

# The Mystery between Human Capital, Corruption, FDI and Their Impact on Economic and Social Development

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**Abstract:** - This Research analyses the relationships among corruption, government spending, FDI, and human capital across as many ASEAN countries as possible, with particular attention to Indonesia, Thailand, Vietnam, and the Philippines. Primary data were collected from the World Bank and Transparency International. Government spending, corruption, and human capital were analysed using the Corruption Perception Index and the Human Capital Index, using health and education as proxy variables. In the study's analysis of inter-variable relationships, the partnership between health and corruption, and the relationship between health and FDI, were particularly noteworthy. In addition, the study found that government spending and the Corruption Perception Index exhibit a strong negative correlation. Furthermore, government spending significantly and positively impacts the health variable.

**Key-Words:** - Human Capital, Corruption Perception Index, Government Expenditure, FDI, PVAR, Economics, Social Development.

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## 1 Introduction

The principal aim of development should be to foster conditions for people to live long, healthy, and economically active lives, i.e., to be in the productive workforce, as they are the most important resource in any country. However, in the rush to achieve prosperity and accumulate wealth, this important aspect is often neglected. Gradual accumulation of wealth and prosperity is not an end in itself for human development. Progress is about shifting the focus to the people, [1].

The Human Development Index offers a way to gauge the extent of success and failure in the development of people as individuals. The greater a country's human success, the greater the value of its people. Looking at the Human Development Index alongside a country level of socio-economic

development provides an adequate measure of a country's level of development, [2].

Life expectancy reflects health and literacy, the average number of years of schooling reflects education, and people's purchasing power reflects economic factors. The Human Capital Index (HCI) guides long-term development. Achievement and its status are the two components that need to be evaluated to assess human development, [3].

Measuring the overall standards of living within a given population can be done using the Human Development Index (HDI). A community's income reflects the educational, health, and economic capabilities of its population. A higher quality of public schooling leads to greater employment availability and, in turn, higher income, which in turn leads to better health care. A population's health

determines productivity, which in turn determines income. Insufficient income and financial capacity limit the community's access to high-quality education and health care, thereby reducing its overall welfare. The HCI shows what a nation or region can achieve at a given level of economic development, [4].

Globally, corruption affects almost every aspect of an individual's life, including the economy. When it comes to the role of corruption in social welfare and economic development, it manifests itself through the erosion of people's trust in public institutions and the government, [5]. One of the most important determinants of a nation's economic development is its human capital. Corruption deteriorates human capital by undermining education, skills, and people's health. A significant number of studies suggest that there is a positive relationship between human capital and productivity levels, and between corruption levels and productivity levels, [6].

Foreign direct investment (FDI) is among the most crucial indicators of a nation's economic growth. The higher the levels of corruption, the higher the negative sentiment the foreign direct investors have toward governance and institutions. This continues to shackle the country's streams of foreign direct investment. Various Research works have shown a negative correlation between a nation's corruption levels and foreign direct investment inflows. For many years, the three integrated parts of a nation's development in social and economic terms have been CPI, government expenditure, and the country's human resource endowment, [7].

In [8], it has been illustrated that corruption and economic growth are directly related, and the manner in which corruption affects economic growth is influenced by the speed of bureaucratic processes. It is better to spend the money to address the bureaucracy, rather than to leave the system as it is. In [9], corruption hampers economic growth by increasing the difficulty of efficient resource allocation. There is consensus that corruption is the most obstructive factor to progress. The definition of corruption involves the use of public office for private gain, leading to higher costs and lower economic growth, [10]. Corruption endangers redistributive justice from an economic perspective, exacerbating unequal wealth distribution and entrenching poverty. Numerous studies highlight the adverse impacts of corruption on economic growth, including the following: (1) budgetary reductions limit a state's anti-corruption capabilities, and reductions in overall government

expenditure, including social and welfare spending, disrupt national defence and political stability by undermining the goals of policymakers. (2) Corruption incentivises illegal economic activities through the acceptance of unearned compensation and the tax-for-bribe scheme, thereby diminishing treasury revenue. (3) Corruption channels capable individuals into rent-seeking activities, whereby productive government officials become rent collectors, resulting in an inefficient allocation of human resources, [11].

