FDI DETERMINANTS IN BRICS

Sebastian-Andrei LABES\textsuperscript{*}

Abstract: In the past two decades the volume of Foreign Direct Investments increased substantially becoming a phenomenon that characterizes the economic environment in the emerging markets. The aim of this working paper is to investigate the Foreign Direct Investments Inflows in the BRICS economies. The research study employs a Panel Data analysis on a sample of 5 countries, the BRICS economies Brazil, Russia, India, China and South Africa and a time series from 1992-2012. The variables taken in consideration are Trade Openness, GDP per capita, Population, Exchange Rate and Human Capital. Our results indicate that the most significant determinants of FDI Inflows are Trade Openness, GDP per capita and Exchange Rate. The value of this work is that it investigates the factors that contribute to the increase of FDI inflows towards the most important emerging economies in the world.

Keywords: FDI; BRICS; emerging economies

JEL Classification: F21; O16; P45

Introduction

In 2001 Jim O’Neill, Goldman Sachs economist coined the term BRIC in a paper titled ‘Building Better Global Economic BRICs’, in order to define the flagship nations of the emerging economies – Brazil, Russia, India and China. With its first Summit held in June 2009 in Yekaterinburg, BRICS is the first coalition that prefigured „in the mind of the economists”, and only subsequently turned into „reality” (Oehler-Sincai, 2011). Although the same research institute warned in another paper 4 years later ‘How solid are the BRIC’s’ about the major distinction that has to be made between potential and reality the BRIC’s fired economists imagination. In December 2010 South Africa was invited to join the club in order to confer it a worldwide perspective and legitimacy. The term BRICS is no longer just a catchphrase coined around trade and international relations, it is a reality and it exists as a transcontinental foreign-policy actor.

Taken as a trans-continental group the BRICS nations do matter in terms of population, land surface, and economies their sizes are impressive. Together the BRICS represent 40% of world’s population, 25% of land surface and approximately 25% of world’s GDP (van Agtamael, 2012). The BRICS turned out to be an important aspect of the modern globalized era and what distinguishes them from any other story of Emerging Markets (EM) growth is their ability to influence and to be influenced by the global economy and the global markets. (O’Neill, Wilson, Purushothaman, Stupnytska, 2005). Between 2000 and 2005 the 4 large BRIC’s contributed to 28% of global growth in US dollars and 55% in PPP (Purchasing Power Parity) and their share in global trade rose to 15%.

\textsuperscript{*} PhD Fellow SOP HRD/159/1.5/133675 Romanian Academy, Iasi Branch, PhD candidate Doctoral School of Economics and Business Administration Iasi, e-mail: labes_sebastian@yahoo.com
in 2010 from 3.6% two decades ago. (see in annexes Figure 1 Trend in BRICS share in global trade (%), 1990–2010)

The BRICS growing importance for the world economy is reflected by various economic and demographic indicators. These include, but are not limited to, their increasing share in world GDP; GDP per capita; total investment as percentage of GDP; share in world trade; trade openness and their foreign direct investment (FDI) inflows and outflows. (see in annexes Table 1 Overview of BRICS, 1992 vs. 2012) The BRICS countries have been the predominant recipients of FDI during the last decades. However, the evolution of FDI inflows and outflows shows very distinct trajectories for the five countries (see in annexes Figure 2. FDI Inflows BRICS, 1992 – 2012 and Figure 3. FDI Outflows BRICS vs. Selected Economies, 1992 - 2012).

“Until 1984, Brazil was the major FDI recipient country among the BRICSs, overtaken by China in 1985 and since then China continues to be a major destiny of FDI, especially in the automotive and consumer durables sectors. China became the world major recipient of FDI in the 1990s, matching with country’s efforts to integrate with the world economy. South Africa and India received an almost constant and small part of the world total FDI flows during last two decades. India has many restrictions to FDI inflows, where, public enterprises dominate in many key sectors. Equally, the low and constant inflow applies to the Russian Federation since 1990”. (Vijayakumar, Sridharan, Rao, 2010, p. 3)

In Figure 4 - FDI inflows and their share in global FDI inflows, 1998-2012 we can clearly see that FDI inflows towards the BRICS economies tripled over the past decade (see annexes). Between 2003 and 2008 the nominal growth was from 77 billion US dollars to 281billion US dollars. Not even during the crisis the FDI flows did not decreased too much – only 30% compared with 40% for developed countries. Almost half of the total FDI inflows go to China and a quarter to Brazil.

