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INVESTIGATING THE ECONOMIC RELATIONSHIP BETWEEN PROVINCES IN VIETNAM: A SPATIAL REGRESSION APPROACH

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To develop provincial economies, it is necessary to focus on not only the internal resources of a province but also the relationship among provinces which can lead to the spillover effect throughout the country. This paper examines the economic relationship and spillover effect between provinces in Vietnam by spatial regression approach with data collected from 2010 to 2017 from statistical yearbooks. The results show that there exists a spatial correlation between provinces in terms of provincial gross domestic product, capital investment and labor force. The results also demonstrate that capital and labor factors not only affect the gross domestic product of the host province but also affect the neighboring ones. The finding implies the significant spillover effect between provinces.

Keywords: The Economic Relationship between Provinces, Spillover Effect, Spatial Regression.
JEL Classification: O40, R11, C21

1. INTRODUCTION

Economic development is considered one of the most important objectives of every country, region or province. For this objective, it is required to not only promote efficiency in using the local resources but also concern to spillover effect of inter-regional economic development. A provincial economy can affect or be affected by surrounding provinces through their economic relationships. Understanding the economic relationships among provinces can help policymakers have more statistical evidence to construct and enhance the effective socio-economic development policy. In quantitative research, spatial econometric techniques can measure the economic relationship between provinces.

The term "spatial econometrics" is first introduced by Paelinck and Klaassen (1979) and further analyzed by Anselin (1988). The spatial regression model is based on spatial correlations between regions or countries.

Because of spatial correlations, LeSage (1997, 2008) refer to two important situations leading to the violation of the Gauss-Markov hypothesis. First, spatial interdependence violates the assumption of non-autocorrelation between errors of the regression model. Second, omitting variables that account for spatial effect between regions may cause endogeneity problem.

Moreover, the spatial correlation among provinces is an empirical evidence for the existence of economic diffusion and the spatial regression method provides effective tools to test and quantify this spatial dependence and economic diffusion between localities. Once the correlation between localities is quantified, the results are useful for analyzing, comparing and proposing better decisions and policies. Policymakers need to be aware that a change in policies, technologies, and laws in a host province could affect neighboring provinces and vice versa, the host province could also receive the impact from neighboring localities. Ignoring spatial dependence in empirical settings can result in violating regression model assumptions. The estimated results can be biased, inconsistent or inefficient.

Along with the increased integration around the world (Batten and Vo, 2010; Vo, 2005; Vo et al., 2017). Vietnam is in the process of globalization with both comment challenges and distinguished features (Bui et al., 2018; Nguyen et al., 2018). Various papers investigate different aspects of the Vietnam economy (Vo and Nguyen, 2016). For example, several papers discuss Vietnam trade and integration (Nguyen and Vo, 2017; Vo, 2018b), financial system and financial markets (Batten and Vo, 2016, 2019; Vo and Nguyen, 2017; Vo, 2016, 2017, 2018a, 2018c). There is also an increased volume of papers analyzing several angles of Vietnam stock market (Vo, 2015, 2016, 2019; Vo and Bui, 2016; Vo and Phan, 2016). The economic relationship between regions or countries have been widely examined in the theoretical perspectives, but there is only a very small number of empirical studies investigating the spatial correlation and spillover effect in Vietnam. To this end, this paper is conducted to provide more empirical evidence of the spatial relationship between Vietnam's provinces.

The remaining of the article is organized as follows. Section 2 provides a theoretical overview related to the topic, Section 3 outlines research data and methodology, Section 4 presents the data analysis results and discussions; Section 5 summarizes the findings and suggests some implications for the policymaking process.

2. LITERATURE REVIEW

In the current literature, economic linkages between provinces are widely examined by various scholars using analysis of economic spillover or diffusion effects. For example, David and Rosenbloom (1990), argue that foreign enterprises are likely to invest in a certain region which shares the technologies, production techniques, management skills, and marketing skills with the host regions and this causes spillover effects to the surrounding regions.

