

Investigating the determining factors of sustainable FDI in Vietnam

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Abstract

Purpose – The main purpose of this paper is to analyze the sustainable inward FDI pattern of Vietnam.

Design/methodology/approach – This paper intends to analyze the sustainable FDI pattern of Vietnam using the gravity theory and panel data approach for the annual data over the period of 2007–2020.

Findings – Vietnamese FDI volume is positively affected by political and social factors, globalization and green energy consumption, while geographical distance is a major obstacle to the increase of FDI inflows of the country.

Practical implications – As the main practical policy implications, issuing policies for sustainable economic growth, launching the novel strategy of green FDI neighborhood policy and regionalism through free trade agreements are recommended.

Originality/value – To the best of author's knowledge, there has not been any in-depth academic study focusing on the Vietnam's sustainable FDI. In addition, three robustness checks have been conducted to ensure the validation of empirical findings.

Keywords FDI pattern, Sustainable development, Green energy consumption, Vietnam

Paper type Research paper

1. Introduction

It is a common belief that investment by foreign investors is a major driver of job creation, economic integration and improvement of infrastructures. [Neto and Viega \(2013\)](#) argued that foreign direct investment (FDI) is a factor accelerating globalization of a target country of investment. This role of FDI is even more important in the current challenge of the coronavirus outbreak due to the negative consequences of COVID-19 on inter-countries investment mobility and the recession of world economies. According to [UNCTAD \(2020\)](#), the global FDI under the COVID-19 has diminished by nearly –5% to –15% in 2019–2020 due to the lockdowns, global risk and reduction in profitability of projects as well as supply chain disruptions.

Nevertheless, the interesting point is that Asia was the only region that experienced growth in FDI under the circumstances of the pandemic. Based on UNCTAD's World Investment Report (2021), the FDI flows to developing economies in Asia rose by nearly 4% in 2020, demonstrating resilience and rapid recovery in trade and economic activities. Among Asian regions, South-East Asia with leaders of Singapore, Indonesia and Vietnam is considered as the engine of FDI growth with the amount of US\$ 91, US\$19 and US\$16bn in 2020, respectively.



The process of private sector development and attraction of foreign direct investment has been started in Vietnam since the Doi Moi reforms in 1986 (Schaumburg-Muller, 2003). A number of scholars such as Doanh (2002) and Dollar and Kraay (2004) argued that expanding FDI and trade flows are two important consequences of this major reforms leading to the economic flourishing of the country until now. Over the last decades, the flows of FDI in and from the country have changed considerably, though the general trend of this variable has a positive slope. Existence of concise and practical planning as well as strategies to economic development in Vietnam can be noted as a main accelerating factor to attract foreign capital and investments in the last decades. In this regard, the approved 10-year socio-economic plan by the Vietnam’s National Party Congress which plans to enhance the contributions of private companies by more than 50% of the economy by 2025, the China Plus one strategy to replace investment from China to other Asian nations like Vietnam, Tay Ninh Master Plan 2020 and Vision for 2050 (Hanoi Master Plan), Five-Year Plans of Vietnam (since first five-year plan of 1961–1965 to the tenth five-year plan of 2016–2020), have had a significant role in enhancing the investment climate of Vietnam (Ho, 2021).

According to the reports of Ministry of Planning and Investment (www.mpi.gov.vn), the most attractive sectors of this country to foreign investors in 2020 were manufacturing and real state activates. Figure 1 illustrates the total registered investment capital (stock value in million US\$) in each sector. Manufacturing is the main destination of foreign direct investment in Vietnam with 15,080 projects in 2020 and US\$225,733m investment capital (in stock value). In addition, the main countries that provide investments into Vietnam are Singapore, South Korea, China and Japan with 225, 573, 311 and 251 new projects in 2020, respectively.

The other type of FDI is the outward FDI (OFDI), which offers important advantages for a developing country such as Vietnam. In general, with the issuing of Decree 78/2006 regulating the OFDI flows by the Vietnam’s government, the flows of OFDI from the country has grown sharply. According to the data collected from the Vietnam’s Ministry of Planning and Investment (www.mpi.gov.vn), in 2020, the country provided over registered capital of

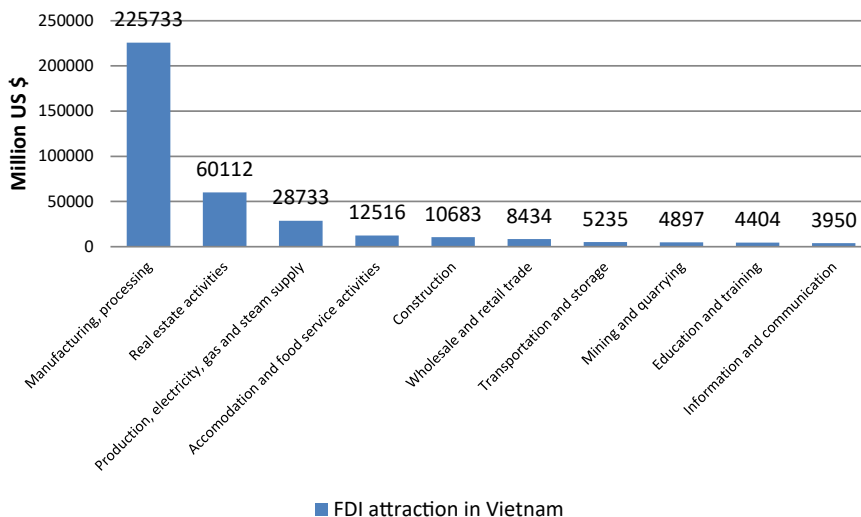


Figure 1. FDI attraction in Vietnam (2020, stock value, million US\$)

Source(s): Authors’ compilation from www.mpi.gov.vn

OFDI by approximately US\$819.67m (in stock value). [Figure 2](#) reveals the trend of OFDI (registered capital in stock value) of Vietnam during 1989–2020.

