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Article

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The contribution and influence of total external debt, FDI, and HCI on economic growth in Indonesia, Thailand, Vietnam, and Philippines

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ABSTRACT

The goal of this research is to ascertain how much foreign debt, foreign investment, and HCI have contributed to the growth of the economies of the four ASEAN nations. This research uses the Panel Vector AutoRegression Model (PVAR). The PVAR method is a method used to analyze the relationship between several variables that change over time. This method combines two approaches, namely Vector Autoregression (VAR) and panel data. The type of data used in this research is secondary data, an annual time series with a time range from 2000 to 2020 for all cross-section variables taken from four countries in ASEAN, namely Indonesia, Thailand, Vietnam and the Philippines. The World Bank provided the data for this study. The variables examined in this study are GDP, total foreign debt, foreign debt, FDI, and HCI which are represented by education and health variables. From this study, we find that the relationship between variables varies, such as gross domestic product which has a significant negative relationship with FDI but has a significant positive relationship with debt service. In addition, there is a significant and negative relationship between GDP and total foreign debt, GDP is also negatively and significantly related to education and health variables, which means that GDP is also negatively and significantly related to HCI. It can be concluded that in the four countries we studied, an increase in debt service will increase people's consumption capacity which will lead to an increase in economic growth, but in this study total foreign debt and debt service have a negative relationship with gross domestic product. This research shows that foreign direct investment (FDI) has a significant positive relationship with the gross domestic product (GDP) of ASEAN member countries, especially Indonesia, Thailand, Vietnam and the Philippines. Therefore, it is recommended that the governments of ASEAN member countries jointly determine foreign investment policies and manage their foreign debt to increase economic growth in the Southeast Asia region. In addition, it is recommended that the governments of ASEAN member countries pay more attention to their fiscal policies, because increasing debt service costs can reduce economic growth. This can be seen when there is a surge in foreign debt which is disproportionate to the ability to pay ASEAN member countries.

Introduction

A nation's economic operations are continually concerned with ways to enhance the well-being of the populace of the nation in question. In this instance, establishing an economically affluent society is a must (Zeeshan, et al., 2022). There are two reasons that require a country to achieve economic growth, namely to create employment opportunities for its population, which is increasing at any time, and to increase the level of community prosperity (Uddin, Ali, & Masih, 2020). Based on this, economic development is carried out by all countries, including countries that are members of the ASEAN.

In general, the government's function in the economy is fairly broad, and the framework of the government budget may be used to summarize one type of activity. The way a country prepares its budget might vary based on its economic situation. A country can prepare its budget in a balanced way if economic conditions are normal. A surplus budget policy can be applied when there is a change in expansionary or contractionary fiscal policy so that the government has three options for covering the state budget deficit, namely from the proceeds from the privatization of SOEs, Domestic Debt, and Foreign Debt funds (Faura, Simionescu, & Gavurova, 2022).

Debt is a source of money for emerging nations that may be used to

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hasten their economic growth. This occurs when there are not enough funds available from domestic savings, necessitating the need for debt, particularly foreign debt. The government of the country in question may choose to seek aid in the form of debt in order to address the lack of funding in emerging nations, particularly in ASEAN. Government expenditures to finance economic development using debt, especially those originating from abroad, are indeed beneficial. Still, apart from paying attention to their use for economic growth, another thing to think about is the debt burden that will arise in the future. However, in the early stages of development, using the debt component as a source of financing is indeed very profitable (Agyeman, Sakyi, & Abayie, 2022).

In macroeconomic analysis, a country's degree of economic growth is determined by the increase of its real Gross National Product, often known as its real national income. Economic growth is influenced by several factors which are economic indicators or also called macroeconomic indicators. Some of the indicators that are often in the spotlight in terms of their impact on economic growth include foreign investment and portfolio investment. Many people question the impact of foreign debt on economic growth. Some experience and empirical evidence have also shown that a number of countries using foreign loans to carry out their development can succeed well in the sense that these countries can increase their economic level and at the same time be able to repay their foreign debts, but not a few countries have experienced the opposite, namely economic conditions. Who is experiencing a decline, so they need help from donors to pay their debts (Mohsin, Ullah, Iqbal, Iqbal, & Hesary, 2021).

Foreign investment can be made directly or through a portfolio, according to economic literature. Through the capital market, portfolio investments are done using securities instruments like stocks and bonds. Direct investment, sometimes referred to as a foreign investment, is a type of investment that involves creating, purchasing, or acquiring a firm. Foreign investment provides more benefits than portfolio investment, including the fact that it is permanent, helps transfer technology, and management skills, and opens up new jobs. These jobs are crucial for the nation given the government's limited capacity to create employment possibilities. In contrast, money from portfolio investments goes to businesses that issue securities but may not always result in the creation of new employment. Even if there are issuers who have received funds from the capital market to expand their business or open new businesses, this does not necessarily mean creating jobs. Not a few funds that go to issuers are only to strengthen the capital structure or maybe even to pay off bank debt (Zhou, 2020).

Five categories may be used to categorize foreign investment in developing nations. First, emerging nations might use external funding sources or foreign cash as a springboard for quickening investment and economic expansion. Second, a change in the organization of production and commerce must occur when economic growth is accelerated. Third, the use of foreign capital can be crucial in raising money and undergoing structural change. Fourth, even if future foreign capital will be more productive, the requirement for it drops right when structural improvements really take place. Fifth, the presence of foreign finance will be highly beneficial for developing nations that are unable to begin establishing heavy industries and strategic sectors in order to be able to create steel plants. So far, domestic investors in developing countries have been reluctant to undertake high-risk businesses such as the exploitation of untapped natural resources and opening up new lands, the presence of foreign investors will greatly support starting businesses in these fields (Wang, Xu, Liu, & Sun, 2023).

