“Role of financial sector development in foreign direct investment inflows in BRICS”

AUTHORS	Kunofiwa Tsaurai

ARTICLE INFO	Kunofiwa Tsaurai (2022). Role of financial sector development in foreign direct investment inflows in BRICS. *Investment Management and Financial Innovations*, *19*(3), 215-228. doi:10.21511/imfi.19(3).2022.18
DOI	http://dx.doi.org/10.21511/imfi.19(3).2022.18
RELEASED ON	Monday, 05 September 2022
RECEIVED ON	Saturday, 18 June 2022
ACCEPTED ON	Thursday, 01 September 2022

JOURNAL	"Investment Management and Financial Innovations"
ISSN PRINT	1810-4967
ISSN ONLINE	1812-9358
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES	NUMBER OF FIGURES	NUMBER OF TABLES
48	2	8

BUSINESS PERSPECTIVES

LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine

www.businessperspectives.org

Kunofiwa Tsaurai (South Africa)

ROLE OF FINANCIAL SECTOR DEVELOPMENT IN FOREIGN DIRECT INVESTMENT INFLOWS IN BRICS

Abstract

This study examined the influence of financial sector development on FDI inflows in BRICS using panel data (1991–2020) analysis methods. The influence of the complementarity between the financial sector and human capital development on FDI inflows was also examined in the context of BRICS using the same data set and econometric methodologies. The advantage of this study is that the results are used as a basis by BRICS countries to develop financial sector development policies that attract significant FDI inflows. Financial sector development (model 2 and 3 of the pooled ordinary least squares approach) significantly enhanced FDI inflows. Human capital development (model 3 of the fully modified ordinary least squares) was found to have had a significant positive effect on FDI inflows in BRICS group of countries. The combination between financial and human capital development under (1) model 1 of the fully modified ordinary least squares and (2) models 2 and 3 of the pooled ordinary least squares (POLS) was observed to have significantly enhanced FDI inflows in BRICS. The study outlines the financial and human capital development recommendations that need to be implemented to facilitate more FDI inflows.

Keywords financial sector development, human capital, FDI inflows, panel data

JEL Classification C33, F21, G15, J24

Received on: 18th of June, 2022
Accepted on: 1st of August, 2022
Published on: 5th of September, 2022

Kunofiwa Tsaurai, Ph.D., Full Professor, Economic and Management Sciences Faculty, Finance, Risk Management and Banking Department, University of South Africa, South Africa.

Conflict of interest statement:
Author(s) reported no conflict of interest

INTRODUCTION

The positive impact of FDI inflows in the economy was espoused by early theorists such as Solow (1956), Swan (1956), Kumar and Pradhan (2002), Sanchez-Robles (2002), Calvo and Romer (1986), and Lucas (1988). The UNCTAD report (UNCTAD, 2012) also noted that one of the major sources of growth in developing nations has been FDI inflows. There is consensus in the literature that FDI inflow is good for economic growth. However, financial sector development enhanced FDI inflows' influence on economic growth (Seenivasan, 2014), a view which was supported by Asong (2014). Choong (2012) argued that financial sector development provides a pathway through which economic growth is enhanced by FDI inflows. It appears there is consensus in the literature that financial sector development is a bridge through which FDI inflows influence economic growth.

What is still contentious is the direct influence of financial sector development on FDI inflows. Several recent empirical studies were done on the influence of financial sector development on FDI inflows, namely Ozili et al. (2020), Pham et al. (2022), Kamasa et al. (2020), Adigwe et al. (2018), Sasmaz and Gumus (2018), Acquah and Ibrahim (2019), Keykanloo et al. (2020), Mishra and Mishra (2019), Shah (2016), Dellis (2018), Nkoa (2018), Veselinovic and Despotovic (2022), Gitanadya and Annisa (2018), Keykanloo et al. (2020), Bahri and Nor (2019), and

Ozili et al. (2020), among others. Majority of these empirical studies did not capture the fact that there are certain absorption capacities that are necessary before FDI inflows are enhanced by financial sector development. The data they used is now outdated. None of these existing empirical studies focused on BRICS. In other words, the story of the influence of financial sector development on FDI inflows in the BRICS countries is not yet told.

1. LITERATURE REVIEW

The economic efficiency, allocative channel and liquidity easing are the three rationales that describe the effect of financial sector development on the inflow of FDI (Ezeoha & Cattaneo, 2012). Proponents of economic efficiency, Bartels et al. (2009), noted that transaction costs and information flow problems are reduced by the developed financial system, hence attracting FDI inflows. Kaur et al. (2013), the supporters of the allocative channel theoretical rationale, noted that a developed financial system is an efficient resource allocator in the economy, thereby increasing the productivity of foreign capital. The liquidity easing theoretical rationale argued that a highly developed financial sector avails liquidity that enables quicker settlement and trading of financial assets. Foreign investors are normally attracted by such an environment.

Empirical studies that noted that financial sector development enhances FDI inflows are described as follows. Using the dynamic generalized method of moments (GMM), Tsaurai and Makina (2018) investigated the influence of banking and stock market development on transitional markets. They found out that higher banking sector and stock market development above levels of threshold enhanced significant FDI inflows in emerging economies.

Using Latin American countries as a focus of the study, Hajilee and Nasser (2015) employed the error correction model (ECM) to investigate the correlation between FDI inflows, stock market and banking sector development. Banking sector development enhanced FDI inflows, whilst FDI inflows and stock market development affected each other.

Kamasa et al. (2020) explored the effect of financial reforms on FDI inflows in Ghana using the autoregressive distributive lag (ARDL). The study noted that financial sector reforms had a significant enhancing effect on FDI inflows. Using the GMM methodology, Sghaier and Abida (2013) examined in North African countries whether a developed banking sector influenced FDI inflows. A developed banking sector was found to be a necessity in enabling FDI inflows to have an economic growth enhancing influence.

Chee and Nair (2010) used panel data analysis to examine the influence of financial sector development on FDI inflows in Asia and Oceania. Financial sector development was noted to have enhanced FDI inflows' positive influence on the economy. In 78 countries worldwide, Korgaonkar (2012) investigated the relationship between the strength of the financial system and FDI inflows using panel data analysis approach. The study noted that financially weak economies repel FDI inflows.

Using developed countries and emerging markets as a unit of analysis, Nor et al. (2013) employed panel data analysis to explore if there is any meaningful relationship between the quality of the banking sector and FDI inflows. The study observed that banking sector quality enhanced FDI inflows's positive influence on economic growth.