The fact of FDI resiliency in Asia motivated this research with a focus on Vietnam from different aspects for the following reasons. The country has an evolving economy from a centrally planned system to a market-based economy ([Dutta, 1995](#)), where the role of FDI in its integration and economic flourishing is significant. One of the major priorities of Vietnam is its strategies and plans in the field of FDI. Addressing the FDI strategy in the Vietnam's 2021–2030 socioeconomic development strategy highlights the importance of this economic sector in national economic roadmap. Analyzing the inward FDI patterns of Vietnam can bring new insights for policymakers in the country to improve the patterns of sustainable foreign investment of the country.

To the best of authors' knowledge, the inward FDI pattern of Vietnam has not been addressed widely. The most important studies include [Anwar and Nguyen \(2011a, b\)](#) on the FDI-trade relationship, [Dang \(2013\)](#) on the relationship between inward FDI and institutional quality, [McLaren and Yoo \(2017\)](#) about the linkage between FDI and inequality, as well as [Bui et al. \(2019\)](#) regarding FDI- household welfare nexus in Vietnam. This paper tries to fill the literature gap of modeling sustainable FDI of this country through considering inward FDI and determination of Vietnamese FDI's origins using a moving average technique.

This study is organized as follows: a brief discussion on literature gap is addressed in [Section 2](#). [Section 3](#) elaborates on data description and model specification. The next section highlights the empirical estimation findings and lastly [Section 5](#) presents the concluding remarks, some practical policy implications as well as recommendations for future research.

2. Literature review

The issues of FDI and sustainable FDI have been addressed by numerous scholars. [Avramov et al. \(2021\)](#) argued that sustainable FDI ensures continuous development of sustainable development goals (SDGs) in countries, which is a crucial issue for our globe. [Pastor \(2021\)](#) expressed that sustainable FDI can make firms greener by transferring investment to green enterprises. [Torre et al. \(2016\)](#) argued that countries should establish reliable legal infrastructure to boost sustainable FDI in order to reach consistent economic development

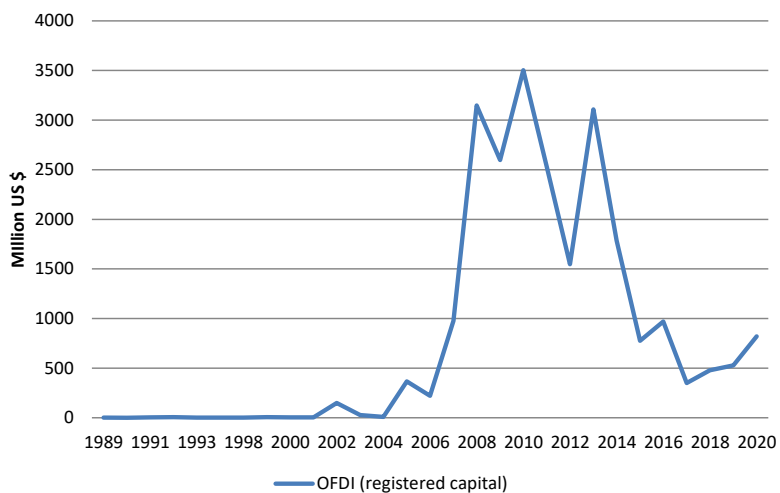


Figure 2.
Vietnam's OFDI (1989–
2020, stock value,
million US\$)

Source(s): Authors' compilation from www.mpi.gov.vn

with environmental protections. [Gutsche et al. \(2021\)](#) studied sustainable investment for the case of Japan. They found that ecological political factors have significant impacts on intention of investors to make sustainable investment. In another study, [Pedersen et al. \(2021\)](#) concluded that investor preferences in a sustainable FDI are contingent upon the return on investment and interest rate in the host country. [Sharma \(2021\)](#) compared conventional and sustainable investments during the pandemic. The major results suggested the significant role of sustainable investment to mitigate long-run negative consequences of pandemic in countries. [Aust et al. \(2020\)](#) found the evidence of positive impact of FDI on SDGs of the United Nations in 44 African economies. This impact is more significant in countries with more clear political and civil rights. In a recent study, [Song et al. \(2021\)](#) explored the positive impact of FDI on environmental protection in China, which is a major insight for the country to combat carbon dioxide emissions. The relationship between FDI and environmental pollution in Vietnam has been addressed by [Tang and Tan \(2015\)](#) as well as [Vo and Ho \(2021\)](#), who revealed that FDI is one of the main important determinants of carbon dioxide emissions in the country.