Foreign investment and portfolio investment are sources of funding for growth in the national economy and development, much like foreign debt is. Foreign debt is intended to be replaced by foreign investment, including direct investment and portfolio investment, as a source of funding for the expansion and development of the domestic economy. Given the enormous growth in foreign debt in developing nations, particularly in ASEAN, the role of foreign investment is seen as becoming more and more crucial. Foreign investment's impact on a

developing nation's ability to boost its economy is significant. Economic growth is thought to be boosted more effectively by foreign investment. Foreign money, especially foreign debt, is viewed as the primary source of development funding, despite the fact that it should really be viewed as a secondary source. Due to this reality, the pattern of development fueled by foreign capital is inherently dangerous. The global economic system will face increased hazards as it becomes more dependent on foreign capital, especially foreign debt, as the position of dependency increases (Narayan, Rath, & Syarifuddin, 2022).

Human capital has a central role in economic development, in addition to the existence of physical capital which has an effect on economic development. On the other hand, human capital tends to provide accumulative and long-term effects compared to physical capital. Human capital accumulation is expected to be one of the initial sources of sustainable development. The interrelationship between economic growth and human capital growth may be an essential key to sustainable economic growth (Tahir, Hayat, Rashid, Afridi, & Bin, 2020; Widarni, Irawan, Harnani, Rusminingsih, & Alim, 2022; Priyanto, Widarni, & Bawono, 2022).

Based on the explanation above, by looking at several aspects of the influence of debt and investment given to the development of economic growth in several ASEAN countries, especially Indonesia, Thailand, Vietnam and the Philippines, the goal of this research is to ascertain how much foreign debt, foreign investment, and HCI have contributed to the growth of the economies of the four ASEAN nations (see Table 1).

Literature review

According to Arabzadeh (2022), A budget that is expected to have a deficit is one where government expenditure is anticipated to exceed government receipts. The government often adopts this deficit budget when it wishes to promote economic expansion. When the economy is through a recession, this is typically done. According to Srebrny (2021), a budget deficit is a difference between the amount of money that the government issues and the money that is collected in taxes. The government budget is a summary of the total amount of spending and earnings. As was previously said, one of the things the government may do to address specific economic situations is through fiscal policy. This fiscal strategy, which is an expansionary one, is evident in the government budget, which also includes the budget deficit (Ma & Lv, 2023).

According to Tanaka's study findings (2022), the government budget deficit has an adverse impact on economic growth within the same period and a favorable impact during the next year. When the economy is experiencing a crisis, the government's budget deficit is the policy

Table 1
Variable Description.

Variable	Explanation	Data type
Total external debt	The sum of all loans made to nonresidents that can be repaid with cash, goods, or services is known as total external debt.	Current US\$
Debt service	The concept of debt service includes all exchanges between citizens of a nation and the rest of the world including the transfer of ownership of general commodities, net exports of products under merchanting, nonmonetary gold, and services from citizens to noncitizens.	Percent
Foreign direct investment	FDI is investment activity by foreign or foreign investors to do business in Indonesia.	Percent
GDP	The entire market worth of all the products and services a nation produces during a certain time period is measured by its GDP.	Percent
Education	Education reflects the proportion of people aged 25 years and older who finished or obtained high secondary school.	Percent
Health	Estimates of current health spending include the cost of healthcare products and services used annually.	Current US\$

chosen by many countries to stimulate the economy. According to (Arjomand, Emami, & Salimi, 2017), the budget deficit of the government is an expansionary fiscal stimulus. An expansionary fiscal policy is needed to promote economic growth in the slow-growing economy.

There are disagreements over the economic effects of the government's budget deficit policy, both theoretically and as a result of the actual study. According to the "pump-priming" theory, a government budget deficit is required to boost overall economic activity and prevent a deep recession. It is feasible to generate employment through the government's approach to funding its budget deficit. The ability to create jobs will enhance aggregate demand and people's spending power. Entrepreneurs will be inspired to boost output as a result. Public expenditure growth might also result in a rise in overall demand. According to Keynesian economists, taxpayers perceive a rise in their after-tax income as a result of the government's budget deficit strategy, which is supported by tax cuts. Spending will grow as a result of the increase in after-tax income. Spending more money will raise the demand for products and services, which will boost economic activity (Istiqomah & Mafruhah, 2022).

Foreign debt is used by the government for development through a budget deficit policy. The budget deficit shows that the condition of government expenditure is greater than its revenue. Thus, a country with a deficit budget condition requires additional funds so that the planned activities can run. Therefore the government must owe to outsiders to obtain funds to cover the budget deficit. With a deficit budget condition, it means that the government has to make loans, this shows that government spending is higher. This increase in government spending will certainly affect the increase in output which will directly increase economic growth. All levels of income have increased planned expenditures as a result of increasing government purchases. The expected spending curve changes higher by ΔG in the event that government purchases rise by ΔG . So this results in a shift in the economic balance (Onwuka, 2022).

In general, foreign loans, FDI, and portfolio investment are the three primary sources of foreign capital in a nation that upholds an open economic system. Foreign loans are carried out by the Government bilaterally or multilaterally, FDI is an investment made by foreign private entities into a country. Branches of multinational corporations, subsidiaries of multinational corporations, licensing, and joint ventures are some examples of the form, whereas a portfolio investment is an investment made on the capital market. Benefits that might be anticipated from a package of foreign investment (FDI) include access to worldwide markets through exports, the absorption of labor, technology transfer, and management training (Sahoo & Dash, 2022).

