Determinants of FDI Inflow in BRICS Countries: Role of Globalization and Corruption Control

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ABSTRACT

This study investigates the determinants of FDI inflows in BRICS countries – the fastest-growing and the most resource-full group of developing countries in the world. Data from the five BRICS countries were analysed using the fixed effect, ARDL, and Dumitrescu and Hurlin Granger causality tests. Alongside multiple models, robustness was checked using additional proxies for corruption, stability, and openness. ARDL offered the benefits of testing both short- and long-run interactions. Globalization, corruption control, market size, and economic growth exhibit strong positive influence on FDI inflow. Financial development (credit to GDP ratio) negatively influences FDI inflow. Corruption exhibits a 'U-shaped' relationship with FDI inflows. When combined using a moderation effect, globalization and corruption control exerts a better strategic impact on FDI inflow than their stand-alone impact. MNEs will prefer a country as their next destination that carries a 'regionally integrated' open economic policy, bigger local market size, and clear policies to mitigate risk attached to corruption and excessive domestic credit. Grounded on the globalization-growth literature, our findings on the globalization and FDI inflow nexus is noble find for the developing countries. Contrary to extant ambiguous findings, we offer clear evidence that FDIs can influence financial market development policies in developing economies. We propose a two-layer strategic FDI decision frame for MNEs that can help profile international investment.

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ملخص

تبحث هذه الدراسة في محددات تدفقات الاستثمار الأجنبي المباشر في بلدان البريكس (البرازيل وروسيا والهند والصين وجنوب أفريقيا)- المجموعة الأسرع نموا والأكثر تشبعا بالموارد من البلدان النامية في العالم. وتم تحليل البيانات من دول البريكس الخمسة باستخدام التأثير الثابت والانحدار الذاتي للإبطاء الموزع واختبارات السببية لدوميتريسكو وهورلين غرانجر. وإلى جانب نماذج متعددة، تم التحقق من المتانة باستخدام عوامل تمثيلية إضافية للفساد والاستقرار والانفتاح. الانحدار الذاتي للإبطاء الموزع عرض فوائد اختبار التفاعلات قصيرة وطويلة المدى. وبينما تُظهر العولمة والسيطرة على الفساد وحجم السوق والنمو الاقتصادي تأثيرا إيجابيا قويا على تدفق الاستثمار الأجنبي المباشر الوارد، تؤثر التنمية المالية (نسبة الائتمان إلى الناتج المحلي الإجمالي) سلبا عليه. ويظهر الفساد علاقة "على شكل حرف U" مع تدفقات الاستثمار الأجنبي المباشر الواردة. وعند الجمع بين استخدام تأثير معتدل، فإن العولمة ومكافحة الفساد تمارسان تأثيرا استراتيجيا أفضل على تدفق الاستثمار الأجنبي المباشر من تأثيرهما المستقل. وستفضل الشركات متعددة الجنسيات كوجهة تالية الدولة التي تطبق سياسة اقتصادية مفتوحة "متكاملة إقليميا"، وحجم سوق محلي أكبر، وسياسات واضحة للتخفيف من المخاطر المرتبطة بالفساد والائتمان المحلي المفرط. واستنادا إلى أدبيات العولمة والنمو، فإن النتائج التي توصلنا إليها حول العلاقة بين العولمة وتدفقات الاستثمار الأجنبي المباشر هي أنها صندوق تمويل للبلدان النامية. وعلى عكس النتائج الغامضة القائمة، فإننا نقدم أدلة واضحة على أن الاستثمار الأجنبي المباشر يمكن أن يؤثر على سياسات تطوير الأسواق المالية في الاقتصادات النامية. ونقترح إطار قرار استراتيجي من طبقتين بشأن الاستثمار الأجنبي المباشر للشركات متعددة الجنسيات من شأنه أن يساعد في تحديد معالم الاستثمار الدولي.

ABSTRAITE

Cette étude examine les déterminants des entrées d'IDE dans les pays BRICS - le groupe de pays en développement à la croissance la plus rapide et aux ressources les plus abondantes au monde. Les données des cinq pays BRICS ont été analysées à l'aide des tests de causalité à effet fixe, ARDL, et Dumitrescu et Hurlin Granger. Outre les modèles multiples, la robustesse a été vérifiée en utilisant des indicateurs supplémentaires pour la corruption, la stabilité et l'ouverture. L'ARDL offre l'avantage de tester les interactions à court et à long terme. La mondialisation, le contrôle de la corruption, la taille du marché et la croissance économique ont une forte influence positive sur les entrées d'IDE. Le développement financier (ratio crédit/PIB) influence négativement les entrées d'IDE. La corruption présente une relation en forme de "U" avec les entrées d'IDE. Lorsqu'ils sont combinés à l'aide d'un effet de modération, la

mondialisation et le contrôle de la corruption exercent un meilleur impact stratégique sur les entrées d'IDE que leur impact autonome. Les entreprises multinationales préfèreront comme prochaine destination un pays doté d'une politique économique ouverte "intégrée au niveau régional", d'un marché local de plus grande taille et de politiques claires pour atténuer les risques liés à la corruption et à un crédit intérieur excessif. Fondées sur la littérature relative à la mondialisation et à la croissance, nos conclusions sur le lien entre la mondialisation et les flux d'IDE sont nobles pour les pays en développement. Contrairement aux résultats ambigus existants, nous offrons des preuves claires que les IDE peuvent influencer les politiques de développement des marchés financiers dans les économies en développement. Nous proposons un cadre de décision stratégique d'IDE à deux niveaux pour les multinationales qui peut aider à profiler l'investissement international.

Keywords: KOF Globalization index; Corruption; BRICS; FDI inflow; Strategic FDI; Granger causality.

JEL Classification: F21; F68; D73; C23.

1. Introduction

Globalization-growth hypothesis states that openness promote international business (Nunnenkamp, 2002; Dreher, 2006; Zahongo, 2017). Also, growth-FDI hypothesis indicates that higher economic growth is an important factor that MNEs analyse before making a FDI decision (Izadi, Rashid and Izadi, 2021). Regional integration for cooperation, such as the BRICS, intends to achieve cooperation among member countries to boost trade, engage in foreign direct investment (FDI), risk sharing, and sustain growth (Kose et al., 2009). Due to diverse risks related to the degree of expected globalization, such as the corruption, inferior economic growth and competitive advantage, Multinational Companies (MNEs) attempt to achieve strategic or targeted globalization (Goldberg and Klein, 1997), which has given birth to BRICS-like pockets of integration. Therefore, to reduce the search cost for next destination, MNEs will rely on 'strategic' motive by staying around large consumer markets and by balancing risk of the host country (i.e., political, social, and economic risks) (Demirbag, Glaister and Sengupta, 2020; Buckley et al., 2020; Narula and Dunning, 2010). While globalization-growth nexus influences FDI, more profoundly so in the developed and industrialized countries, the relationship between globalization and FDI is rarely studied for the strategically integrated

countries, such as the BRICS. This study aims to investigate the influence of globalization, corruption control, among other determinants, on the FDI inflow in BRICS countries.