A large group of scholars has examined the impacts of FDI on productivity and trade potentials in Vietnam. [Anwar and Nguyen \(2011a\)](#) addressed how FDI can change imports and exports in Vietnam. To this end, they analyzed a dataset involving 19 trading partners of the country over the period of 1990–2017. The existence of complementary relationship between FDI and exports as well as FDI and imports in Vietnam was proved by empirical estimations. Similarly, [Anwar and Nguyen \(2011b\)](#) tried to discover how FDI in Vietnam's manufacturing sector and export spillovers are related. The main results indicated that any increase in numbers of foreign firms in Vietnam would significantly affect the decision of Vietnamese firms to export. [Newman et al. \(2015\)](#) tested the existence of relationship between FDI and productivity of domestic firms in Vietnam. They found that there are significant productivity gains through inward FDI. [Ni et al. \(2017\)](#) expressed that the origin of foreign investment has a positive impact on domestic firm's productivity in Vietnam. They indicated that there is positive link between the number of Asian firms in downstream sectors and the productivity of Vietnamese firms in supply industries.

Some studies have dealt with the impacts of FDI on social indicators of Vietnam. In a study, [Gueorguev and Malesky \(2012\)](#) focused on how FDI and bribery in Vietnam are related. They found there was no relationship between inward FDI and the prevalence of corruption in the country. [Dang \(2013\)](#) studied the relationship between FDI and inequality in Vietnam. The empirical findings of this research indicated that rising inward FDI in Vietnam after the membership of the country in WTO would have a positive association with improvement of institutions. [Bui et al. \(2019\)](#) investigated the impact of FDI on household welfare using survey data over 2002–2016. The major findings suggested the significant and positive impact of FDI on income per capita, while it can reduce the migration ratio in the country. In another study, [Nguyen \(2019\)](#) analyzed the relationship between inward FDI and local wages in Vietnam during 2009–2013. The results overall indicated that any increase in the number of foreign firms in the country would lead to reduced local wages.

Another group of studies has concentrated on determining influential factors on the FDI in Vietnam. [Schaumburg-Muller \(2003\)](#) investigated the reasons of changes in FDI in Vietnam focusing on local manufacturing sector. The political relationship, national security and local economic power were three roots of changes in this variable. [Huyen \(2015\)](#) tried to employ a survey method in order to explore the factors affecting FDI flow to Thanh Hoa province in the country. The results demonstrated the major roles of availability of resources, infrastructure and financial factors to absorb investment from abroad. [Hanh et al. \(2017\)](#) determined factors in enhancing FDI flows in Vietnam. The paper concluded that investment reforms and transparency are two wings of success of FDI in Vietnam. [Vo \(2018\)](#) highlighted the role of push factors to absorb foreign capitals into Vietnam. Among the influential factors, political

relationship between source and destination targets of investment plays a major role. In a recent study, [Hoang et al. \(2021\)](#) tried to find which factors affect the inward FDI in southern central coast of Vietnam through employing spatial anemometric estimation for data over 2007–2016. They discovered that legal institutions and social security have the largest contribution to the inward FDI.

Considering the aforementioned studies, summarized in [Table 1](#), it is clear that there is a literature gap about the inward FDI pattern of Vietnam. The study of the effect of various variables including green energy consumption on the volume of foreign direct investment in Vietnam has not been seriously carried out so far. Since the earlier studies have proven that FDI is an important challenge of countries, which is debatable for the case of Vietnam as a leading Asian country in the field of FDI attraction, this paper tries to fill this gap using the gravity theory. It also addresses the impact of green energy consumption on FDI inflows in Vietnam which would yield practical policies for the country to promote sustainable FDI and development goals.

3. Data description and methodology

In order to evaluate the sustainable FDI pattern of Vietnam, the gravity theory proposed by [Tinbergen \(1962\)](#) and developed by a large number of scholars (e.g. [Bergstrand, 1985](#); [Bialynicka-Birula, 2015](#); [Rasoulinezhad and Jabalameh, 2019](#)) is employed. The theory of gravity has its origins in physics and can be used in the field of bilateral trade between the two countries. This theory in bilateral trade assumes that the volume of trade between two countries will be directly related to the size of their national economy and inversely related to the geographical distance between them. In recent years, some studies (e.g. [Brenton et al., 1999](#); [Goh et al., 2013](#); [Cieslik, 2019](#)) have used this concept and definition in bilateral FDI between two countries. Mathematically, the basic gravity model of FDI flows from country i to a partner country j can be written as [Equation \(1\)](#):

Author/s	Object	Major findings
Avramov et al. (2021) Pastor (2021)	FDI and sustainable development	Sustainable FDI ensures continuous development of sustainable development goals in countries FDI can make firms greener by transferring investment to green enterprises
Song et al. (2021)		The positive impact of FDI on environmental protection in China, which is a major insight for the county to combat carbon dioxide emissions FDI is one of the main important determinants of carbon dioxide emissions in Vietnam
Vo and Ho (2021)		The existence of complementary relationship between FDI and exports as well as FDI and imports in Vietnam was proved by empirical estimations The origin of foreign investment has a positive impact on domestic firm's productivity in Vietnam
Anwar and Nguyen (2011a) Ni et al. (2017)	FDI and Vietnam's economic performances	Any increase in the number of foreign firms in the country would lead to reduced local wages
Nguyen (2019)		The political relationship, national security and local economic power are three roots of changes in FDI The major roles of availability of resources, infrastructure and financial factors to absorb investment from abroad
Schaumburg-Muller (2003) Huyen (2015) Vo (2018)	Determining influential factors on the FDI in Vietnam	Political relationship between source and destination targets of investment plays a major role Legal institutions and social security have the largest contribution to the inward FDI
Hoang et al. (2021)		