Direct investment and portfolio investment are the two different types of investments. Foreign direct investment is typically regarded as another way that businesses from one nation move their capital to the economic activities of another nation that entail some level of capital engagement in the business sectors they invest in. Direct investment means that companies from investment countries carry out de facto and de jure supervision over assets invested in investment countries by way of investment. Direct investment investors control management, typically done by multinational corporations, it takes a long time because commodities are involved. Infrastructure, labor, and manufacturing expenses, as well as the market size and growth rates, are of more importance to direct investment money (Fatmawati, 2022).

Investors in portfolio investments, however, merely provide funds and play no managerial role. Institutional investors, short-term in nature, and easily liquidatable through the sale of bought shares describe the investors. From some of the views and understandings above, it can be seen that direct investment is the direct involvement of investors in the investments they make, both in terms of capital, strengthening, and supervision. The advantages of direct investment are that it does not bring burdens that must be paid in the form of interest, dividends, and/or repayment, can combine expertise, technology, and capital, can overcome the problem of money transfers, there is the reinvestment of

investment profits that do not yet exist and can create technology transfer. and skills (Hamid, et al., 2022).

According to the framework of the Harrod-Domar model, savings become crucial for economic development, which is mediated by investment growth, in a closed economy with full employment and no capital mobility. As a result, saving might be considered a function of investing. The ability of the nation to invest increases with the amount of savings that can be generated. Increased investment also results in the addition of more capital, which multiplies to improve economic growth and per capita income (Addi & Abubakar, 2022). However, existing empirical studies show a positive relationship between saving and investment. This is based on several reasons. First, productivity increases and other shocks have the same effect on desired savings and investment, even under conditions where the mobility of capital between countries is perfect. Second, an increase in domestic savings will make investment increase, especially in large countries. Third, capital control protects domestic tax sources and foreign balance of payments (BOP) thereby reducing the possibility of a BOP deficit. Finally, the high transaction costs for buying securities and investing abroad, the risk of changes in exchange rates, and the limited information between countries regarding investments make domestic savings not simply run abroad for investment purposes (Beckmann, Belke, & Gros, 2022).

Human capital is defined as the resources, qualifications, skills, and knowledge available and acquired by individuals to maximize their own work abilities. A healthy, educated, and productive workforce is critical in determining long-term economic success. This is not only a crucial determinant of economic growth but also contributes to reducing inequality which is an integral part of the economic sustainability agenda. Human and social capital contribute to higher incomes, life satisfaction, and social cohesion (Duan et al., 2021; Widarni & Bawono, 2023). Awan, Iqbal, and Wahid (2010) examined the impact of education and health on economic growth in Pakistan, using time series data from 1972 to 2008. They applied the Johansen cointegration technique and the Granger causality test to analyze the long-run and short-run relationships among the variables. They found that both education and health had a positive and significant effect on economic growth in the long run, as well as in the short run. They also found that economic growth caused an increase in education and health expenditures, indicating a bidirectional causality between human capital and economic growth.

Barro (1996) analyzed the determinants of economic growth for a panel of around 100 countries from 1960 to 1990, using a production function approach. He included various measures of human capital, such as schooling, life expectancy, and fertility, as well as other variables, such as government consumption, rule of law, inflation, and terms of trade. He found that higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in the terms of trade enhanced the growth rate of real per capita GDP. He also found a negative relationship between the initial level of GDP and the growth rate, implying conditional convergence. He did not find a strong effect of democracy on growth, but suggested a nonlinear relationship in which more democracy stimulated growth at low levels of political freedom, but depressed growth at higher levels.

Bloom, Canning, and Sevilla (2004) extended the production function model of economic growth to account for health as a separate form of human capital, in addition to schooling and work experience. They used cross-country data from 1965 to 1990, and estimated the effects of health on growth using both life expectancy and adult survival rates as indicators of health. They found that health had a positive, sizable, and statistically significant effect on economic growth, holding other variables constant. They also found that work experience had little variation across countries, and thus did not explain much of the variation in growth rates. They also found that the effects of schooling on growth were consistent with the microeconomic estimates of the returns to education, suggesting no externalities from education. Dhrifi et al.

(2021) analyzed the causal relationship between human capital (health and education) and economic growth by comparing low, middle and high income countries. They found that there was bidirectional causality between education and economic growth in all groups of countries, and bidirectional causality between health and economic growth in low- and middle-income countries. They also show that human capital has a positive and significant influence on long-term economic growth.

Mariani et al. (2021) emphasize the importance of developing human capital in driving economic prosperity. They conducted an empirical analysis of countries divided by income and showed that both GDP and GDP per capita were positively correlated with the human development index. They also examine the impact of various human capital indicators, such as life expectancy, literacy rates, and quality of education, on economic growth. Bucci et al. (2020) studied the relationship between human capital, innovation, and economic growth using an endogenous model. They found that human capital has an important role in influencing the level of innovation and economic growth. They also show that there is a positive feedback effect between human capital and innovation, meaning that increasing human capital can increase the ability to produce innovation, and vice versa.

Cipriani et al. (2020) examines the impact of human capital on economic growth in European Union countries. They used panel data from 2000 to 2018 and applied different estimation methods. They found that human capital has a positive and significant influence on economic growth, both in the short and long term. They also show that human capital has a multiplicative effect on other factors that influence economic growth, such as investment, trade, and the quality of institutions. World Bank (2019) presents a report on human capital and economic growth in developing countries. This report measures human capital using the human capital index, which includes indicators such as health, education and skills. This report shows that human capital has a major contribution to economic growth, especially in low and middle income countries. This report also provides policy recommendations to increase human capital, such as improving access and quality of health and education services, and developing social protection systems.

