The International Journal of Business Management and Technology, Volume 5 Issue 5 September – October 2021
ISSN: 2581-3889

Research Article Open Access

The importance of business environment in logistics transport development: Ho Chi Minh, Vietnam

Vu Thi Kim Hanh (author)
University of Economics and Law, Vietnam National University Ho Chi Minh City

Abstract: There is a variety of factors impact on business environment, they are in different way to impact on. Objective of the paper is to analyse the importance of business environment in logistics transport development by assess three variables are investment of government, foreign investment and economy openness in Ho Chi Minh City, Vietnam (HCM). Author uses Multivariate regression (MR) with time series data between 2010 and 2020. The main findings arewhile investment from the government budgetand foreign investment impact, openness of economy does not impact on Labour goods productivity. While investment from the government budgetand foreign investment impact, openness of economy does not impact on Labour passenger productivity. While foreign investment impacts, investment from the government budgetand openness of economy do not impact on Capital goods productivity. While foreign investment impacts, investment from the government budgetand openness of economy do not impact on Capital passenger productivity. Whileinvestment from the government budgetand foreign investment impact, openness of economy does not impact on Gross domestic products.

Key words: business environment, logistics, transport, development, HCM, Ho Chi Minh City, Vietnam.

I. Introduction

Investment to business environment is considered the official driver of economic growth and the nature of this relationship has been studied in many theoretical and experimental studies. There are many studies distinguish between private investment and public investment, whereby public investment is often thought of as investment in infrastructure. Such a distinction is significant because investment in infrastructure is different from the capital used in enterprises, firms, business activities. Infrastructure is capital that exists outside of a business and supports the economic activities of businesses. As a result, many businesses are in an area get benefits from that infrastructure at no additional cost or at least at a lower cost if the infrastructure has to be made available to users. In addition, the infrastructure can be seen as providing extraneous benefits to those users. This paper analysis the role of investment of government in business environment like logistics transport infrastructure, general administrative and public services in logistics transport sector in Ho Chi Minh City, Vietnam (HCM).

Helde A.D. Hdom, Jose Alberto Fuinhas (2020) found that "Electricity generation, GDP and trade liberalization have both positive and negative effects on Brazil's economy. We also discovered a bi- directional causality between trade openness and all the energies produced in Brazil. Separately, we observed that GDP, hydropower, and renewables have negative effects on the CO2 emissions model, while only emissions of pollution and trade openness have positive effects on the economic growth model". There is a long-run effects of energy-mix, trade openness, research and development on the economic output of G20 countries. Trade openness, research and development are found to be the contributing factors in enhancing economic output for almost countries. The increasing roles of renewable sources are prominent in Argentina, Germany, Indonesia, Italy, the Russian Federation, and the United States; while in Australia, Brazil, Canada, France, Japan, South Korea and Mexico, there is a negative relationship with output (ArjitaSikder, John Inekwe, Mita Bhattacharya, 2019). KaziSohag, Rawshan Ara Begum, Sharifah Mastura Syed Abdullah et al., (2015) foud that "Increasing GDP per capita and trade openness produce a rebound effect of technological innovation on energy use". Through analysis, the efficiency of total logistics transport investment in a sample of 34 countries over the period 1996 to 2010. By evaluating countries according to their ability to achieve the maximum attainable infrastructure quantity and usage for a given investment volume. It is found that the Central European countries, New Zealand and Japan are the

most efficient when investing in transport infrastructure while the Eastern European countries, Russia, Turkey and Mexico are the least. Conclusion is the role of quality of government is positive impact to investment in business environment and the efficiency of logistics transport infrastructure (Andreas P. Kyriacou, Leonel Muinelo-Gallo, Oriol Roca-Sagalés, 2019).

The content of paper has eight sections; section 1, section 2, section 3, section 4, section 5, section 6, section 7 and section 8 areintroduction, literature review, methodology, theoretical basis, data source, study results, discussion and conclusion, respectively.