Source(s): Authors; FDI: foreign direct investment

Table 1.
Summarization of
earlier studies

$$FDI_{ij} = \frac{GDP_i * GDP_j}{Dis_{ij}} \quad (1) \text{ Analysis of the sustainable FDI in Vietnam}$$

where, FDI denotes inward FDI from country i to country j , while GDP and Dis denote economic size of the country and geographical distance between countries i and j , respectively. Based on the existing literature (e.g. Jadhav, 2012; Huyen, 2015; Yang *et al.*, 2020) that determined the factors affecting the volume of FDI, Equation (1), in the form of econometrics including explanatory variables, can be considered as Eq. (2):

$$FDI_{ijt} = \alpha + \alpha_1(GDP_i * GDP_j) + \alpha_2(Ecoin_{ijt}) + \alpha_3(Poin_{ijt}) + \alpha_4(Soin_{ijt}) + \alpha_5(GEC_{ijt}) + \alpha_6(DIS_{ijt}) + \alpha_7(BORDER) + \alpha_8(WTO) + \varepsilon_{it} \quad (2)$$

where, Ecoin, Poin, Soin and GEC represent economic index, political index, social index and green energy consumption for countries, respectively, while Border and WTO are two dummy variables showing the existence of a common geographical border between countries and membership in the World Trade Organization, respectively. The data for this study was gathered annually from 2007 to 2020 for the FDI flow to Vietnam from the major FDI partner of this country. The main reason to select the beginning year of 2007 is the highlighted point of Vietnam joining the WTO. According to Baccini *et al.* (2019), Co *et al.* (2018) and Vu (2016), the year of 2007 is the unique step of Vietnam in the way of globalization and economic openness. In addition, we transform all variables in Equation (2) into logarithmic form to mitigate the existence of heteroscedasticity and change the slope coefficients into elasticity (Rahman and Alam, 2021).

To construct the indices (economic, political and social), principal component analysis (PCA) technique was employed. In general, the variables of the model are as listed in Table 2:

The results of employing the PCA technique which transform the aforementioned variables in Table 1 (inflation rate, bilateral exchange rate and unemployment rate for economic index; control of corruption, rule of law, regulatory quality and government effectiveness for political index; urbanization growth, poverty and age dependency ratio for social index) to an equal number of principal components of economic, political and social indices are reported in Table 3 as follows:

The results prove that there is only one component in each economic, political and social index, which are used as the explanatory variables in the present empirical model.

In addition, to choose the main origins of Vietnam's FDI, the approach of moving average (MA) of FDI shares (2007–2020) is applied to select the 10 main origins of Vietnam's inward FDI. The findings are summarized in Table 4.

To evaluate the signs and magnitudes of coefficients of explanatory variables on sustainable FDI into Vietnam from its main FDI origins, the panel co-integration approach through the Fully Modified Ordinary Least Squares (FMOLS) estimator is employed. This estimator, proposed by Philips and Hansen (1990), has been noted by many scholars (e.g. Hamit-Hagggar, 2012) as the most appropriate panel co-integration estimator due to its ability in fixing the common problems of endogeneity bias and serial correlation. Prior to the estimation, various preliminary analyses should be applied. The first includes the panel unit root tests to find whether all series can be integrated in the same order. In this order, three types of the panel unit root tests, namely Levin, Li and Chu (LLC), ADF–Fisher and Philips–Perron–Fisher (PP–Fisher) statistics, are conducted. Next, the Pedroni panel co-integration containing seven various statistics is used to explore the existence/absence of long-run relationship among variables. If there is a long-run nexus between variables, the panel FMOLS would be used as an estimator of panel co-integration approach. To ensure the reliability of findings, robustness checks are employed using different estimator and control variables. In general, the path of this research can be shown as follows (Figure 3):