Several studies have shown a positive relationship between economic growth and FDI, total foreign debt, debt service, education and health. This relationship shows that developing countries can utilize foreign capital to improve the quality of their human resources and infrastructure, as well as to reduce their debt burden. However, this relationship also depends on other factors, such as political stability, macroeconomic policies, and global market conditions. Therefore, it is important for developing countries to create a conducive environment for foreign investment, while maintaining a balance between economic growth and social welfare (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004; Patillo, Poirson, & Ricci, 2002; Sachs & Warner, 1995). According to Siddiqui and Ahmed (2019), FDI has a positive impact on GDP growth in Pakistan, and also shows that foreign debt contributes to economic development. FDI brings capital, technology and managerial skills that increase productivity and efficiency. The same thing was also found by Khan et al. (2019) who analyzed the relationship between GDP, FDI and debt service in South Asian countries, and found that FDI and debt service had a positive effect on GDP in the long term. Debt service reflects a country's ability to repay its foreign obligations, which increases its credibility and attracts more FDI. In addition, Nasir et al. (2019) examined the impact of education and health expenditure on GDP growth in Pakistan, and observed that both variables had positive and significant effects. Education and health are important human capital factors that improve the quality and quantity of labor, which in turn improves economic performance.

The combination of theoretical and empirical studies regarding the contribution and magnitude of the influence of foreign debt, FDI, and HCI on economic growth above explains how important the influence of foreign loans and HCI is on development in developing countries, the research hypothesis is (H1) Economic growth has a positive effect significant to total foreign debt, FDI, HCI, and debt services, (H2) The

development of economic growth has no significant effect on total foreign debt, FDI, HCI, and debt services.

The combination of theoretical and empirical studies regarding the contribution and magnitude of the influence of foreign debt, FDI, and HCI on economic growth above explains how important the influence of foreign loans and HCI is on development in developing countries, the research hypothesis is (H1) Economic growth has a positive effect significant to total foreign debt, FDI, HCI, and debt services, (H2) The development of economic growth has no significant effect on total foreign debt, FDI, HCI, and debt services.

Research method

The type of data used in this study is secondary data, annual time series with a time span from 2000 to 2020 for all cross section variables taken from four countries in ASEAN, namely Indonesia, Thailand, Vietnam, and the Philippines. The World Bank provided data for this study. The variables examined in this study are GDP, total foreign debt, foreign debt, FDI, and HCI which are represented by education and health variables. The following is the model we used in this study:

$$GDP_{it} = \beta_0 + \beta_1 TED_{it} + \beta_2 DS_{it} + \beta_3 FDI_{it} + \beta_4 ED_{it} + \beta_5 HE_{it} + e_{it} \quad (1)$$

$$TED_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 DS_{it} + \beta_3 FDI_{it} + \beta_4 ED_{it} + \beta_5 HE_{it} + e_{it} \quad (2)$$

$$DS_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 TED_{it} + \beta_3 FDI_{it} + \beta_4 ED_{it} + \beta_5 HE_{it} + e_{it} \quad (3)$$

$$FDI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 TED_{it} + \beta_3 DS_{it} + \beta_4 ED_{it} + \beta_5 HE_{it} + e_{it} \quad (4)$$

$$ED_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 TED_{it} + \beta_3 DS_{it} + \beta_4 FDI_{it} + \beta_5 HE_{it} + e_{it} \quad (5)$$

$$HE_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 TED_{it} + \beta_3 DS_{it} + \beta_4 FDI_{it} + \beta_5 ED_{it} + e_{it} \quad (6)$$

Description:

GDP: Gross Domestic Product

TED: Total External Debt

DS: Debt Service

FDI: Foreign Direct Investment

ED: Education

HE: Health

β : the magnitude of the effect of causality

t: time series

i: cross section

eql: equation

E: error term

This research uses the Panel Vector Autoregression Model (PVAR). The PVAR method is a method used to analyze the relationship between several variables that change over time. This method combines two approaches, namely Vector Autoregression (VAR) and panel data. VAR is a method that treats all variables as endogenous variables, meaning that these variables influence each other. For example, the inflation variable affects the economic growth variable, and vice versa. VAR can also capture dynamic relationships between variables, namely how variables at a previous time affect variables at the present or future. Panel data is data that consists of two dimensions, namely the individual dimension and the time dimension. Panel data allows us to accommodate individual heterogeneity, namely differences in characteristics between individuals that cannot be observed directly. By combining VAR and panel data, we can analyze the relationship between variables that vary between individuals and change over time. The PVAR method can also test causality between variables, namely determining the direction of influence between variables. To apply the PVAR method, we need to take several steps, namely: Determine the variables to be analyzed. Determine the number of lags, namely the time period used to see the influence of variables at the previous time. Carry out a Granger causality test, namely a test that can determine the direction of the relationship

between variables. Carrying out impulse response function (IRF) analysis and forecast error variance decomposition (FEVD), namely analysis that can measure the magnitude and duration of the influence of one variable on another variable due to a disturbance or surprise.

Result and discussion

Stationery test

One of the essential requirements in analyzing data in the form of time series and cross-sectional or overall panel data is to differentiate the data to be stationary to find out whether there is a trend or random walk element ((Liaqat, 2019; Shokoohi & Saghaian, 2022). The test forms in stationarity are Augmented DickyFuller (ADF), Philips-Perron (PP), and Dicky-Fuller (DF) (Kim, Shim, & Park, 2022). This study used the Philip-Perron (PP)-Fisher test with data testing at the 1st difference level. Where is the result value of the critical value test compared to the t-statistic value of the PP-Fisher test results with a PP-Fisher probability value of less than an alpha value of 0.05 or 5 %. Then the test results are as follows: (see Table 2)

At the 1st difference level, the results of the stationarity test using the Phillip-Perron - Fisher method show that all variables are stationary. The probability value of 0.0000 for all variables, which appears to lower than the alpha level of 5 %, serves as an indication of this. Where these results are interpreted that the GDP has a prob worth of 0.0000, and a t-stat worth of 51.7930, so it is stationary. Furthermore, for the test statistics, the TED variable value is 96.5938 with a probability value of 0.0000, which means it is stationary. The DS value variable from the statistical test is 53.8319 with a probability value of 0.0000, so it is stationary. The FDI has a probability worth of 0.0000, with a statistical test worth of 159.125, so it is stationary.