Veselinovic and Despotovic (2022) used Central and Eastern European countries as an area of focus to find out the relationship between FDI inflows and financial sector development. Panel causality tests (Dumitrescu-Hurlin) were employed for data analysis purposes. The study noted that FDI inflows were enhanced by a well-regulated financial system. In the case of ASEAN-6 countries, Gitanadya and Annisa (2018), using panel data analysis, investigated the interrelationship between FDI inflows and financial sector development. It was noted that the amount of FDI inflows to ASEAN countries had a positive impact on financial sector development levels.

http://dx.doi.org/10.21511/imfi.19(3).2022.18

Dellis (2018), using a GMM approach, estimated the linkage between financial sector development and FDI inflows in emerging and advanced economies. Financial sector, which is efficient, attracted a significant number of FDI inflows into emerging markets. Employing random effects methodology, Shah (2016) explored the relationship between FDI inflows and financial sector development in Middle East and North African (MENA) countries. Financial sector development was noted to be a major predictor of FDI inflows in the MENA region.

Chigbu et al. (2016) employed descriptive statistics to find out if financial sector development affected FDI inflows in Ghana and Nigeria. Bank deposit rate and domestic credit to private sector were observed to have had a significant positive impact on FDI inflows. Employing the Toda and Yamamoto Granger causality test, Mishra and Mishra (2019) explored the nature of the relationship between financial sector growth and FDI inflows in the case of India. Banking sector and capital markets had a significant positive influence on FDI inflows in India.

Empirical research, which observed that FDI inflows are negatively affected by financial sector development, was done by Ayouni et al. (2014), Acquah and Ibrahim (2019), and Keykanloo et al. (2020). Using 69 developed and developing countries as a unit of analysis, Ayouni et al. (2014) employed panel data analysis to find out if financial sector development is related to FDI inflows and economic growth. Non-liberalized financial sector had a negative influence on FDI inflows's influence on economic growth. In contrast, FDI inflows had a significant positive effect on gross domestic product per capita if financial markets are liberalized.

The two-system GMM approach was used by Acquah and Ibrahim (2019) to examine the relationship between the financial sector and FDI inflows in Africa. They noted that financial sector development had a negative impact on FDI inflows' influence on economic growth in the African context. Keykanloo et al. (2020) used panel data analysis to find out if the bond market and banking sector development influenced FDI inflows in Saudi Arabia, Sweden, Belgium, Thailand, Austria, Venezuela, Argentina, Poland, Iran, Nigeria, and Norway. Different forms of financial sector development (bond market, banking sector, stock market) was observed to have reduced FDI inflows in these countries.

The bi-directional relationship between financial sector development and FDI inflows was noted by empirical studies done by Pham et al. (2022), Sahin and Ege (2015), Ljungwall and Li (2007), Sasmaz and Gumus (2018), and Adigwe et al. (2018). Pham et al. (2022) used the GMM to find out the relationship between financial sector development and FDI inflows in Asian developing countries. A bi-directional causality between FDI inflows and financial sector development was observed in Asian developing countries. Using ARDL in the context of Nigeria, Adigwe et al. (2018) explored the correlation between banking sector development and FDI inflows. Banking sector deposits and FDI inflows had a bi-directional causality relationship in Nigeria.

Sahin and Ege (2015) employed the bootstrap causality analysis to investigate the correlation between FDI inflows and financial sector development in Greece and its neighbouring countries. A feedback causality relationship between FDI inflows and financial sector development was found in the case of Turkey. Using ARDL, Sasmaz and Gumus (2018) explored the linkage between financial sector development, economic growth and FDI inflows in Turkey. Both banking sector development and FDI inflows influenced each other in Turkey. On the other hand, these two variables enhanced economic growth in the context of Turkey.

Another group of empirical researchers noted that certain factors should be available in the host country before financial sector development significantly enhances FDI inflows (the non-linearity rationale). Empirical researchers who agree with this theoretical rationale are Bahri and Nor (2019), Ozili et al. (2020), Ljungwall and Li (2007), Nkoa (2018), and Adeniyi et al. (2015).

Using ordinary least squares, Ozili et al. (2020) examined the correlation between banking sector performance and FDI inflows in United Arab Emirates (UAE). The complementary effect between FDI inflows and bank efficiency was

found to have reduced the non-performing loans. Ljungwall and Li (2007) used GMM to explore the causality between FDI inflows and different financial sector development measures in Chinese provinces. The complementarity between different measures of financial sector development and FDI inflows was found to have an enhancing effect on economic growth across Chinese provinces.

Bahri and Nor (2019) used the vector error correction model (VECM) and ARDL approaches to find out the linkage between financial sector development and FDI inflows in ASEAN countries. Their study noted that financial sector development influenced FDI inflows in a U-shaped format. The system GMM approach was employed by Nkoa (2018) in the African context to find out the nature of the correlation between FDI inflows, growth and financial sector development. The growth of the economy's positive influence of FDI inflows was enhanced by financial sector development in Africa. In Sub-Saharan African countries, Adeniyi et al. (2015) used panel data analysis to explore the interactions between financial sector development, economic growth, and FDI inflows. In the case of Sub-Saharan African nations, financial sector development enhanced economic growth effects of FDI inflows.

Kaur et al. (2013) explored the relationship between financial sector development and FDI inflows using panel data analysis in BRIC countries (Brazil, Russia, India, and China). FDI inflows were found to have been attracted by the stock market and banking sector development. Stock market capital capitalization and banking sector size had a significant positive impact on FDI inflows.

Existing empirical studies that examined the influence of financial sector development on FDI inflows produced results that are inconclusive, mixed, divergent and far from showing signs of convergence. These conflicting results indicate that the effect of financial sector development on FDI inflows is far from reaching a consensus. The current study embarked on this topic to make its own unique contribution on the subject matter.

Kpodar and Goff (2012) argued that personal remittances inflow removes obstacles to FDI inflows inflow into the host country. On the other hand, according to Kpodar and Goff (2012), more private sources of funding (personal remittances) have a downward impact on FDI inflows. Personal remittances received (% of GDP) are the measure of REMIT used in this study. Personal remittances are expected to affect FDI inflows either way.

Wang and Xie (2009) argued that enhanced development of infrastructure enhances host countries' ability to benefit from technology related to FDI inflows. Quality infrastructural development supports domestic firms-FDI inflows linkages and support new technology framework from FDI inflows (Craigwell, 2012). The proxy of infrastructural development used in this study is individuals using internet (% of population). FDI inflows is expected to be enhanced by infrastructural development.