Figure 5 - FDI outflows and their share in global FDI outflows, 1998-2012 show that the role of BRICS as investors in the world’s economy increased significantly (see annexes). In 2012 BRICS accounted for 9% of world outflows but ten years before that share was only 1%. “BRICS investors also remained resilient to the crisis, with outflows dropping by only 26% in 2009, compared to 41% for the world as a whole.” (UNCTAD, 2014)

The following paper is divided into 4 sections: Literature review, Data & methodology, Results, Summary and concluding remarks.
1. Literature review

Foreign direct Investment (FDI) is an increasing phenomenon. During the 1980’s and 1990’s it has grown significantly faster than trade flows, and the estimation is that over 30% of world trade is due to multinational firms that transfer goods between them, which is all part of FDI. Main causes for this trend were on the one hand the reaction of multinational corporations to regulations and trade barriers and on the other hand the preservation of intellectual property that makes self-production more profitable than licensing agreements.

As shown in the introduction the volume of FDIs in the past decade has increased substantially and as any other type of capital flows (portfolio investments, international loans) can be measured by flows at a given point in time or by stocks accumulated over time. Capital inflows are net purchases of domestic assets by foreign residents, whereas capital outflows are net purchases of foreign assets by domestic residents. A country’s exposure to international capital flows can be measured either by its government’s policies (restrictions or incentives vis-à-vis capital flows) or by the actual amount of capital movement (scaled by the size of the recipient economy).

International capital flows have the potential to bring a variety of benefits to recipient countries. In theory, financial globalization could raise a country’s economic growth rate through a number of direct and indirect channels. The direct channels include (a) augmenting domestic savings, (b) reducing the cost of capital through better allocation of risks (Henry, 2000; and Stulz, 1999), (c) transferring technology and managerial know-how (Grossman and Helpman, 1991), and (d) stimulating development of the domestic financial sector (Levine, 1996 and 2005). The indirect channels include (a) promoting specialization (Brainard and Cooper, 1968; and Imbs and Wacziang, 2003), and (b) committing to better economic policies (Gourinchas and Jeanne, 2004; Tytell and Wei, 2004).

The theoretical literature on FDI focuses on two broad categories: the factors that determine the patterns of worldwide FDI and the impact that FDI and MNEs have on the parent and host countries, including economic growth, returns to factors of production, and externalities for innovative activity. (Bloningen, 2008) The most common methods of FDI are through acquisition of a firm, construction of a plant (Greenfield FDI), partnership in joint-venture or earnings reinvested in an existing foreign affiliate. Firms with affiliates in more than one country are termed ‘multinational enterprises’ (MNEs).

The empirical literature can also be divided into two types: country level analyses, where the sample contains macro level data by country; and firm level analyses, in which the sample contains
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micro level data from firms in a single country. In general country level estimations of FDI effects on growth are positive while most of the firm level gets to controversial results.

The role of FDI seems to be country-based and can be positive/negative/insignificant depending on the economic, institutional and technological conditions in the recipient economy. In Xu (2000) developed countries are expected to have a higher level of human capital and hence to benefit more from FDI than developing countries.

Durham (1994) finds that the effects of FDI are contingent on the absorptive capability of host countries. Related to the absorptive ability Borensztein (1998) conclude that differences in the technological absorptive ability may explain the variation in growth effects of FDI across countries. The level of human capital determines the ability to adopt foreign technology. Larger endowments of human capital are assumed to induce higher growth rates given the amount of FDI therefore a minimum threshold sock of human capital is required for stronger effects.

GDP and GDP per capita are most commonly used as major determinant for FDI flows between two countries. This is due to the fact that FDI is strongly influenced by the size of the markets of the partner countries because FDI flows tend to gravitate towards larger economies. Kinoshita and Campos (2003)

Moreover Olofsdotter (1998) concludes that beneficiary effects of FDI are stronger in those with a higher level of institutional capability stressing the importance of bureaucratic efficiency. However Bende-Nabende (2003) in a comparative study on East Asian countries concludes that the direct long-termed impact of FDI on output is significant and positive for comparative economically less advanced Philippines and Thailand, but negative in the more economically advanced Japan and Taiwan even though the absorptive abilities of Philippines and Thailand are lower than those of Japan or Taiwan. Zhang (1995) investigates the causation in 10 East Asian economies and finds that FDI appears to enhance Economic Growth in the long run for mainland China, Hong-Kong, Indonesia, Japan, Taiwan and on the short run for Singapore. Sjoholm (1999) stresses the importance of the technology gap between domestic and foreign establishments in which the larger the technology gap the greater the productivity spillovers. In Balasubramanyam et al. (1996) FDI is seen as a composite bundle of capital stock, know-how and technology that augment labor training, skill acquisition, alternative management and organizational arrangements. Blonstrom (1996) finds positive growth effects of FDI using FDI inflows in a developing country as a measure of its interchange with other countries. According to Balasubramanyam et al. (1996) FDI is more important for economic growth in export-promoting than in import-substituting countries in a matter that that the impact of FDI varies across countries and that trade policy can affect the role played by FDI in economic growth. In an
UNCTAD report (1999) FDI’s impact on economic growth can be perceived both negative and positive depending on the variables used in the proposed equation of the model (GDP per capita, education attainment, domestic investment ratio, political instability, terms of trade, block market premium, state of financial development, etc.). Bengoa and Sanchez–Robles (2003) find a positive correlation between FDI and economic growth but host countries require Human capital, Economic Stability and liberalized markets in order to have a long-term benefit from the FDI inflows.