Optimum lag test

To pinpoint the precise time frame for a variable to have an impact on other variables that produce the best outcomes, it is vital to know the ideal lag before estimating the PVAR. Because of optimum lag, the impact of altering one variable on another does not happen at the same time, optimal lag management is crucial (Albuquerque & Rajhi, 2019; Adarov, 2021). The Lag Length Criteria test, which considers the value criteria for LR, FPE, AIC, SC, and HQ, is used to determine the best lag test.

Table 3 displays the findings of the best lag test, where lag 1 is indicated by the most * symbols in accordance with the selection of criteria.

Cointegration test

The long-term balance contained in the research model is the most important requirement in estimating long-term research models by making comparisons between variables so that they have the same trend

Table 2
Philips-Perron 1st Difference Test.

Variable	PP – Fisher stat.	Prob.	Description
GDP	51.7930	0.0000	Stationer
TED	96.5938	0.0000	Stationer
DS	53.8319	0.0000	Stationer
FDI	159.125	0.0000	Stationer
ED	35.6369	0.0000	Stationer
HE	38.0598	0.0000	Stationer

(Gabriel & Ribeiro, 2019; Kacou, Kassouri, Evrard, & Altuntaş, 2022). The cointegration test is carried out using the Pedroni Residual Cointegration Test. Considering the likelihood value, which is under 5 %, the Pedroni Residual Cointegration Test indicates that the data in the model have a long-term link. Nevertheless, if the likelihood value exceeds alpha 5 percent, then the data in the model does not have cointegration or a long-term relationship (see Table 4).

The disclosure that all variables are not cointegrated with each other. This is demonstrated by the probability value, which is less than an alpha value of 5 %. The connection with the model is not cointegrated, so the data analysis tool used is the Panel Vector AutoRegression Model (PVAR).

Panel Vector AutoRegression model (PVAR)

The PVAR Model is the analytical method that was utilized to examine the relationship between the variables employed in this study, as was previously stated. Based on the findings of the optimal lag test, PVAR estimation was performed using lag 1. To test the significance of each variable, the computation of the coefficient value is also utilized to calculate the value of the t-stat (see Table 5).

The estimation findings of the VAR Panel Model show that the t-statistic value is -0.05126 , and the coefficient is -0.010954 indicating a significant negative relationship between GDP (-1) and GDP. With a coefficient of -0.076114 and a t-stat of -1.04047 , the relationship between TED(-1) and GDP is statistically negative and significant, indicating an inverse relationship between the two. Likewise, the relationship between DS(-1) and GDP has a coefficient value of 0.054493 and a t-statistic of 0.62641 which is statistically significant and positive, meaning that the greater the DS, the greater the GDP. With a coefficient of -0.004115 and a t-stat of -0.01192 , the relationship between FDI(-1) and GDP is negative and statistically significant, indicating that when FDI increases, GDP will decrease. With a coefficient of -0.017132 and a t-stat of -0.53797 , the relationship between ED(-1) and GDP is negative and statistically significant, indicating that as ED increases, GDP decreases. With a coefficient of -0.630369 and a t-stat of -0.98432 , the relationship between HE(-1) and GDP is negative and statistically significant, indicating that as HE increases, GDP decreases.

By using the HE variable in a certain year period as a function of all variables in the previous year, the estimation results from the model also show the magnitude of Adj. The coefficient of determination of R-square is 0.983267 . This shows the accuracy of the model above and is reinforced by evidence of a statistical F value of 714.9390 to explain the HE variable.

Granger causality analysis

When using the Granger Causality approach, it's crucial to do the test to see how variables are related to one another. Whenever the f-stat's value exceeds the f-value table's or if H_0 is rejected and H_1 is approved, and vice versa, it is claimed that causation exists between the variables. Given that the study's f-table value is 2.720 , the following table shows the findings of a causality test between two variables with a lag duration of 1 (see Table 6).

From the causality test results above, it can be seen that most of the causality test results produce a variable relationship by distinguishing causality independence or there is no reciprocal relationship between variables. For the GDP variable to TED, HE variable to GDP, TED to FDI variables, it has fulfilled the element of causality but only has one direction or is called unidirectional causality as indicated by the respective f-statistic values of 9.40848 , 5.57004 , and 5.66335 . Whereas for other variables there is no reciprocal relationship or causality feedback.

Impuls response function (IRF)

It is essential to establish a technique that can demonstrate the

Table 3

Optimum lag test.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-783.7604	NA	71574.06	28.20573	28.42273	28.28986
1	-499.4282	497.5813*	10.14870*	19.33672	20.85573*	19.92564*
2	-473.8167	39.33190	15.36668	19.70774	22.52877	20.80145
3	-445.5980	37.28903	22.79116	19.98564	24.10868	21.58414
4	-409.9258	39.49417	29.24527	19.99735	25.42240	22.10063
5	-370.8113	34.92373	40.37420	19.88612	26.61318	22.49418
6	-316.3727	36.94044	44.73369	19.22760	27.25667	22.34045
7	-229.6721	40.25388	28.68386	17.41686*	26.74794	21.03450

Table 4

Cointegration Test.