II. Literature review

Variables of business environment at the sub-national level in explaining firm employment and productivity growth consists of finance and infrastructure, and the existence of a strong agglomeration environment to be critically important (Jose-Daniel Reyes, Mark Roberts, Lixin Colin Xu, 2021). According to Christine ZhenweiQiang, He Wang, L. Colin Xu (2021) that "Four aspects of the business environment are found to be relatively robust by multiple data sources: access to finance, electricity, internet, and human capital. The effects of de jure business environment indicators on firm performances depend on measures of contract enforcement. Foreign-owned firms benefit more from the maintenance of physical safety and ease in obtaining construction permits, gain competitive advantage in productivity when domestic infrastructure or access to finance is worse". Low input costs, easy access to finance and a good level of sophistication and business innovation in a competitive and productive small and medium enterprises sector must be associated with complex and innovative business environments (Erick Ariel Gonzales Rocha, 2012). As in study by Monica Escaleras, Eric P. Chiang (2017) that "Fiscal decentralization improves the business environment and the effect is strongest among lower-income countries".In China, Government plays big role in strengthening environmental protection investment suck as making system innovation on environmental investment, including administrative and financial environmental affairs, giving fair treatment of investor, business environment. Environmental fund for special purposes and environmental taxes (Zhang Wei, Wen Hongyu, Zhang Dandan, 2011). The R&D investment intensity has a significant positive correlation with the financial competitiveness to new energy listed companies in China (Zhihong Zhu, Zhiwei Zhu, Ping Xu et al., 2019). Japanese direct investment in the United States has dramatically increased in the 1980s, particularly since 1985. All the Japanese direct investment in the United States that is more than 60% occured in the second half of the decade. Export promotional activities of state government are effective in attracting Japanese investments (Masaaki Kotabe, 1993). The role of government in promoting private investment that can be assessed through two dimensions which are size of government and governance quality. Public governance remains a big challenge in Vietnam's private sector development policies. Changes of public governance quality is crucial to improve the effects of government size on private investment (Thanh DinhSu, Thi Mai Hoai Bui, 2017).

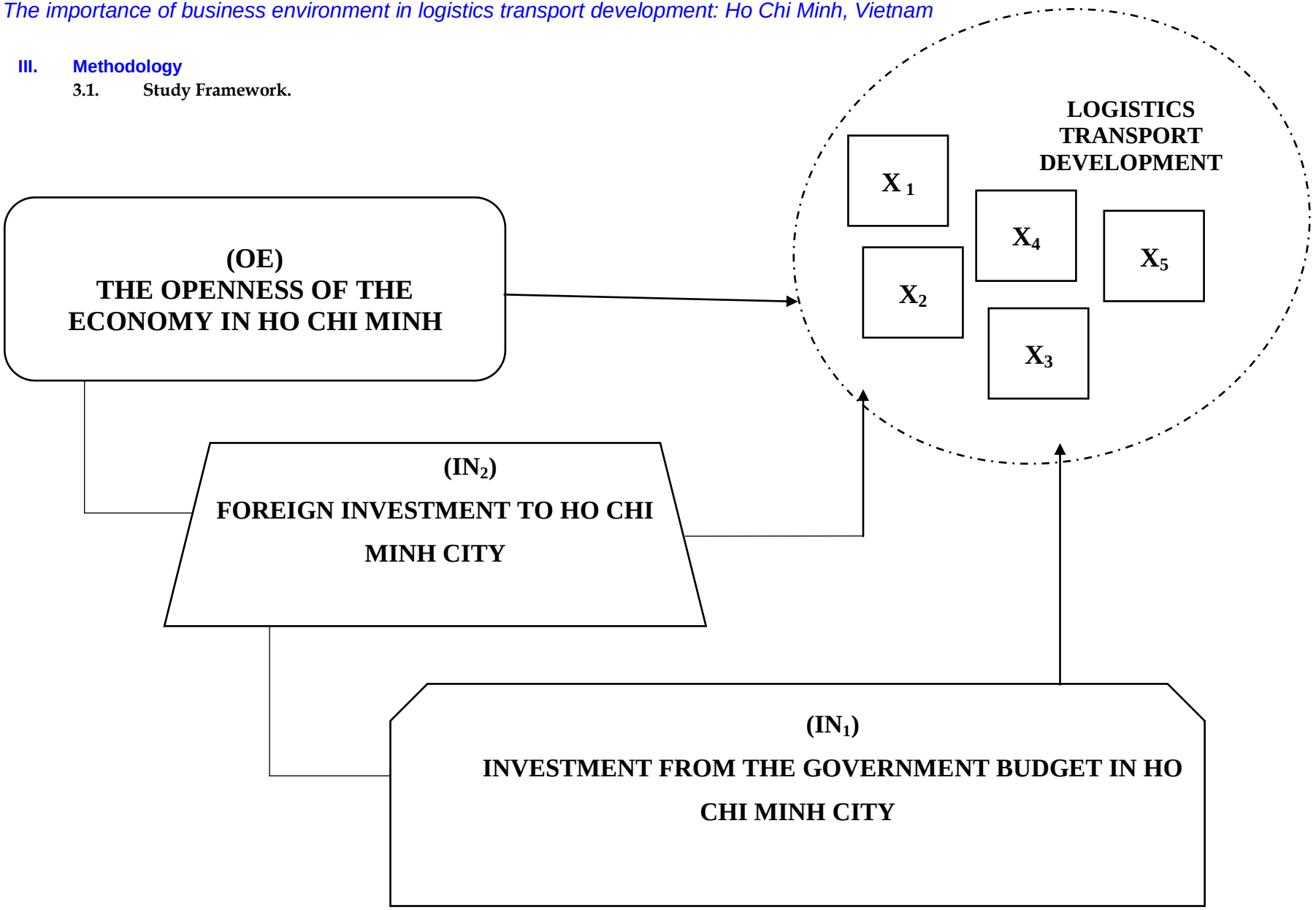
Regulation Policies, Service Policies, investmennt and the general attitude of the government have significant effects on outward foreign direct investment in China at the national level (Tong Yin, Lisa De Propris, Liza Jabbour, 2021).