The Corruption Perceptions Index (CPI) is one of many metrics that seek to provide a more accurate gauge of the level of malfeasance across countries. One must keep in mind that the Corruption Perceptions Index ranks countries on a scale of 0-100. A country that is less corrupt (a clean country) will score closer to 100, while a country with a higher score will be more corrupt (a higher-score country) than the country before it. It is a well-known fact that statistical systems and rating systems are flawed to a certain extent; the fact remains that these systems do the best job of nudging the countries that are in the most desperate need of fighting and curbing (most lacking) in the Corruption Perceptions Index to the frontline of fighting corruption in their country, [12].

The economic Influenceimpact of corruption in a given country can be examined using the country's score on the Corruption Perceptions Index (CPI). A country is said to be economically growing positively for the BRICS countries when its CPI score is rising and approaching 100. Conversely, if a country is economically growing negatively for the BRICS countries, it is recorded with a decreasing score approaching 0. Here, the country is in a negative budget, which limits its ability to address corruption and finance efforts to curb social protection and public welfare budgetary expenditures, [13].

As already stated, we attempt to determine the means and structure the investigations of the interaction among human capital, corruption, foreign direct investment, and social and economic development. Specifically, we attempt to analyse the interactions among corruption, government expenditure, foreign direct investment, and human capital in some ASEAN countries, particularly Indonesia, Thailand, Vietnam, and the Philippines. We also attempt to identify alternatives with respect to policies on social and economic development. Ultimately, we hope to enhance the analytical framework for the sub-constructs and the implications of the interaction among corruption, government

expenditure, foreign direct investment, and human capital in the development of countries.

## 2 Literature Review

The expected future human and economic developments will most likely include transformations of both sorts. Technologically and institutionally advanced economic development depends on a country's level and means of economic human development and on how people utilize and manage the resources that are growing economically, [14].

For development to occur, economic growth is needed, [15]. Growth in an economy means there will be an increase in employment opportunities, leading to greater circulation of money and an upswing in productivity. The community's human economic development will stimulate economic growth by improving people's productive potential and ability to generate new, [16]. Economically, people will be more valuable as potential resources and will be more productive and creative.

Although the CPI reflects public perceptions of corruption in the public sector, its absence can indeed be associated with a country's social and economic welfare. Gross public expenditure, a portion of a country's social and economic resources devoted to addressing the most critical social and economic issues, is a key component of a country's level of development. Ultimately, the country's human capital is defined by people's skills, knowledge, and experience, and it serves as a key measure of the country's competitiveness and productivity, [17].

Human capital is one of the many driving forces of a nation's economic advancement. For a nation to achieve economic progress, it must have a population that is well educated, skilled, and healthy. A combination of these three attributes ensures the nation's productivity. The economic productivity of a nation is further enhanced by the presence of a relatively smaller population of corrupt individuals. Corruption in a nation is indicative of the underutilization of human capital, defines the nation's human capital, and outlines the potential and the real status of any given situation, [18].

The Corruption Perceptions Index is one of several metrics that gauge the level of corruption in a society. Several publications examine the correlations between corruption, public trust in government, and economic development, and between social welfare and economic development. The findings of these

publications have not been consistent. Certain scholars point to Foreign Direct Investment (FDI) as a negative consequence of corruption, while others argue that foreign investment removes the barrier of doing business with a corrupt partner. Developing countries are among the most corrupt, whereas developed countries lack this form of foreign investment. It is not always ideal to do business with a corrupt country that is willing to accept foreign investment, [19].

This is why the relationship between human resources and foreign direct investment is examined: whether countries with high and low corruption can attract FDI differentially after similar enhancements in human capital. According to [20], a country with a high corruption score can be expected to experience an FDI inflow increase that is 40% lower than that of a low-corruption country for a comparable increase in the size of the human capital stock. Positive FDI inflows are observed across all measures of human capital.

The authors of the paper [21] are analyzing the relationships between government spending and economic growth, and between corruption and these relationships. They argue that government control of corruption spending reduces economic growth and, therefore, the need for such spending. Despite the authors stating that there is a negative relationship between government control of corruption and economic growth, there seems to be some interaction when government spending is combined with control of corruption, which would be negative and reduce economic growth. In the Asia EMDE region, this is indeed the empirical Research. In addition, when government spending and corruption control are perceived to be combined through interactive variables to reduce the negative effects of economic growth, the variables can be considered operational. The threshold model, in this case, improves GMM by providing better, more sufficient results for this particular Research. In addition, it provides empirical results that are particularly useful to the Asia EMDE region.