Studies examining spillover effects from foreign enterprises to domestic enterprises comprise of three main aspects including technology diffusion, knowledge spillover, and export spread. The diffusion capabilities among neighboring provinces gradually build up similarities in economic and social conditions, which is also referred to as mutual dependence between provinces. Consequently, it is important to apply statistical tools of spatial correlation analysis to investigate the spillover effect between provinces for consistent results.

Ramirez and Loboguerrero (2002) use spatial regression models with a dataset of 98 countries with 270 observations covering the period 1965-1995 to estimate a growth model that includes cross-country interdependence. The results show that economic growth of these countries is affected by neighboring countries. Hence, ignoring the spatial dependences when analyzing economic growth could cause biased results.

Stel and Nieuwenhuijsen (2004) conduct an analysis on the link between knowledge spillovers and economic growth among Dutch regions during the period from 1987 to 1995 using a model of regional growth. The article shows the growth effect of inter-sectoral spillovers but not intra-sectoral spillovers.

Naveed and Ahmad (2016) use adjacent weights and spatial techniques with a dataset covering 204 regions of 16 countries in the European Union for the period 1999-2010. The results show that there is a spillover effect of technology and knowledge among regions in the same country, while there is no evidence of spread among out-of-country regions that share the same border. In addition, the research results show the important role of regional integration in a country to the diffusion of technology and knowledge; while national border regions do not contribute to the increase in the region's aggregate productivity, although there is a free movement of labor and capital among those countries.

Esiyok and Ugur (2018) examine local economic growth and spatial convergence in Vietnam. The study collects data including 238 observations of 63 provinces Vietnam from the General Statistics Office (GSO) and the local Provincial Statistical Yearbook. The research conducts the estimation by Generalized Method of Moment (GMM) and the augmented Solow growth model. The research results show that there exists a spatial correlation of localities on economic growth. This implies that the economic growth of one locality has a positive impact on other localities. In addition, the study shows that the rate of convergence decreases as the distance between neighboring provinces increases.

Ahmad (2019) employs data from 83 countries from 1985 to 2014 and spatial methods to provide evidence of the relationship between globalization and national economic growth. The research uses current GDP per capita, GDP per capita growth rate, total investment, population growth rate, inflation, political institutions, education, and the globalization index. The study uses SAR model under fixed effects (FEM) with adjacent weight matrix, exponential distance weight matrix and some other types of weight matrices. The paper provides evidence to show that globalization has a positive impact on economic growth, and political institution settings play an important role in this relationship. Further, the paper presents evidence of spillover effects of globalization across neighboring countries.

Since the number of studies using spatial regression to investigate the economic relationship and spillover effect between provinces in Vietnam is relatively limited, this paper employs this approach as a contribution for empirical research using the context of provincial level of Vietnam.

3. DATA AND METHODOLOGY

3.1. Data

The province-level data are collected from the Statistical Yearbooks of 63 provinces and GSO for the period from 2010 to 2017. The distance between provinces determined by geographical coordinates is used to construct spatial weight matrix.

3.2. Testing the Spatial Correlation between Provinces

The spatial correlation between provinces in Vietnam on key variables is estimated by Moran's I test and visualized by the Moran scatter plot. These are described as follows.

Assuming *X* is a variable of interest (ie. economic growth), the formula for calculating Moran's I statistic for variable *X* is as follows.

$$I = \frac{n\sum_{i=1}^{n}\sum_{j=1}^{n}\left[w_{ij}(x_i - \bar{x})(x_j - \bar{x})\right]}{\left(\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}\right)\sum_{i=1}^{n}(x_i - \bar{x})^2},$$

where x_i is the value of *X* at i^{th} province; x_j is the value of *X* at j^{th} province; $\bar{x}$ is the mean of *X*. Meanwhile, w_{ij} is the element at i^{th} row and j^{th} column of standardized spatial weight matrix and n is the number of observations.

Because the weight matrix is standardized, the Moran's I statistic is also called standardized Moran's I coefficient. If the Moran's I statistic is statistically significant, there exists a spatial correlation between provinces for the concerned variable. If the Moran's I coefficient is positive, this means that the interested variable is positively correlated and vice versa.

The Moran's I is further visualized by a Moran scatter plot which shows the relationship between the standardized variable (horizontal axis) and its own spatial lagged variable with a standardized weight matrix (vertical axis). The slope of the linear line fitting the scattered data point is the Moran's I coefficient.