Foreign Direct Investment (FDI) is an important driving force of economic growth in emerging economies. FDI brings along new technologies, capitals, skills, and knowledge that stimulate domestic market growth (Izadi, Rashid and Izadi, 2021; Saini and Singhania, 2018; Tsaurai, 2018). FDI is often more resilient than other forms of private capital flows, especially during financial crisis, as evidenced by the reversal of investment during Latin American crisis of the 1980s, Mexican crisis of 1994-95, and Asian financial crisis of 1997-98 (Dadush, Dasgupta and Ratha, 2000). In-spite of a global reduction of FDI inflows, UNCTAD reports that countries in BRICS – Brazil, Russia, India, China, and South Africa – have experienced growth in FDI inflow (refer to Figure A1 and Figure A2 in appendix). BRICS countries are collectively the most resourceful developing countries with the largest domestic markets. BRICS countries are directly and indirectly part of the China-led Belt and Road Initiative, which clearly forwards a 'strategic' view of FDI.

Since the inception of the World Trade Organization, pockets of regional and strategic partnerships have gained significant attention in several blocks of countries (Asongu, Akpan, and Isihak, 2018). These countries either share a common cultural language or are regionally integrated. MNEs feel comfortable with a regional FDI policy not only to balance their cost and convenience, but also to understand their risk mitigating capacity in the host country (Demirbag, Glaister and Sengupta, 2020; Buckley et al., 2020). A mixed bag of factors that influence FDIs in BRICS include openness, proximity to the market and customers, and improvement of institutional quality through control of corruption. Much of these developments in BRICS are derived from the growth of Chinese and Indian influence on trade and investment (Gusarova, 2019). Despite having relatively large markets, lower labor cost, and massive reserves of natural resources, BRICS countries often face criticisms on policies related to limited openness, extreme nationalization, lack of corruption control and instable regional political stability (Nistor, 2015).

Past results on the determinants of FDI inflows in developing and emerging economies are mixed. Despite numerous positives of FDI flowing into developing countries, increased competition, resource

fragmentation, and institutional complexities are some of the common risk factors that MNEs must factor in while investing in developing countries (Hassan, Rashid and Castro, 2016; Rashid, Looi, and Wong, 2017). Janicki and Wunnava (2004) study the determinants of inward FDI for eight transitional Central and East European economies. Asiedu (2002) found market size, country risk, labour cost and trade openness as determinants of FDI flowing into Sub-Saharan African (SSA) countries. Asiedu (2002) reported that trade openness has a positive impact, whereas infrastructure and high return on investment show no significant impact on FDI in selected SSA countries. Hassan et al. (2016) found FDI negatively related to interest rates, and strong bi-directional positive causality between investor sentiment and FDI inflow. Rashid et al. (2017) found that GDP, trade openness, and political stability positively affected FDI inflows while inflation rate negatively impacted FDI inflows in Asia Pacific countries. Other factors influencing FDI include stock market development (Tsaurai, 2018); market size, and (low) labor cost (Khamphengvong, Xia and Srithilat, 2018); and economic growth (Saini and Singhania, 2018).

This study considers data on five BRICS countries for the period of 2000-2015. Alongside traditional determinants of FDI inflow, such as the economic growth, market size, financial development, and political stability, we have employed KOF Globalization Index, several proxies for corruption control and openness for robustness test. Empirical analyses were conducted using fixed effect, EGLS, ARDL and Granger causality models. Our results indicate that countries with higher rate of globalization, better corruption control, large domestic markets and higher economic growth will receive more FDI, in the short- as well as long-run. Globalization and market size also Granger caused FDI inflow.

We compare our findings against two groups of FDI literature. First, we consider a group of general FDI papers on BRICS. While Ranjan and Agrawal (2011), Vijayakumar, Sridharan and Rao (2010) and Jadhav (2012) study the most common determinants of FDI inflow in BRICS, we add on the globalization-FDI nexus on BRICS. Our results present that if globalization and corruption control can be coupled together, countries that are equally open and less corrupted will see a significant growth in FDI inflows. Our results also suggest that large domestic credit as a proxy for financial development may dishearten foreign investors. Second, our findings draw attention to another group of papers on globalization and

growth literature. We extend the impact of globalization on FDI with similar positive and causal impacts, as observed in existing studies on globalization and growth nexus (Salahuddin et al., 2019; Zahonogo, 2017). Contrary to the existing literature, the results from the Granger causality tests found that Globalization and Market Size Granger caused FDI inflow. We also found that FDI Granger caused financial development. While adding to the body of the most recent financial development-FDI nexus literature (See Tsaurai, 2018), the causal relationship between FDI and financial development indicate that FDI inflow may increase the demand of bank-led financial development, which may in turn hurt foreign investment in the long-run. Therefore, our findings strongly support the strategic nature of foreign investment in BRICS, when compared to most common resource-seeking view of FDI. Our results are robust across proxy variables and methods.

Next, chapter 2 discusses the past literature, theories, and relevant hypotheses to be tested. Chapter 3 explains the methodology and data. Chapter 4 presents the results. Chapter 5 discusses findings and concludes the study with implications for theory and policy making.

2.   Past Studies and Hypotheses

2.1 FDI in BRICS countries

Among the developing economies, BRICS countries (Brazil, Russia, India, China, and South Africa) stand as the most significant emerging markets due to their fast-growing economies, large populations and increasing industrialized markets (refer to Table A1 in appendix). In 2015, share of FDI in BRICS was 33% of the FDI in all developing economies. Following sections give a brief update on the FDIs in BRICS countries.

2.1.1 China:

China moved to the second position, after United States, in terms of the top recipient of FDIs between 2018-2019. In 2015, China reported an inflow of USD 135 billion. China's massive domestic market, at 1.3 billion customers strong, coupled with a booming economy and inexpensive labor force allows it to be an attractive destination for FDI. However, there are also problems that hinder foreign investment such as

unregulated intellectual property rights, lack of transparency and corruption.

2.1.2 Brazil:

Brazil, as the largest emerging market in Latin America showed significant increase in FDI inflow from USD 49 billion in 2015 to USD 67 billion in 2017; the second largest leap amongst its BRICS counterparts, after China. The country appeals to international investors due to its large domestic market, rapid growth of economy, diversified economic structure and strategic hub among other South American countries. However, factors such as an extremely complicated tax system, strict labor laws and red tape make the country less competitive when compared to other developing countries.

