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EMPIRICAL LINKAGES BETWEEN SOME ECONOMIC FACTORS AND FOREIGN DIRECT INVESTMENT IN BRICS COUNTRIES

Keywords: BRICS, FDI, GDP, international trade

INTRODUCTION

The purpose of the paper is to put relevant economic data to research the relationship between FDI and GDP, import, export, trade balance and economic openness index. Such topic presents to be relevant as most of the empirical work done on the topic of both BRICS countries and FDI inflows never explored such relationship.

Scope of this paper is to study macroeconomic data related to BRICS countries from years of 2007 (two years before the first summit) to 2017 (latest available data) and see whenever selected economic factors have positive or negative impact on FDI inflows in a given country. The study aims to look if there are deviations and extensions from the specified econometric model. Method of research is quantitative, based on simple linear regression (OLS) estimation.

1. BACKGROUND

The acronym “BRICs” was initially formulated in 2001 by economist Jim O'Neill, of Goldman Sachs, in a report on growth prospects for the economies of Brazil, Russia, India and China – which together represented a significant share of the world's production and population.

In 2003 Goldman Sachs published a report written by Wilson and Purushothaman entitled Global Economics Paper No. 99: Dreaming With BRICs: The Path to 2050, which central idea is that over the next 50 years, Brazil, Russia, India and China could become a much larger force in the world economy, even larger than the current G7 economies in US dollar

terms. The conditions for such growth can be summarized in four core factors:¹

- macro stability (inflation, monetary policy, government deficit),
- institutions (legal system markets, health and education),
- openness (openness to trade and FDI),
- education (school enrolment, labor force dynamic, quality of human capital).

The report makes a prediction that today's developed economies will become a shrinking part of the world economy, the accompanying shifts in spending could provide significant opportunities for the FDI thus it is crucial that there are studies that contribute to the knowledge of determinants that drive investors in those developing markets.²

First BRICS summit at the highest political level was held in Yekaterinburg, Russia in 2009. The summit issued a joint statement calling for greater role and representation of emerging markets and developing countries in international financial institutions, and adopted a Joint Statement on Global Food Security.³

In 2010s after five annual meetings members have formulated two major pillars of cooperation coordination in multilateral fora, with a focus on economic and political governance; and cooperation between member states.⁴

Latest BRICS summit was hosted in Johannesburg, South Africa with a focus on development, economic growth, prosperity, peace and global security.⁵

In 2017 BRICS joint contribution to the world economy was 23.6 per cent and according to the International Monetary Fund (IMF) predictions this is set to rise to 26.8 per cent by 2022.⁶

2. LITERATURE REVIEW

¹ Wilson D. & Purushothaman R., *Global economics paper no. 99: Dreaming with BRICs: The path to 2050*, 2003, <https://www.goldmansachs.com/insights/archive/archive-pdfs/brics-dream.pdf>, access date 17.10.2018.

² Ibidem., p. 1.

³ China Daily, http://www.chinadaily.com.cn/world/2017brics/2017-08/31/content_31369213_3.htm, access date 19.10.2018.

⁴ Brief history of BRICS, <http://brics.itamaraty.gov.br/about-brics/information-about-brics>, access date 27.06.2018.

⁵ BRICS Journal Outcomes of 10th BRICS Summit, <http://bricsjournal.com/10th-brics-summit-outcomes/>, access date 19.10.2018.

⁶ Deutsche Welle BRICS 2018: South Africa sets the pace, <https://www.dw.com/en/brics-2018-south-africa-sets-the-pace/a-41996771>, access date 27.06.2018.