How a government spends its budget, how much a government spends on the development and growth of human capital, and the budgetary inflow of FDI (Foreign Direct Investment) plays a crucial role in determining the extent to which empirical and theoretical works explain the role and effect of government spending, FDI, and human capital on the movement of the Corruption Perception Index (CPI).

The Research hypotheses are: (H1) There exists a statistically significant and positive relationship between government spending, FDI, and human capital, and the CPI; (H2) There exists a statistically non-significant relationship between government spending, FDI, and human capital, and the CPI.

### 3 Research Method

This Research is based on secondary data, including Government spending, foreign direct investment (FDI), the Corruption Perception Index (CPI), and the Human Capital Index (HCI) proxied by education and health. The World Bank and Transparency International provided data. Time series cross-sectional data for four ASEAN member states, Indonesia, Thailand, Vietnam, and the Philippines, were also used. For this study, data were aggregated annually over two decades (2000-2020). The model for this study is as follows:

$$\begin{aligned} \text{CPI}_{ti} &= \beta_0 + \beta_1 \text{ED}_{ti} + \beta_2 \text{HE}_{ti} + \beta_3 \text{GE}_{ti} + \beta_4 \text{FDI}_{ti} + e_{ti} & \text{eq1 1} \\ \text{ED}_{ti} &= \beta_0 + \beta_1 \text{CPI}_{ti} + \beta_2 \text{HE}_{ti} + \beta_3 \text{GE}_{ti} + \beta_4 \text{FDI}_{ti} + e_{ti} & \text{eq1 2} \\ \text{HE}_{ti} &= \beta_0 + \beta_1 \text{CPI}_{ti} + \beta_2 \text{ED}_{ti} + \beta_3 \text{GE}_{ti} + \beta_4 \text{FDI}_{ti} + e_{ti} & \text{eq1 3} \\ \text{GE}_{ti} &= \beta_0 + \beta_1 \text{CPI}_{ti} + \beta_2 \text{ED}_{ti} + \beta_3 \text{HE}_{ti} + \beta_4 \text{FDI}_{ti} + e_{ti} & \text{eq1 4} \\ \text{FDI}_{ti} &= \beta_0 + \beta_1 \text{CPI}_{ti} + \beta_2 \text{ED}_{ti} + \beta_3 \text{HE}_{ti} + \beta_4 \text{GE}_{ti} + e_{ti} & \text{eq1 5} \end{aligned}$$

Description:

CPI : Corruption Perceptions Index

ED : Education

HE : Health

GE : Government expenditure

FDI : Foreign Direct Investment

$\beta$  : the magnitude of the effect of causality

t : time series

i : cross section

eq1: equation

E : error term

Table 1. Variable Description

| Variable                     | Explanation                                                                                                                                                                                                                                                            | Data type    |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Corruption perceptions index | State officials and politicians' opinions of corruption in the public sector are measured by the CPI, a composite index.                                                                                                                                               | Index        |
| Government expenditure       | General government final consumption expenditures comprise all current government purchases of goods and services. Most national security and defence costs are also covered, but government military spending, which is a component of capital creation, is excluded. | 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\$ |
| Foreign direct investment    | FDI is investment activity by foreign or foreign investors to do business in Indonesia.                                                                                                                                                                                | Percent      |

Source: created by the authors

Table 1 outlines the operational definitions of the study's core variables, capturing governance, human capital, and external economic dimensions. The Corruption perceptions index reflects perceived levels of corruption in the public sector, while government expenditure measures fiscal activity through final consumption spending. Human capital is represented by education, indicating the share of adults completing secondary schooling, and health, expressed in annual healthcare spending. Finally, foreign direct investment captures international capital inflows as a share of GDP. Together, these variables provide a multidimensional framework to assess the interplay between governance quality, public investment, human development, and economic openness in shaping growth outcomes.