2.1.3 India:

India is the third largest FDI recipient among BRICS countries. The country has received an average of USD 40 billion a year between 2015 to 2018. India is also known for its skilled, English-speaking and inexpensive labor, and above-average middle class earning families. India has placed restrictions on FDIs in several areas which deters investors from an otherwise huge opportunity in the retail sector.

2.1.4 Russia:

Before sanctions imposed by the U.S. and its allies, Russia stood its ground as one of the largest FDI recipients worldwide back in 2013 with over USD 70 billion in foreign investment. However, its flow of FDI declined between 2016 (of USD 37 billion) and 2018 (of USD 13 billion). Russia makes for an otherwise attractive place of investment; amidst an unstable political climate and complicated accounting legislations which only hinder foreign investment. Various economic reforms and tax deductions have been initiated with the intent to attract foreign investment.

2.1.5 South Africa:

Despite criticism for harsh labor laws, high crime rates, and increasing levels of corruption, South Africa has seen some significant progress in attracting foreign investment. The country reported USD 1.79 billion of

FDI in 2016, going up to USD 5.33 billion in 2018. South Africa has made significant strides towards the global Halal tourism industry – aiming to contend in its global projected value of USD 250 billion by the year 2021.

2.2 General Determinants of FDI

We summarize a long list of FDI determinants in three groups – a) openness, b) market size, growth, and development, and c) corruption and stability.

2.2.1 Openness:

Studies found positive influence of openness on FDI in global context (see Rashid et al., 2017 for discussion). Going one step further, the term globalization has attracted much attention since the last quarter of the 20th century due to competitive advantages of nations in financial markets, product and manufacturing supply chain, and labor market. While studies on the impact on globalization on economic growth is widely available, the same relationship between globalization and FDI is rare, particularly from the perspective of regional globalization that includes BRICS.

When studying globalization, researchers offer three dimensions to its influence. Firstly, starting with one of the oldest, Nunnenkamp (2002) forwards findings of the impact of globalization on FDI in 28 developing economies. While globalization has helped channel FDI through international trade, its impact on FDI is rarely studied, when compared to the extensive list of market-driven traditional factors. Even with globalization's questionable impact, Goldberg and Klein (1997) found hope for "negotiated (regional) globalization" in smaller sets of countries; particularly while considering the bilateral exchange rate between firms in United States, Japan and Southeast Asia. Secondly, due to the increased importance of regional globalization, Narula and Dunning (2010) proposed that the motives of FDIs are changing from merely "resource-seeking" to "strategic", led by the industrial demand for FDIs. According to their study, in the era of mobile and knowledge-intensive asset creation, FDI-receiving economies must produce FDI-driven development strategies in order to attract quality and sustainable direct investments.

Thirdly, globalization may influence FDI through economic growth or market size. There exists wide assembly of literature on relationship

between economic growth and FDI (see for reference Yu and Walsh, 2010; Eicher, Helpman and Lenkoski, 2012; Tang and Tan, 2014; Otchere, Soumaré and Yourougou, 2015) and economic growth and globalization (Dreher, 2006; Zahongo, 2017). Most studies find a positive connection between FDI and economic growth, and economic growth and globalization. Countries with larger internal markets, i.e., China and India in BRICS, and/or faster economic growth potentials are expected to derive the best out of globalization. Globalization is also found to benefit large industrial and developed nations in terms of increased risk sharing and financial development when compared to their developing counterparts (Kose et al., 2009). In order to reach a robust impact of globalization on FDI in the BRICS countries, we hypothesize that:

H1: Higher degree of openness (i.e., overall globalization) carries a positive impact on FDI in BRICS countries.

2.2.2 Market size, growth and development:

MNEs prioritize countries with higher economic growth while choosing their next destination (Demirbag et al., 2020). GDP growth has been one of the important determinants of FDI inflow (Kirchner, 2012). Results of GDP growth rate on BRICS countries are mixed. Ranjan and Agrawal (2011) reported a positive impact whilst taking industrial production as a proxy for economic growth, Vijayakumar et al. (2010) reported an insignificant relationship between growth and FDI. Looking at the rising importance of economic growth in emerging economies, we hypothesize that:

H2: Higher GDP growth has a positive impact on FDI in BRICS.

A large market size is essential to exploit economies of scale and efficient utilization of resources. Past studies find a strong correlation between GDP size and the FDI inflows (Ang, 2008; Hassan et al., 2014). Market size is a reliable positive determinant of FDI inflows in BRICS countries (Ranjan and Agrawal, 2011; Vijayakumar et al., 2010; Jadhav, 2012). Three proxies are used to measure size: GDP per capita, GDP in absolute form, and FDI to GDP ratio. The third one is preferred considering the population bias in the first and second proxies. Observing the robust positive impact of market size on FDI inflows, the study hypothesizes that:

H_3: Market size will have a positive impact on FDI inflow in BRICS countries.

Financial development, taking domestic credit over GDP as a proxy, is a measure of bank-led financing support for MNCs in the host market. Essentially, a higher ratio, keeping other things constant, will attract both FDI and portfolio investors. The connection between financial development and FDI is explained from two dimensions: direct connection and indirect connection through economic growth. King and Levine (1993) and Levine and Zervos (1998) found support for the positive connection between economic growth and financial development, while Agarwal and Mohtadi (2004) discussed evidence for a positive connection between bank lending and FDI. Contrary to existing belief of a positive connection, Ramirez (2018) found a negative relationship between stock index return and FDI while analysing a set of developing countries. Pindzo and Vjetrov (2013) considered stock market development in Central Eastern European countries and found a positive connection with FDI inflow. Also, higher credit may signal riskiness (Yong et al., 2012). On the other hand, establishing a lower risk point is necessary for the MNEs to invest in host country (Balan, 2019). Despite strong domestic credit market growth in China, India and South Africa, the financial development of BRICS countries has not been studied in-depth. With the view to fill up this link, the study hypothesized that:

H_4: Higher financial development attracts more FDI inflows in BRICS countries.