The formation and activities of BRICS are primarily studied from a political stand point. BRICS members are seen as rising powers and global change in multilateral institutions. The discussion revolves around unipolar world and power transition.⁷

The economic papers on the BRICS are written about trade potential, capital flows, competitiveness, development policy, institutions and economic growth.⁸ The topic of FDI is studied in papers by Mathur and Dasgupta with a focus on FDI flows between BRICS countries alongside trade and by Mlachila and Takebe with an emphasis of FDI flows from BRICS to low income countries (development).⁹ There are no studies, which are focused on FDI inflows to BRICS countries and their determinants thus the paper establishes a framework and discussion for such studies.¹⁰

This paper adopts gravity model approach to explain FDI inflows to the BRICS economies as it uses Gross Domestic Product and trade volumes as core estimates.¹¹

3. AN OVERVIEW OF BRICS ECONOMIES

As of 2017 **Brazil** is the world's 8th economy with the nominal GDP of about US\$ 2.055 trillion. After almost a decade of strong growth (2002-2013), Brazil entered into the worst recession in its history in 2015 (-3.8 per cent of GDP) and 2016 (-3.6 per cent). This economic crisis was due to the fall of commodities price and a drop in consumption and in investment. In 2017, the economy recovered and GDP recorded a 0.7 per cent progression. Budgetary adjustment and favorable economic conditions have fostered the recovery. In 2018 the Brazilian economy should confirm its rebound with an expected growth of 1.5 per cent.¹²

⁷ Sperlich Y., *A review of the BRICS literature*, Geneva School of Economics and Management, 2016.

⁸ Ibidem, p. 2.

⁹ Mathur S. & Dasgupta M., *BRICS: Trade policies, institution and areas of deepening cooperation*, Centre for WTO studies Working paper, 2013; Mlachila M. & Takebe M., *FDI from BRICS to LICs: Emerging growth driver?*, IMF Working paper WP/11/178, 2011.

¹⁰ Sperlich Y., op. cit. p. 2.

¹¹ Anderson J., *A Theoretical Foundation for the Gravity Equation*, American Economic Review 1979, vol. 69; Tinbergen J., *An analysis of world trade flows. Shaping the world economy*, Twentieth Century Fund, New York, 1962 p. 20–42

¹² United Nations World Economic Situation Prospects 2018, https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/publication/WESP2018_Full_Web-1.pdf, access date 29.10.2018.

The economy is largely dominated by services sector, accounting for 72.8 per cent, then industry with 21 per cent and agriculture contributing just 6.2 per cent. Main export commodities are: transport equipment, iron ore, coffee, automobiles and footwear, while imports are: machinery, electrical equipment, chemicals and oil. Important trading partners of Brazil are China, United States, Argentina and the European Union. Brazil mostly maintains a mostly negative trade balance and has a relatively low economic openness index of just 24.69 per cent.¹³

There have been negative effects on the economy due to multiple corruption scandals involving private companies and government officials, including the impeachment and conviction of Former President Dilma Rousseff in August 2016. As well as economic sanctions against the firms involved — some of the largest in Brazil — have limited their business opportunities, producing a ripple effect on associated businesses and contractors but creating opportunities for foreign companies to step into what had been a closed market, which may explain the sudden increase in FDI inflows into the economy.¹⁴

According to the World Bank Policy Report Brazil's economy faces three core challenges in achieving sustainable economic growth:¹⁵

- public debt crisis (currently estimated at 74 per cent of country's GDP and expected to double in the next five years),
- absence of labor force productivity growth,
- inability of state to deliver basic public services in the areas of education, health and sanitation despite the large size of the economy.

Russia is classified as a transitional economy by the United Nations 2018 World Economic Situation and Prospects report with a GDP of about US\$ 1,577 trillion, which makes it 11th largest economy in the world.¹⁶ The economy has been in a slowdown after 2008 and averaged an annual growth of 1.85 per cent. A combination of falling oil prices, international sanctions, and structural limitations pushed Russia into a deep recession in 2015, with GDP falling by close to 2.8 per cent. The downturn continued through 2016, with GDP contracting another 0.2 per cent, but was reversed in 2017 as world

¹³ CIA World Factbook Brazil, <https://www.cia.gov/library/publications/the-world-factbook/geos/br.html>, access date 29.10.2018.

¹⁴ Ibidem, p.3.