Foreign investment's choice in local level is changed by emission reduction target at city-level vary and environmental regulation helps improve the structure of foreign direct investment and contributes to business environment and industrial upgrading in the economy (Yuan Xu, Yanrui Wu, Yongli Shi, 2021). Dynamic institutional changes that impact at the actor level, which are largely neglected in research on the role of institutional change in foreign direct investment. German firms have long-term investment relationships in Turkey, such these relationships are impacted by both formal and informal institutions to respond to risks arising from shocks at a formal institutional level (Philip Völlers, Nuri Yavan, Martin Franz, 2021). According to Andrzej Cieślik, Mahdi Ghodsi (2021) that "The empirical evidence suggests that better economic sentiments in an uropean Union Member State attract multinational enterprises to undertake foreign direct investment in that country, while worse economic sentiments in European Union Member State motivatemultinational enterprises in that country to invest abroad". foreign investments and firm value are negatively associated. Foreign investments are negatively related to firm performance at short and long terms. Foreign investments reduce revenue growth but do not have effect in firm efficiency. It is understood that simply increasing foreign investments does not mean necessarily enhance revenue growth or firm efficiency (NapapornLikitwongkajon, ChaipornVithessonthi, 2020). The importance of foreign investment and concentration of firms with foreign investments to increase business competitiveness. It is also important investment zones to attract concentration of global firms and necessity for coordination and synchronization between municipalities and with international stakeholders at the megacity level (AdiwanF.Aritenang, 2021). Foreign Direct Investment is important part in the economic growth of developing Asia and logistics capability, foreign direct Investment is impacted by location choice (Keng Lin Soh, Wai Peng Wong, ChorFoonTang, 2021). Betsy M. Oloyede, Evans S. Osabuohien, Jeremiah O. Ejemeyovwi, (2021) said that "There is a positive but insignificant nexus between economic growth rate and trade openness in both the combined simulated Economic Community of West African States and Southern African Development Community and the

individual regional economic communities. The government and other relevant stakeholders should ensure policies are enacted and enforced to transmit the experienced economic growth into substantial trade gains and further trade openness in Economic Community of West African States and Southern African Development Community". CO2 emissions, population density and trade openness negatively affect the economic growth in South Asia. There is a bidirectional causality between economic growth and CO2 emissions, and between trade openness and CO2 emissions. And there is a unidirectional causality running from trade openness to economic growth (Mohammad Mafizur Rahman, KaisSaidi, Mounir Ben Mbarek, 2020). Gideon Kwaku MinuaAmpofo, Jinhua Cheng, Daniel Akwasi Asante et al., (2020) indicate that "A positive shock to trade openness has a positive impact on economic growth in most of the countries. It is recommended the implementation of more trade liberalization policies to maximize the benefits from trade openness, especially in the countries where the "natural resource curse phenomenon reported".