2.2.3 Corruption and quality:

Quality institutions play an important role in attracting FDI by creating an impression that corruption, to a higher degree, is controlled. Campos, Lien and Pradhan (1999) study the influence of corruption on investment in developing countries by pooling samples from the East Asian countries. Their analyses reveal that highly corrupted countries with high predictable rate of bribery witnessed fewer negative impacts on new investment than countries perceived to be more highly corrupted with relatively lower degree of bribe predictability. While studies on corruption control in BRICS countries are limited, Jadhav (2012) investigated governance quality and corruption control in BRICS countries with mixed results on governance quality, as some components

positively influenced FDI while others proved insignificant. His results on corruption control found an insignificant connection to FDI. Given the importance of and limited research on corruption for BRICS economies, this study hypothesizes that:

H_5: Higher level of corruption control (lower level of corruption) increases (decreases) FDI flowing into BRICS countries.

3.   Data and Methodology

3.1 Data

BRICS include five countries – Brazil, Russia, India, China, and South Africa. Table 1 shows brief descriptions, sources, and measurements of the variables used in the study. All amounts are presented in United States Dollars. FDI inflows (in natural log) is the dependent variable. This study has considered a data frame that is longer than recent studies on BRICS countries. The range, from 2000 to 2015, is considered due to incomplete data for Russia and South Africa, and limited data on globalization index. Hence, the dataset includes (sixteen years and five countries) eighty year-country observations. The study excluded recent few years of available data ranging from 2016-2018 as the global decrease in net FDI inflow may distort the overall findings of the study. Also, 2016-2018 is an extremely short period to be examined separately. Most data were collected from the database of the World Bank and Worldwide Development Indicators. The Corruption Perception Index data was collected from the Transparency International. Globalization data was collected from KOF index of globalization. Trade Openness, Political Stability, and Corruption Perception Index were used to check robustness of the results. Following section further emphasizes on globalization index and corruption control variables.

3.1.1 KOF Globalization index:

KOF Swiss Economic Institute manages KOF globalization index (GLOB). GLOB is a multi-dimensional index comprising of economic, social, and political globalization. The index was first published in 2002 by Dreher (2006) and re-examined by Dreher, Gaston and Martens (2008). The index is defined as a "process" that connects countries and cultures beyond borders through integration of national economies,

governance practices, and social systems. The items considered in the index are listed in Table A2 in appendix. The index reports value ranging from '1' to '100'; '100' representing the most globalized country. Economic globalization represents economic openness of a country, which includes trade and investment connectivity and restrictions among countries. Political globalization considers the relationship among countries in terms of membership in international association and operating overseas missions and embassies. Social globalization presents the degree of social integration, migrant and foreign population, interconnectivity and even having a branch (per capita) of McDonald's or Ikea.

3.1.2 Corruption control:

World Bank publishes corruption control as a perception index that represents the "capture" of private interests using public power (Kaufmann, Kraay and Mastruzzi, 2010). The scores are presented in the form of a standard normal distribution, ranging from -2.5 to +2.5. We took Corruption Perception Index (COPI) as a proxy for robustness check. COPI is published by the Transparency International as an index based on the perception of the business community and country experts on public sector corruption. Using mean and standard deviations from the year 2012 as the benchmark, COPI produces standard normal scores ranging from '0' to '100', where '0' represents countries with the highest level of "perceived" corruption and '100' represents countries with the lowest level of "perceived" corruption.

Grounded on the panel data methods, the basic testable model is given in equation (1). The model includes five determinants of net FDI inflow. Notations for the variables in equation (1) can be found in Table 1. In equation (1), a_{it} presents the intercept term, while μ_{it} is used for the error term. COPI, TROP and POST will be used to test for robustness (Table 1). Expected signs for the COPI is negative, for trade openness is positive, and for political stability is positive.

$$NFDI_{it} = a_{it} + \beta_1 GLOB_{it} + \beta_2 GDPG_{it} + \beta_3 SIZE_{it} + \beta_4 FIND_{it} + \beta_5 COCO_{it} + \mu_{it} \qquad (1)$$

Table 1: Descriptions of the variables

Notation	Meaning	Definition/ measurement	Source
NFDI	Net inflow of FDI	Natural Log of the foreign direct investments' net inflows.	World Bank
GLOB	Overall KOF Globalization index	Natural log of the Overall KOF globalization index based on Dreher (2006) – a combined openness using social, economic, and political globalization indices.	KOF Swiss Economic Institute
GDPG	GDP growth	Annual growth of real GDP.	World Bank
SIZE	Market size	FDI net inflow over GDP.	Word Bank
FIND	Financial development	Domestic credit over GDP.	World Bank
COCO	Corruption control	Perception of the extent to which public power is exercised for private gain.	Worldwide Governance Indicators
POST	Political stability	Perception of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means.	Worldwide Governance Indicators
TROP	Trade openness	Sum of exports and imports over GDP	World Bank
COPI	Corruption perception index	Natural log of the aggregate quantitative perception of corruption in public sector.	Transparency International

Notes: POST, TROP, and COPI will be used for robustness test.

3.2 Empirical analyses

Table 2 reports the descriptive statistics and Table 3 shows the correlation matrix. Graphical representation of the variables for selected years is presented in Figure A3 in appendix. Testing on the selection of the basic panel model (fixed versus random effect models) was performed using the Hausman test. The panel in this study has longer time series

component and smaller cross-section components. Similar panels may suffer from serial-correlation problem (Kim, 2010; Baltagi and Kao, 2000). To resolve these issues, several Panel ARDL tests were conducted (Pesaran, Shin and Smith, 1999). Regular Fixed Effect Models are adjusted using Estimated GLS (EGLS) models that helps to avoid serial-correlation problem. In addition, ARDL models offer opportunities to explain both short- and long-run relationships between the determinants and FDI inflows. For a general case of $NFDI_{it}$ as the dependent variable for the cross-section 'i' for 'i' = 1, 2, … N, and time 't' where 't' = 1, 2, … T, following is our ARDL model (in equation 2) for the five independent variables with K x 1 vector:

$$
NFDI_{it} = \sum_{Z}^{P} \vartheta_{it} NFDI_{i,t-z} + \sum_{Z}^{P} \theta_{it} GLOB_{i,t-z} + \sum_{Z}^{P} \theta_{it} SIZE_{i,t-z}
$$
$$
+ \sum_{Z}^{P} \theta_{it} GDPG_{i,t-z} + \sum_{Z}^{P} \theta_{it} FIND_{i,t-z}
$$
$$
+ \sum_{Z}^{P} \theta_{it} COCO_{i,t-z} + \varepsilon_{it}
$$

$$(2)$$

Where, $\varepsilon_{it} = \delta_i P_t + \omega_{it}$, which also represents the random error for cross-section 'i'. P_t is used to present the vector of observed factors. NFDI is the net FDI inflow, GLOB is the overall globalization, SIZE is the market size, GDPG is the growth of GDP, FIND is the financial development, and COCO stands for corruption control. Results for fixed effect and ARDL models are presented in Table 4.1 and 4.2.