When the Moran's I coefficient is positive, it is represented by a straight line with a positive slope that passes through the first and third quadrant. When Moran's I coefficient is negative, the fitted straight line with a negative slope goes through the second and fourth quadrant.

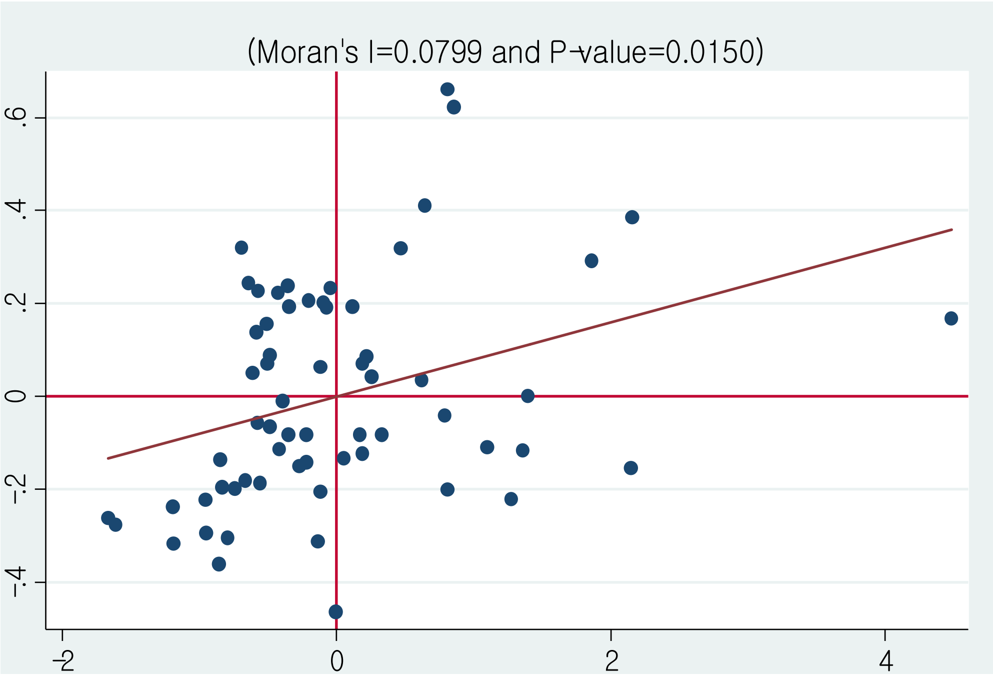

Figure 1. Example of Moran Scatter Plot

3.3. Spatial Regression Model

To be in line with previous studies and based on the availability of data, this paper proposes a regression model to examine economic linkage among provinces in Vietnam. The model with the general form is outlined as follows:

$$Y = \beta_1 + X_1\beta + X_2\gamma + X_3\delta + u, \quad (2)$$

where Y is dependent variable which represents economic growth; X_1 is independent variable which relates to the province's capital; X_2 is independent variable which to the province's labor force; and X_3 is a set of control variables.

The realization of Model (2) is:

$$\ln GRDP = \beta_1 + \beta_2 \ln Capital + \beta_3 \ln Population + \sum_{i=1}^{5} \gamma_i Region_i + \varepsilon_i. \quad (3)$$

The detailed list of variables is shown in Table 1.

Table 1. List of Variables

Factor	No	Symbol	Definition
Economic scale	1	ln*GRDP*	Logarithm of Gross Regional Domestic Product (GRDP, at constant 2010 VND), which is used to measure the scale of provincial economy.
Capital	2	ln*Capital*	Logarithm of total provincial investment capital (at constant 2010 VND)
Labor force	3	ln*Population*	Logarithm of province population, which is used as a proxy for the size of the labor force.
Control variables	4	Region 1	Dummy for provinces in the Red River Delta
	5	Region 2	Dummy for provinces in the Northern Midland and Mountainous region.
	6	Region 3	Dummy for provinces in the North Central and Central Coast
	7	Region 4	Dummy for provinces in the Central Highlands
	8	Region 5	Dummy for provinces in the Mekong Delta

Note: This table shows the definition of variables which are included in the model to investigate the economic linkages between provinces in Vietnam. Data are collected from the GSO statistical yearbooks covering the period from 2010 to 2017.

The spatial Error Model (SEM) for panel data:

$$Y_{it} = X_{it}\beta + \alpha_i + u_{it}, \quad s.t \quad u_{it} = \lambda W u_t + \varepsilon_{it}. \tag{4}$$

Pace et al. (1998) extend the spatial autoregressive model into a new model which not only measures the impact of the spatial lagged dependent variable, but also spatial lagged independent variables to the dependent variable. Then the model becomes a Spatial Durbin Model (SDM).

The Spatial Durbin Model (SDM) for panel data:

$$Y_{it} = \rho W Y_{it} + X_{it}\beta + W X_{it}\delta + \alpha_i + \varepsilon_{it}, \tag{5}$$

where Y_{it} is the dependent variable of province i at time t; $W = (w_{ij})_{nxn}$ is the spatial weight matrix; while WY_{it} is the spatially lagged variable of Y_{it}; and X_{it} is independent variable of province i at time t.

The spatial weight matrix W is in the form of exponential distances calculated by the coordinates of the provincial administrative center, and the exponent is -1. We expect the spatial correlation will be higher for neighboring provinces. This implies that the elements in the weight matrix are the inverse of the distance between the two provinces. The calculations are computed using Stata package.

4. ESTIMATION RESULTS AND DISCUSSTIONS

4.1. Descriptive Statistics

Table 2 describes the annual average of the province's GRDP for each economic region, except for the last column which shows the GRDP annual growth rate for the whole period 2010-2017. In terms of economic size measured by GRDP, the Southeast region is considered as the largest economic region in Vietnam. Particularly, Ho Chi Minh City plays a leading role in promoting economic development in the whole region. Similarly, Hanoi plays a leading role in the Red River Delta. Economic development activities in Hanoi tend to have a spillover effect to other parts of the region. The Central Coast region has a relatively low starting point, but thanks to the efforts of localities in promoting restructuring the provincial economic activities such as shifting priority toward manufacturing industry, tourism, international freight, and fishing, the GRDP growth rate in this region is over 8% per annum.

Table 2. GRDP by Economic Regions

Unit: 1000 billion VND

Regions	Year								Average 2010-2017 (%)
	2010	2011	2012	2013	2014	2015	2016	2017	
- Red River Delta	657.8	729.0	788.8	867.2	936.7	1,027.7	1,121.4	1,237.6	109.4
- Northern Midland and Mountainous region	164.8	175.4	189.8	209.3	236.8	272.7	303.3	333.0	110.6
- North Central and Central Coast	340.8	369.5	398.1	433.0	470.0	527.3	569.8	610.5	108.7
- Central Highlands	97.1	105.0	111.5	119.2	127.1	135.8	145.6	156.9	107.1
- Southeast	1,079.9	1.151.5	1,235.6	1,312.4	1,400.7	1,490.0	1,571.0	1,664.3	106.4
- Mekong Delta	357.7	387.0	413.9	444.0	476.3	506.9	543.9	580.1	107.2

Notes: This table shows descriptive statistics of GRDP for all six economic regions by years. The Southeast and Red River Delta have shown to be the key regions with highest levels of GRDP. However, the GRDP growth rate of the Red River Delta is higher than that of the Southeast. The Central Highlands has the lowest GRDP in the country. Data are collected from the GSO statistical yearbooks covering the period 2010-2017.

The Mekong Delta continues to promote its strength as the center of agricultural production of the country. Regional GDP growth reaches 7.2% per annum on average. In more recent years, the Northern Midland and Mountainous region become more active in attracting FDI. As a result, this region becomes the center for foreign investment in manufacturing and technology. That further contributes to the improvement in economic performance where the relative growth rate is more than 10% per annum.

Provinces which are in the same region can be considered as neighboring provinces where socio-economic conditions are similar, and mutual cooperation between provinces in the same economic region is one of the main causes of a strong spillover effect. This leads to economic linkage between neighboring provinces.

4.2. Results of Moran's I test

Moran's I test for spatial correlation of provincial GRDP with exponential weight matrix is shown in Table 3.

The Moran's I coefficient in Table 3 has a magnitude of 0.0873 with a positive (+) sign and is statistically significant at the 1% level, which provides statistical evidence of the existence of a positive spatial correlation between localities in Vietnam on the economic scale (ln*GRDP*). This means that by geographical distribution, cities with large GRDP are usually distributed around other large GRDP cities. However, the magnitude of the Moran's I coefficient is quite small compared to the value of 1, indicating that the degree of positive spatial correlation is not strong. In addition, Table 4 shows that the average value of the ln*GRDP* series is approximately 0 (-0.0161), the standard deviation is 0.0255 and the Z-score value equals to 4.055. This shows that the ln*GRDP* has right-skewed distribution.

Table 3. Moran's I Test for Provincial GRDP

Statistics	Standardized Value
Moran' I coefficient	0.0873***
Mean	-0.0161
Std dev	0.0255
Z-score	4.0559
P-value	0.0000

Notes: This table shows the result of Moran's I test which measures the spatial correlation of provincial GRDP. Moran's I coefficient is statistically significant indicating that there is a positive spatial correlation of GRDP between provinces. *, **, and *** denote statistical significance at the level of 10%, 5%, and 1% respectively.

The GRDP spatial relationship between provinces is represented by a scatter plot (Figure 2). The Moran's I line for this variable has a positive slope and passes through the first and third quadrant.

Similarly, the results of the spatial correlation test with exponential distance weight matrix also show the positive correlation among regions concerning both the capital factors (shown in Table 4) and the population (shown in Table 5).

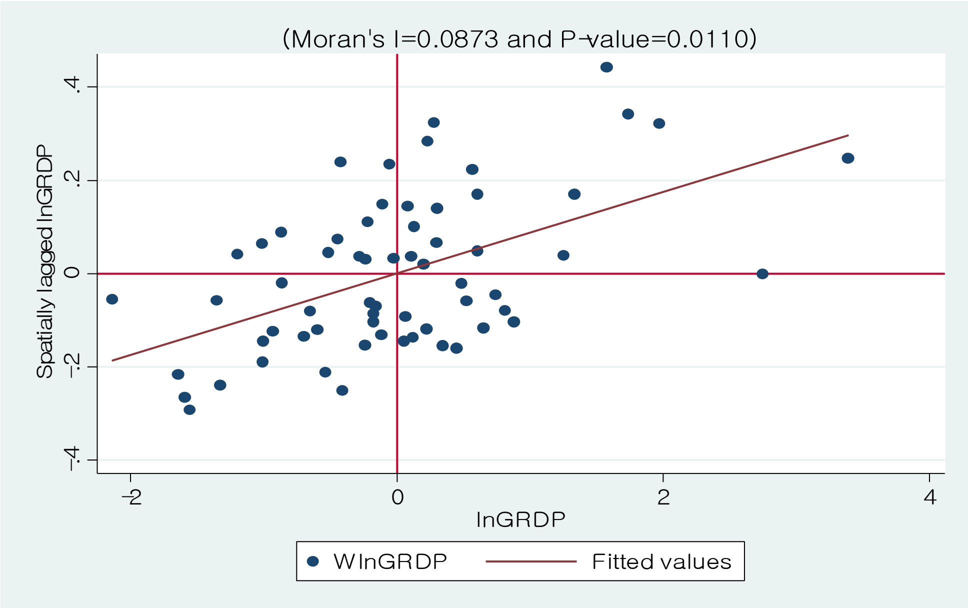

Figure 2. Moran's I Scatter Plot of ln*GRDP*

Table 4. Moran'I Test for Spatial Correlation of ln*Captital*

Statistics	Standardized Value
Moran' I coefficient	0.0708
Mean	-0.0161
Std dev	0.0260
Z-score	3.3490
P-value	0.0008

Notes: This table shows the result of Moran's I test for the spatial correlation of provincial capital. Since the Moran's I coefficient is statistically insignificant, there is no spatial correlation of capital between provinces. *, **, and *** denote significance at the level of 10%, 5%, and 1% respectively.

Table 5. Moran's I Test for Spatial Correlation of ln*Population*

Statistics	Standardized Value
Moran's I coefficient	0.0980
Mean	-0.0161
Std dev	0.0260
Z-score	4.3953
P-value	0.0000

Notes: This table shows the result of Moran's I test for the spatial correlation of provincial population which used to measure the labor force. Since the Moran's I coefficient is statistically insignificant, there is no spatial correlation of population between provinces. *, **, and *** denote statistical significance at the level of 10%, 5%, and 1% respectively.

The existence of a spatial correlation between GRDP, capital, and labor, expressed by population size, is an initial condition that shows the necessity to use the spatial regression method to estimate economic relationships between provinces instead of usual panel data estimation methods to ensure consistency for the results obtained.

4.3. Results of Spatial Regression for Investigating the Economic Linkage between Provinces

Table 6. Results of Spatial Regression Model

Dependent variable: ln*GRDP*	SEM		SAR		SDM	
	FEM	REM	FEM	REM	FEM	REM
Independent variables	(1)	(2)	(3)	(4)	(5)	(6)
ln*Capital*	0.0969***	0.108***	0.110***	0.122***	0.105***	0.119***
ln*Population*	1.017***	1.007***	1.095***	1.007***	0.922***	1.131***
$Region_1$		-0.600***		-0.386**		0.450
$Region_2$		-1.153***		-0.779***		-0.130
$Region_3$		-0.970***		-0.685***		-0.472
$Region_4$		-0.985***		-0.736***		-0.600*
$Region_5$		-0.882***		-0.734***		-1.064***
Intercept		3.020***		-4.775***		-17.13***
W.ln*GRDP*			0.718***	0.711***	0.399***	0.340***
W.ln*Capital*					0.125*	0.124*
W.ln*Population*					1.630**	1.784***
Spatial correlation of residuals	0.934***	0.930***				
Observations	504	504	504	504	504	504
Hausman test		-4.07		-4.76		-3.44
Log-likelihood	629.8896	438.036	649.9109	454.0976	**656.1183**	468.7652
AIC	-1251.779	-854.0719	-1291.822	-886.1952	**-1300.237**	-901.5304
BIC	-1234.889	-807.6236	-1274.931	-839.7468	**-1274.901**	-825.524

Source: Computed by Stata. *, **, and *** indicate statistical significance at the level of 10%, 5%, and 1% respectively.

Conducting Hausman tests on SAR, SEM and SDM models which are accounted for heteroskedasticity, the results show that the SDM fixed effects (SDM - FEM) is the most appropriate model. According to the SDM-FEM results, the provincial investment capital, and population size have a positive impact on economic development. Because all the variables are in the logarithmic form, the regression coefficients are obtained as the elasticity coefficient of GRDP concerning each factor in the model.

In addition, in SDM - FEM, the rho (ρ) and theta (θ) coefficients are both positive and statistically significant at the 5% level, which provides further evidence on the spatial dependence of gross domestic products, investment capital and labor force between provinces. This is also consistent with the Moran's I results.

These results provide evidence to confirm that there exist economic spillovers between regions. In other words, the economic development of a province is positively influenced by development of its neighbor provinces. To decompose the effects of capital and labor force on the economic development of the provinces, this study uses Stata software to estimate the direct, indirect and total impacts and the results are reported in Table 7.

Table 7. Direct, Indirect and Total Effect in the SDM

Spatial weight matrix	Dependent variable: ln*GRDP*	Impact		
		Total	Direct	Indirect
	Independent variables	(1)	(2)	(3)
Exponential weight matrix	ln*Capital*	0.3907***	0.1091***	0.2816***
	ln*Population*	4.1621***	0.9535***	3.2086***

Source: Computed by Stata. *, **, and *** indicate statistical significance at the level of 10%, 5%, and 1% respectively.

In this table, the total impact is decomposed into direct and indirect effect. This provides an interesting way to consider the overall impact of capital and labor in our intra- and inter-province. The direct impact measures how capital and labor of the host province effect its own GRDP. The results show that the scale of investment capital and the average annual population size have a statistically positive impact on GRDP.