Consistent with Denisia (2010, p. 108), trade openness facilitates foreign capital mobility between countries and is also a locational advantage of FDI inflows. Total of exports and imports (% of GDP) is the measure of trade openness employed in this study.

Denisia (2010) argued that one of the locational advantages of FDI inflows is economic growth. The study noted that foreign investment flowing into the host country is due to higher expected returns that normally occurs in an economically sound country. Gross domestic product (GDP) per capita is a measure of economic growth used. Economic growth's influence on FDI inflows is expected to be positive.

According to Solow (1957), increased savings attract more foreign investment through their ability to enhance domestic investment and growth (which is a locational advantage of FDI inflows). The measure of savings used in this study is gross domestic savings as a ratio of GDP. Savings' effect on FDI inflows is anticipated to be positive.

Stock market capitalization (% of GDP), domestic credit to private sector (% of GDP) and outstanding domestic public debt securities (% of GDP) are the proxies of financial sector development used, whilst FDI inflows' proxy employed is the net FDI inflows (% of GDP), in support of empirical research done by Ozili et al. (2020), Kaur et

http://dx.doi.org/10.21511/imfi.19(3).2022.18

al. (2013), Hajilee and Nasser (2015), Kamasa et al. (2020), Pham et al. (2022), Sghaier and Abida (2013), Korgaonkar (2012), Adigwe et al. (2018), Sahin and Ege (2015), Acquah and Ibrahim (2019), Sasmaz and Gumus (2018), and Ayouni et al. (2014), among others. Apart from available empirical research work, the availability of data informed the choice of the proxies of the variables used.

2. METHODS

Using panel data (1991–2020) extracted from World Development Indicators, this study explored the influence of financial sector development on FDI inflows in the BRICS bloc of countries.

The general model specification used in this study is represented by equation (1).

$$FDI = f\begin{pmatrix} FIN, HCD, REMIT, INFR, \\ OPEN, GROWTH, SAV \end{pmatrix}. \quad (1)$$

Keykanloo et al. (2020), Mishra and Mishra (2019), Chigbu et al. (2016), Adeniyi et al. (2015), Shah (2016), Nkoa (2018), Dellis (2018), Gitanadya and Annisa (2018), Veselinovic and Despotovic (2022), Bahri and Nor (2019), and Keykanloo et al. (2020) are some of the main empirical researchers whose work informed the choice of the explanatory variables included in equation (1).

Transformed into an econometric format, equation (1) becomes equation (2), consistent with Adeniyi et al. (2015).

$$\begin{aligned} FDI_{it} &= \beta_0 + \beta_1 FIN_{it} + \beta_2 HCD_{it} + \\ &+ \beta_3 \left(FIN_{it}.HCD_{it} \right) + \beta_4 REMIT_{it} + \beta_5 INFR_{it} \\ &+ \beta_6 OPEN_{it} + \beta_7 GROWTH_{it} + \beta_8 SAV_{it} + \\ &+ \mu + \varepsilon. \end{aligned} \quad (2)$$

Table 1. Equation (2) signs

Source: Author.

t	Time
FDI_{it}	FDI inflows in country *i* at time *t*
$INFR_{it}$	Infrastructural development in country *i* at time *t*
SAV_{it}	Savings in country *i* at time *t*
$REMIT_{it}$	Personal remittances received in country *i* at time *t*
β_0	Intercept
FINit	Financial sector development in country *i* at time *t*
t	Time
i	Country
β_1 *to* β_8	Co-efficients of independent variables
$GROWTH_{it}$	Economic growth in country *i* at time *t*
μ	Time invariant and unobserved country specific effect
OPENit	Trade openness in country *i* at time *t*
ε	Error
HCD_{it}	Human capital development in country *i* at time *t*

The inclusion of the complementarity variable $\beta_3(FIN_{it}.HCD_{it})$ was informed by Craigwell (2012) and Dunning (1979) whose views imply that the combined effect of financial and human capital development enhances the inflow of FDI inflows because the two variables are locational advantages of FDI inflows. They argued that certain variables such as human capital development quickens the rate at which financial sector development's positive influence on FDI inflows occurs. Econometric estimation methods such as pooled OLS, FMOLS and fixed effects were employed to estimate equation 2 (Tables 6, 7 and 8).

Six control variables of the FDI inflows function used in this study are described next. Host country's high level of human capital development attracts more FDI inflows through its ability to enable both domestic and foreign companies to quickly utilize state of the art technology (Craigwell, 2012). Human capital development is also FDI inflows' locational advantage, according to Dunning (1979). Human capital development index is expected to enhance FDI inflows. Human capital development index is the proxy used for HCD.

3. RESULTS

Figures 1 and 2 present and discuss the financial sector development and FDI inflows trends for BRICS using annual data (1991–2020). The purpose of the trend analysis is to find out if there is an a priori relationship between financial sector development and FDI inflows before the main data analysis is carried out.

Brazil's financial sector development level decreased from 45.16% of GDP in 1991 to 43.49% of GDP in 1995, further declined by 12.35 percentage points during the period between 1995 and 2000 before going up from 31.14% of GDP in 2000 to

Source: Author.