To add an in-depth emphasis on globalization and FDI, we examined the data for causality. Recent studies on FDI – economic growth nexus considered Granger causality on vector autoregressive (VAR) or vector error correction (VEC) models (Sothan, 2017). We tested panel Granger causality offering individual coefficient. As China differentiated itself from the rest of the countries on the aspect of inward FDI, we tested for cross-section specific coefficient using Dumitrescu and Hurlin (2012) test. Also, unique data structure in BRICS case, with relatively fewer cross-section compared to longer time-series (T > N) and the possibility of cross-section slope heterogeneity, matches the prerequisites of D-H

tests (Akbas, 2013). Essentially, Granger causality is built upon bivariate regression, which will report the causality in a pair of two variables (Granger, 1969). Usual pre-tests on panel unit roots and lag-length selection were conducted. Results on Granger causality are presented in Table 5.

Table 2: Descriptive statistics

Items	NFDI	GLOB	GDPG	FIND	COCO	SIZE	COPI	POST	TROP
Mean	49.04	60.00	5.72	100.74	-0.32	2.50	1.53	-0.57	46.37
Max	290.92	70.30	14.19	196.93	0.61	6.00	1.70	0.37	72.86
Min	0.62	44.41	-7.82	20.81	-1.08	0.20	1.32	-1.52	22.10
Std. Dev.	65.72	6.76	3.54	53.94	0.44	1.30	0.10	0.50	13.75

Notes: NFDI = Net FDI Inflows, GLOB = Overall KOF Globalization Index, GDPG = GDP Growth, FIND = Financial Development, COCO = Corruption Control, SIZE = Market Size, COPI = Corruption Perception Index, POST = Political Stability, TROP = Trade Openness. Figures are calculated before transforming data.

Table 3: Correlation matrix

Items	NFDI	GLOB	GDPG	FIND	COCO	SIZE	COPI	POST	TROP
NFDI	1.000	0.045	0.342	-0.113	-0.447	0.741	-0.182	-0.024	-0.159
GLOB		1.000	-0.230	0.539	-0.127	0.236	-0.039	0.301	0.440
GDPG			1.000	0.243	-0.262	0.202	-0.165	-0.322	0.235
FIND				1.000	-0.314	-0.013	-0.160	-0.256	0.964
COCO					1.000	-0.129	0.869	0.662	-0.194
SIZE						1.000	0.002	0.225	-0.036
COPI							1.000	0.712	-0.014
POST								1.000	-0.190
TROP									1.000

Notes: NFDI = Net FDI Inflows, GLOB = Overall KOF Globalization Index, GDPG = GDP Growth, FIND = Financial Development, COCO = Corruption Control, SIZE = Market Size, COPI = Corruption Perception Index, POST = Political Stability, TROP = Trade Openness.

4. Results

4.1 General and descriptive findings (Table 2, 3 and Figure A3)

While the average FDI inflow stayed at USD 49 billion, average maximum FDI inflow reached USD 291 billion. China received the highest amount of FDI among BRICS countries. Average GDP growth rate was 5.73%. The highest average of financial development (percentage of domestic credit to GDP) reached 197%. The negative average value of corruption control (COCO) or alternatively positive average value of corruption perception index (COPI) establishes that average countries in BRICS have experienced higher level of corruption. The average FDI inflow was 2.5% of the GDP, with the maximum average reaching 6%. Across the board, BRICS suffered from political instability. Average export and import combined was 46% of GDP, while the highest average was 73%. Comparison of trade openness and market size indicates that most BRICS countries' internal market activities, including production, consumption, and export, are powerful factors for MNCs to consider when investing in these countries. Overall, BRICS countries have received above average FDI inflows compared to other developing countries. These countries are characterized by higher levels of trading activities, above average globalization scores albeit with higher degrees of corruption and political instability. The correlation matrix (Table 3) presents that Political Stability (POST) is highly correlated with Corruption Control (COCO) and Corruption Perception Index (COPI). Also, Trade Openness (TROP) is strongly positively connected to Financial Development (FIND). Hence, these variables were carefully utilized in the final testing to avoid multi-collinearity problem.

4.2 Choice of model, panel unit root and lag-length selection

Table 4.1 and 4.2 offer nine models (FE (1) through FE (9) using fixed effect estimations and four models (ARDL (1) though ARDL (4) using ARDL estimations. ARDL models show long- and short-run estimations and the possibility of error correction. In order to choose between Random and Fixed Effect models, Hausman test was conducted. The null hypothesis for the test was that the random effects were efficient. The result reports a Chi-square value of 39.334 ($p = 0.000$), which rejects the null hypothesis indicating a preference for fixed effect over the random effect models. Fixed effect model imposes a time independent effect for

each cross-section that may correlate with variables, thus helping to control unobserved heterogeneity correlated to variables and are constant over time.

Results for panel unit root and lag-length selection are given in the appendix Table A3 and Table A4. Following Pesaran (2015), Augmented Dicky Fuller (ADF) and Phillips-Perron (PP) test results are summarised. We have also added results on Levin-Lin-Chu t test. Null hypothesis of these tests was that the series is non-stationary. Our results exhibit mixed results for NFDI and GLOB, even where the ADF and PP tests find all variables to be stationary upon initial differentiation. Due to difference in order of integration, ARDL was used. Results of the lag-length selection to help with the Granger causality tests are presented in appendix Table A4. While Akaike Information Criteria (AIC) supported up to two lags, we proceeded with Schwarz Information Criteria (SIC) and Hannan-Quinn Information Criteria (HQ) supporting one lag at maximum.

4.3 Most consistent determinants of FDI inflow

Based on fixed effect and ARDL tests, Globalization (GLOB) and Market Size (SIZE) are the two most consistent and positive determinant of FDI inflow in BRICS. Economic Growth (GDPG) also influences FDI inflow positively, albeit less consistently than globalization and size; like the Corruption Perception Index (COPI). While the expected sign for COPI was positive, only one ARDL model, out of the four, found a significant relationship. Notwithstanding, Corruption Control (COCO) and Financial Development (FIND) have shown consistent negative influence on FDI inflows. Political stability (POST) and Trade openness (TROP) are found to be insignificant. Since the correlation between these two variables proved to be higher with some key variables of the study, we have excluded them from further analysis. The signs from the three factors - GLOB, SIZE and COCO - are consistent with the initial estimations. Notably, countries with higher degrees of globalization, corruption control, and large domestic markets will attract more FDIs. Interestingly, higher domestic credit, which indicates excessive domestic financial risk, has significantly reduced FDI inflows to BRICS countries. Higher adjusted R^2 in all the FE models indicates a robust model fit.