Table 2.
Data description of
the model

Variable	Index	unit	Definition	Source
GDP	-	Current US\$	Gross Domestic Product at time t	World Bank (https://data.worldbank.org/)
DIS	-	Kilometers	Geographical distance between two countries at time t	The Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) (http://www.cepii.fr/cepii/en)
BORDER	-	0, 1	The dummy variable, takes 1 if there is a common border between countries i and j , otherwise takes 0	World Bank Maps (https://maps.worldbank.org/)
WTO	-	0, 1	The dummy variable, captures 1 for all the years of membership in the WTO and takes 0 for the rest years	WTO (https://www.wto.org/english/)
FDI	-	Million US\$	inward FDI to Vietnam from its top partners at time t	Ministry of Planning and Investment portal (www.mpi.gov.vn)
Green energy consumption	-	Thousand barrels of oil equivalent per day	Sum of consumptions of solar energy, nuclear energy, wind energy and water energy	Bp statistical review of world energy (www.bp.com)
Inflation rate	Economic index	%	General level of commodities' prices in partner country j at time t	World Bank (https://data.worldbank.org/)
Bilateral exchange rate	-	-	Vietnamese dong/national currency of partner country j at time t	Calculation from the data of World Bank (https://data.worldbank.org/)
Unemployment rate	Political index	%	% of total labor force in partner country j at time t	World Bank (https://data.worldbank.org/)
COR	-	-	Control of corruption in partner country j at time t	World Governance Indicators, World Bank (https://databank.worldbank.org/source/worldwide-governance-indicators)
ROL	-	-	Rule of law in partner country j at time t	World Governance Indicators, World Bank (https://databank.worldbank.org/source/worldwide-governance-indicators)
RQ	-	-	Regulatory quality in partner country j at time t	World Governance Indicators, World Bank (https://databank.worldbank.org/source/worldwide-governance-indicators)
GE	-	-	Government effectiveness in partner country j at time t	World Governance Indicators, World Bank (https://databank.worldbank.org/source/worldwide-governance-indicators)
URB	Social index	%	Urbanization growth in partner country j at time t	World Bank (https://data.worldbank.org/)
POV	-	% of population	Poverty headcount ratio at national poverty lines in partner country j at time t	World Bank (https://data.worldbank.org/)
DR	-	% of working-age population	Age dependency ratio	World Bank (https://data.worldbank.org/)

Source(s): Authors' compilation

Index	Number	Value	Proportion	Cumulative values	Cumulative proportion
Economic	1	2.97	0.990	2.97	0.990
	2	0.02	0.007	2.99	0.997
	3	0.01	0.003	3.00	1.000
Political	1	2.84	0.710	2.84	0.710
	2	0.42	0.105	3.26	0.815
	3	0.38	0.095	3.64	0.910
	4	0.36	0.090	4.00	1.000
Social	1	2.37	0.790	2.37	0.790
	2	0.38	0.127	2.75	0.917
	3	0.25	0.083	3	1.000

Source(s): Authors' compilation from Eviews

Table 3. PCA results

Origin of Vietnam's FDI	Share of Vietnam's FDI
Singapore	40.13
Japan	39.43
South Korea	5.43
China	4.94
The US	3.42
Malaysia	2.55
Taiwan	1.87
Hong Kong	1.45
Indonesia	0.54
Thailand	0.24

Source(s): Authors' compilation

Table 4. Main origins of FDI into Vietnam (MA technique results)

4. Empirical findings and discussion

4.1 Estimation findings

As mentioned in the previous section, some required pre-tests should be performed to discover the appropriate panel estimator. In this regard, first three panel unit root tests, namely LLC, ADF-Fisher and PP-Fisher tests were conducted for all variables (except dummy ones) at levels and first differences. The results of these panel unit tests are reported in Table 5.

The results of panel unit root tests prove that all variables of the present model are nonstationary at levels and become stationary at their first difference. This finding allows for checking the existence of long-run relationship via the Pedroni panel co-integration test. The findings of this test are listed in Table 6 as follows. Note that the majority of all statistical tests are significant at 5%, suggesting the existence of a long-run relationship among the variables.

Furthermore, to confirm the existence of long-run relationship, another panel co-integration test called Kao test (Kao, 1999) is applied. The findings of this test are shown in Table 7, which prove the presence of long-run relationships among variables of the model.

Confirming the existence of long-run co-integration, the empirical estimation to evaluate the signs and magnitudes of the long-run coefficients can be performed through the FMOLS estimator. Table 8 reports the results of the estimation.

According to the estimated coefficients, joint GDP as a proxy for economic size has a significant and positive impact on the Vietnam's FDI from the main origins. With 1% increase in the joint GDP, the FDI into Vietnam from the main country origins may grows by nearly 0.01%. The coefficient for geographical distance between Vietnam and partner country reveals a negative relationship, meaning that near countries are preferable for Vietnam to