### 4 Result and Discussion

Analysis is very important in time series studies. When combined with cross-section and/or panel data, it is conducted by differentiating the data examined to detect trends and/or a random walk and establish stationarity, [22]. For instance, stationarity tests can be done using Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Dickey-Fuller (DF) tests, [23]. This study employed the Phillips-Perron (PP) and Fisher tests on first-difference data. In this analysis, a critical

value is set against the t-stat value of the PP-Fisher, and a PP-Fisher prob less than 0.05 (5%) is considered significant. The test results, therefore, are as follows:

Table 2. Philips-Perron 1st Difference Test

| Variable | PP – Fisher stat. | Prob.  | Description |
|----------|-------------------|--------|-------------|
| CPI      | 60.3603           | 0.0000 | Stationer   |
| GE       | 36.7983           | 0.0000 | Stationer   |
| ED       | 35.6369           | 0.0000 | Stationer   |
| HE       | 38.0598           | 0.0000 | Stationer   |
| FDI      | 159.125           | 0.0000 | Stationer   |

Source: created by the authors

The Phillip-Perron-Fisher test in Table 2 is used to assess results after a stationarity test conducted at first-difference levels, and it shows that all the variables in the dataset are stationary. The result shows a probability of 0.0000 for all variables, which is less than the alpha of 5% confirming this. The results are as follows: the CPI has a p-value of 0.0000 and a t-stat of 60.3603, indicating that it is stationary. Then, for the test statistics, GE has a value of 36.7983 and a probability value of 0.0000, indicating that it is stationary. For ED, the probability is 0.0000 and the test statistic is 35.6369; thus, it is stationary. HE has a probability of 0.0000 and a test statistic of 38.0598, thus it is stationary. FDI also has a probability of 0.000 and a test statistic of 159.125, indicating that it is stationary as well.

Before estimating the PVAR, the optimal lag length must be determined to isolate the strongest effect of one variable on the other (s) over time. Due to optimal lag, the effects of one variable on the other do not coincide, so optimal lag handling is critical, [18]. The Lag Length Criteria is applied, where one of the value criteria for LR, FPE, AIC, and SC is taken for positing the optimal lag.

Table 3 shows the results for the final best lag test. Lag 1 has the most \* signs according to the selected criteria.

What is most vital in estimating long-term Research models is the most fundamental requirement of the Research model's balanced long-term constraints, as you make comparisons between variables to ensure their trends are similar, [24]. The test for cointegrating relationships uses the Pedroni Residual Cointegration Test. The Cointegration Test results indicate a long-term relationship between the data, with a probability below 5%. On the contrary, if the probability exceeds the 5% alpha level, then the data in the model lacks cointegration/long-term relationship.

Table 3. Optimum lag test

| Lag | LogL      | LR        | FPE       | AIC       | SC        |
|-----|-----------|-----------|-----------|-----------|-----------|
| 0   | -857.4417 | NA        | 16389038  | 30.80149  | 30.98232  |
| 1   | -573.9782 | 506.1848* | 1612.262* | 21.57065* | 22.65566* |
| 2   | -558.0177 | 25.65084  | 2275.531  | 21.89349  | 23.88267  |
| 3   | -542.0610 | 22.79534  | 3323.813  | 22.21646  | 25.10982  |
| 4   | -523.2867 | 23.46781  | 4636.489  | 22.43881  | 26.23635  |
| 5   | -491.2999 | 34.27162  | 4379.316  | 22.18928  | 26.89099  |
| 6   | -467.2940 | 21.43384  | 6215.780  | 22.22478  | 27.83067  |
| 7   | -436.5296 | 21.97452  | 8360.225  | 22.01892  | 28.52897  |

Source: created by the authors

Table 4. Cointegration Test

|           | Value     | Prob.  | Value     | Prob.  |
|-----------|-----------|--------|-----------|--------|
| v-Stat.   | -0.269163 | 0.6061 | -1.186566 | 0.8823 |
| rho-Stat. | 1.144906  | 0.8739 | 0.011931  | 0.5048 |
| PP-Stat.  | 0.753325  | 0.7744 | -1.862668 | 0.0313 |
| ADF-Stat. | 0.815096  | 0.7925 | -1.918906 | 0.0275 |

Source: created by the authors

The first finding in Table 4 is that there are no signs of cointegration among the variables in the set. This is supported by a probability value below the 5 percent alpha level. Given that the model is not cointegrated, the best method of data analysis is the Panel Vector AutoRegression (PVAR) model.

The analysis of relationships among the variables is conducted using the PVAR Model. PVAR estimation was performed using the first lag, based on the optimal lag test results. The coefficient value is used to calculate the t-statistic to test the variable's significance.