4.4 Moderation of corruption and globalization

Both proxies of corruption – COPI and COCO – have shown significant optimality, indicating the possibility of a 'U' shaped relationship between corruption and FDI inflows. While economies with a higher degree of perceived corruption may be able to attract some FDIs initially, this will eventually dry up in the absence of sustainable corruption controlling mechanisms. Globalization interacts positively with corruption control on FDI inflow. Countries scoring high on globalization and corruption control will see growth in FDI inflow. Hence, the degree of openness and corruption control strategies may appear advantageous to uphold image of the country. Our results also suggest that a strategic move of openness and corruption control works better than their stand-alone impact.

4.5 Short-term interactions using ARDL and error correction

Error correction is significant and possible, at least with two ARDL models. Size and corruption control (COCO) are the two significant determinants of FDI inflow in the short run. Financial development (FIND) appeared positive, with very weak significance. This positive sign with FIND indicates that larger domestic credit may attract some FDI in the short run. Overall, short-run interactions are less consistent when compared to the long-run estimations.

4.6 Granger Causality

Results on Dumitrescu and Hurlin (D-H) Granger causality is presented in Table 5. The null hypothesis states that variable 'A' does not homogeneously Granger cause variable 'B'. Results indicate that there exists strong unidirectional Granger causality running from Globalization and Size towards FDI inflow. FDI inflows Granger caused Financial Development.

Table 4.1: Determinants of FDI inflows in BRICS countries: Long-term estimations

Variables	FE (1)	FE (2)	FE (3)	FE (4)	FE (5)	FE (6)	FE (7)	FE (8)	FE (9)	ARDL (1)	ARDL (2)	ARDL (3)	ARDL (4)
GLOB		0.33***	0.36***	0.41***	0.37***	0.36***				0.80***	0.42***	0.59***	0.67***
COCO	-1.85***	-1.05***		-0.51						0.43		1.90***	
FIND	0.25	-0.07***	-0.77***	-0.08***	-0.05**	-0.07***	-0.01	-0.03**	-0.01	-0.35***	-0.11***	-0.13***	-0.19***
SIZE	57.58***	49.80***	45.34***			45.39***	55.32***	60.89***	53.28***	79.21***	17.92*		
GDPG	-0.01			-0.01	-0.03							0.17***	0.24***
COPI			0.01		0.037						0.08**		-0.02
POST	0.34												
TROP	-0.001												
Constant	21.65***	4.25*	2.35	1.15	1.90	2.64	21.23***	22.01***	18.24***	-5.54	-0.65	-3.31***	-5.87***
Moderation terms													
COCO*COCO						0.70***							
COPI*COPI							0.001***						
GLOB*COCO								-0.04***					
GLOB*COPI									0.002***				
Adj. R^2	0.86	0.93	0.92	0.79	0.86	0.92	0.76	0.86	0.84				
Obs.	79	70	70	70	70	70	79	70	70	65	65	65	65

Notes: Refer to Table 4.2.

Table 4.2: Determinants of FDI inflows in BRICS countries: Short-term estimations

Variables	ARDL (1)	ARDL (2)	ARDL (3)	ARDL (4)
Error correction	-0.29	-0.23	-0.38***	-0.44***
ΔCOCO	-0.89		1.18*	
ΔFIND	0.05	0.004	-0.0005	0.04*
ΔSIZE	30.87**	36.19***		
ΔGLOB	-0.33	-0.09		-0.02
ΔGDPG			-0.08	-0.10
ΔCOPI		-0.02*		-0.01
Adj. R^2				
Obs.	65	65	65	65

Notes (Table 4.1 and 4.2): Notes: NFDI = Net FDI Inflows, GLOB = Overall KOF Globalization Index, GDPG = GDP Growth, FIND = Financial Development, COCO = Corruption Control, SIZE = Market Size, COPI = Corruption Perception Index, POST = Political Stability, TROP = Trade Openness. Figures are beta coefficients. FE = Fixed Effect. FE models are White GLS Weights and White Covariance adjusted. Dependent Variable for ARDL model is ΔNFDI. ARDL model lag is 1, automatically selected using Akaike Information Criteria (AIC).

Table 5: D-H Granger causality

Alternate Hypothesis	W-Stat.	Zbar-Stat.	Prob.
GLOB …> NFDI	5.88	4.78***	0.00
NFDI …> GLOB	0.33	-0.95	0.34
SIZE …> NFDI	3.63	2.73***	0.01
NFDI …> SIZE	1.72	0.59	0.56
GDPG …> NFDI	1.80	0.67	0.50
NFDI …> GDPG	2.52	1.48	0.14
FIND …> NFDI	1.26	0.06	0.95
NFDI …> FIND	3.46	2.51***	0.01
COCO …> NFDI	0.85	-0.39	0.70
NFDI …> COCO	1.95	0.84	0.40

Note: *** = Significant at 1%.
Null hypothesis = Variable A does not homogeneously cause Variable B.

5. Discussions and implications

5.1 Regional and strategic cooperation:

Openness is particularly rewarding to countries with greater domestic demand and more effective corruption control. While the connection between FDI and globalization is rare in extant studies, an indirect connection is being established through economic growth and corruption control (Salahuddin et al., 2019; Zahonogo, 2017). Globalization is found to Granger cause economic growth, which is long-term in nature. Our findings suggest that the relationship between globalization and FDI is strong, positive, and long-term in nature. Hence, being globalized undoubtedly helps in attracting new investment. While globalization with BRICS may place regulators at a dilemma, due to their China-led or India-driven policies, many countries may eventually exact benefits from FDI and trade cooperation from these giants (Gusarova, 2019). For instance, China has been working on its strategic global cooperation through the Belt and Road initiative. Consequently, FDI involving BRICS countries are going to be more strategic than resource-seeking.

Nonetheless, simply opening an economy may not bring in foreign investors, if the countries do not introduce healthier economic policy reforms, renewed commitments to staving-off corruption, and business-friendly policies (Demirbag et al., 2020). A preference towards strategy-led FDI theories over the resource-led FDI theories may help attract more foreign companies. One such strategy may include selecting investments in countries with allying national interests and expected synergies which in-turn may lead to greater bi- and multi-lateral industrialization. To cite few examples, Brazil is full of natural resources, but still struggles due to political instability. Slow growth of FDI inflow in South Africa reminds us of the country's higher crime rate, despite government initiative to attract global investments. These anecdotes support that strong strategic cooperation among partner countries might be needed to achieve sustainable FDI inflow. The success of other regional blocs, such as the ASEAN and OECD, might be considered for further study and surprising insights.