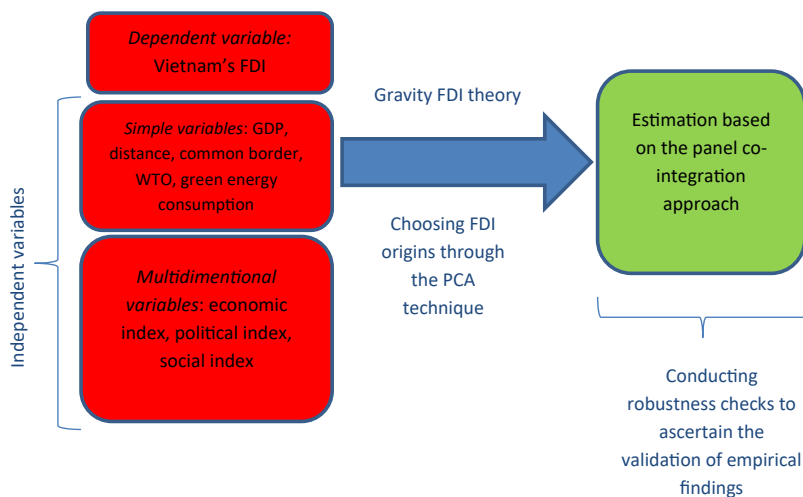


Figure 3.
Research path
framework

Variable	LLC	ADF-Fisher	PP-Fisher	Stationary
LFDI	-0.13 [0.43]	21.84 [0.15]	12.01[0.59]	No
D(LFDI)	-15.45[0.00]	155.69[0.00]	160.43[0.00]	Yes
LGDP	-0.39[0.19]	4.19[0.32]	5.11[0.44]	No
D(LGDP)	-19.11[0.00]	188.55[0.00]	170.58[0.00]	Yes
LECOIN	-0.11[0.51]	4.10[0.43]	5.19[0.21]	No
D(LECOIN)	-149.19[0.00]	186.99[0.00]	194.66[0.00]	Yes
LPOIN	1.04[0.77]	10.54[1.00]	8.58[0.24]	No
D(LPOIN)	-13.16[0.00]	186.58[0.00]	201.43[0.00]	Yes
LSOIN	-0.09[0.57]	38.68[0.89]	14.22[0.24]	No
D(LSOIN)	-19.88[0.00]	144.94[0.00]	153.04[0.00]	Yes
LGEC	-0.014[0.47]	32.15[0.66]	17.73[0.56]	No
D(LGEC)	-108.33[0.00]	123.49[0.00]	144.33[0.00]	Yes

Note(s): 1: Numbers in brackets indicate *p*-values

2: LOFDI, LGDP, LECOIN, LPOIN, LSOIN and LGEC indicate logarithm of FDI into Vietnam, logarithm of GDP, logarithm of economic index, logarithm of political index, logarithm of social index and logarithm of green energy consumption, respectively

Source(s): Authors' compilation

Table 5.
Panel unit root test
findings

receive direct investment there. For economic index, the coefficient was found positive albeit statistically insignificant. Thus, it can be expressed that the variables such as inflation rate, unemployment rate and bilateral exchange rate in a form of unique index cannot play a significant role in boosting/lowering sustainable FDI into Vietnam from the main destinations. Regarding political index, upon 1% increase in this variable, the volume of inward FDI into Vietnam from the partner countries may increase by approximately 0.4%. It may be noted as evidence of importance of stability and improvement of political circumstances (i.e. control of corruption, rule of law, regulatory quality and government effectiveness) in Vietnam and its main origins of FDI. In the case of social index (covering poverty, dependency ratio and urbanization growth), its impact has been positive and statistically significant. This suggests that with 1% increase in this index, the FDI into Vietnam from the main destinations may grow by nearly 0.2%.

In addition, the coefficients of dummy variables have been found positive and statistically significant. The findings show that the existence of common geographical border can improve the Vietnam's inward FDI volume by nearly 9.4% ($9.41\% = \text{Exp}[0.09] - 1$), while membership of the Vietnam's FDI sources in WTO promotes the inward FDI into Vietnam by approximately 5.1% ($5.12\% = \text{Exp}[0.05] - 1$). In other words, analysis of membership in WTO as a proxy for globalization and common border as a proxy for The FDI neighborhood policy demonstrates that globalization (based on the magnitude of WTO accession's coefficient) is less effective than the FDI neighborhood policy (existence of common border) for Vietnam's sustainable FDI promotion. Regarding green energy consumption as a proxy for green economy, the results revealed that enhancing the contribution of green energy consumption to the total energy consumption basket of Vietnam may be defined as a stimulator of investment of other countries into Vietnam. Due to the importance of reaching the SDGs defined by the United Nations in 2015, many countries such as Vietnam consider different facilities and encouraging policies to attract foreign investment in their green projects.

4.2 Robustness check

To ensure the validation and reliability of estimated coefficients through the FMOLS estimator, two different robustness checks using other estimator and control variables are conducted as well.

	Statistic	Prob	Weighted statistic	Prob
Panel <i>v</i> -statistic	-3.15	0.94	-4.19	1.00
Panel rho-statistic	6.17	1.00	5.18	1.00
Panel PP-statistic	-2.43*	0.00	-7.19*	0.00
Panel ADF-statistic	-1.22*	0.02	-3.75*	0.00
Group rho-statistic	7.05	0.99	-	-
Group PP-statistic	-11.54*	0.00	-	-
Group ADF-statistic	-1.45*	0.03	-	-

Note(s): (*) indicates statistical significance at the 5% level

Source(s): Authors' compilation

Table 6. Co-integration test results

ADF statistics	-1.388* (0.084)
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Note(s): * indicates the significant level at 10% and number in parenthesis is *p*-value

Source(s): Authors' compilation

Table 7. Kao integration test

Dependent variable	Explanatory variable	Coefficient	<i>t</i> -stat	<i>p</i> -value
FDI	Joint GDP	0.01	38.54	0.02
	Geographical distance	-0.21	15.22	0.00
	Economic index	0.11	4.33	0.13
	Political index	0.42	34.33	0.01
	Social index	0.29	14.98	0.00
	Green energy consumption	0.14	33.44	0.01
	Common border (BORDER)	0.09	59.43	0.04
	WTO Accession (WTO)	0.05	22.66	0.02

Source(s): Authors' compilation

Table 8. FMOLS estimation results

The first robustness check is performed using an alternative estimation approach through the proposed theory of Dynamic OLS (DOLS) by [Stock and Watson \(1993\)](#). [Table 9](#) reports the results of the panel DOLS estimation approach. It can be concluded from [Table 9](#) that all the signs of coefficients are similar to the results by FMOLS, thus validating the empirical findings.