2. Data & methodology

For our analysis we are taking into consideration FDI inflows for the 5 BRICS economies – Brazil, Russian Federation, China, India and South Africa from 1992 – 2012. The dependent variable in our study is the FDI inflows in current US dollars (FDI inflows i,t) and the independent variables that are expected to determine FDI flows are carefully chosen, based on previous literature and availability of dataset for the selected period. All data is compiled from the World Bank database and UNCTADstat database in current US dollars. The set of independent variables are expected to capture the main economic characteristics of the target country.

The econometric specification is written as the following presented in Equation 1:

\[
\text{FDI inflows}_{i,t} = \alpha_0 + \alpha_1 (\text{GDP per capita}_{i,t}) + \alpha_2 (\text{HK}_{i,t}) + \alpha_3 (\text{PoP}_{i,t}) + \alpha_4 (\text{TO}_{i,t}) + \alpha_5 (\text{X}_{i,t}) + \mu_{i,t} + \varepsilon_{i,t}
\]  

Where: we analyze the influence of the parameters that we find in the literature as determinants of FDI. GDP per capita consists of data take from World Bank and is in current millions of US dollars. HK is the variable expressing the Human Capital as education attainment taken from Barro-Lee dataset for total population aged 25 expressed as percentage of total population aged 25 and over that have completed secondary level of education. PoP is an indicator that refers to total population expressed in millions data taken from World Development Indicators, World Bank. TO is an indicator of trade openness expressed as a sum of exports and imports calculated for trade in goods, trade in services and total trade in goods and services, data is in millions of US dollars taken from UNCTADstat. For Russian Federation data is available only for period from 1994-2012. Finally, X is an indicator to grasp country's international competitiveness in terms of its foreign exchange rates that cannot be understood by examining only individual exchange rates between the country's currency and other currencies. It is expressed as Real Effective Exchange Rate. The term ‘effective’ means that exchange rate changes are not measured against one particular currency, but instead use
an average index (Consumer Price Index) of a whole basket of currencies, each weighted according to the issuing countries’ respective importance as a trade partner. \( \mu_{i,t} \) represents the between-entity error and \( \varepsilon_{i,t} \) within-entity error. Random effects assume that the entity’s error term is not correlated with the predictors which allows for time-invariant variables to play a role as explanatory variables. Data is taken from UNCTADstat available for all the countries in the study except Russian Federation. Data is processed using Stata11 software package.

3. Results

The descriptive statistics and correlation results for the selected variables for BRICS countries are given in Table 2 and Table 3 respectively (see annexes). All the variables in the estimation are having 105 observations. The trade openness has highest mean and standard deviation of 488023.5 and 766319.8 respectively in the data distribution. The independent variable \( FDI \) inflows is highly correlated with GDP per capita, Population, and trade openness. The variable Population is highly correlated with GDP per capita, Exchange Rate and trade openness. The existence of high correlation among the independent variables will lead to the problem of multicollinearity in the estimation. Still we consider these variables because of advantageousness of the panel data estimation which takes care of the collinearity problems.

Regarding stationarity we check for each variable whether we have a stationary/unstationary series using the ADF test. The results for each variable are presented in Table 4 (see annexes). In order to work with stationary series we estimate equation (1) using the log function into equation (2):

\[
dl_{FDI \text{inflows}}_{i,t} = \alpha_0 + \alpha_1 d(GDP\text{per capita}_{i,t}) + \alpha_2 d(HK_{i,t}) + \alpha_3 d(PoP_{i,t}) + \alpha_4 d(TO_{i,t}) + \alpha_5 d(X_{i,t}) + \mu_{i,t} + \varepsilon_{i,t}
\]

(2)

We estimate Panel data analysis including OLS pooled regression (Common constant method), testing fixed effects method and random effects method for the selected study period. The robustness of parameter coefficients are used to explain the relationship between FDI inflows and the selected independent variables. Since, the results of OLS pooled regression, the Random effects parameter coefficients sign and their significance levels are almost similar, we choose to check the robustness with the Hausman Test (see annexes). To decide between fixed or random effects we ran a Hausman test where the null hypothesis is that the preferred model is random effects vs. the alternative the fixed
effects (Green, 2008). The chi2 probability is higher than the expected 0.05 value so we decide to use
the random effects method.