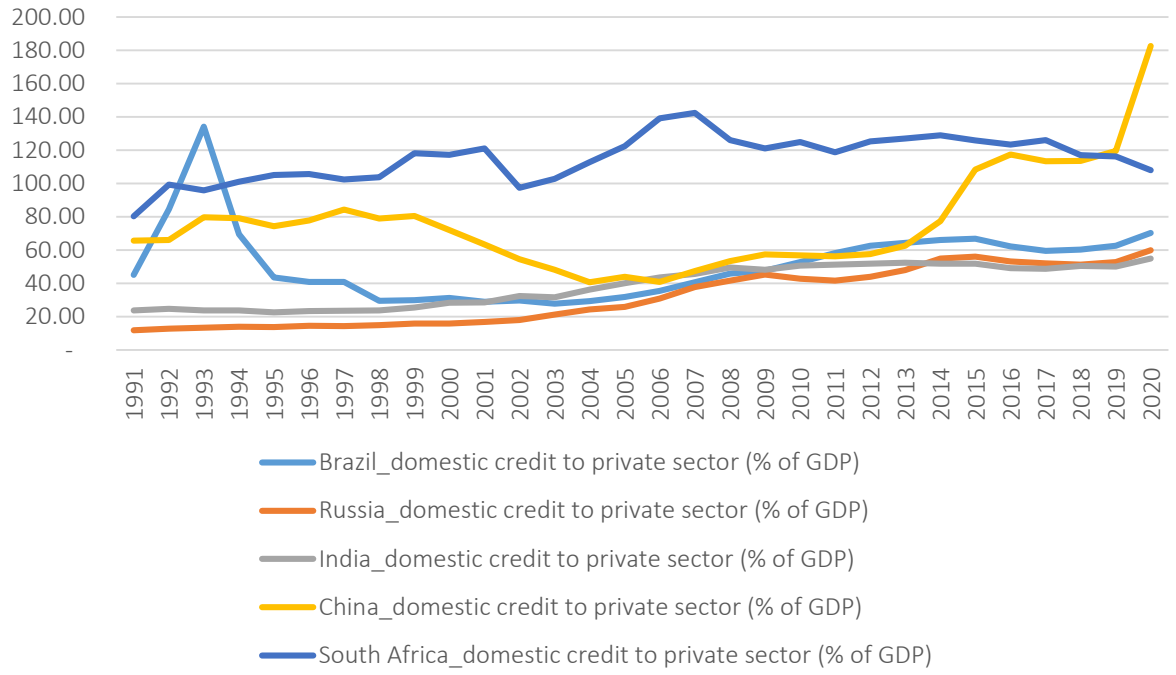

Figure 1. Domestic credit to private sector (% of GDP) trends in BRICS

31.84% of GDP in 2005. An increase of 20.92 percentage points of financial sector development was observed (2005–2010), whilst financial sector development increased from 52.76% of GDP in 2010 to 66.83% of GDP in 2015. The five-year period ranging from 2015 to 2020 saw Brazil's financial sector development level surging by 3.36 percentage points (from 66.83% of GDP in 2015 to 70.19% of GDP in 2020).

Russia's financial sector development consistently went up during the 30-year period ranging from 1991 to 2020. It increased by (1) 1.91 percentage points (11.76% of GDP in 1991 – 13.67% of GDP in 1995), (2) 2.26 percentage points from 1995 to 2000, (3) 9.99 percentage points (from 15.93% of GDP in 2000 to 25.93% of GDP in 2005), (4) 16.92 percentage points during the period from 2005 to 2010, (5) 13.11 percentage points (from 42.84% of GDP in 2010 to 55.95% of GDP in 2015) and (6) 4.02 percentage points (2015–2020) to end the year 2020 at 59.97% of GDP.

India's financial sector development declined by 1.31 percentage points, from 23.82% of GDP in 1991 to 22.51% of GDP in 1995, went up by 5.83 percentage points (1995–2000) before further increasing by 11.73 percentage points during the next five years to end year 2005 at 40.07% of GDP. The period between 2005 and 2010 saw financial sector development level going up by 10.49 percentage points, whilst India's financial sector development increased by 1.31 percentage points during the next five years (50.56% of GDP in 2010 – 51.87% of GDP in 2015). India's financial sector development then went up by 2.93 percentage points between 2015 and 2020 to end the year 2020 at 54.80% of GDP.

China's financial sector development increased from 65.59% of GDP in 1991 to 74.27% of GDP in 1995, declined by 2.30 percentage points (1995–2000) before plummeting by a massive 28.07 percentage points during the next five years (71.97% of GDP in 2000 – 43.90% of GDP in 2005). Increases in China's financial sector development were also observed during the following five-year time horizons: (1) 12.97 percentage points (from 43.90% of GDP in 2005 to 56.87% of GDP in 2010), (2) 51.38 percentage points (from 56.87% of GDP in 2010 to 108.25% of GDP in 2015), and (3) 74.18 percentage points (from 108.25% of GDP in 2015 to 182.43% of GDP in 2020).

South Africa's financial sector development level increased from 80.26% of GDP in 1991 to 105.01% of GDP in 1995, went up by 12.09 percentage points (1995–2000) before further going up by

http://dx.doi.org/10.21511/imfi.19(3).2022.18

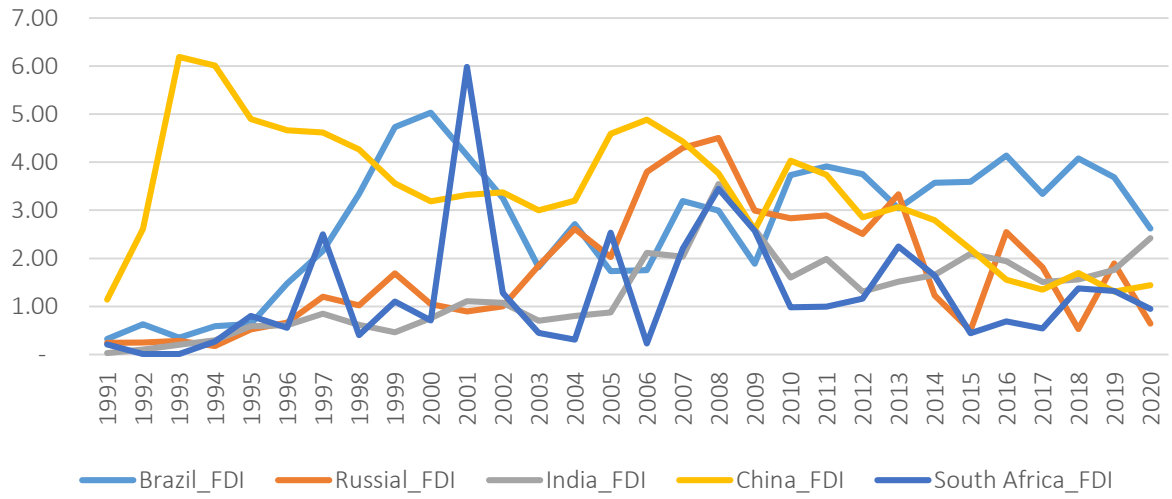

Figure 2. Net FDI inflow (% of GDP) trends in BRICS

5.19 percentage points, from 117.10% of GDP in 2000 to 122.28% of GDP in 2005. A 2.61 percentage points increase in South Africa's financial sector development during the period from 2005 to 2010 was observed whilst a 0.99 percentage points increase in South Africa's financial sector development characterised the period ranging from 2010 to 2015. South Africa's financial sector development massively plummeted by 18 percentage points, from 125.88% of GDP in 2015 to 107.88% of GDP in 2020.