	Value	Prob.	Value	Prob.
v-Stat.	2.949429	0.0016	2.073046	0.0191
rho-Stat.	0.183333	0.5727	0.208718	0.5827
PP-Stat.	-1.403617	0.0802	-1.930275	0.0268
ADF-Stat.	-1.802900	0.0357	-2.316538	0.0103

dynamic structure of PVAR using the Impulse Response Function (IRF) after calculating PVAR. IRF demonstrates the size of an endogenous variable's reaction to changes in other model variables. IRF can therefore be used to ascertain how a shock or unexpected change impacts other variables. IRF may be used to investigate the impact of a single innovation variable's standard deviation of surprise on the present or potential value of endogenous variables [Fig. 1](#).

Based on the examination of the figure above, it can be seen that: In shock, the GDP variable is reacted with the magnitude of GDP from period 1 to period 10. This shows that the GDP variable and the GDP variable itself have a relationship both in the short and long term. Overall the responses given tend to be stable against other variables. From the first to the tenth period, TED reacts to GDP and DS variable shocks. This shows that the TED and GDP variables have a short and long-term relationship, as well as between the TED and DS variables. However, overall the TED variable is responded to by other variables, the FDI, ED, and HE variable has a small shock to the TED variable.

Table 5

PVAR result.

	GDP	TED	DS	FDI	ED	HE
GDP(-1)	-0.010954 (0.21369) [-0.05126]	-0.375708 (0.13494) [-2.78417]	-0.154325 (0.18082) [-0.85347]	-0.046156 (0.07755) [-0.59515]	-0.116810 (0.12889) [-0.90630]	3.95E-05 (0.00678) [0.00582]
TED(-1)	-0.076114 (0.07315) [-1.04047]	0.952213 (0.04620) [20.6120]	0.079910 (0.06190) [1.29089]	-0.077153 (0.02655) [-2.90600]	-0.005129 (0.04412) [-0.11625]	0.003155 (0.00232) [1.35961]
DS(-1)	0.054493 (0.08699) [0.62641]	0.002692 (0.05494) [0.04901]	0.860449 (0.07361) [11.6890]	-0.062668 (0.03157) [-1.98495]	0.034691 (0.05247) [0.66116]	-0.000396 (0.00276) [-0.14356]
FDI(-1)	-0.004115 (0.34531) [-0.01192]	0.155511 (0.21807) [0.71314]	-0.008794 (0.29220) [-0.03010]	0.290645 (0.12532) [2.31915]	0.144757 (0.20828) [0.69503]	0.016581 (0.01095) [1.51366]
ED(-1)	-0.017132 (0.03185) [-0.53797]	0.000914 (0.02011) [0.04544]	0.017489 (0.02695) [0.64899]	-0.013235 (0.01156) [-1.14508]	0.975374 (0.01921) [50.7788]	0.000644 (0.00101) [0.63741]
HE(-1)	-0.630369 (0.64041) [-0.98432]	0.281799 (0.40442) [0.69680]	-0.681223 (0.54191) [-1.25708]	0.009855 (0.23242) [0.04240]	-0.306501 (0.38626) [-0.79351]	0.942765 (0.02032) [46.4064]
C	9.971540 (3.74562) [2.66219]	1.991154 (2.36536) [0.84180]	1.234367 (3.16951) [0.38945]	5.129651 (1.35939) [3.77350]	3.727926 (2.25916) [1.65014]	0.185302 (0.11882) [1.55951]
R-squared	0.088040	0.915192	0.815259	0.397335	0.980503	0.983267
Adj. R-squared	0.013085	0.908221	0.800075	0.347801	0.978901	0.981892
F-statistic	1.174568	131.2939	53.69129	8.021447	611.8726	714.9390

Variance decomposition (VD)

The variation of the shock's change from each variable to other variables in the model is divided using a process known as variance decomposition. It is anticipated that no variable change in the model will be correlated. Variance decomposition explains the extent of the impact of a change in one variable on other variables in the model. According to the analysis's findings, the variance decomposition of the national income variable explains why it is completely impacted by the variable in the first period (see [Table 7](#)).

According to the VD test results, the GDP variable has a 99.44 percent self-impact in the second period, with other factors having an influence on the remaining 0.56 percent. Overall the GDP variable is more stable against the influence exerted by other variables in the model. This indicates that the GDP variable, even though it has decreased, tends to be influenced by itself and is little influenced by other variables. This research shows that investment in human capital through education and health can increase people's productivity and welfare, as well as contribute to economic growth. This is in accordance with several other studies which found a positive relationship between education, health and economic growth ([Awan, Iqbal, & Wahid, 2010](#); [Barro, 1996](#); [Bloom, Canning, & Sevilla, 2004](#)). This research shows that investment in human capital through education and health can increase people's productivity and welfare, as well as contribute to economic growth. This is in accordance with several other studies which found a positive relationship between education, health and economic growth. For example, [Dhrifi et al. \(2021\)](#) analyzed the causal relationship between human capital (health and education) and economic growth by comparing low, middle and high income countries. They found that

Table 6
Granger Causality test.