¹⁵ World Bank Policy Notes for Brazil 2018, <http://pubdocs.worldbank.org/en/642051536712359805/Overview-Towards-a-Fair-Adjustment-and-Inclusive-Growth.pdf>, access date 29.10.2018.

¹⁶ United Nations World Economic Situation Prospects 2018, op. cit., p. 3.

demand picked up. Government support for import substitution has increased recently in an effort to diversify the economy away from extractive industries.¹⁷

Russia has undergone significant changes since the collapse of the Soviet Union, moving from a centrally planned economy towards a more market-based system. Today Russia is one of the world's leading producers of oil and natural gas, and is also a top exporter of metals such as steel and primary aluminum. As a result, Russia is heavily dependent on the movement of world commodity prices as reliance on commodity exports makes it vulnerable to boom and bust cycles that follow the volatile swings in global commodity market prices.

Russia's runs a positive trade balance and has an economic openness index of 48.63 per cent. Main exports include: natural gas, petroleum products, metals, wood and chemicals, while imports are: machinery, vehicles, meat, fruits and medical instruments. Russia's trading partners are China, the European Union, Belarus and Turkey.¹⁸

The lack of transparency, insufficient accountability, and consequent spread of corruption has often been identified as important self-reinforcing sources of Russia's woes. As a result, the economy continues to be looked upon as governed by nontransparent rules and unattractive to foreign investment.¹⁹

Key economic challenges are:²⁰

- resource dependence,
- real income growth,
- regional development,
- impact of the Western sanctions on the economy.

At the moment **India** is the world's 6th economy with the nominal GDP of around US\$ 2.611 trillion. Past decade the economy has been constantly growing with an average of 7.29 per cent with just few slowdowns. The slowdowns were mainly caused by investment slowdown,

¹⁷ CIA Factbook Russia, <https://www.cia.gov/library/publications/the-world-factbook/geos/rs.html>, access date 30.10.2018.

¹⁸ Ibidem, p.4.

¹⁹ Ledeneva A., *How Russia Really Works: The Informal Practices that Shaped Post-Soviet Politics and Business*, Cornell University Press, 2006.

²⁰ Financial Times, *Russia's economy: challenges facing Vladimir Putin*, <https://www.ft.com/content/3aac3faa-1bb6-11e8-aaca-4574d7dabfb6>, access date 30.10.2018.

rising inflation and high interest rates as well as a sharp depreciation of the rupee (INR) through 2016.²¹

India's economy consists of traditional village farming, modern agriculture, handicrafts, a wide range of modern industries, and a multitude of services. About a half of the workforce is employed in agriculture, but services are the major source of economic growth, accounting for nearly two-thirds of India's output but employing less than one-third of its labor force. India has capitalized on its large educated English-speaking population to become a major exporter of information technology services, business outsourcing services, and software workers.²²

India keeps a strong negative trade balance and has a relatively high economic openness index of 48.5 per cent. Main exports are: petroleum products, machinery, chemicals, iron and steel, while main imports are: crude oil, machinery, plastics, chemicals and precious stones. Important trade partners are United States, China, United Arab Emirates and Saudi Arabia.²³

Country's economy main challenges are:²⁴

- uneven economic development, including low level of national and per capita income,
- human capital development, ranging from education to female labor participation,
- dominance of agriculture in the economy,
- underdeveloped infrastructure capacities in areas such as home utilities, highways, railways and sea ports.

Currently **China's** economy is ranked 1st by the purchasing power parity estimate of GDP of US\$ 22.16 trillion and 2nd by the nominal GDP of US\$ 12.01 trillion, such large discrepancy is caused by the exchange rate between renminbi (CNY) and the US dollar (USD), which leads to the underestimation of the actual level of China's output *vis-a-vis* the rest of the world. In the past decade Chinese economy annual growth averaged at about 8.8 per cent, although the growth has gradually slowed.²⁵

China is a world leader in agricultural output with a variety of products like rice, wheat, potatoes, corn, tobacco, peanuts, tea, apples, cotton,

²¹ World Bank Data Base, <http://databank.worldbank.org/data/home.aspx>, access date 29.10.2018

²² CIA Factbook India, <https://www.cia.gov/library/publications/the-world-factbook/geos/in.html>, access date 29.10.2018.

