisis		(0.221)
Observations	533	533
Number of countries	24	24
Arellano-Bond Test		
Order 1 p-value	0.0890	0.0885
Order 2 p-value	0.2184	0.2094
Hansen p-value	0.734	0.729

*Notes: *** ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively*
Numbers in round parentheses (.) are the robust standard errors.

Table 10 Country's Crisis Effect: Foreign Direct Investment and Sovereign Rating
Dependent variable: Foreign Direct Investment (% of GDP)
Estimation Method: Arellano-Bover/Blundell-Bond Dynamic Panel System GMM.

VARIABLES	(1) FDI	(2) FDI
FDI $_{it-1}$	0.419***	0.422***
	(0.141)	(0.142)
GDP Growth $_{it-1}$	0.0693	0.0723
	(0.0837)	(0.0836)
Rating it-1	0.229***	0.226***
	(0.0678)	(0.0676)
Capital Control Index $_{it-1}$	-0.0103	-0.00970
	(0.00938)	(0.00910)
G-7 Growth $_{it}$	0.400**	0.397**
	(0.190)	(0.191)
G-7 Real Interest $_{it}$	-0.154	-0.169
	(0.125)	(0.128)
Crisis Dummy $_{t-1}$	0.590	-3.845**
	(0.926)	(1.689)
Crisis Rating Interaction $_{it-1}$		0.337**
		(0.155)
Total Effect of Rating		0.556***
And Crisis		(0.1756)
Observations	533	533
Number of countries	24	24
Arellano-Bond Test		
Order 1 p-value	0.0887	0.0903
Order 2 p-value	0.2211	0.2053
Hansen p-value	0.625	0.699

Notes: ***, ** and * denotes statistical significance at the 1%, 5% and 10% levels respectively
Numbers in round parentheses (.) are the robust standard errors.

Appendix II

Linear Transformation of Sovereign Credit Ratings

Rating	Transformation
AAA	22
AA+	21
AA	20
AA-	19
A+	18
A	17
A-	16
BBB+	15
BBB	14
BBB-[46]	13
BB+	12
BB	11
BB-	10
B+	9
B	8
B-	7
CCC+	6
CCC	5
CCC-	4
CC	3
C	2
SD	1
D	0

Source: Gaillard, N (2009).

Ratings Transformation Methodology

Using the linear transformations above, we convert a country's sovereign rating into numbers, taking into consideration the day that a ratings change has occurred in addition to changes in the outlook (an outlook is either stable, or positive or negative). Sovereign ratings are represented on a scale from 0 (Serial Default) to 22 (AAA), and every change in the ratings outlook is given a weight of +0.3 (positive outlook), -3 (negative outlook), and

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[46] Ratings of BBB- and below are classified as speculative- or junk- grade.

0 (Stable Outlook), and a -0.5 for Negative Watch. The lower value of the positive and negative outlook (+0.3/-0.3), implies that a ratings change is possible within three months to a year, whereas a Negative Watch implies a more imminent ratings cut within three months or less. Hence it has a slightly more weight relative to the Negative Outlook. For example, Brazil's rating changed from BB/Watch Neg to BB/Negative on August 15, 2017. That is, its rating stood at 9 with -0.5 for the negative watch, rendering it an 8.5 score for the first 15 days of August, and as of August 16, its rating gets numerically adjusted to 9 for the rating (BB), and -0.3 for the negative rating outlook, giving it a score of 8.7. On a monthly basis, Brazil's rating would be calculated as follows,

$$August\ 2017 = (8.5*15+8.7*16)/31$$

The average monthly rating is divided by the number of days in our month of interest. September's rating- and onwards- would be 8.7 until another ratings change occurs, and a similar ratings adjustment occur, with the weighted average rating calculation driven by the number of days in the month. After obtaining a monthly series of ratings in numerical form, these ratings are averaged (three-months) to obtain quarterly ratings for our regressions.