The indirect impact implies there exists an effect of capital and labor force from neighboring provinces on the economic scale of the host provinces. The indirect effects reflect spatial spillover effects cumulated over all provinces in the sample. The estimation results show that capital and labor resource of neighboring provinces have a positive and significant impact on local GRDP.

5. CONCLUSION

Various papers in the literature concern different aspects of economic development and economic growth (Batten and Vo, 2009; Vo, 2010). This paper identifies the economic linkage among provinces by employing spatial regression analysis. Examining the spatial correlation between provinces by Moran's I coefficient, the results show a positive spatial correlation between provinces in Vietnam in terms of province-level economic development (ln*GRDP*), total investment (ln*Capital*) and population size (ln*Population*). The results show the importance of employing spatial regression analysis in assessing economic relations at the provincial level in Vietnam.

Using the spatial regression to investigate economic relationship of provinces in Vietnam with the exponential distance matrix, the results show that the capital and labor factors not only have an impact on the local economic scale but also has a positive impact on the economic scale of the neighboring provinces. The economic linkages between provinces in the period of 2010-2017 are modeled by a spatial Durbin model which includes investment capital and labor factor as independent variables.

With the statistical evidence for spatial economic linkages, this study offers some policy implications. Firstly, to strengthen the role of regional economic integration, we reveal that there exists a positive spatial correlation between neighboring provinces. In addition, the study shows that the impact of provincial external factors is greater than the internal factor. Since socio-economic policy of one province is likely to influence the others, local governments need to change their perceptions in making local economic development plans in both short term and long term. It is critical for policymakers to consider the linkage and spillover effects in constructing regional economic policy for sustainable growth.

Secondly, to enhance the economic scale, the research results show that investment capital is an important factor to help the economic growth of the host province and its neighbors through diffusion effect. Therefore, it is necessary to develop policies to effectively attract and use the capital for infrastructure construction to reduce transportation costs between regions, thereby creating motivation and improving local and regional competitiveness.

Thirdly, local provincial regulatory bodies need to implement policies to enhance the regional economic links in FDI attraction to increase investment capital. In addition, provinces in the same region should promote restructuring administrative system, capital market liberalization, labor market and technology market in order to attract investment capital into the economic zone.

Fourthly, this article provides evidence for the important role of labor force size on the provincial economic development. Hence, local provincial authority needs to strengthen regional links for more efficient labor resource allocation.

REFERENCES

Ahmad, M. (2019), “Globalization, Economic Growth, and Spillovers: A Spatial Analysis”, *Margin: The Journal of Applied Economic Research*, 13(3), 255-276.

Anselin, L. (1988), *Spatial Econometrics: Methods and Models*, Kluwer Academic, Dordrecht.

Batten, J.A. and X.V. Vo (2009), “An Analysis of the Relationship Between Foreign Direct Investment and Economic Growth”, *Applied Economics*, 41(13), 1621-1641.

_____ (2010), “The Determinates of Equity Portfolio Holdings”, *Applied Financial Economics*, 20(14), 1125-1132.

_____ (2016), “Bank Risk Shifting and Diversification in an Emerging Market”, *Risk Management*, 18(4), 217-235.

_____ (2019), “Determinants of Bank Profitability: Evidence from Vietnam”, *Emerging Markets Finance and Trade*, 55(6), 1417-1428.

Bui, T.M.H., X.V. Vo and D.T. Bui (2018), “Gender Inequality and FDI: Empirical Evidence from Developing Asia–Pacific Countries”, *Eurasian Economic Review*, 8(3), 393-416.

David, P. and J. Rosenbloom, (1990), “Marshallian Factor Market Externalities and the Dynamics of Industrial Localization”, *Journal of Urban Economics*, 28(3), 349-370.

Esiyok, B. and M. Ugur (2018), “Spatial Dependence in the Growth Process and Implications for Convergence Rate: Evidence on Vietnamese Provinces”, *Journal of the Asia Pacific Economy*, 23(1), 51-65.

LeSage, J.P. (1997), “Regression Analysis of Spatial Data,” *Journal of Regional Analysis and Policy*, Mid-Continent Regional Science Association, 27(2), 1-12.

_____ (2008), “An Introduction to Spatial Econometrics”, *Revue d'économie industrielle*, 123, 19-44.

Naveed, A. and N. Ahmad (2016), “Technology Spillovers and International Borders: A Spatial Econometric Analysis,” *Journal of Borderlands Studies*, 31(4), 441-461.

Nguyen, D.P. and X.V. Vo (2017), “Determinants of Bilateral Trade: Evidence from ASEAN+ 3”, *Asian-Pacific Economic Literature*, 31(2), 115-122.

Nguyen, D.P., V.T. Ho and X.V. Vo (2018), “Challenges for Vietnam in the Globalization Era”, *Asian Journal of Law and Economics*, 9(1).

Paelinck, J.H.P. and L.H. Klaassen (1979), *Spatial Econometrics*, Farnborough Saxon House.

Ramirez, M.T.T. and A.M. Loboguerrero (2002), “Spatial Dependence and Economic Growth: Evidence from a Panel of Countries”, *Borradores de Economia,* 206, Banco de la Republica de Colombia.

Rosenbloom, D.P. and J. Marshallian (1990), “Factor Market Externalities and the Dynamics of Industrial Location”, *Journal of Urban Economics*, 28(3), 349-370.

Stel, A.J.V. and H.R. Nieuwenhuijsen (2002), “Knowledge Spillovers and Economic Growth: An Analysis Using Data of Dutch Regions in the Period 1987-1995”, *SCALES-paper N200203*, EIM Business and Policy Research.

Vo, X.V. (2005), “A New Set of Measures on International Financial Integration”, The 3rd Financial Markets Asia-Pacific Conference, Sydney.

_____ (2010), “Net Private Capital Flows and Economic Growth: The Case of Emerging Asian Economies”, *Applied Economics*, 42(24), 3135-3146.

_____ (2015), “Foreign Ownership and Dividend Policy: The Case of Vietnam”, *International Journal of Banking, Accounting and Finance,* 6(2), 73-86.

_____ (2016a), “Finance in Vietnam: An Overview”, *Afro-Asian Journal of Finance and Accounting*, 6(3), 202-209.

_____ (2016b), “Foreign Investors and Corporate Risk-taking Behavior in an Emerging Market”, *Finance Research Letters*, 18, 273-277.

_____ (2017), “Do Foreign Investors Improve Stock Price Informativeness in Emerging Equity Markets? Evidence from Vietnam”, *Research in International Business and Finance*, 42, 986-991.

____ (2018a), “Trade Integration and International Financial Integration: Evidence from Asia”, *The Singapore Economic Review,* 1-12.

____ (2018b), “M&As in the Process of Banking Consolidation: Preliminary Evidence from Vietnam”, *Asian Journal of Law and Economics*, 9(2).

____ (2018c), “The Role of Bank Funding Diversity: Evidence from Vietnam”, *International Review of Finance*. DOI: https://doi.org/10.1111/irfi.12215

____ (2019), “Leverage and Corporate Investment: Evidence from Vietnam”, *Finance Research Letters*, 28, 1-5.

Vo, X.V. and H.T. Bui, (2016), “Liquidity, Liquidity Risk and Stock Returns: Evidence from Vietnam”, *International Journal of Monetary Economics and Finance*, 6(2), 67-89.

Vo, X.V. and P.C. Nguyen (2016), “Impacts of the US Monetary Policy on the Vietnamese Stock Market”, *Afro-Asian Journal of Finance and Accounting*, 6(2), 119-134.

_____ (2017), “Monetary Policy Transmission in Vietnam: Evidence from a VAR Approach”, *Australian Economic Papers*, 56(1), 27-38.

Vo, X.V. et al. (2017), “Where Do the Advanced Countries Invest? An Investigation of Capital Flows from Advanced Countries to Emerging Economies”, *Journal of International Financial Markets, Institutions and Money*, 51, 142-154.

Vo, X.V. and D.B.A. Phan (2016), “Herd Behavior in Emerging Equity Markets: Evidence from Vietnam”, *Asian Journal of Law and Economics*, 7(3), 369-383.

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