III. Methodology

3.1. Study Framework.



3.2. Variables of study framework.

Independent variables:

IN_1 is investment from the government budget in HCM, unit is billion Vietnam Dong.

IN_2 is foreign investment in HCM, unit is thousand US Dollar.

OE is openness of economy in HCM.

Dependent variables:

Labour goods productivity (X_1):

$$X_1 = \frac{Total\ volume\ of\ goods\ have\ been\ transported}{Total\ number\ of\ human\ resource}$$

Labour passenger productivity (X_2):

$$X_2 = \frac{Total\ number\ of\ passenger\ have\ been\ transported}{Total\ number\ of\ human\ resource}$$

Capital goods productivity (X_3):

$$X_3 = \frac{Total\ volume\ of\ goods\ have\ been\ transported}{Total\ captal}$$

Capital passenger productivity (X_4):

$$X_4 = \frac{Total\ number\ of\ passenger\ have\ been\ transported}{Total\ capital}$$

Gross domestic products (X_5):

As by definition of HCM statistics department that"GDP of HCM transport logistics is the total transport logistics product in HCM, which are carried out by production and business units residing in HCM. X_5 is calculated by equal to the total value added at the base prices of all economic activities plus product taxes minus product subsidies".

3.3. Multivariate regression model.

$X_1 = i_0 + i_1IN_1 + i_2IN_2 + i_3OE + j$ (1)

$X_2 = i_0 + i_1IN_1 + i_2IN_2 + i_3OE + j$ (2)

$X_3 = i_0 + i_1IN_1 + i_2IN_2 + i_3OE + j$ (3)

$X_4 = i_0 + i_1IN_1 + i_2IN_2 + i_3OE + j$ (4)

$X_5 = i_0 + i_1IN_1 + i_2IN_2 + i_3OE + j$ (5)

Where

i_o is the intersection of vertical axis and lines of regression.

j is other factors which are notIN_1, IN_2, OEthat this paper does not have analysis.

Based on Keshab Bhattarai (2015, p. 55) and Jeffrey M. Wooldridge (2020, p. 126) that is below:

$i_o + i_1 + i_2 + i_3 = 0$ is to mean that (1), (2), (3), (4) and (5)are not built suitably to the input data and it does not have statistics significance.

$i_o + i_1 + i_2 + i_3 \neq 0$ is to mean (1), (2), (3), (4) and (5) are built suitably to the input data and it has statistics significance.

$i_o + i_1 + i_2 + i_3 > 0$ means IN_1, IN_2, OEimpact on X_1, X_2, X_3, X_4, X_5, respectively and separately.

$i_o + i_1 + i_2 + i_3 <= 0$ means IN_1, IN_2, OE do not impact on X_1, X_2, X_3, X_4, X_5, respectively and separately.

IV. Theoretical basis

4.1. Government investment.

Base on World Bank's definition that Government investment is "General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defence and securitybut excludes government military expenditures that are part of government capital formation."

4.2. Foreign investment.

According to World Bank, "Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy. Ownership of 10 percent or more of the ordinary shares of voting stock is the criterion for determining the existence of a direct investment relationship. Data are in current U.S. dollars".

4.3. Openness of economy.

Based on definition of Vietnamese Government, openness of economy is calculated by two methods:

$$OE = \frac{Total\ export\ turnover}{GDP} \quad \text{(Method 1)}$$

$$OE = \frac{Total\ export\ turnover\ and\ service}{GDP} \quad \text{(Method 2)}$$

Author uses method 1 for this paper.

V. Data source

All data are from HCM Statistics Department and HCM Statistical Yearbook.