Based on the output of the estimated VAR Panel Model in Table 5, the t-statistic of 3.02548 and a coefficient of 1.616522 show a positive effect of HE (-1) on CPI, and hence, HE increases when CPI increases. The t-stat of 2.15793 and the coefficient of 0.017091 confirm the existence of a positive and significant relationship, and hence a unidirectional relationship, between HE and FDI (-1). The relationship between GE and HE (-1) shows a t-stat of 2.01091 and a coefficient of 0.490765, suggesting that HE increases with GE and is consistent with the aforementioned relationships. There is a statistically significant negative relationship between GE and CPI (-1), with a coefficient of -0.019661 and a t-stat of -0.65837, indicating that when GE increases, CPI decreases.

Using the variables CPI, ED, and HE for a given year as functions of all other variables from the previous year, the estimation results from the two models show the magnitude of Adj. The coefficient of determination (R-squared) is 0.909667, 0.980207, and

0.984153. This indicates that the models are accurate, and the statistical F values for each variable are 149.0376, 732.9209, and 919.1206, further strengthening the accuracy of the models.

Using the Granger Causality approach would imply performing the test to assess the extent of the variables' Influence. If the value of the f-stat is more than the f-value of the table or if H0 is rejected and H1 is accepted, and vice versa, it is said that the variables are in a cause-and-effect situation. Given that for this particular study, the f-table value is 2.305, the results of the causality test for two variables with a lag period of 1 are presented in Table 6.

Table 5. PVAR result

|                | CPI                                  | ED                                   | HE                                   | GE                                   | FDI                                  |
|----------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| CPI(-1)        | 0.742426<br>(0.06538)<br>[ 11.3553]  | -0.012103<br>(0.06930)<br>[-0.17465] | -0.007629<br>(0.00352)<br>[-2.16720] | -0.019661<br>(0.02986)<br>[-0.65837] | 0.047901<br>(0.04515)<br>[ 1.06099]  |
| ED(-1)         | -0.013194<br>(0.01659)<br>[-0.79532] | 0.975916<br>(0.01758)<br>[ 55.5002]  | -0.000719<br>(0.00089)<br>[-0.80488] | -0.002872<br>(0.00758)<br>[-0.37901] | 5.59E-05<br>(0.01146)<br>[ 0.00488]  |
| HE(-1)         | 1.616522<br>(0.53430)<br>[ 3.02548]  | -0.363107<br>(0.56632)<br>[-0.64117] | 1.016032<br>(0.02877)<br>[ 35.3180]  | 0.490765<br>(0.24405)<br>[ 2.01091]  | -0.249734<br>(0.36895)<br>[-0.67688] |
| GE(-1)         | 0.001371<br>(0.14013)<br>[ 0.00978]  | 0.022310<br>(0.14852)<br>[ 0.15021]  | -0.006582<br>(0.00754)<br>[-0.87240] | 0.872043<br>(0.06400)<br>[ 13.6248]  | -0.014649<br>(0.09676)<br>[-0.15140] |
| FDI(-1)        | 0.086134<br>(0.14709)<br>[ 0.58557]  | 0.052379<br>(0.15591)<br>[ 0.33596]  | 0.017091<br>(0.00792)<br>[ 2.15793]  | -0.083309<br>(0.06719)<br>[-1.23994] | 0.459967<br>(0.10157)<br>[ 4.52848]  |
| C              | 1.750303<br>(1.43421)<br>[ 1.22039]  | 3.800100<br>(1.52015)<br>[ 2.49982]  | 0.322878<br>(0.07722)<br>[ 4.18120]  | 0.214057<br>(0.65510)<br>[ 0.32676]  | 0.945385<br>(0.99035)<br>[ 0.95459]  |
| R-sq.          | 0.909667                             | 0.980207                             | 0.984153                             | 0.881722                             | 0.282776                             |
| Adj. R-sq.     | 0.903563                             | 0.978869                             | 0.983082                             | 0.873730                             | 0.234315                             |
| Sum sq. resids | 217.7835                             | 244.6636                             | 0.631354                             | 45.43718                             | 103.8433                             |
| S.E. equation  | 1.715523                             | 1.818314                             | 0.092368                             | 0.783592                             | 1.184604                             |
| F-statistic    | 149.0376                             | 732.9209                             | 919.1206                             | 110.3289                             | 5.835111                             |

Source: created by the authors

From the results of the causality test in Table 6 detailed above, the independence of causality suggests that most of the results indicate a different correlation, or, in other words, they do not exhibit a two-way correlation with the other variables. For the HE variable to CPI, it satisfies the condition of causality. However, it is only one-way, or unidirectional, as

evinced by the f-statistic of 710.8744 and the prob of 0.0015. However, regarding other variables, there is no two-way relationship or feedback causality.