The R square coefficient is 0.9333 meaning that 93% of the variation in the dependent variable
it is explained by the independent variables of the model. Table 5 in annexes is showing the results
of Random effects model and confirms the significance of GDP per capita, trade openness and
Exchange rate. The co-efficient signs for each of these variables are as expected, positive for GDP
per capita, trade openness and Exchange rate.

4. Summary and concluding remarks

In recent days, BRICS – the fast developing economies of the world having larger market
potentials are expected to attract larger inflow of FDI. However, the factors attracting the FDI inflows
towards these countries are relatively less researched. This study made an attempt to identify the
factors determining the FDI inflows of BRICS countries from the period 1992 to 2012. The
determinant factors include: GDP per capita, Population, Human Capita, Exchange Rate and Trade
Openness. The study finds that Trade openness (measured by the ratio of total trade to GDP), GDP
per capita (often considered an indicator of a country's standard of living) and Exchange Rate (a
measure of country's international competitiveness in terms of its foreign exchange rates) seem to be
the potential determinants of FDI inflows in BRICS countries. The empirical results are robust in
general for alternative variables determining FDI flows.

The empirical analysis has some policy implications towards the improvement of investment
climate to attract higher FDI inflows into BRICS countries. Therefore, it is an important object to
maintain the stability of the currency of the host country to attract increased FDI. The benefit of trade
openness in terms of their impact on FDI is validated in this study. Thus, BRICS countries as
developing nations have to involve themselves in the path of economic reform and liberalization
activities. As expected, the significance of exchange rate seems to validate the study as the
determinant of FDI.

The overall significance of the model specified in this study would contribute to a greater
understanding of the FDI determinants in the emerging markets, as well as, the findings of this study
would also lay emphasis on the importance of liberalization and economic policy reforms.
Annexes

**Figure 1 - Trend in BRICS share in global trade (%), 1990–2010**

Source: UNCTAD, UNCTADstat data processed by author in Microsoft Excel 2010

**Figure 2 - FDI Inflows BRICS, 1992 – 2012**

Source: UNCTAD, UNCTADstat data processed by author in Microsoft Excel 2010

**Figure 3 - FDI Outflows BRICS vs. selected economies, 1992 – 2012**

Source: UNCTAD, UNCTADstat data processed by author in Microsoft Excel 2010
Table 1 - Overview of BRICS, 1992 vs. 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>GDP, Current prices ($ bn)</th>
<th>GDP Per capita ($)</th>
<th>GDP (ppp bn)</th>
<th>Share in world GDP (%)</th>
<th>Total investment (% of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BRAZIL</td>
<td>390</td>
<td>2,253</td>
<td>2,529</td>
<td>11,358</td>
<td>838</td>
</tr>
<tr>
<td>RUSSIA</td>
<td>85</td>
<td>2,029</td>
<td>575</td>
<td>14,302</td>
<td>1,170</td>
</tr>
<tr>
<td>INDIA</td>
<td>293</td>
<td>1,841</td>
<td>333</td>
<td>1,500</td>
<td>861</td>
</tr>
<tr>
<td>CHINA</td>
<td>488</td>
<td>8,221</td>
<td>416</td>
<td>6,071</td>
<td>1,204</td>
</tr>
<tr>
<td>SOUTH AFRICA</td>
<td>130</td>
<td>384</td>
<td>3,389</td>
<td>7,525</td>
<td>206</td>
</tr>
</tbody>
</table>

Source: IMF, World Economic Outlook Database, October 2013

Figure 4 - FDI inflows and their share in global FDI inflows, 1998-2012

Source: UNCTAD, FDI/TNC database

Figure 5 - FDI outflows and their share in global FDI outflows, 1998-2012

Source: UNCTAD, FDI/TNC database
Table 2 - Summarize

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>fdi_inflows</td>
<td>105</td>
<td>30974.5</td>
<td>51110.6</td>
<td>-183</td>
<td>280072</td>
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<tr>
<td>humankapital</td>
<td>105</td>
<td>3.764952</td>
<td>9.309777</td>
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<td>40.32</td>
</tr>
<tr>
<td>gdppercapita</td>
<td>105</td>
<td>3609.856</td>
<td>3155.633</td>
<td>305.94</td>
<td>13860.91</td>
</tr>
<tr>
<td>population</td>
<td>105</td>
<td>5.43e+08</td>
<td>5.25e+08</td>
<td>3.67e+07</td>
<td>1.35e+09</td>
</tr>
<tr>
<td>tradeopenness</td>
<td>105</td>
<td>488023.5</td>
<td>766319.8</td>
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<td>4272634</td>
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<td>exchangerate</td>
<td>105</td>
<td>84.51429</td>
<td>45.00195</td>
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<td>158</td>
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</tbody>
</table>