VI. Study results

Table 1: Results of MR models for relations between (1) IN_1+ IN_2+ OE and X_1, (2) IN_1+ IN_2+ OE and X_2, (3) IN_1+ IN_2+ OE and X_3

(1) IN_1+ IN_2+ OE and X_1				(2) IN_1+ IN_2+ OE and X_2				(3) IN_1+ IN_2+ OE and X_3			
R square (RS)		0.86341502 (86%)		R square (RS)		0.5838768 (58%)		R square (RS)		0.42442333 (42%)	
Adjusted R Square (ARS)		0.8048786 (80%)		Adjusted R Square (ARS)		0.40553829 (41%)		Adjusted R Square (ARS)		0.17774761 (18%)	
Significance F (SF)		0.00207255		Significance F (SF)		0.08887196		Significance F (SF)		0.24930864	
Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)	Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)	Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)
	i_0	1.03053683	0.00178384		i_0	0.07842556	0.11843926		i_0	0.8793584	0.0380915
IN_1	i_1	3.748E-06	0.40505915	IN_1	i_1	1.0861E-06	0.25889031	IN_1	i_1	-2.663E-06	0.71154606
IN_2	i_2	6.5123E-07	0.66766874	IN_2	i_2	3.3274E-07	0.30950351	IN_2	i_2	2.3215E-06	0.36104738
OE	i_3	-14.485969	0.00180603	OE	i_3	-0.7308247	0.27771337	OE	i_3	-9.186351	0.10051693

Table 1gives information ofthe results:

(1) IN_1+ IN_2+ OE and X_1:

RS = 0.86341502 (86%), ARS = 0.8048786 (80%) to tell the output of regression is explained 80% of input data. $i_o + i_1 + i_2 + i_3$ = -13.45542798 ≠ 0, it defines that MR model was built to be suitableto the input data and has statistics significance is 0.00207255.

Value of Coefficients>0 consists of i_1 = 3.748E-06 and i_2 = 6.5123E-07 which is evidence to confirm that $IN_1$and IN_2impact on X_1

Value of Coefficients < 0 is i_3= -14.485969 that means OE does not impact on X_1

(2) IN_1+ IN_2+ OE and X_2

RS = 0.42442333 (42%), ARS = 0.40553829 (41%) to tell the output of regression is explained 41% of input data. $i_o + i_1 + i_2 + i_3$ = -0.652397693 ≠ 0, it defines that MR model was built to be suitable to the input data and has statistics significance is 0.08887196.

Value of Coefficients> 0 consists of i_1= 1.0861E-06 and i_2= 3.3274E-07 which is evidence to confirm that $IN_1$and IN_2impact on X_2

Value of Coefficients < 0 is i_3= -0.7308247 that means OE does not impact on X_2

(3) IN_1+ IN_2+ OE and X_3

RS = 0.86341502 (86%), ARS = 0.17774761 (18%) to tell the output of regression is explained 18% of input data. $i_o + i_1 + i_2 + i_3$ = -8.306992931 ≠ 0, it defines that MR model was built to be suitable to the input data and has statistics significance is 0.24930864.

Value of Coefficients> 0 consists of i_2 = 2.3215E-06 which is evidence to confirm thatIN_2impacts on X_3

Value of Coefficients < 0 isi_1 = -2.663E-06 anddi_3 = -9.186351 that means $IN_1$and OE do not impact on X_3

Table 2: Results of MR models for relations between (4) IN_1+ IN_2+ OE and X_4, (5) IN_1+ IN_2+ OE and X_5

(4) IN_1+ IN_2+ OE and X_4				(5) IN_1+ IN_2+ OE and X_5			
R square (RS)		0.54139804 (54%)		R square (RS)		0.92410747 (92%)	
Adjusted R Square (ARS)		0.34485435 (34%)		Adjusted R Square (ARS)		0.8915821 (89%)	
Significance F (SF)		0.12173916		Significance F (SF)		0.00027195	
Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)	Independent variables	Coefficients	Value of Coefficients (VC)	P-Value (PV)
	i_0	0.06489551	0.08003114		i_0	67965.2093	0.09562426
IN_1	i_1	-6.749E-08	0.91847755	IN_1	i_1	2.65991428	0.00710354
IN_2	i_2	5.8534E-07	0.03162315	IN_2	i_2	0.38687904	0.15576912
OE	i_3	-0.0297656	0.94875867	OE	i_3	-2085574.5	0.00407097

(4) IN_1+ IN_2+ OE and X_4

RS = 0.54139804 (54%), ARS = 0.34485435 (34%) to tell the output of regression is explained 34% of input data. $i_o + i_1 + i_2 + i_3 = 0.035130392 \neq 0$, it defines that MR model was built to be suitable to the input data and has statistics significance is 0.00027195.