5.2 New corruption control channel between globalization and FDI inflow:

We have discussed three possible connections between globalization and FDI inflow from extant studies: 1) international competition, 2) strategic FDI, and 3) market size and economic growth. This study finds that globalization can lead to higher FDI inflow through a corruption control channel. Similar channels are explained in poverty and economic growth studies (Salahuddin et al., 2019). In the long-run, only countries with better corruption control can hope to benefit from increased globalization.

5.3 Credit-driven financial development signals high risk in the long run:

Due to market complexities, volatile investor sentiment, limited access to financing from the mother company, a higher dependency on the bank credit market in BRICS countries remains strong. While existing studies find stock market development as positively connected to FDI (Tsaurai, 2018), our results establish that FDI inflow Granger causes financial development. This result provides evidence of bank credit preference of MNCs. On the contrary, BRICS countries with higher domestic credit, reaching up to 196% of GDP, indicate pocket of financial risks. Therefore, the key message from the MNCs is to diversify the financial sector by investing more in stock market. With this prerequisite fulfilled, increase in FDI inflow will help build the financial market in the host country.

5.4 A strategic FDI decision frame:

BRICS countries apparently offer the largest consumer markets for foreign goods. Hence, following the market-seeking FDI theory, market size and growth factors, which are mostly endogenous to the host country, will be at the centre of the FDI decision frame (Dunning, 1980). Except globalization, all other factors, such as the corruption control, financial development, are endogenous to the host country (Buckley et al., 2020). Due to stronger influence of the country level exogenous variable, such as the globalization index, FDI decision in BRICS goes beyond market-seeking to strategic. It is important to note that retracting investment from these countries will be expensive to any MNE. We propose the following strategic decision frame to effectively manage FDI in BRICS or in similar countries. Based on Figure 1, MNEs will choose countries first based on

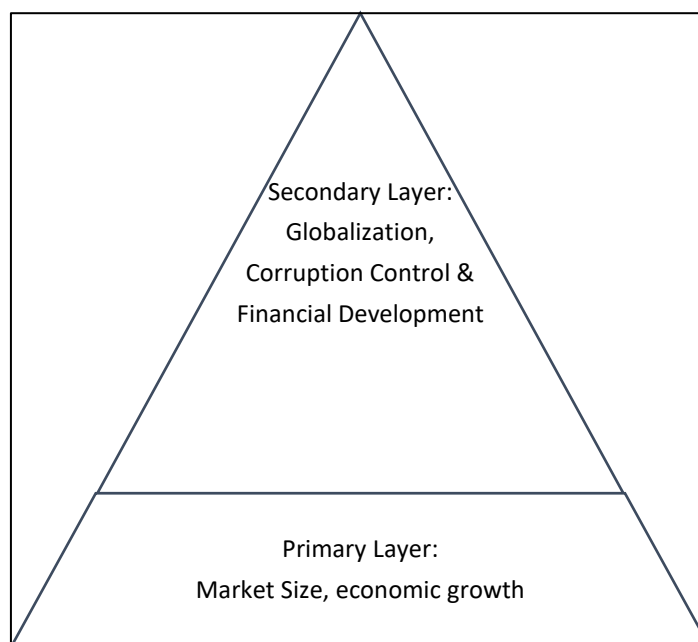the variables in the primary layer and then will move to the secondary layer.

Figure 1: Strategic FDI decision frame.
Source: Proposed by the authors.

5.5 Future studies

Globalization is an important determinant of economic growth and FDI. Future studies may consider extending the study by using globalization for other regional blocs. Also, the three individual components of globalization - economic, political, and social, can be considered as independent indices.

6. Conclusion

This study investigates determinants of FDI inflows in BRICS countries, with emphasis given to regional globalization and corruption control in the BRICS' portfolio of countries. BRICS countries collectively receive more FDIs than any other developing country blocs in recent years, asking for renewed queries on their success and challenges. This study considers FDI inflows in all five BRICS countries over a period of sixteen years

between 2000 to 2015. Thirteen Fixed Effect and ARDL models were tested. We have also tested for Dumitrescu and Hurlin Granger causality. The findings suggest that economies with higher levels of (overall) globalization, better corruption control, larger market size and better economic growth attract more FDI in the short- as well as long-run. Financial development, however, had a mixed relation: with a long-term negative relationship and weak yet positive relationship in the short run. Globalization and market size Granger caused FDI inflow. The results contain strong implications for other developing countries with large domestic market size that are suffering from lower degree of openness and corruption control. Our study suggests two layers of FDI decision criteria. First layer incudes basic requirements such as the economic growth and market size. When passed, the countries will then be checked for openness, financial development, and corruption control.   In other words, countries will attract more foreign investment if they can ensure effective globalization, corruption control, and diversified financial sector that strikes a balance between domestic credit and stock market.

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Appendix:

Figure A1: FDI inflows (USD Million) in BRICS countries; selected years
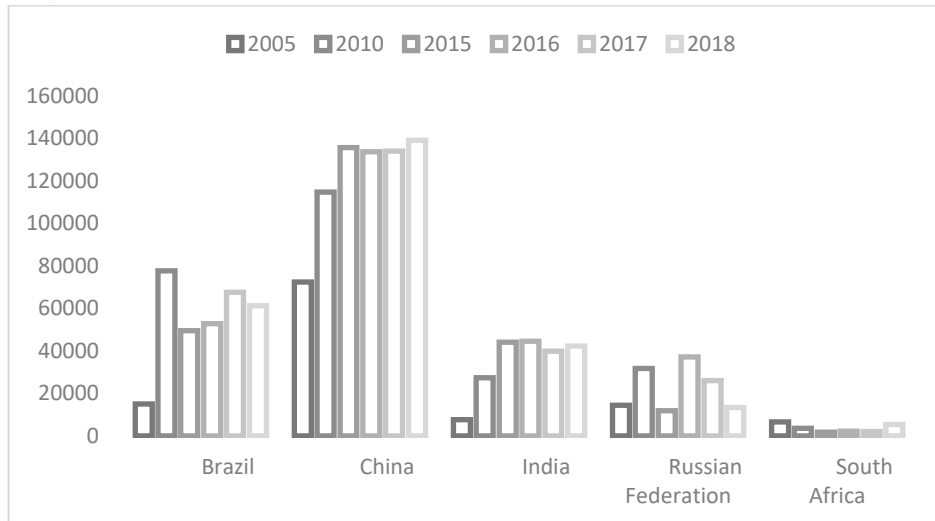
Source: UNCTAD (2018)