Brazil's net FDI inflows went up by 0.31 percentage points, from 0.32% of GDP in 1991 to 0.63% of GDP in 1995, surged by 4.40% of GDP during the period from 1995 to 2000 before taking a 3.30 percentage points knock during the following five years (2000–2005). Net FDI inflows went up from 1.73% of GDP in 2005 to 3.73% of GDP in 2010, declined by 0.14 percentage points during the period from 2010 to 2015 before further plummeting by 0.97 percentage points, from 3.59% of GDP in 2015 to 2.62% of GDP in 2020.

India's net FDI inflows increased consistently throughout all the five-year periods ranging from 1991 to 2020. It went up by 0.55, 0.17, 0.12, 0.73, 0.49 and 0.33 percentage points during the periods 1991 to 1995, 1995 to 2000, 2000 to 2005, 2005 to 2010, 2010 to 2015 and 2015 to 2020 respectively. Regarding Russia, its net FDI inflows increased by 0.28 percentage points (from 1991 to 1995), 0.52 percentage points (from 0.52% of GDP in 1995 to 1.05% of GDP in 2000), 0.98 percentage points (from 1.05% of GDP in 2000 to 2.03% of GDP in 2005) and 0.80 percentage points (from 2.03% of GDP in 2005 to 2.83% of GDP in 2010). Russia's net FDI inflows plummeted by 2.33% percentage points, from 2.83% of GDP in 2010 to 0.50% of GDP in 2015 before marginally going up by 0.14 percentage points during the following five years to finish year 2020 at 0.64% of GDP.

Net FDI inflows for South Africa went up from 0.21% of GDP in 1991 to 0.80% of GDP in 1995, marginally went down by 0.09 percentage points (1995–2010) before increasing from 0.71% of GDP in 2000 to 2.53% of GDP in 2005. South Africa's net FDI inflows went down by 1.55 percentage points, from 2.53% of GDP in 2005 to 0.98% of GDP in 2010, further declined by 0.55 percentage points during the period from 2010 to 2015 before going up from 0.44% of GDP in 2015 to 0.95% of GDP in 2020.

Regarding China, its net FDI inflows increased from 1.14% of GDP in 1991 to 4.90% of GDP in 1995, declined by 1.71 percentage points between 1995 and 2000 before increasing from 3.19% of GDP in 2000 to 4.59% of GDP in 2005. It declined by 0.55 percentage points between 2005 and 2010, went down from 4.04% of GDP in 2010 to 2.19% of GDP in 2015 before further declining by 0.75 percentage points during the following five years to finish the year 2020 at 1.44% of GDP.

Table 2 presents correlation analysis results, descriptive statistical results are shown in Table 3,

Table 2. Correlation analysis

Source: E-Views.

Variable	FDI	FIN	HCD	REMIT	INFR	OPEN	GROWTH	SAV
FDI	1.00							
FIN	–0.04	1.00						
HCD	0.18**	–0.01	1.00					
REMIT	–0.21**	–0.30***	–0.63***	1.00				
INFR	0.12	0.27***	0.41***	–0.22***	1.00			
OPEN	–0.02	0.11	0.18**	–0.05	0.09	1.00		
GROWTH	0.15*	0.28***	0.53***	–0.43***	0.82***	0.05	1.00	
SAV	0.27***	–0.16*	0.03	0.06	–0.02	0.37***	–0.16**	1.00

Note: ***, **, and * represent 1%, 5% and 10% significance levels, respectively.

Table 3. Descriptive statistical analysis

Source: Author.

Variable	FDI	FIN	HCD	REMIT	INFR	OPEN	GROWTH	SAV
Mean	2.07	62.66	0.70	0.75	22.27	41.23	4 746.82	28.15
Median	1.79	52.57	0.72	0.24	8.43	42.28	3 496.31	26.69
Maximum	6.19	182.43	0.83	4.17	84.99	110.58	15 974.64	51.09
Minimum	0.01	11.76	0.44	0.03	0.01	15.64	301.16	15.09
Standard. deviation	1.47	36.28	0.09	1.08	25.80	14.76	3 829.02	10.16
Skewness	0.60	0.74	–0.91	1.76	0.90	0.55	0.82	0.60
Kurtosis	2.57	2.72	3.37	4.52	2.38	4.75	2.83	2.28
Jarque–Bera	10.31	14.34	21.40	91.49	22.73	26.75	16.90	12.23
Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Observations	150	150	150	150	150	150	150	150

Table 4. Stationarity tests (Individual intercept)

Source: Author.

Level stage				
Variable	**LLC tests**	**IPS tests**	**ADF tests**	**PP tests**
FDI	–2.51***	–2.52***	23.02**	35.35***
FIN	0.20	1.14	7.14	10.01
HCD	–3.46***	–2.97***	26.72***	34.04***
REMIT	–3.52***	–2.98***	26.73***	20.74**
INFR	–6.57***	–4.44***	40.41***	51.99***
OPEN	–1.33*	–1.37*	17.47*	30.87***
GROWTH	–1.50*	0.35	6.75	4.25
SAV	–1.44*	–2.18**	25.35	13.44
First difference				
FDI	–6.56***	–8.09***	75.15***	119.60***
FIN	–3.92***	–4.59***	42.48***	61.42***
HCD	–10.60***	–10.15***	95.49***	133.67***
REMIT	–2.78***	–6.87***	62.51***	113.15***
INFR	–1.85**	–2.30**	20.80**	25.22***
OPEN	–3.82***	–5.75***	52.05***	84.22***
GROWTH	–3.19***	–3.70***	31.64***	40.30***
SAV	–3.25***	–4.91***	44.63***	70.86***

http://dx.doi.org/10.21511/imfi.19(3).2022.18

Table 5. Johansen-Fisher panel co-integration test

Source: Author's compilation from E-Views.

Hypothesized No. of CE(s)	Fisher Statistic (from trace test)	Probability	Fisher Statistic (from max-eigen test)	Probability
None	546.3	0.0000	166.2	0.0000
At most 1	251.3	0.0000	191.0	0.0000
At most 2	190.3	0.0000	96.12	0.0000
At most 3	112.8	0.0000	52.63	0.0000
At most 4	68.66	0.0000	36.29	0.0001
At most 5	39.84	0.0000	23.41	0.0093
At most 6	26.49	0.0031	22.55	0.0125
At most 7	19.83	0.0309	19.83	0.0309

and Table 4 presents the results of the panel stationarity test. Table 5 presents the results of the panel co-integration test.