Value of Coefficients> 0 consists of i_2 = 5.8534E-07 which is evidence to confirm that IN_2impacts on X_4

Value of Coefficients < 0 is i_1 = -6.749E-08 and i_3 = -0.0297656 that means $IN_1$and OE do not impact on X_4

(5) IN_1+ IN_2+ OE and X_5

RS = 0.92410747 (92%), ARS = 0.8915821 (89%) to tell the output of regression is explained 89% of input data. $i_o + i_1 + i_2 + i_3$ = -2017606.289 ≠ 0, it defines that MR model was built to be suitable to the input data and has statistics significance is 0.24930864.

Value of Coefficients> 0 consists of i_1 = 2.65991428 and i_2 = 0.38687904 which is evidence to confirm that $IN_1$and IN_2impact on X_5.

Value of Coefficients < 0 is i_3 = -2085574.5 that means OE does not impact on X_5

VII. Discussion

From MR results are described in section 6, (1) IN_1+ IN_2+ OE and X is explained 80% of input data, $IN_1$and IN_2impact on X_1, OE does not impact on X_1. (2) IN_1+ IN_2+ OE and X_2 is explained 41% of input data, $IN_1$and IN_2impact on X_2, OE does not impact on X_2. (3) IN_1+ IN_2+ OE and X_3 is explained 18% of input data, IN_2impacts on X_3, $IN_1$and OE do not impact on X_3. (4) IN_1+ IN_2+ OE and $X_4$is explained 34% of input data, IN_2impacts on X_4, $IN_1$and OE do not impact on X_4. (5) IN_1+ IN_2+ OE and $X_5$is explained 89% of input data, $IN_1$and IN_2impact on X_5, OE does not impact on X_5

VIII. Conclusion

Based on section 6 of study results and section 7 for discussion, the conclusion is (IN_1) investment from the government budgetand (IN_2) foreign investment impact on (X_1) Labour goods productivity, (OE) openness of economy in HCM does not impact on (X_1) Labour goods productivity. (IN_1) investment from the government budgetand (IN_2) foreign investment impact on (X_2) Labour passenger productivity, (OE) openness of economy does not impact on (X_2) Labour passenger productivity.(IN_2) foreign investment impacts on (X_3) Capital goods productivity, (IN_1) investment from the government budgetand (OE) openness of economy do not impact on (X_3) Capital goods productivity. (IN_2) foreign investment impacts on (X_4) Capital passenger productivity, (IN_1) investment from the government budgetand (OE) openness of economy do not impact on (X_4) Capital passenger productivity.(IN_1) investment from the government budgetand (IN_2) foreign investment impact on (X_5) Gross domestic products, (OE) openness of economy does not impact on (X_5) Gross domestic products.

Acknowledgement:("This research is funded by University of Economics and Law, Vietnam National University Ho Chi Minh City / VNU-HCM").

Reference

[1.] Jose-Daniel Reyes, Mark Roberts, Lixin Colin Xu, 2021. The heterogeneous growth effects of the business environment: Firm-level evidence for a global sample of cities. China Economic Quarterly International 1 (2021) 15–28.

[2.] Christine ZhenweiQiang, He Wang, L. Colin Xu, 2021.

[3.] Ownership, Enforcement, and the Effects of Business Environment. Journal of Government and Economics 2 (2021) 100007.

[4.] Erick Ariel Gonzales Rocha, 2012. The Impact of the Business Environment on the Size of the Micro, Small and Medium Enterprise Sector; Preliminary Findings from a Cross-Country Comparison. Procedia Economics and Finance 4 (2012) 335 - 349.

[5.] Monica Escaleras, Eric P. Chiang, 2017. Fiscal decentralization and institutional quality on the business environment. Volume 159, October 2017, Pages 161-163.

[6.] Zhang Wei, Wen Hongyu, Zhang Dandan, 2011. Discussion on the Role of Chinese Government in Strengthening Environmental Protection Investment. Energy Procedia 5 (2011) 250–254.