²³ Ibidem, p.4.

²⁴ World Bank Overview of India, <https://www.worldbank.org/en/country/india/overview>, access date 29.10.2018.

²⁵ CIA Factbook China, <https://www.cia.gov/library/publications/the-world-factbook/geos/ch.html>, access date 29.10.2018.

and pork as well as industrial output in mining and metal processing, machine building, armaments, textiles and apparel, chemicals and consumer products. Country's economy is in the process of transition from industry dominated to service dominated.²⁶

Chinese economy runs a strong positive trade balance and has an economic openness index of 47.04 per cent. Main exports include: electrical machinery, telecommunications equipment, apparel, furniture and textiles, while imports are computer components, oil, gas, medical equipment and motor vehicles. China's main trade partners are United States, Honk Kong, Japan and the European Union.²⁷

China's main economy challenges include:²⁸

- income inequalities in urban vs. rural areas,
- environmental pollution,
- regional divergence and regional balance.

In 2017 **South Africa** was ranked 33rd by the nominal GDP of US\$ 349.29 billion and is the leading African economy. In the past decade the country's economy has been in constant slowdown and averaged 2.09 per cent annual growth. The economy has been heavily impacted by the fall of raw materials prices, a decline in Chinese demand and bad harvests.²⁹

South Africa is the world's largest producer and exporter of gold, platinum, chrome, magnesium and the fourth largest producer of diamonds. It produces 80 per cent of the world's platinum and has 60 per cent of the world's coal reserves. The services sector employs over 70 per cent of the workforce and in 2017 it represented 61.5 per cent of the country's GDP. The economy has a sophisticated financial structure with an active stock exchange that ranks among the world's top 20 in terms of market capitalization.³⁰

The economy's trade balance is often negative with small discrepancies, while the economic openness index is relatively high with 61.66 per cent. Main exports include: gold, diamonds, platinum, machinery and equipment, whilst main imports are: petroleum, foodstuffs, chemicals

²⁶ Ibidem, p. 4.

²⁷ China World Bank Overview, <https://www.worldbank.org/en/country/china/overview>, access date 29.10.2018.

²⁸ Fan S, Kanbur R., Wei S., Zhang X., *The Economics of China: Successes and Challenges*, National Bureau of Economic Research Working Paper, 2013.

²⁹ CIA Factbook South Africa, <https://www.cia.gov/library/publications/the-world-factbook/geos/sf.html>, access date 29.10.2018.

³⁰ Nordea, South Africa: Economic and Political Overview, <https://www.nordeatrade.com/fi/explore-new-market/south-africa/economical-context>, access date 29.10.2018.

and machinery. South Africa's main trade partners are China, United States and the European Union.³¹

Country's main economic challenges are:³²

- income inequality,
- human capital development, including educational attainment,
- unemployment (currently is at about 26 per cent)
- public debt (estimated at 52.7 per cent of GDP)

4. MODEL SPECIFICATION AND ESTIMATION

Based on the literature review, there is no unanimous conclusion as to which variable has the most significant and positive impact on FDI inflows and paper's goal is to determine the most important factor that attracts FDI into BRICS economies, the following model is employed:

$$Y_{FDI(inflows)} = B_0 + B_1GDP + B_2Import + B_3Export + B_4Economic_Openness + B_5Trade_Balance + e_t \quad (1),$$

where:

- $Y_{FDI(inflows)}$ - is the value of aggregate average of FDI inflows
- GDP – is the value of Gross Domestic Product (in current US dollars),
- Import - is the value of all goods and services imported (in current US dollars),
- Export – is the value of all goods and services exported (in current US dollars),
- Economic_openness - is the index, which adds imports and exports in goods and services and divides this sum by GDP. Measures country's exposure to international trade,
- Trade_Balance – is a dummy variable, which takes value 1 – when trade balance is positive and 0 when negative,
- e_t - is a random error (unexplained data).