Analyzing the results from the PVAR, one approach is the Impulse Response Function (IRF), which allows one to describe the dynamic structure of the PVAR. The IRF shows how big a reaction can be from one endogenous variable to the other variables in the system. Hence, the IRF can be used to analyze how a shock or an unexpected change affects other variables in the system. The IRF can also be used to analyze the effect of the standard deviation of a single innovative variable's surprise on the present or future values of other endogenous variables.

Table 6. Granger Causality test

| H0:                 | Obs | F-Stat. | Prob.  |
|---------------------|-----|---------|--------|
| ED not Granger CPI  | 80  | 0.01318 | 0.9089 |
| CPI not Granger ED  |     | 1.27906 | 0.2616 |
| HE not Granger CPI  | 80  | 10.8744 | 0.0015 |
| CPI not Granger HE  |     | 2.94448 | 0.0902 |
| GE not Granger CPI  | 80  | 2.02532 | 0.1587 |
| CPI not Granger GE  |     | 0.16949 | 0.6817 |
| FDI not Granger CPI | 80  | 0.05108 | 0.8218 |
| CPI not Granger FDI |     | 0.44032 | 0.5090 |
| HE not Granger ED   | 80  | 1.76083 | 0.1884 |
| ED not Granger HE   |     | 0.00148 | 0.9694 |
| GE not Granger ED   | 80  | 0.83050 | 0.3650 |
| ED not Granger GE   |     | 0.06218 | 0.8037 |
| FDI not Granger ED  | 80  | 0.00359 | 0.9524 |
| ED not Granger FDI  |     | 0.02877 | 0.8658 |
| GE not Granger HE   | 80  | 1.33526 | 0.2514 |
| HE not Granger GE   |     | 3.30985 | 0.0728 |
| FDI not Granger HE  | 80  | 2.38704 | 0.1264 |
| HE not Granger FDI  |     | 0.00152 | 0.9690 |
| FDI not Granger GE  | 80  | 1.22808 | 0.2712 |
| GE not Granger FDI  |     | 0.00857 | 0.9265 |

Source: created by the authors

The test shown in the Figure 1 indicates the following: In the CPI's response to shocks, the response from the first to the tenth period is the amount of CPI. This indicates a relationship between the CPI variable and the CPI itself, both in the short and the long run. Overall, the responses were stable across the other variables; however, those with the variables FDI and HE were strongest.

From the first to the tenth period, ED reacts to the shock from the variable FDI. This means there is a relationship between the variables ED and FDI in the short and long run. In general, though, other variables exert a small shock on the variable ED.

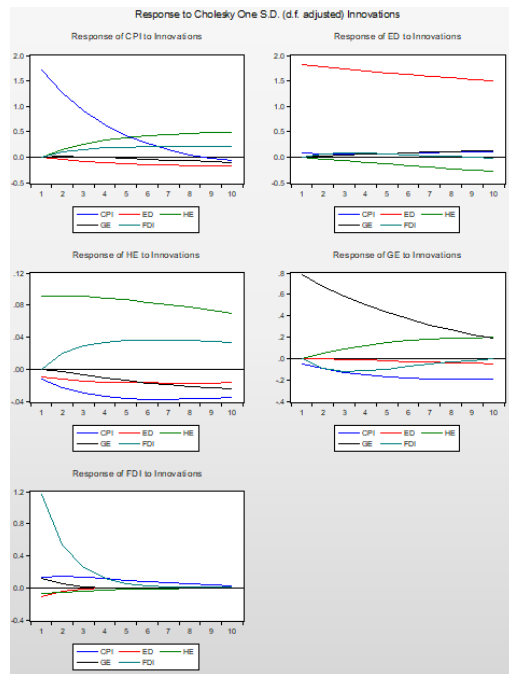


Fig. 1: IRF result  
Source: created by the authors

The model's response to a shock from one variable to another is termed variance decomposition. It is undertaken under the assumption that there are no correlations between changes in the model's variables. The primary concern in variance decomposition is the extent to which a variable changes and its impact on the other variables in the model. The analysis indicates that, in the first period, the variance decomposition of a national income variable shows the variable in question completely dominates it.