[7.] Zhihong Zhu, Zhiwei Zhu, Ping Xu et al., 2019. Exploring the impact of government subsidy and R&D investment on financial competitiveness of China's new energy listed companies: An empirical study. Energy Reports 5 (2019) 919–925.

[8.] Andreas P. Kyriacou, Leonel Muinelo-Gallo, Oriol Roca-Sagalés, 2019. The efficiency of transport infrastructure investment and the role of government quality: An empirical analysis. Volume 74, February 2019, Pages 93-102.

[9.] Masaaki Kotabe, 1993. The promotional roles of the state government and Japanese manufacturing direct investment in the United States. olume 27, Issue 2, June 1993, Pages 131-146.

[10.] Thanh DinhSu, Thi Mai Hoai Bui, 2017. Government size, public governance and private investment: The case of Vietnamese provinces. Volume 41, Issue 4, December 2017, Pages 651-666.

[11.] Tong Yin, Lisa De Propris, Liza Jabbour, 2021. Assessing the effects of policies on China's outward foreign direct investment. Available online 12 March 2021, 101818.

[12.] Yuan Xu, Yanrui Wu, Yongli Shi, 2021. Emission reduction and foreign direct investment nexus in China. Journal of Asian Economics 74 (2021) 101305.

[13.] Philip Völlers, Nuri Yavan, Martin Franz, 2021. The reaction of foreign firms to institutional changes: The case of German direct investment in Turkey. Volume 134, September 2021, 102503.

[14.] Andrzej Cieślik, Mahdi Ghodsi, 2021. Economic Sentiment Indicators and Foreign Direct Investment: Empirical Evidence from the European Union Countries. International Economics. Available online 6 July 2021. https://doi.org/10.1016/j.inteco.2021.07.001.

[15.] NapapornLikitwongkajon, ChaipornVithessonthi, 2020. Do foreign investments increase firm value and firm performance? Evidence from Japan. Research in International Business and Finance. Volume 51, January 2020, 101099. https://doi.org/10.1016/j.ribaf.2019.101099.

[16.] AdiwanF.Aritenang, 2021. The contribution of foreign investment and industrial concentration to firm competitiveness in Jakarta Megacity. Cities. Volume 113, June 2021, 103152. https://doi.org/10.1016/j.cities.2021.103152.

[17.] Keng Lin Soh, Wai Peng Wong, ChorFoonTang, 2021. The role of institutions at the nexus of logistic performance and foreign direct investment in Asia. The Asian Journal of Shipping and Logistics. Volume 37, Issue 2, June 2021, Pages 165-173.

[18.] Betsy M. Oloyede, Evans S. Osabuohien, Jeremiah O. Ejemeyovwi, 2021. Trade openness and economic growth in Africa's regional economic communities: empirical evidence from ECOWAS and SADC. Heliyon 7 (2021) e06996.

[19.] Mohammad Mafizur Rahman, KaisSaidi, Mounir Ben Mbarek, 2020. Economic growth in South Asia: the role of CO2 emissions, population density and trade openness. Heliyon 6 (2020) e03903.

[20.] Gideon Kwaku MinuaAmpofo, Jinhua Cheng, Daniel Akwasi Asante et al., 2020. Total natural resource rents, trade openness and economic growth in the top mineral-rich countries: New evidence from nonlinear and asymmetric analysis. Resources Policy. Volume 68, October 2020, 101710.

[21.] Helde A.D. Hdom, Jose Alberto Fuinhas, 2020. Energy production and trade openness: Assessing economic growth, CO2 emissions and the applicability of the cointegration analysis. Energy Strategy Reviews 30 (2020) 100488.

[22.] ArjitaSikder, John Inekwe, Mita Bhattacharya, 2019. Economic output in the era of changing energy-mix for G20 countries: New evidence with trade openness and research and development investment. Applied Energy. Volume 235, 1 February 2019, Pages 930-938.

[23.] KaziSohag, Rawshan Ara Begum, Sharifah Mastura Syed Abdullah et al., 2015. Dynamics of energy use, technological innovation, economic growth and trade openness in Malaysia. Energy. Volume 90, Part 2, October 2015, Pages 1497-1507.