The model is based on time series and estimated separately for each BRICS economy. Table 1 features description of Variables used in the model (1).

³¹ CIA Factbook South Africa, op. cit., p. 4.

³² BBC South Africa: the economic challenge, <https://www.bbc.com/news/uk-43073781>, access date 29.10.2018.

Table 1: Description of Variables used in the Analysis (2007-2017)

Variable Name	Description	Source
FDI	FDI inflows in US billion	World Bank Data Bank
GDP	GDP in US billion	World Bank Data Bank
Import	Value of all goods and services imported in US billion	World Trade Organization Data Base
Export	Value of all goods and services exported in US billion	World Trade Organization Data Base
Economic openness	Own elaboration based on values of GDP, Import and Export, measured in percentage points	World Bank Data Bank
Trade Balance	Own elaboration, based on values of Import and Export, measured in 0 or 1	World Bank Data Bank

The results of model (1) estimation are presented in table 2, “*” indicates the statistical significance of a variable, where “*” is significance at below 10 per cent and “**” is significance at below 5 per cent.

Table 2: Estimation of model (1) for BRICS countries

Variables/ Country	Brazil	Russia	India	China	South Africa
GDP	+0.66 **	+0.21 *	+0.10 *	-0.06 **	+0.57
Import	-2.94 *	-0.59	-0.18	+0.32	-2.33
Export	-2.15 *	-0.10	-0.27	+0.08	+0.43
Economic Openness	+4801.15 **	+1249 *	+400.86	-610	+308.63 *
Trade Balance	+21.28	0	0	0	+9.61
R-squared ³³	86.6 %	44.02 %	55.6 %	82.9 %	57.49 %

Source: Own elaboration, based on World Bank data, <http://databank.worldbank.org/data/home.aspx>, access date 01.04.2018

Table 2 results can be interpreted:

- The model does well in explaining FDI inflows into the economy of Brazil with 86.6 per cent of data variation being explained by the model and four out of five variables having statistical significance. In case of Brazil three major contributors to a positive FDI dynamic are GDP, economic openness index and trade balance. On contrary, it

³³ R-squared is a statistical measure that represents the proportion of the variance for a dependent variable that is explained by independent variables.

possible to conclude that in case of Brazil both import and export decrease FDI inflows into the economy.

- The model offers little in describing FDI inflows into Russia with 44.02 per cent of data variation being explained and two variables having statistical significance. In case of Russia two major contributors to a positive FDI dynamic are GDP and economic openness index. On the other hand, both import and export decrease FDI inflows into the economy of Russia.
- The results are mediocre in interpreting FDI inflows into India with 55.6 per cent of data variation being explained and just one variable having statistical significance. In case of India two major contributors to a positive FDI dynamic are GDP and economic openness index, while both import and export decrease FDI inflows into the economy of India.
- The model does satisfactory in explaining FDI inflows into China with 82.9 per cent of data variation being explained and one variable having statistical significance. In case of China two major contributors to a positive FDI dynamic are import and export values, while economic openness and GDP negatively contribute to FDI inflows into Chinese economy.
- Lastly, model does mediocre in explaining FDI inflows into South Africa with 57.49 per cent of data variation being explained and one variable having statistical significance. In case of South Africa four major contributors to a positive FDI dynamic are GDP, economic openness index, export and trade balance. On the other hand, import negatively contributes to FDI inflows into the economy of South Africa.