Figure A2: FDI inflows in the world, BRICS, developing and developed economies; selected years
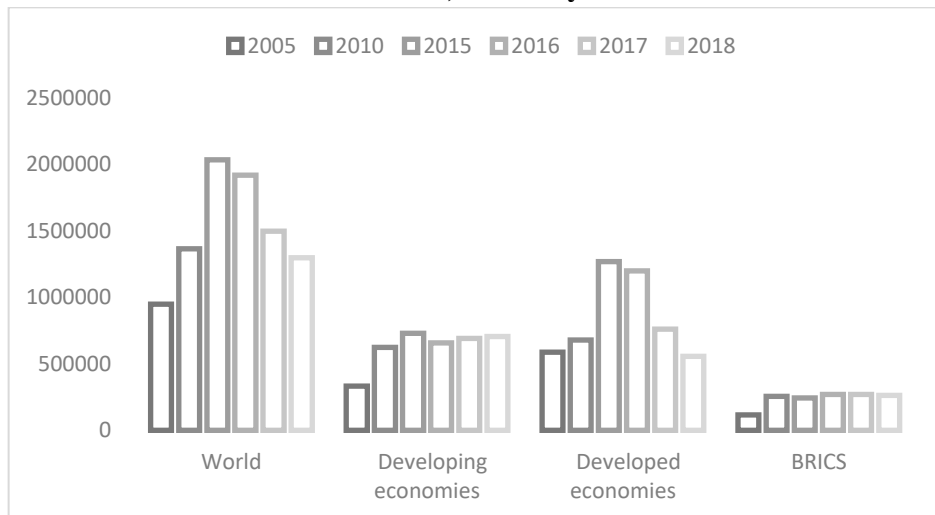
Source: UNCTAD (2018)

Figure A3: Graphical representation of the testable variables (before transformation)
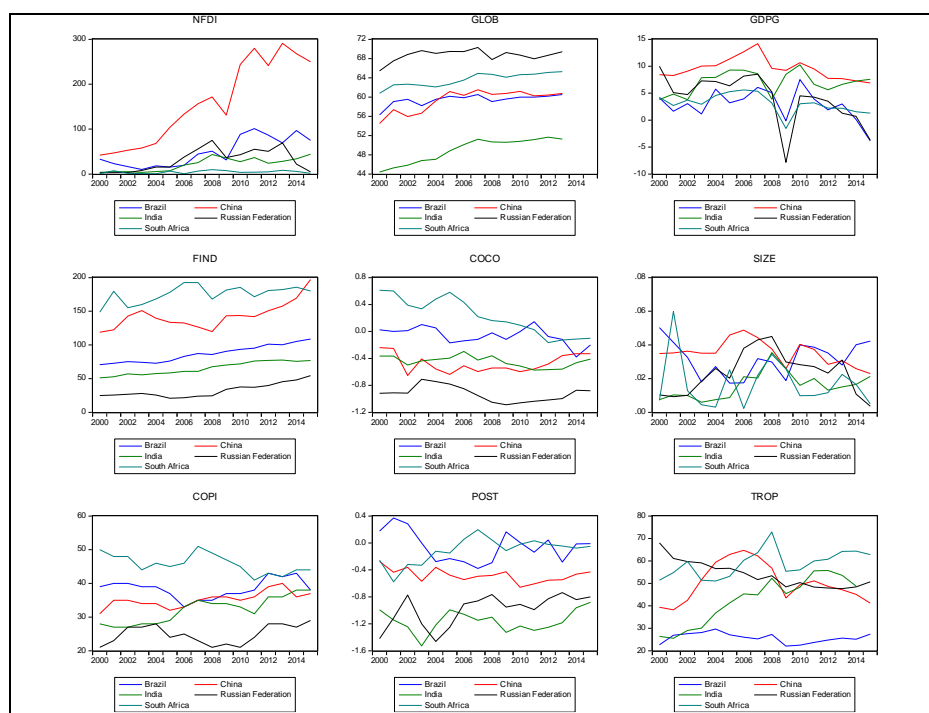
Notes: FDI in converted to Billion USD.

Table A1: Land area and population of BRICS in 2018

Country	Land area (sq. km)	% World land area	Population	% World Population	Density (pop. per sq. km)
Brazil	8,515,770	6%	209,469,333	3%	24.60
Russia	17,098,250	13%	144,478,050	2%	8.45
India	3,287,259	2%	1,352,617,330	18%	411.47
China	9,562,910	7%	1,392,730,000	19%	145.64
South Africa	1,219,090	1%	57,779,620	1%	47.40
BRICS Total	39,683,279	30%	3,157,074,333	42%	79.56

Source: World Bank, 2018

Table A2: Three components of KOF Globalization index

Social	Economic	Political
Personal contacts • Outgoing telephone traffic • International tourism connectivity • Migrants and residents as a percentage of total population • International letters per capita. Information flow • Internet host per 1000 people. • Internet users per 1000 people. • Cable connection per 1000 people. • Newspaper circulation value as % of GDP. • Radios (channels and connectivity) per 1000 people. Cultural/ social proximity • Number of McDonald's restaurants. • Number of Ikeas per capita. • Trade in books as % of GDP.	Economic value transfer (% of GDP) • General trade volume • FDI flows • FDI stock • FPI • Payment to foreign nationals Restrictions • Hidden import barriers • Tariff rate • Taxes on international trade as a % of current revenues. • Restrictions on capital account.	• (No.) Embassies in country • Membership of international organization • Participation in UN security missions.

Source: KOF Globalization Index Website

Table A3: Panel unit root test

Variable	Level	ADF - Fisher Chi-square	PP - Fisher Chi-square	Levin, Lin & Chu t*
NFDI	Level	2.49	1.83	2.57***
	1st Diff	64.78***	66.42***	-8.04***
GLOB	Level	0.64	0.37	3.56***
	1st Diff	70.58***	75.24***	-8.46***
SIZE	Level	12.23	13.14	-1.27
	1st Diff	72.21***	88.27***	-8.43***
GDPG	Level	15.15	17.61	-1.33
	1st Diff	77.49***	103.14***	-8.95***
FIND	Level	6.55	6.20	-0.24
	1st Diff	55.49***	70.31***	-7.15***
COCO	Level	13.85	14.35	-1.35
	1st Diff	59.57***	72.8***	-7.57***

Notes: Automatic selection of maximum lags based on AIC. Newey-West automatic bandwidth selection and Bartlett kernel. Null hypothesis: Unit root (assumes individual unit root process). *** = significant at 1%. Probabilities for Fisher tests are based on an asymptotic Chi-square distribution.

Table A4: Lag-length selection

Lag	AIC	SC	HQ
0	-2.595	-2.386	-2.513
1	-13.222	-11.756*	-12.648*
2	-13.435*	-10.713	-12.370

Notes: AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion