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Research Article

The Impact of Foreign Direct Investment, Human Capital, Urbanization, and CO2 Emissions on Economic Growth in ASEAN

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ABSTRACT

Introduction: This study explores the impact of human resources, foreign direct investment (FDI), urbanization, and CO2 emissions on industrial growth within ASEAN member countries, with a specific focus on the relationship between these factors and GDP.

Objectives: The research aims to identify the influence of human capital, capital inflows, urban development, and CO2 emissions on industrial expansion across ASEAN nations and analyze the causal relationships among these variables.

Methods: Secondary data from the World Bank, spanning 1990 to 2020, was utilized. Industrial expansion served as the dependent variable, while human capital, FDI, urbanization, and CO2 emissions acted as exogenous factors. The analysis employed statistical methods to evaluate both direct impacts and causal relationships.

Results: Human resources and FDI significantly affect GDP in all ASEAN member states, though the intensity of their impact varies across countries. A bidirectional causal relationship exists between human capital and GDP, as well as between FDI and GDP. Urbanization is a crucial determinant of economic growth in Southeast Asia. However, CO2 emissions correlate strongly with industrial expansion, underlining environmental concerns.

Conclusions: The findings highlight the need for ASEAN governments to collaborate on foreign investment policies, prioritize human capital development, and promote sustainable economic practices. Policies focusing on skill enhancement and reducing environmental impact are essential for balanced growth. The study's limitations include data accessibility and the research time frame.

Keywords: Capital Inflows from Abroad, People Resource, Urbanization, CO2 Emissions, Economic Growth, ASEAN.

INTRODUCTION

An circulation of foreign capital at Southeast Asian region is important at the economic development of the Southeast Asian region (Liu, Wang, Yang, Rahman, & Sriboonchitta, 2020). Expansion from abroad has a vital part of developing Southeast economic expansion Asia (Nasir, Huynh, & Tram, 2019). The international financing is accelerating Southeast Asia's development efforts by increasing investments within the country, employment growth, and creation, joining the global system, transferring new technology, improving effectiveness, and enhancing the workforce's abilities in the area (Hanif, Raza, Gago-de-Santos, & Abbas, 2019). In Considering concept in slow growth, a people resource is important element of Total Factor Production (TFP), explanatory of royalties that are not accounted for in other models (Sobieraj & Metelski, 2021).

Human capital is the core strength of human performance in the form of ability to work which consists of knowledge, experience, expertise and other complex human factors that support human performance (Park, J., Jung, W., & Kim, 2020). Among these are health and education vital reasons for developing people resources

((Twum, Long, Salman, Mensah, Kankam, & Tachie, 2021). Human capital and foreign direct investment are vital forces in financial development in the Southeast Asian region (Haini, 2019). However, the increase in increase in the Southeast's economy Asian a area also followed due to a rise in co dioxide emitted that damage the surroundings and human health (Khan, 2019).

Human health factor is an important factor of human capital. When there is an increase in carbon dioxide there will be a decrease in human health which will result in a decrease in productivity (Lin, Zhao, Ahmad, Ahmed, Rjoub, & Adebayo, 2021). Reducing carbon dioxide emissions needs to be done to avoid reducing human productivity and impacting on economic growth (Du, Li, & Yan, 2019). Increased carbon emissions are also caused by human movement and urbanization (Anser, Alharthi, Aziz, & Wasim, 2020). Human movement and urbanization have proven to drive monetary expansion (Liang & Yang, 2019). However, the growth to carbon emissions threatens sustainable economic growth (Raihan & Tuspekova, 2022).

Theoretically, monetary expansion is influenced through people resources and financial wealth (Pomi, Sarkar, & Dhar, 2021). However, there are still pros and cons related to inconsistent empirical evidence. Different results in the empirical realm require more in-depth research with a fairly long research period. The difference in results is possible because there are other factors that affect the dependant parameter has not been taken into account. Comprehensive research needs to be done in overcoming differences in results in the empirical realm. Research from Widarni & Bawono (2021) and Sulisnaningrum, Widarni & Bawono (2022) states that human capital is the main factor driving economic growth. However, different things were reported by Antamoshkina, Zinina, & Olentsova, (2020) which stated that human capital was not the primary engine of expansion.

personnel has both a current and near positive connection with financial development, and monetary expansion (Zia, Noor, Khan, Bibi, Godil, Quddoos, & Anser, 2021). People resources has a close connection with monetary expansion in each of the lengths term (Zallé, 2019). It is a substantial positive the connection between FDI, Human Capital, & economic expansion in the long term (Le, Duy, & Ngoc, 2019).

Although there are many empirical studies that both the shorter and longer terms positive effects comparing people resources, FDI, & monetary expansion, research by Cinar & Nulambeh (2018) has quite interesting findings where Foreign Direct Investment influxes in the brief term possess none a important effect in monetary expansion. Research from Babalola and Shittu (2020) where FDI has an impartial effect in monetary expansion. Likewise, Musah, Kong, Mensah, Antwi, & Donkor (2020) reports that the contribution of Foreign Direct Investment (FDI) to monetary expansion is insignificant and have a detrimental effect. Some studies report a long-term and immediate relationship while those that report a negative or nonexistent connection.

Abdouli & Omri (2020) found results of various links between the causative factors inflows of FDI, CO2, Human Capital, and monetary expansion. However, Harnani, Widarni, & Bawono, (2022) noticed long-term balancing the link among people resources and monetary expansion. Al-Mulali, Fereidouni, Lee, & Sab, (2013) concluded that no proof is available of causation among people resources, CO2 per-person pollution, & factual GDP per person over in length term, but in the near future, there is evidence of causation relating energy use and CO2 emissions. However, Zhang, Pang, Chen, & Lu, (2019). Discovered that a 2 diferrent connection comparison of CO2 pollution and economic expansion that occur both the brief & medium term. However, Osiobe (2020) in contrast discovered to be no connection between the two direct relationship contractionary monetary policy and social resources.

The urbanization factor is driving the economy and the greenhouse effect of carbon emissions goes hand in hand with economic growth (Zhang, Ma, Lian, Guo, Song, Chang, & Luo, 2020). These two variables are worthy of consideration when investigating employees, investment and expansion of the economy in Southeast Asian region. The purpose that article's goal will be to investigate what effect human capital, capital inflows from abroad, urbanization, and CO2 emissions on ASEAN's macroeconomic stability member nations.

Social resource drives economic growth and participates in it expansion in a the national industry nation besides raising a abilities and understanding as for its nation, hence there is a close connection between the two. (Amna Intisar, Yaseen, Kousar, Usman, & Makhdum, 2020). Human resources refer to the knowledge, experience, and skills possessed by workers. Skills create economic value (Aryanti & Adhariani, 2020). The more knowledge in the workforce, the higher the productivity (Flores, Xu, & Lu, 2020). Productive capacity as an idea includes recognizing that people are not equal in the knowledge and skills they possess and that this rate at employment is enhanced with spending on education (Baharin, Syah Aji, Yussof, & Mohd Saukani, 2020).

Increased ability at a economy for produce products and services is referred to as financial progress to the previous period, calculated by measuring the modification of the country's gross domestic product, which represents the economy's total products and services produced (Magdalena & Suhatman, 2020). An growth on GDP growth caused by consumer spending has led to an improvement in business conditions (Zheng, Mi, Coffman, Shan, Guan, & Wang, 2019). As their profits increase, companies tend to increase their investment and make expansions to secure future growth (Agarwal & Chua, 2020). Business investments include buying new equipment and technology, and these investments are called business loans (Arroyo, Corea, Jimenez-Diaz, & Recio-Garcia, 2019). Capital investment requires significant costs, and its job is to boost the productivity and profits of the company the lengthy term (Pervan, Pervan, & Ćurak, 2019).

In developing countries, corporate loans from banks have also increased, with the aim of increasing production to meet higher consumer demand (Shahbaz, Topcu, Sarıgül, & Vo, 2021). These loans are usually used to finance large transactions, such as the purchase of industrial plants and equipment (Lahkani, Wang, Urbański, & Egorova, 2020). A rise in manufacturing activities inside a rise on workers' wages and employment opportunities because companies need increased workers to meet the high consumer demand for the company's products (Shkarlet, Dubyna, Shtyrkhun, & Verbivska, 2020). As companies seek to hire more workers to increase their sales, new job opportunities are created in all types of jobs. If pressure on the labor market increases with an expanding economy, firms will have to train workers in the required skills due due to a commercial scarcity of trained (Gleim, Johnson, & Lawson, 2019). The company's productivity will increase after increasing its investment, so that GDP grows thanks to business investment which is a key element of economic growth (Kryshtanovych, Prosovych, Panas, Trushkina, & Omelchenko, 2022).

The role of Private consumption and company investing serve more purposes than just fostering growth in the economy, as they have a very important position in defining the workforce's level of training and development (Ahmad, Majeed, Khan, Sohaib, & Shehzad, 2021). Human capital and economic growth are positively correlated due to increased investment for productivity (Baharin, Syah Aji, Yussof, & Mohd Saukani, 2020).

An process in labor education is an investment, but this investment is not capital investment in machinery and equipment, but in human capital. Governments have a fundamental role in increasing the skills and educational levels of citizens (Sima, Gheorghe, Subić, & Nancu, 2020). Several governments participate in human resource development by securing tertiary education for citizens free of charge (de Wit & Altbach, 2021).

The knowledge people gain the industrial activity and growth-stimulating effects of education (Kurilova, Lysenko, Pronkin, Mukhin, & Syromyatnikov, 2019). There is no doubt that workers' wages increase with their education and skills, which in turn increases economic growth as consumer spending increases (D'Alessandro, Cieplinski, Distefano, & Dittmer, 2020).

Companies also invest in human resources to increase profits and productivity, such as a technology company that trains one of its employees to become a programmer, whether that training is from home or on the job (Rahman & Akhter, 2021). Also, companies can pay part of the cost of higher education. In case the employee remains in the company after completing his training, he can develop new ideas and products for the company, and the employee can leave his job in the company and set up an independent business based on the knowledge he has acquired (Alsharef, Banerjee, Uddin, Albert, & Jaselskis, 2021). However, The growth of the economy will be boosted by investments in human resources. (Zallé, 2019).

Investing in workers creates better working conditions in economies around the world. If employment improves, consumer spending increases, leading to higher corporate earnings and investment (Majid, 2020). While investment in human capital results in growth, this does not mean that job opportunities are available for new graduates (Rodrigues, Butler, & Guest, 2020). Geography has an important role to play in creating new job opportunities and labor movement (Meadows, 2020).

The issue of immigration has become one of the most important aspirations of young people in many developing countries, hoping for a better life in some countries that enjoy economic prosperity, political and social stability providing a decent life that young people do not have in their home countries (Huijsmans, Ansell, & Froerer, 2021). Migration is a conceptual and interpretive approach to the concept of significance (De Haas, 2021). Earth's population is growing rapidly. Around the world, large numbers of people migrate from villages to cities one after another in search of jobs and better livelihoods, as well as educational and recreational opportunities, with the goal

of improving their quality of life (Bodo, 2019). The increasing how many individuals reside in cities also means that the scale of cities is increasing. Such trends pose great challenges to society (Allam, Sharifi, Bibri, Jones, & Krogstie, 2022).

Migration from villages to cities often occurs as economic conditions change. At one point, the rural population grew above average and resources became scarce (Lyu, Dong, Roobavannan, Kandasamy, & Pande, 2019). At other times, due to technological advances, such as the mechanization of agriculture, people in rural areas lose their jobs and look for new jobs in urban areas (Sachs, 2019). Cities must change to provide a good quality of life for new immigrants. It has to deal with the maintenance and expansion of the sewer network and energy supply to a large number of large homes (Bryan, Glaeser, & Tsivanidis, 2020). Local transit was developed to transport large numbers of people from residential areas to work in industrial areas (Allen & Farber, 2019).

The view that urbanization is correlated with economic growth prevails in all cases, except for islands and arid desert areas (Hesse & Rafferty, 2020). However, at a time when phenomena such as the industrial revolution, industrialization, and economic sophistication factor into urbanization, it's safe to say that urban studies need a new perspective (Rehman, Radulescu, Cismas, Alvarado, Secara, & Tolea, 2022).

Urbanization in developing countries and the resulting urban problems include problems caused by underdeveloped systems, problems caused by over-tightening of urban labor markets, and security caused by the influx of weapons and rampant illegal activity (Khan, Singh, Patel, & Jain, 2021). The perspective of urbanization and research on metropolitan issues is characterized by regional conditions in which the world's metropolitanization is extraordinary, and in that sense it can be said that it develops alongside area studies (Cardoso & Meijers, 2021).

Urbanization can boost the economy by increasing production capacity and increasing investment including foreign direct investment (Ahmad, Jiang, Majeed, & Raza, 2020). Foreign direct investment means investing in and conducting business for permanent gain in a foreign company (Çalık, Çizmecioğlu, & Akpınar, 2019). FDI (Foreign Direct Investment) the first an investment method employed as a strategy to get around trading obstacles like import duties, the emergence of companies also had an impact and turned into an investment method used as a management strategy by large companies in developed countries (Othman, 2022). In addition, until now FDI often occurs between developed countries and between developed countries, both on the lender's side and on the recipient's side (Fromentin & Leon, 2019).

Countries receiving FDI (Foreign Investment) can expand their industrial foundation by doing more than just increasing Investing in assets can create jobs, but so can gaining technology and managerial know-how from overseas businesses (Nguyen, 2022). In contrast, foreign companies sending FDI can more efficiently utilize domestic and foreign factors of production such as capital, labor, and technology through FDI (Pegoraro, De Propris, & Chidlow, 2022). Many studies argue that FDI has made a positive contribution to income growth and productivity in the host country, but of course, there are benefits that go beyond the benefits (Buchholz, Bathelt, & Cantwell, 2020). Increased economic growth also has an impact on environmental preservation, including an increase in the greenhouse effect due to increased CO2 emissions from economic activities and human isolation (Usman, Balsalobre-Lorente, Jahanger, & Ahmad, 2023). A large amount of CO2 is expected to be emitted when producing and transporting goods, it is believed that the amount of CO2 emissions per GDP of a country will increase as the economy becomes more active (Mohsin, Abbas, Zhang, Ikram, & Iqbal, 2019).

Considering a outcomes in previous researches and findings literature studies, we develop the following hypotheses:

H1. Human capital influences economic growth

H2. investing abroad directly influences economic growth

H3. Urbanization affects economic growth

H4. Carbon Dioxide Emissions are connected to in some way economic growth

OBJECTIVES

The research aims to identify the influence of human capital, capital inflows, urban development, and CO2 emissions on industrial expansion across ASEAN nations and analyze the causal relationships among these variables.

METHODS

To calculate the long-term impact of parameters, the panel cointegration test is used with the following equation model:

$y_{it} = \delta_{0i} + \delta_{1it} + n_i D_{it} + x'_{it}\beta_i + ({}_t x_{it})' \gamma_i + z_{it}$

Which i = 1 .....N, t = 1 .....T, $x_{it} = x_{i,t-1} + v_{it}$ is k -dimensional a rectangle is I(1). Dit represent factors for delay. Dit = 1 if t > T & nothing else. T correlates to the day when person i's contract ended so that T = θ with θ ∈ (Ψ, 1 − Ψ) & Ψ∈(0, 1), δ_{0i} & n_i unidentified factor matrices and z_{it} is the leftover phrase. z_{it} is then developed as;

$(L)\Delta e_{it} = \vartheta_i e_{i.t-1} + \varepsilon_{it}$

With $\vartheta_i(L) = 1 - \sum p_{i\,j=1}\, \vartheta_{ij} L_j$ that it is a vector delay quadratic and εit the mistake procedure. Ho = ϑ_i = 0 There's no correlation to $\forall_i$ $H_1 = \vartheta_i < 0$ availability of serial correlation to $\forall_i$ at board evaluation, The alternative theory states that transition into balance occurs consistently throughout various. In order for veto a invalid theory however, suggests it significant relation among an distinct groupings.

$H_o = \vartheta_i = 0$ There isn't correlation to ∀i

$H_1 = \vartheta_i < 0$ availability to serial correlation to ∀i

An collinearity of participants is suggested by the disproved probability value since the modification of equilibria in various factions is diverse. Because the modification of equilibria in different factions differs, Rejecting the invalid theory, which suggests that individuals are collinear, Carbon Dioxide Emissions, and Urbanization were adopted independently varying factors. We apply secondary worldwide information bank with a research period from 1990 to 2020. with the following model equation:

Economic growth = F (People Resource, Capital inflows from abroad, Carbon Dioxide Pollution, Rapid urbanisation)

Consequently, to overcome quasi issue, transformed multivariable PDB model uses the following logarithmic equation:

Ln Economic growth$_{it}$ = β_0 + $\beta_1 Ln$ Human Capital $_{it}$ + $\beta_2 Ln$ Foreign direct investment $_{it}$ + $\beta_3 Ln$ Carbon Dioxide Emissions $_{it}$ + $\beta_4 Ln$ Urbanization $_{it}$ + ε_{it}

In this study, using the GMM estimator with the following equation:

$DVit = \eta_i + \beta_1 DV_{it-1} + \beta_2 RV_{it} + \epsilon_{it}$

The times are captured by t in which the pass sections I, DV_{it} an reliant variables, RV_{it} is the scale parameter of unrelated items, η is a previously unrecorded nation-specific impact, DV_{it-1} its initial latency, and ϵ_{it} the mistaken phrase

RESULTS

Southeast Asia has a regional organization called ASEAN. This research examines all ASEAN members to thoroughly investigate the Southeast Asian region, especially the countries in Southeast Asia that are members of the ASEAN organization. the nations included in this the process of studying presented in table 1.

Table 1. The States Inside This Listing Study

No	Country	Time to join ASEAN
1	Indonesia	August 8, 1967
2	Malaysia	August 8, 1967

3	Singapore	August 8, 1967
4	Thailand	August 8, 1967
5	Philippines	August 8, 1967
6	Brunei Darussalam	January 8, 1984
7	Vietnam	July 28, 1995
8	Laos	July 23, 1997
9	Myanmar	July 23, 1997
10	Cambodia	April 30, 1999

All data in this study it had modified describing with basic notation the estimate gotten also as elasticity of the gotten also as (GDP). Table 2 shows the selected factors, whose descriptions, whose of measures, as well as their origins.

Table 2. The Chosen Elements

Variables	**Definition**	**Period**	**Source**
Economic growth	GDP per capita (perpetual 2010 US$)	1990 -2020	World Bank
Human Capital	percentage that completing elementary	1990 -2020	World Bank
Foreign direct investment	Foreign direct investor inflows	1990 -2020	World Bank
Carbon Dioxide Emissions	CO2 emissions (metric tons per capita)	1990 -2020	World Bank
Urbanization	Industrialization, that number of people that lives in cities	1990 -2020	World Bank

The factors were subjected to the arithmetic mean as demonstrated in Table 3.