CONCLUSION

To sum up, this paper research concludes that considering both scope and framework of the study there are multiple factors that significantly influence FDI inflows to the economies of BRICS countries. Firstly, based on the estimation, the biggest contributor to the FDI inflows is an index of economic openness, such argument is well-aligned with the theoretical framework of FDI, where decreasing barriers for trade and investment increase country's exposure to the global economy, which in return has a significant effect on FDI inflows to the economy. Secondly, in majority of

cases change in both import and export values tend to negatively affect FDI inflows, such phenomenon does not necessarily mean that country must not engage in trade, but that the impact of those factors is inconsistent and has to be researched further. Thirdly, GDP contribution confirms the gravity model hypothesis as larger economies tend to attract larger volumes of FDI inflows, however in case of China this effect seems to be reversed. Lastly, the effect of trade balance on FDI inflows remains complex to capture, however a dummy variable method applied in this paper can be applied to countries that have both positive and negative trade balance dynamic.

Possible extensions of the research would be to include inflation, public debt levels, real exchange rate of domestic currency as well as country-wide indexes such as doing business, corruption perception index and intra-trade volumes.

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SUMMARY

In 2003 Goldman Sachs published a report written by Wilson and Purushothaman entitled Global Economics Paper No. 99: Dreaming With BRICs: The Path to 2050, which central idea is that over the next 50 years, Brazil, Russia, India and China could become a much larger force in the world economy, even larger than the current G7 economies in US dollar terms.

In 2017 BRICS joint contribution to the world economy was 23.6 per cent and according to the International Monetary Fund (IMF) predictions this is set to rise to 26.8 per cent by 2022.

Based on the used estimation, the biggest contributor to the FDI inflows is an index of economic openness, where decreasing barriers for trade and investment increase country's exposure to the global economy, which in return has a significant effect in attracting FDI to the economy. Secondly, in majority of cases change in both import and export values tend to negatively affect FDI inflows, such phenomenon does not necessarily mean that country must not engage and liberalize its trade policy, but that the impact of those factors is inconsistent and has to be researched further. Thirdly, GDP contribution confirms the gravity model hypothesis as larger economies tend to attract larger volumes of FDI inflows, however in case of China this effect seems to be slightly reversed. Lastly, the effect of trade balance on FDI inflows remains complex to capture, however a dummy variable method applied in this paper can be applied to countries that have both positive and negative trade balance dynamic.

PODSUMOWANIE

W 2003 roku Goldman Sachs opublikował raport napisany przez Wilsona i Purushothamana zatytułowany "Global Economics Paper No. 99: Dreaming With BRICs: The Path to 2050, którego główną ideą jest to, że w ciągu następnych 50 lat Brazylia, Rosja, Indie i Chiny mogą stać się znacznie większa siła w światowej gospodarce, nawet większa niż obecne gospodarki G7 w ujęciu dolarowym.

W 2017 r. Wspólny wkład BRICS w gospodarkę światową wyniósł 23,6%, a według prognoz Międzynarodowego Funduszu Walutowego (MFW) do 2022 r. Ma wzrosnąć do 26,8%.

Na podstawie wykorzystanych szacunków największy udział w napływie BIZ stanowi wskaźnik otwartości gospodarczej, gdzie malejące bariery w handlu i inwestycjach zwiększają ekspozycję kraju na globalną gospodarkę, co z kolei ma znaczący wpływ na przyciąganie bezpośrednich inwestycji zagranicznych do gospodarki. Po drugie, w większości przypadków zmiana zarówno wartości importu, jak i eksportu wpływa negatywnie na napływ BIZ, zjawisko to niekoniecznie oznacza, że kraj nie może angażować się i liberalizować swojej polityki handlowej, ale że wpływ tych czynników jest niespójny i musi być zbadanym dalej. Po trzecie, wkład PKB potwierdza hipotezę modelu grawitacji, ponieważ większe gospodarki mają tendencję do przyciągania większych wolumenów napływów BIZ, jednak w przypadku Chin efekt ten wydaje się być nieco odwrotny. Wreszcie, wpływ salda handlowego na napływ BIZ jest nadal trudny do uchwycenia, jednak zastosowana w niniejszym dokumencie metoda zmiennej fikcyjnej może być stosowana do krajów, które mają zarówno dodatnią, jak i ujemną dynamikę bilansu handlowego.