Source: data processed by author in STATA 11

Table 3 - Pearson Correlation

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<th>fdi_inflows</th>
<th>humankapital</th>
<th>gdppercapita</th>
<th>population</th>
<th>tradeopenness</th>
<th>exchangerate</th>
</tr>
</thead>
<tbody>
<tr>
<td>fdi_inflows</td>
<td>1.0000</td>
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<td></td>
<td></td>
<td></td>
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<td>humankapital</td>
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<td>gdppercapita</td>
<td>0.2238*</td>
<td>0.0218</td>
<td>0.1085</td>
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<tr>
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<td>-0.0363</td>
<td>-0.5406*</td>
<td>0.0000</td>
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<tr>
<td>tradeopenness</td>
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<td>0.0000</td>
<td>0.1212</td>
<td>0.0869</td>
<td>0.4873*</td>
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<tr>
<td>exchangerate</td>
<td>0.1619</td>
<td>0.0988</td>
<td>-0.0648</td>
<td>0.2811</td>
<td>0.2888*</td>
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</tbody>
</table>

Source: data processed by author in STATA 11

Table 4 - ADF test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Level t-statistic</th>
<th>t-statistic</th>
<th>Prob.</th>
<th>t-statistic</th>
<th>Prob.</th>
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</thead>
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<td>FDI inflows</td>
<td>19.3530</td>
<td>26.9369</td>
<td>0.0360</td>
<td></td>
<td>0.0027</td>
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<tr>
<td>Exchange Rate</td>
<td>5.14316</td>
<td>40.6548</td>
<td>0.7422</td>
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<td>GDP per capita</td>
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<td>23.8743</td>
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<td>Human Capital</td>
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<td>0.14278</td>
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<td>0.0000</td>
</tr>
</tbody>
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Source: data processed by author in STATA 11

Table 5 - Panel Data Regression, Random Effects

<table>
<thead>
<tr>
<th>R-sq: within = 0.9205</th>
<th>between = 0.9723</th>
<th>overall = 0.9333</th>
<th>Obs per group: min = 21</th>
<th>avg = 21.0</th>
<th>max = 21</th>
</tr>
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<tbody>
<tr>
<td>Wald chi2(5) = 1384.33</td>
<td>Prob &gt; chi2 = 0.0000</td>
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<td></td>
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</tr>
<tr>
<td>Random effects u_i ~ Gaussian</td>
<td>Corr(u_i, x) = 0 (assumed)</td>
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<td></td>
<td></td>
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<tr>
<td>fdi_inflows</td>
<td>Coef.</td>
<td>Std. err.</td>
<td>Z</td>
<td>p&gt;</td>
<td>z</td>
</tr>
<tr>
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<td>--------------------</td>
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<td>--------</td>
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<td>population</td>
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<td>4.34e-06</td>
<td>1.08</td>
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<td>0.000</td>
<td>.0558463</td>
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<tr>
<td>Sigma_e</td>
<td>10871.278</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rho</td>
<td>0 (fraction of variance due to u_i)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: data processed by author in STATA 11
<table>
<thead>
<tr>
<th></th>
<th>(b)</th>
<th>(B)</th>
<th>(b-B) Difference</th>
<th>Sqrt(diag(V_b-V_B)) S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human capital</td>
<td>0.0193653</td>
<td>0.0321566</td>
<td>-0.0127913</td>
<td>0.0042975</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>0.0739573</td>
<td>0.0999224</td>
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<td>Population</td>
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<td>-0.880026</td>
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<tr>
<td>Trade openness</td>
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<td>0.9100932</td>
<td>0.0110408</td>
<td>0.0262347</td>
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<td>Exchange Rate</td>
<td>0.0633331</td>
<td>0.059612</td>
<td>0.0037211</td>
<td>0.0913538</td>
</tr>
</tbody>
</table>

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

\[ \text{chi2}(4) = (\text{b-B})' \cdot [(\text{V}_b-\text{V}_B)^{-1}] \cdot (\text{b-B}) \]

\[ = 37.70 \]

prob > chi2 = 0.157

Source: data processed by author in STATA 11

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**References**