Fixed effects, FMOLS and pooled OLS are the three econometric approaches employed to analyze the data (see results in Tables 6, 7 and 8). Model 1 used domestic credit to private sector (% of GDP) to proxy financial sector development. Stock market capitalization (% of GDP) is the measure of financial sector development employed in model 2. Model 3 used outstanding domestic public debt securities (% of GDP) to proxy financial sector development.

Table 6. Financial sector development and FDI inflows – Fixed effects

Source: E-Views.

Variable	Model 1	Model 2	Model 3
FIN	0.19	0.23	0.21
HCD	0.26	0.18	0.58
FIN.HCD	0.04	0.72	0.61
REMIT	–0.02*	0.04	0.06
INFR	0.26***	0.22***	0.21***
OPEN	0.31	1.23**	0.99**
GROWTH	–0.53	–0.37*	–0.33*
SAV	–0.87	–0.68	–0.53
Number of countries	5	5	5
Adjusted R–squared	0.58	0.58	0.64
F–statistic	18.46	14.03	14.30
Prob(F–statistic)	0.00	0.00	0.00

Note: ***, **, and * indicate 1%, 5% and 10% significance levels, respectively.

Table 7. Financial sector development and FDI inflows – FMOLS

Source: E-Views.

Variable	Model 1	Model 2	Model 3
FIN	0.26	0.39	0.20
HCD	0.03	0.57	0.48*
FIN.HCD	0.34*	0.13	0.44
REMIT	–0.14***	0.11	0.13
INFR	0.03***	0.21**	0.26***
OPEN	0.36*	0.82***	0.88
GROWTH	0.05	0.42*	0.52*
SAV	–0.62*	0.36	0.94
Number of countries	5	5	5
F–statistic	–	–	–
Prob(F-statistic)	–	–	–
Adjusted R-squared	0.78	0.68	0.74

Table 8. Financial sector development and FDI inflows – Pooled ordinary least squares

Source: E-Views.

Variable	Model 1	Model 2	Model 3
FIN	0.28	0.45***	0.49***
HCD	0.11	0.19	0.67
FIN.HCD	0.25	0.91***	0.05***
REMIT	–0.19**	–0.20**	–0.17**
INFR	0.25***	0.32***	0.26***
OPEN	–0.65***	–0.26	–0.56***
GROWTH	–0.15	–0.34***	–0.37***
SAV	0.38***	0.59**	0.32***
Number of countries	5	5	5
F–statistic	–	–	–
Prob(F-statistic)	–	–	–
Adjusted R-squared	0.61	0.63	0.59

4. EXPLANATION OF THE RESULTS

Figures 1 and 2 clearly show that the analysis of trends of financial sector development and FDI inflows in BRICS is not capable of indicating the impact of the former on the latter. Although showing how financial sector development and FDI inflows for BRICS related during the period from 1991 to 2020, the precise statistical influence cannot be deduced from such an analysis. Stead (2007) noted that the correlation size above 70% indicates the existence of a multi-collinearity problem. The correlation between infrastructural development and economic growth confirmed that there is a multi-collinearity problem between the two variables (see Table 2). The disadvantage of correlation analysis is it fails to establish the direction of causality of one variable on another.

Table 3 shows that data for every variable is abnormally distributed. This shows that the probability of the Jarque-Bera criteria is zero, consistent with Tsaurai and Ngcobo (2018). It is also evidenced by the fact that all the variables are skewed to the right, except for human capital development. Table 3 indicates that standard deviation of economic growth data (3 829.02), a figure which exceeds 100, is an indication that outliers exist in the data set, which is in line with Tsaurai and Ngcobo (2018). All the data set had to first be transformed into natural logarithms prior to main data analysis, in support of Aye and Edoja (2017).

Table 4 shows that first difference produced results indicating that all the variables were stable. This means the data set was integrated of order 1, consistent with Malefane and Odhiambo (2018). The results of the Johansen Fisher Panel Co-integration test (Table 5) indicate that most 7 long-run relationships were confirmed between the variables, hence allowing the final stage of data analysis.

Under the fixed effects (Table 6) and FMOLS (Table 7), financial sector development non-significantly enhanced FDI inflows across all the three models, results which were also supported by the pooled OLS (Table 8) under the model 1 approach. Pooled OLS methodology noted that the positive influence of financial sector development on FDI inflows was significant under model 2 and 3. These results generally mean that FDI inflows were enhanced by financial sector development in the context of BRICS, which is in line with the three theoretical rationales of financial sector development-FDI inflows hypothesis enunciated by Ezeoha and Cattaneo (2012) in Section 1 of this paper.

Except for model 3 under the FMOLS (Table 7) approach (which observed a significant positive relationship from human capital development towards FDI inflows), human capital development's impact on FDI inflows was noted to be non-significantly positive across all the three econometric approaches under the three models. These results indicate that human capital development increases FDI inflows, consistent with higher levels of developed human capital

http://dx.doi.org/10.21511/imfi.19(3).2022.18

in the host country attracts more FDI inflows through its ability to enable both domestic and foreign companies to quickly utilize state of the art technology (Craigwell, 2012).

A non-significant positive impact of the combination between financial sector development and developed human capital on FDI inflows was observed under the fixed effects (model 1, 2 and 3), FMOLS (model 2 and 3) and pooled OLS (model 1). On the other hand, a significant positive influence of the combination between financial sector development and developed human capital on FDI inflows was noted under FMOLS (model 1) and pooled OLS (model 2 and 3). These results show that the complementarity variable enhanced the inflow of FDI inflows in BRICS. They confirm Dunning's (1979) and Craigwell's (2012) views that both financial sector development and developed human capital enhances foreign investment inflows because they are locational advantages of FDI inflows.

Fixed effects (model 2 and 3) and FMOLS (model 2 and 3) observed that remittances' positive impact on FDI inflows was non-significant, which is in line with Kpodar and Goff (2012) who argue that personal remittances inflow removes obstacles to FDI inflows into the host country. Model 1 under the fixed effects, model 1 under the FMOLS, and models 1, 2 and 3 under the pooled OLS noted that personal remittances' negative effect on FDI inflows was significant, in support of Kpodar and Goff (2012)'s view that more private sources of funding (personal remittances) have a downward impact on FDI inflows.

Under the pooled OLS, fixed effects and FMOLS, the positive influence of developed infrastructure on FDI inflows was found to be significant across all the three econometric estimation approaches under the models 1, 2 and 3. These results support Wang and Xie (2009)'s argument that developed infrastructure enhances host countries' ability to benefit from technology flowing from FDI.