Table 3. Statistical Analysis

Variables	**Mean**	**Std. dev**	**Skewness**	**kurtossis**	**JB test**
Economic growth	4.619	3.715	0.766	2.039	22.082
Human Capital	6.124	1.229	0.005	2.131	152.137
Foreign direct investment	14.781	1.572	0.643	2.919	192.272
Carbon Dioxide Emissions	7.412	1.997	1.323	3.921	659.112
Urbanization	2.126	0.817	-0.342	1.925	43.572

In terms of kurtosis and skewness, neither There is a mathematical concept of variance. Findings from the Connection appears on Table 4.

Table 4. Correlation Outcomes

Variables	Economic growth	Human Capital	Foreign direct investment	Carbon Dioxide Emissions	Urbanization	**Total**	**VIF**
Economic growth	1	0.392 (0.000)	0.192 (0.000)	0.392 (0.000)	0.864 (0.000)	1.674	0.132

Human Capital		1	0.329 (0.000)	0.189 (0.000)	0.759 (0.000)	1.198	0.515
Foreign direct investment			1	-0.401 (0.000)	0.259 (0.006)	1.434	0.692
Carbon Dioxide Emissions				1	-0.335 (0.000)	1.017	0.792
Urbanization					1	1.894	0.981

Economic growth has no correlation problem with the variables tested the Pearson product correlation is displayed below. it appears that the percentage of the connection is inferior to 0.7 between all factors. Values within tolerances variance inflation factor (VIF) < 5 and > 0.2, Conclusion: Each explanatory factor has a distinct role to play influence on response variability. Pass dependence analysis results are displayed at Table 5.

Table 5. The outcomes of pass dependence

Test type	**Value**	**Prob.**
Breusch-Pagan LM	53.924	0.000
Bias-corrected scaled LM	3.931	0.000
Pesaran scaled LM	2.821	0.000
Pesaran CD	54.126	0.000
Friedman	26.912	0.000

The exam outcomes show that the independent cross-section a false assumption is not true. It was determined that there was enough data to support a cross-sectional link between panel errors. Economometric estimates were therefore applied.

Table 6. Conclusions of the Slope Heterogeneity Test

Test type	Value	Prob.
Delta tilde	5.629	0.016
Adjusted delta tilde	9.779	0.019

Heterogeneity test is needed to avoid biased calculations. the test results in table 6 show no problems related to heterogeneity. Table 7 introduces the results outcomes of a regression model.

Table 7. Panel Stationarity outcomes

Panels	**Levels**		**First difference**	
	Constant	**Constant and trend**	**Constant**	**Constant and trend**
Economic growth	-1.029	-1.691	-2.921	5.002
Human Capital	-1.401	-1.292	-4.641	-5.071
Foreign direct investment	-1.491	-1.401	-4.498	-5.079
Carbon Dioxide Emissions	-1.502	-1.109	4.392	-5.081
Urbanization	-1.171	-1.193	-3.672	-4.069

The results indicate accepting the varying co - integration empty assumption, regardless regardless regardless of date trends are incorporated. The 6 different The values are static in the important level of 1%, 5% and 10%, following the initial discrepancy. System GMM results estimations present in table 8.

Table 8. System GMM results estimations

Variable	Value	Prob.
Constant	−1.039	0.000
Economic growth	0.047	0.019
Human Capital	0.189	0.006
Foreign direct investment	0.298	0.000
Carbon Dioxide Emissions	0.349	0.000
Urbanization	0.069	0.008
AR [2] test	−0.294	0.019
Sargent test	16.812	0.292

The GMM system is served also as primary conversely, the GMM and AMG difference estimator serves being a strong and comparable objective for the GMM system. GMM estimation of the system reveals which the rise at HC drives monetary expansion significantly. Likewise, an boost in the percentage of FDI increases GDP. The percentage increase in REW also significantly boosted GDP. In order to estimate the influencing factors in GDP, system GMM results, differences in GMM, and AMG are shown in Table 9.