To conduct another robustness check, the strategy of changes of explanatory variables is followed. In this regard, GDP per capita (in current US\$ from <https://data.worldbank.org>), Gini index (<https://data.worldbank.org>) and free trade agreement (FTA) (as dummy variable) are replaced with GDP, Social index and WTO Accession in the model and the estimations are calculated using FMOLS. The findings are listed in [Table 10](#).

The signs of coefficients are in line with the estimated coefficients listed in [Table 8](#). The only difference is the significant coefficient of economic index, which becomes significance at 10% level. Further, the coefficient of FTA (as a proxy for openness) is positive suggesting that signing any FTA between Vietnam and its origins for FDI may promote the Vietnam's sustainable FDI volume. This finding is similar to [Doan and Xing \(2018\)](#) and [Dang and Yeo \(2018\)](#) who proved the efficiency of FTAs for Vietnam's economy.

The third robustness check was done to ensure the validity of the dependent variable (inward FDI into Vietnam). To this end, net inflows of FDI (BoP, current US\$) from World Bank database (<https://data.worldbank.org/indicator/BX.KLT.DINV.CD.WD>) were collected and considered as dependent variable in [Equation \(2\)](#). The estimation results from the FMOLS estimator are reported in [Table 11](#). The estimated coefficients have similar signs with the findings reported in [Table 8](#). Hence, we can conclude the validation of dependent variable.

Table 9.
DOLS estimation
results (first
robustness check)

Dependent variable	Explanatory variable	Coefficient	<i>t</i> -stat	<i>p</i> -value
<i>FDI</i>	Joint GDP	0.18	29.65	0.08**
	Geographical distance	-0.01	19.05	0.01*
	Economic index	0.00	5.32	0.69
	Political index	0.09	40.19	0.04*
	Social index	0.18	19.06	0.01*
	Green energy consumption	0.04	23.95	0.00*
	Common border (BORDER)	0.05	20.44	0.00*
	WTO Accession (WTO)	0.04	49.16	0.01*

Note(s): * and ** denotes significance level at 5% and 10%, respectively

Source(s): Authors' compilation

Table 10.
FMOLS estimation
with control variables'
substitution (second
robustness check)

Dependent variable	Explanatory variable	Coefficient	<i>t</i> -stat	<i>p</i> -value
<i>FDI</i>	GDP per capita	0.26	44.19	0.00*
	Geographical distance	-0.15	25.10	0.04*
	Economic index	0.01	34.29	0.09**
	Political index	0.15	75.90	0.06**
	Gini index	-0.18	51.85	0.07**
	Green energy consumption	0.08	32.94	0.05*
	Common border (BORDER)	0.02	31.29	0.03*
	Free Trade Agreement (FTA)	0.06	21.77	0.00*

Note(s): * and ** denotes significance level at 5 and 10%, respectively

Source(s): Authors' compilation

4.3 Discussion

According to the estimation findings, the economic size and geographical distance are two influential factors to promote the Vietnam’s sustainable FDI. Regarding the economic size, the CNBC (2021) addresses the Vietnamese economy as the top-performing Asian economy in 2020, which is better even than China. Such an economic boom in Vietnam in 2020 and 2021, when most of the world’s economies have in recession due to the outbreak of COVID, was caused by various reforms in the service sector, exports of manufacturing sector and supply chain reallocation from China into this country. Thus, it seems that Vietnam’s FDI trend will be positive in terms of its economic growth in the future. In addition, the significant impacts of geographical distance and the presence of common border on the Vietnam’s sustainable FDI volume may be considered as “FDI neighborhood policy”, which is the modified version of European Neighborhood Policy. China as one of the main origins of the Vietnam’s FDI has common geographical border with the country, while Indonesia, Thailand and Malaysia are three other main origins of Vietnam’s FDI, which have maritime borders with Vietnam. On the other hand, Singapore, Japan and South Korea are other three advanced Asian economies with significant FDI in Vietnam with a geographical distance advantage.

The contributions of outward FDI to the GDP of Vietnam’s neighbor countries are another important signal for the country’s FDI policy. According to World Bank database, as reported in Table 12, Singapore, Hong Kong and Japan are three major origins of FDI into Vietnam with the highest contributions of outward FDI to their GDP, meaning that there are more FDI potentials from these nations for investment in Vietnam. Furthermore, in general, the contributions of outward FDI to GDP in neighboring countries of Vietnam have increased over the last decade, which is a desirable signal for Vietnam to provide more attractive projects for its neighboring nations.