A significant positive relationship from trade openness to FDI inflows was observed under the fixed effects (model 2 and 3) and FMOLS (1 and 2), whilst FMOLS (model 3) and fixed effects (model 1) show that trade openness non-significantly enhanced FDI inflows. The results generally resonate with Denisia (2010, p. 108)'s argument that trade openness facilitates foreign capital mobility between countries and is also a locational advantage of FDI inflows. Pooled OLS generally indicates that trade openness had a deleterious effect on FDI inflows, contrary to the available literature on the subject matter.

Whilst pooled OLS and fixed effects indicate that FDI inflows were negatively affected by economic growth across all the three models, FMOLS shows that FDI inflows were enhanced by economic growth under models 1, 2 and 3. The results on savings are quite mixed. Pooled OLS shows that savings significantly enhanced FDI inflows across all the three models, fixed effects (1, 2 and 3) shows that savings had an insignificant negative influence on FDI inflows. FMOLS produced mixed results on the relationship between savings and FDI inflows.

CONCLUSION

The paper explored financial sector development's influence on FDI inflows using BRICS as a case study. The impact of the complementarity variable (financial sector x human capital development) on FDI inflows was also a subject of investigation using the same unit of analysis. Only the pooled OLS methodology (models 2 and 3) shows that FDI inflow into BRICS was significantly enhanced by financial development. FDI inflow into BRICS was also enhanced significantly by the complementarity variable (see pooled OLS under models 2 and 3, and model 1 of FMOLS). These results can be used by BRICS to develop and implement financial sector and human capital development policies geared at enhancing FDI inflows. Further empirical research could be done on financial and human capital development threshold levels required to trigger significant FDI inflows into BRICS.

AUTHOR CONTRIBUTIONS

Conceptualization: Kunofiwa Tsaurai.
Data curation: Kunofiwa Tsaurai.
Formal analysis: Kunofiwa Tsaurai.
Investigation: Kunofiwa Tsaurai.
Methodology: Kunofiwa Tsaurai.
Project administration: Kunofiwa Tsaurai.
Resources: Kunofiwa Tsaurai.
Software: Kunofiwa Tsaurai.
Validation: Kunofiwa Tsaurai.
Writing – original draft: Kunofiwa Tsaurai.
Writing – review & editing: Kunofiwa Tsaurai.

ACKNOWLEDGMENT

Kunofiwa Tsaurai is grateful for the moral support from his employer, University of South Africa.

REFERENCES

1. Acquah, A. M., & Ibrahim, M. (2019). FDI inflows, economic growth and financial sector development. *Journal of Sustainable Finance and Investment, 10*(4), 315-334.
2. Adeniyi, O., Ajide, B., & Salisu, A. (2015). Foreign capital flows, financial sector development and growth in Sub-Saharan Africa. *Journal of Economic Development, 40*(3), 85-103.
3. Adigwe, P. K., Okaro, C. S., Emejulu, I. J., & Ananwude, A. C. (2018). Banking sector operations and FDI inflows in Nigeria: A causality analysis. *Asian Themes in Social Sciences Research, 1*(2), 60-75. https://doi.org/10.18488/journal.139.2018.12.60.75
4. Asong, S. A. (2014). Linkages between investment flows and financial sector development. *African Journal of Economic and Management Studies, 5*(3), 269-299. http://dx.doi.org/10.2139/ssrn.2493269
5. Aye, G. C., & Edoja, P. E. (2017). Effect of economic growth on CO2 emission in developing countries: Evidence from a dynamic panel threshold regression model. *General and Applied Economics*. https://doi.org/10.1080/23322039.2017.1379239
6. Ayouni, S. E., Issaoui, F., & Brahim, S. (2014). Financial liberalization, FDI inflows and economic growth: A dynamic panel data validation. *International Journal of Economics and Financial Issues, 4*(3), 677-697.
7. Bahri, E. N. A., & Nor, N. H. H. M. (2019). Nonlinear effect of financial sector development and FDI inflows in integration economies among ASEAN-5 countries following IFRS adoption. *Accounting and Finance Open Access Peer-Reviewed Chapter.* https://doi.org/10.5772/intechopen.86104
8. Bartels, F. L., Alladina, S. N., & Lederer, S. (2009). FDI inflows in Sub-Saharan Africa: Motivating factors and policy issues. *Journal of African Business, 10*(2), 141-162. https://doi.org/10.1080/15228910903187791
9. Calvo, M. B., & Sanchez-Robles, B. (2002). *FDI inflows, Economic freedom and Economic growth: New evidence from Latin America* (Universidad de Cartabria, Economics Working Paper No. 4/03).
10. Chee, Y. L., & Nair, M. (2010). The impact of FDI and financial sector development on economic growth: Empirical evidence from Asia and Oceania. *International Journal of Economics and Finance, 2*(2), 107-119. https://doi.org/10.5539/ijef.v2n2p107
11. Chigbu, U. S., Promise, U. C., & Chigbu, E. E. (2016). Study of the influence of the banking sector development on the inflows of foreign investment in Nigeria and Ghana. *International Letters of Social and Humanistic Sciences, 72,* 63-75. https://doi.org/10.18052/www.scipress.com/ILSHS.72.63
12. Craigwell, M. F. A. W. R. (2012). Economic growth, FDI inflows and corruption in developed and developing countries. *Journal of Economic Studies, 39*(6), 639-652. http://dx.doi.org/10.1108/01443581211274593
13. Dellis, K. (2018). *Financial sector development and FDI inflows: Evidence from advanced economies* (Bank of Greece Eurosystem Working Paper Number December 2018).
14. Denisia, V. (2010). FDI inflows theories: An overview of the main theories. *European Journal of Interdisciplinary Studies, 2*(2), 104-110.
15. Dunning, J. H. (1979). Explaining changing patterns of international production: In defense of the eclectic theory. *Oxford Bulletin*

http://dx.doi.org/10.21511/imfi.19(3).2022.18

of Economics and Statistics, 41(4), 269-295. https://doi.org/10.1111/j.1468-0084.1979.mp41004003.x