H0:	Obs	F-Stat.	Prob.
TED not Granger GDP	80	2.38744	0.1264
GDP not Granger TED		9.40848	0.0030
DS not Granger GDP	80	3.13736	0.0805
GDP not Granger DS		0.81784	0.3686
FDI not Granger GDP	80	0.32245	0.5718
GDP not Granger FDI		3.06783	0.0838
ED not Granger GDP	80	0.02203	0.8824
GDP not Granger ED		0.23343	0.6304
HE not Granger GDP	80	5.57004	0.0208
GDP not Granger HE		0.73285	0.3946
DS not Granger TED	80	1.79126	0.1847
TED not Granger DS		1.19807	0.2771
FDI not Granger TED	80	0.07057	0.7912
TED not Granger FDI		5.66335	0.0198
ED not Granger TED	80	0.09363	0.7604
TED not Granger ED		0.77512	0.3814
HE not Granger TED	80	2.49235	0.1185
TED not Granger HE		0.27281	0.6030
FDI not Granger DS	80	1.04665	0.3095
DS not Granger FDI		3.13637	0.0805
ED not Granger DS	80	0.09491	0.7589
DS not Granger ED		1.00964	0.3181
HE not Granger DS	80	0.53386	0.4672
DS not Granger HE		0.67976	0.4122
ED not Granger FDI	80	0.02877	0.8658
FDI not Granger ED		0.00359	0.9524
HE not Granger FDI	80	0.00152	0.9690
FDI not Granger HE		2.38704	0.1264
HE not Granger ED	80	1.76083	0.1884
ED not Granger HE		0.00148	0.9694

there was bidirectional causality between education and economic growth in all groups of countries, and bidirectional causality between health and economic growth in low- and middle-income countries. In addition, [Mariani et al. \(2021\)](#) highlight the importance of human capital development in driving economic prosperity. They conducted an empirical analysis of countries divided by income and showed that both GDP and GDP per capita were positively correlated with the human development index. Another study that supports these findings is [Bucci et al. \(2020\)](#), [Cipriani et al. \(2020\)](#), and [World Bank \(2019\)](#). Thus, this research is in line with existing literature which emphasizes the role of human capital in improving the economic performance of developing and developed countries. this research can be concluded that this research is in line with existing literature which emphasizes the role of human capital in improving the economic performance of developing and developed countries. Therefore, investment in human capital through education and health is an important strategy to achieve sustainable and inclusive economic growth.

This research finds that GDP has a negative and significant relationship with FDI, total foreign debt, debt service, education and health. This is contrary to several other studies that found a positive relationship between these variables and economic growth ([Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004](#); [Patillo, Poirson, & Ricci, 2002](#); [Sachs & Warner, 1995](#)). Hence, these studies contradict the research finding that GDP has a negative and significant association with FDI, total foreign debt, debt service, education and health. They provide empirical evidence and theoretical arguments that support the opposite direction of causality. However, it is possible that the relationship between these variables may vary depending on the context, methodology, and data sources of each study. Therefore, further research is required to compare and contrast the different findings and explore the underlying mechanisms and factors that influence the relationship between GDP and other macroeconomic variables. According to previous literature, GDP has a positive and significant association with FDI, total foreign debt, debt service, education and health. For instance, [Siddiqui and Ahmed \(2019\)](#) reported a positive impact of FDI on GDP growth in Pakistan, and also found that foreign debt contributes to economic development. They claimed that

FDI brings capital, technology, and managerial skills that enhance productivity and efficiency. Likewise, [Khan et al. \(2019\)](#) analyzed the relationship between GDP, FDI, and debt service in South Asian countries, and discovered that FDI and debt service have a positive effect on GDP in the long run. They proposed that debt service reflects the ability of a country to repay its foreign obligations, which improves its credit-worthiness and attracts more FDI. Moreover, [Nasir et al. \(2019\)](#) examined the impact of education and health expenditures on GDP growth in Pakistan, and observed that both variables have a positive and significant effect. They explained that education and health are important human capital factors that increase the quality and quantity of labor force, which in turn boosts economic performance.

Conclusions

From this research, we find that the relationship between variables varies, such as gross domestic product which has a significant negative relationship with FDI but has a significant positive relationship with debt service. Apart from that, there is a negative and significant relationship between GDP and total foreign debt, GDP is also negatively and significantly related to education and health variables, which means GDP is also negatively and significantly related to HCI. It can be concluded that in the four countries we studied, increasing debt service will increase people's consumption capacity which will lead to increased economic growth, but in this study total foreign debt and debt service have a negative relationship with gross domestic product. This conclusion shows that FDI, total foreign debt, debt service, education, health, and HCI have different influences on GDP in the four countries studied. FDI has a negative effect on GDP, which may be caused by factors such as political instability, corruption, bureaucracy, and lack of legal protection for foreign investors. Total foreign debt and debt service also have a negative effect on GDP, indicating that a high debt burden reduces the country's ability to allocate resources for economic development. Education and health have a positive effect on GDP, reflecting that investment in human capital can increase the productivity and welfare of society. HCI also has a positive effect on GDP, indicating that quality of life and human development potential can contribute to economic growth. Therefore, we recommend that the countries studied can improve the investment climate that is conducive to FDI, manage foreign debt and debt service wisely, and increase budget allocations for education and health.

Limitation

This research is limited by data availability and research period. This research only uses data from four countries, namely Indonesia, Malaysia, Thailand and the Philippines, which may not represent the characteristics and conditions of other developing countries. Therefore, generalization of the results of this research needs to be careful and consider differences in context and situation between countries. This research also does not include other variables that might influence economic growth, such as institutional quality, political stability, level of corruption, and socio-cultural factors.