Other important influential factors are political and social circumstances in FDI origins of Vietnam, which provide significant and positive impacts on the country’s OFDI volume. With

Dependent variable	Explanatory variable	Coefficient	t-stat	p-value
<i>Net inflows of FDI</i>	Joint GDP	0.21	24.54	0.00
	Geographical distance	-0.02	34.58	0.02
	Economic index	0.19	4.43	0.04
	Political index	0.18	19.76	0.00
	Social index	0.41	60.43	0.02
	Green energy consumption	0.06	43.77	0.04
	Common border (BORDER)	0.02	27.06	0.01
	WTO Accession (WTO)	0.07	39.07	0.00

Source(s): Authors’ compilation

Table 11. FMOLS estimation results

Country	2010	2015	2017	2018	2019
China	0.952	1.576	1.123	1.029	0.958
Hong Kong	43.050	25.377	29.820	20.739	10.403
Indonesia	0.554	1.0541	0.197	0.613	0.398
Japan	1.383	3.113	3.523	3.180	5.0197
South Korea	2.466	1.616	2.0979	2.215	2.139
Malaysia	6.018	3.498	1.757	1.607	2.064
Singapore	14.764	14.682	18.897	5.860	13.509
Thailand	2.383	1.243	3.115	3.428	1.863

Source(s): Authors’ compilation from the World Bank database

Table 12. Contribution of outward FDI to GDP (2010–2019, %)

regard to political situation of Southeast Asian region, there remain some potential challenges such as the Mekong region and domestic political tensions in Myanmar and Thailand, which affect the quality and quantity of FDI flows in the region. In addition, good governance is the missing link in political stability in the region. According to [Othman *et al.* \(2014\)](#), [Williams \(2020\)](#) and [Yanuardi *et al.* \(2021\)](#), the Southeast Asian economies suffer from poor governance indicators such as corruption. This may create uncertainty for foreign investors and increase the region's risk for investment.

5. Conclusions and policy implications

5.1 Concluding remarks

Sustainable FDI, as an important factor of boosting economic growth, regional integration, promotion of infrastructural projects, as well as cause of job creation and employment, has become a major priority of national economic system of countries. This factor is even more important for the developing economies of Asia, which are the drivers of world economic growth in the COVID and post-COVID era. This study examined the sustainable FDI pattern of Vietnam as a leading country with potential for economic growth and convergence through FDI. To empirically analyze the Vietnam's sustainable FDI model, a panel data framework for the main 10 origins of Vietnam's FDI for a large data from 2007 to 2020 was employed. The progress of choosing explanatory variables was based on principles of gravity theory and the results of existing literature. In doing so, three different panel unit root tests were conducted to explore the order of integration. The existence of long-run relationship among variables was tested using the Pedroni and Kao panel co-integration approaches. Finally, the long-run coefficients of variables were estimated employing the FMOLS. To assess the validation of empirical results, another estimator called DOLS and the strategy of control variables' substitution were employed. The empirical findings revealed the positive role of gross domestic product (GDP), political stability, good governance, social situations and green energy consumption in promoting the Vietnam's sustainable FDI from the main origins, while geographical distance as a proxy for transportation cost showed a negative coefficient. Furthermore, the existence of common border plays a major role in the Vietnam's FDI pattern. In addition, globalization and economic openness can be addressed as two main accelerators of the Vietnam's inward FDI volume.

5.2 Practical policy implications

Based on the empirical results, the following practical policies can be suggested:

- (1) Since the positive impact of GDP (and GDP per capita through robustness check) on the Vietnam's sustainable FDI has been proved, it is recommended for Vietnamese policy makers to issue some strategies and action plans to reach sustainable economic growth under the consequences of the COVID-19. To this end, policies to promote social capabilities and to support vulnerable households as well as SMEs under the COVID-19 can be practical and fruitful.
- (2) Since political and social circumstances of the FDI origins have positive impacts, Vietnam may prioritize the sources of FDI based on the political and social situations. To this end, consideration of governance indicator in destinations can be highlighted as a major element of prioritization to have a more sustainable FDI pattern.
- (3) Since we observed the positive impact of common border and free trade agreement (through robustness check) on the volume of the Vietnamese inward FDI, following the strategies of multilateralism and regionalism are highly recommended. Furthermore, as a novel strategy, launching "FDI neighborhood policy" is

proposed for Vietnam and neighboring countries. Under this novel policy, Vietnam and its neighbors can foster unification, stability and prosperity in the FDI flows.

- (4) Developing the FTAs between Vietnam and other nations can be noted as a fruitful policy under the COVID-19. Although currently Vietnam has various FTAs with different countries and blocs (e.g. ASEAN Free Trade Area, People's Republic of China, South Korea, Japan, India, New Zealand, the European Union) which have played an important role in economic and trade liberalization, i.e. the globalization of the Vietnamese economy (Vu, 2016; Nga, 2020), these FTAs need more improvement and adaptation in various fields such as rules of origin which have been addressed as an obstacle against the Vietnamese FTAs efficiency (e.g. see Doan and Xing, 2018).

5.3 Limitations and recommendations for future studies

There were limitations in conducting this research. One of the main limitations was the lack of quarterly or monthly data of variables to determine the coefficients of explanatory variables more accurately. The lack of data for 2021 also hindered the analytical approach to the effects of the COVID-19 pandemic on Vietnam's FDI model in this article. The authors of this article believe that this research has made a useful contribution to understanding the pattern of FDI, especially in the Asian country of Vietnam. Nevertheless, the research findings in future studies can be more extensive and comprehensive. Accordingly, studying disaggregating sustainable FDI in industrial, service and agricultural sectors is highly recommended. In addition, use of time series analysis through ARDL for the case of Vietnam may bring some complementary results to this research.

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