16. Ezeoha, A. E., & Cattaneo, N. (2012). FDI flows to Sub-Saharan Africa: The impact of finance, institutions and natural resource endowment. *Comparative Economic Studies, 54*(3), 597-632.
17. Gitanadya, A. M., & Annisa, P. (2018). The relationship between FDI inflows influx, economic growth and financial institutions in ASEAN-6. In *Proceedings of Airlangga Conference on International Relations (ACIR 2018) – Politics, Economy and Security in Changing Indo-Pacific Region, 26-33.* http://dx.doi.org/10.5220/0010272600260033
18. Hajilee, M., & Nasser, O. M. A. (2015). The relationship between financial market development and FDI inflows in Latin American countries. *The Journal of Developing Areas, 49*(2), 227-245. http://dx.doi.org/10.1353/jda.2015.0043
19. Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing unit roots in heterogeneous panels. *Journal of Econometrics, 115*(1), 53-74. https://doi.org/10.1016/S0304-4076(03)00092-7
20. Kamasa, K., Mochiah, I., Doku, A. K., & Forson, P. (2020). The impact of financial sector reforms on FDI inflows in an emerging economy: Empirical evidence from Ghana. *Journal of Humanities and Applied Social Sciences, 2*(4), 271-284. http://dx.doi.org/10.1108/JHASS-11-2019-0077
21. Kaur, M., Yadav, S. S., & Gautam, V. (2013). Financial system development and FDI inflows: A panel data study for BRIC countries. *Global Business Review, 14*(4), 729-742. http://dx.doi.org/10.1177/0972150913501607
22. Keykanloo, M. G., Hosseini, S., Jazeh, K. E., & Askari, A. (2020). The effect of financial sector development on FDI inflows. *Iran Economics Review, 24*(4), 885-906.
23. Korgaonkar, C. (2012). Analysis of the impact of financial sector development on FDI inflows: A data mining approach. *Journal of Economics and Sustainable Development, 3*(6), 70-78. https://www.semanticscholar.org/paper/Analysis-of-the-impact-of-financial-development-on-Korgaonkar/c16c925f449fd2a40e5e6fff-68fe4cb3aa8586b3
24. Kpodar, K., & Goff, M. L. (2012). *Do remittances reduce aid dependency?* (International Monetary Fund Development Policies Working Paper Number 34).
25. Kumar, N., & Pradhan, J. P. (2002). *FDI, externalities and economic growth in developing countries: Some empirical explorations and implications for WTO negotiations on investment* (RIS Discussion Paper No. 27/2002). New Delhi, India.
26. Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics, 108*(1), 1-24. https://doi.org/10.1016/S0304-4076(01)00098-7
27. Ljungwall, C., & Li, J. (2007). *Financial sector development, FDI and economic growth in China* (Working Paper Series Paper Number E2007005). Stockholm School of Economics and CCER, Peking University.
28. Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3-42. https://doi.org/10.1016/0304-3932(88)90168-7
29. Malefane, M.R., & Odhiambo, N.M. (2018). Impact of trade openness on economic growth: Empirical evidence from South Africa. *International Economics, 71*(4), 387-416.
30. Mishra, P. K., & Mishra, S. K. (2019). FDI inflows and financial sector development in India. *Indian Journal of Applied Economics and Business, 1*(1), 21-33.
31. Nkoa, B. E. O. (2018). The specific growth effects of FDI in Africa: The role of finance. *Revue d'economie du development, 26*(3), 33-63.
32. Nor, N. H. H., Low, S., Nor, A. H. S. M., & Ghazali, N. A. (2013). FDI and economic growth: Does the quality of banking development matter? *Gadjah Mada International Journal of Business, 15*(3), 287-303. https://doi.org/10.22146/gamaijb.5472
33. Pham, H. T., Gan, C., & Hu, B. (2022). Causality between financial sector development and FDI inflows in Asian developing countries. *Journal of Risk and Financial Management, 15*(195), 1-26.
34. Romer, P. (1986). Increasing returns and long run economic growth. *Journal of Political Economy, 94*(5), 1002-1037. https://doi.org/10.1086/261420
35. Sahin, S., & Ege, I. (2015). Financial sector development and FDI in Greece and neighbouring countries: A panel data analysis. *Procedia Economics and Finance, 24*(2015), 583-588. https://doi.org/10.1016/S2212-5671(15)00640-1
36. Sasmaz, M. U., & Gumus, E. (2018). The impact of development in banking sector and FDI inflows on economic growth: Sample of Turkey. *International Journal of Advanced and Applied Sciences, 5*(12), 30-35. https://doi.org/10.21833/ijaas.2018.12.005
37. Seenivasan, R. (2014). Analysis of the relationship between FDI and economic growth. *Advances in Management, 7*(1), 1-23.
38. Sghaier, I. M., & Abida, Z. (2013). FDI inflows, financial sector development and economic growth: Empirical evidence from North African countries. *Journal of International and Global Economic Studies, 6*(1), 1-13.
39. Shah, M. H. (2016). *Financial sector development and FDI inflows: The case of Middle East and North African (MENA) developing nations* (Munich Personal RePEc Archive Working Paper Number 82013).
40. Solow, R. (1956). A contribution to the theory of economic growth. *Quarterly Journal of*

Economics, 70(1), 65-94. https://doi.org/10.2307/1884513

41. Solow, R. M. (1957). Technical change and aggregate production, *Review of Economics and Statistics, 39*(3), 213-320. https://doi.org/10.2307/1926047

42. Stead, R. (2007). *Foundation quantitative methods for business.* England: Prentice Hall.

43. Swan, T. (1956). Economic growth and capital accumulation. *The Economic Record, 32*(2), 334-361. https://doi.org/10.1111/j.1475-4932.1956.tb00434.x

44. Tsaurai, K., & Makina, D. (2018). The impact of financial sector development on FDI inflows: An empirical study on minimum threshold levels. *Journal of Economics and Behavioural Studies, 10*(5), 244-254. https://doi.org/10.22610/jebs.v10i5(J).2513

45. Tsaurai, K., & Ngcobo, L. (2018). The role of liquidity in the remittances-human capital development nexus in emerging economies, *OEconomica, 14*(7), 101-119. https://www.europarl.europa.eu/RegData/etudes/IDAN/2022/702563/EXPO_IDA(2022)702563_EN.pdf

46. UNCTAD. (2012). *World Investment Report*. New York: United Nations.

47. Veselinovic, N., & Despotovic, D. (2022). Financial sector development, FDI inflows and economic growth: Panel causality approach. *Industrija, 49*(3/4), 47-61. https://doi.org/10.5937/industrija49-35397

48. Wang, H., & Xie, X. (2009). On effects of FDI inflows on economic growth. *International Business Research Journal, 2*(4), 100-108.

http://dx.doi.org/10.21511/imfi.19(3).2022.18