Suggestions

This research shows that foreign direct investment (FDI) has a significant positive relationship with the gross domestic product (GDP) of ASEAN member countries, especially Indonesia, Thailand, Vietnam and the Philippines. Therefore, it is recommended that the governments of ASEAN member countries jointly determine foreign investment policies and manage their foreign debt to increase economic growth in the Southeast Asia region. In addition, it is recommended that the governments of ASEAN member countries pay more attention to their fiscal policies, because increasing debt service costs can reduce economic growth. This can be seen when there is a surge in foreign debt which is

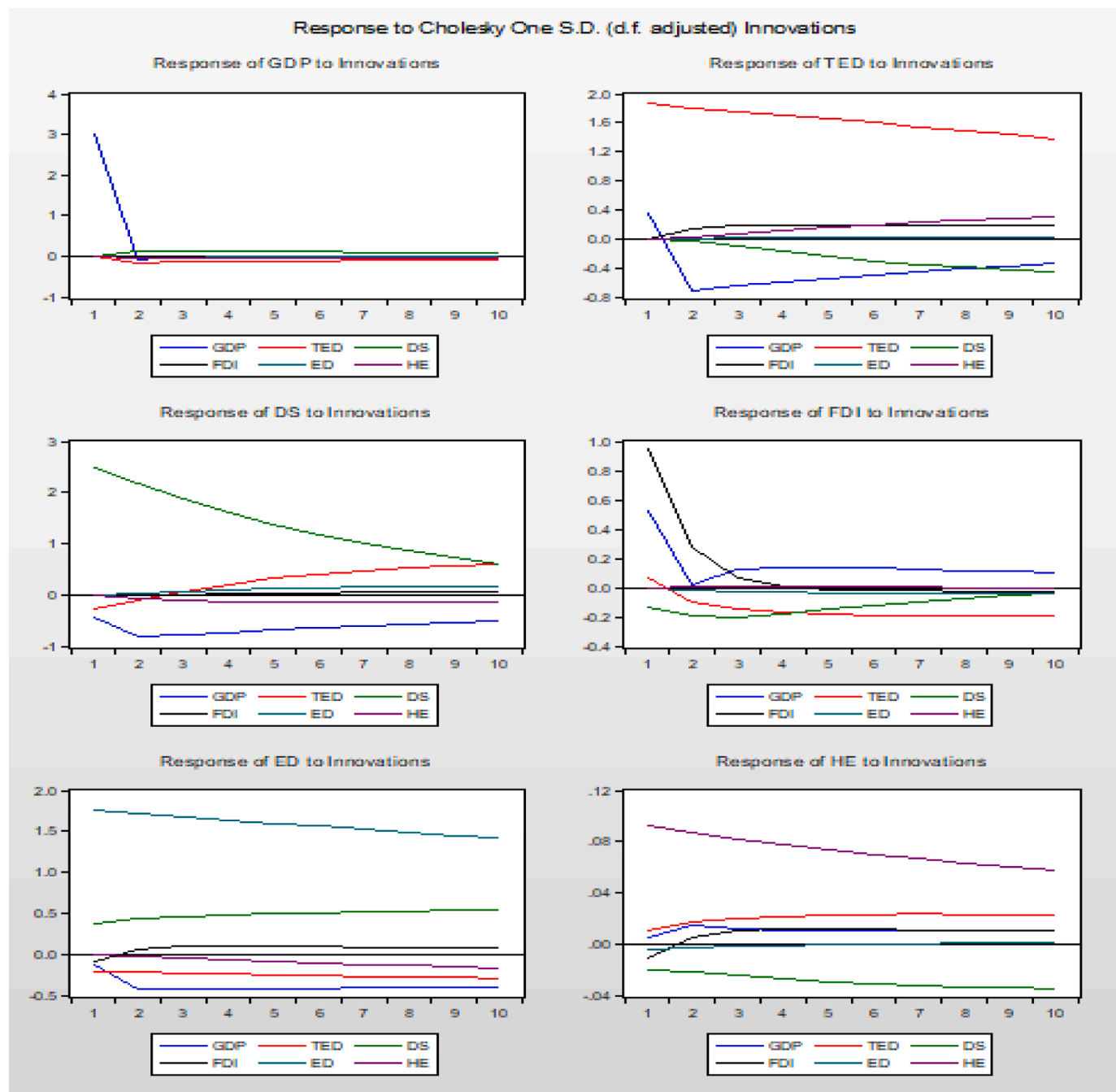


Fig. 1. IRF result.

Table 7
Variance decomposition.

	S.E.	GDP	TED	DS	FDI	ED	HE
1	3.012440	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	3.022067	99.44720	0.283326	0.224226	0.000201	0.008302	0.036743
3	3.028965	98.99547	0.516756	0.394771	0.003292	0.015343	0.074366
4	3.035078	98.59746	0.716503	0.541450	0.008432	0.021627	0.114528
5	3.040505	98.24610	0.886150	0.669976	0.013926	0.027231	0.156614
6	3.045338	97.93461	1.030193	0.783720	0.019185	0.032246	0.200051
7	3.049660	97.65726	1.152635	0.884984	0.024062	0.036756	0.244299
8	3.053538	97.40936	1.256862	0.975528	0.028543	0.040829	0.288877
9	3.057030	97.18700	1.345698	1.056772	0.032647	0.044524	0.333362
10	3.060182	96.98693	1.421499	1.129888	0.036405	0.047887	0.377392

disproportionate to the ability to pay ASEAN member countries. Future research could investigate the impact of the increase in total foreign debt due to the COVID-19 pandemic crisis and the Russian-Ukrainian war crisis on economic growth.

Policy implications

Policies that can increase foreign direct investment (FDI) in the four countries studied, such as providing fiscal incentives, improving the business climate, and improving the quality of human resources. This can help reduce the debt service burden and increase economic growth (GDP). Policies that can reduce total foreign debt in the four countries studied include managing budget deficits, optimizing loan utilization and increasing exports. This can help increase economic growth (GDP) and reduce dependence on debt. Policies that can increase spending on education and health in the four countries studied, such as allocating adequate budgets, improving access and quality of services, and encouraging community participation. This can help increase the human capital index (HCI) and reduce poverty.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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