Table 9. Difference GMM estimation results

Variable	Value	Prob.
Constant	−1.018	0.001
Economic growth	0.029	0.021
Human Capital	0.092	0.006
Foreign direct investment	0.212	0.000
Carbon Dioxide Emissions	0.231	0.000
Urbanization	0.071	0.007
AR [2] test	−0.171	0.011
Sargent test	11.721	0.181

To reveal the dynamic connection among monetary expansion, people resource, the dynamic interaction in the ASEAN region among populations, CO2 emissions, people resource, FDI, & monetary expansion. ASEAN member nations are examined with various tests to reveal cross-sectional dependencies. Any relationship that has a cross-sectional structure must also have one variation in the variables a country's economic policies might have an impact on other regions. The individualised throw coefficients are nation-specific heterogeneous across nation classes. Thus, it tends to be heterogeneous or may vary between groupings of nations in order to evaluate elasticity impacts and conduct causation test. How human capital affects economic growth is substantially realized to be positive. When Human Capital increases, economic growth also increases. It is clear for economic expansion is influenced by human capital. In Southeast Asia foreign Investment, which is connected to capital equipment and is often made in the corporate companies, stimulates the economy. Urbanization is also favorably associated with economic expansion. However, the worrying thing is a rise in co 2 dioxide polutions is also increasing at line with a increased economic expansion

DISCUSSION

The findings of this research highlight the multifaceted dynamics of economic growth in ASEAN member states, offering both opportunities and challenges for regional development. Human capital emerges as a cornerstone for economic growth, showcasing a positive and bidirectional relationship with GDP. This underscores the importance of education and skills development as pivotal drivers of long-term economic expansion in Southeast Asia. Policymakers should prioritize investments in education and vocational training to enhance workforce productivity.

Foreign direct investment (FDI) also significantly impacts GDP, reflecting its role in introducing capital, technology, and expertise to the region. This aligns with ASEAN's strategic focus on fostering economic integration and attracting international investors. However, the variability of FDI's impact across countries suggests the need for tailored investment policies that address each nation's unique economic landscape and infrastructure.

Urbanization stands out as a critical factor in economic growth, driving industrialization and expanding markets. However, it is accompanied by environmental challenges, particularly the rise in CO2 emissions. While urbanization fosters development, its environmental impact underscores the pressing need for sustainable urban planning and green infrastructure initiatives. Balancing urban expansion with environmental conservation is a policy imperative for ASEAN governments.

The study's econometric analyses, including the system GMM estimations, validate the robustness of these findings. The absence of multicollinearity and the confirmation of cross-sectional dependencies enhance the credibility of the results. However, the study acknowledges limitations in data accessibility and the research timeframe, suggesting that further longitudinal studies with more comprehensive datasets are necessary to deepen the understanding of these dynamics.

Lastly, the regional nature of this study emphasizes the interconnectedness of ASEAN member states. Economic policies in one country often ripple across the region, highlighting the importance of collective action and policy coordination. ASEAN's role as a regional organization is crucial in fostering collaboration to address shared challenges, such as balancing economic growth with environmental sustainability.

CONCLUSION

Direct investments from abroad and Human Resources both significantly influence GDP in all panel groups in ASEAN member countries. Nevertheless, the force of a effects differs between frames. The dependent variable was significantly influenced by the explanatory variables in a similar manner (GDP). Regarding the impacts and causes, Human Capital has a double-sided causative impact such as GDP on the aggregate board. Meanwhile, FDI has 2 connection of causation among GDP. Urbanization is a determining factor for economic growth Southeast Asian countries, especially in ASEAN member countries. However, the thing that needs to be observed is that the increase in the greenhouse effect of increasing CO2 emissions also shows a strong positive relationship with the expansion of ASEAN member countries.

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