Table 7. Variance decomposition

| Period | S.E.     | CPI      | ED       | HE       | GE       | FDI      |
|--------|----------|----------|----------|----------|----------|----------|
| 1      | 1.715523 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2      | 2.138801 | 99.28937 | 0.051819 | 0.436011 | 0.002998 | 0.219799 |
| 3      | 2.345444 | 97.73841 | 0.172514 | 1.483716 | 0.003744 | 0.601615 |
| 4      | 2.462591 | 95.43469 | 0.360318 | 3.121191 | 0.003608 | 1.080195 |
| 5      | 2.540539 | 92.52912 | 0.606487 | 5.240891 | 0.009589 | 1.613918 |
| 6      | 2.602552 | 89.22445 | 0.896543 | 7.678004 | 0.031020 | 2.169986 |
| 7      | 2.659435 | 85.73579 | 1.213540 | 10.25229 | 0.076474 | 2.721905 |
| 8      | 2.715702 | 82.25174 | 1.541480 | 12.80494 | 0.151691 | 3.250155 |
| 9      | 2.772681 | 78.91210 | 1.867570 | 15.21904 | 0.258891 | 3.742399 |
| 10     | 2.830202 | 75.80413 | 2.182973 | 17.42324 | 0.397143 | 4.192518 |

Source: created by the authors

The VD results in Table 7 indicate that the self-impact of the CPI variable in the second period is 99.28 percent, while the other variables account for only 0.72 percent. Defensively, the CPI variable

shows a more stable impact compared to the other variables in the model. Thus, despite the decline in the CPI variable, it demonstrates greater self-impact and contributes less to the Influence of other variables.

## 5 Conclusion

The study observed varying kinds of association among the variables; for instance, the variable health showed a substantial positive association with the CPI, and FDI also showed a substantial positive association with health. Moreover, in this study, there exists a strong, negative relationship between CPI (complain, if possible, constructively; e.g., state the relationship of the variables with little information and make it longer with your explanation of the relationship). Also, there is a positive and significant relationship between the variable health and government expenditure. It follows that, in the four countries under study, increased government expenditure reduced CPI and increased the health variable. The positive relationship between human capital and FDI also supports the positive impact on CPI attainment in the four ASEAN countries.

### 5.1 Limitation

This research is limited by data availability and research period

### 5.2 Sugestion

Research shows that the higher the levels of Human Capital, the higher the Corruption Perception Index (CPI) levels, which, in the case of the ASEAN members, Indonesia, Thailand, Vietnam, and the Philippines, suggests that the government(s) should improve human capital by increasing investment in education and health care. More and better schools and health care facilities should be built, and education should be subsidized for the children of low-income families. With a better-educated population, the government will be able to make more investments in transparency and accountability in spending and in the procurement of government services and goods, which will, in turn, reduce corruption and improve people's quality of life.

Policies like these also refine oversight mechanisms and the prevention of governmental malpractice. In this sense, malpractice and the loss of public funds are countered. Additionally, governments' expenditures on developmental activities should focus on local people and the

conservation of the natural environment. This aim is best achieved when developmental projects are designed to facilitate transparency and accountability. For optimal results, the policies should be integrated and implemented in a way that further promotes and defends sustainable development. This, in turn, will advance the sustainable and just distribution of the country's economic and social development. The recognition of the importance of the absence of corruption to developing countries motivates our present study, which we propose should examine the interdependence among the CPI, poverty, public expenditure, and social injustice.

### **Declaration of Generative AI and AI-assisted technologies in the writing process**

The author(s) wrote, reviewed and edited the content as needed and has/have not utilised artificial intelligence (AI) tools. The author(s) take(s) full responsibility for the content of the publication

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### Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

All authors contributed substantially to the creation of this scientific article in accordance with the ghostwriting policy. Nanik Wahyuni was responsible for conceptualizing the research framework, formulating the main hypotheses, and coordinating data collection from international sources such as the World Bank and Transparency International. Boge Triatmanto contributed to the methodological design, including the application of panel vector autoregression (PVAR), and performed the econometric analysis to ensure the robustness of the findings. Suryaning Bawono focused on the interpretation of results, drafting the discussion section, and aligning the manuscript with international publication standards. All authors jointly reviewed, revised, and approved the final version of the article, and each author takes full responsibility for the integrity and originality of the work.

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The authors have no conflicts of interest to declare that are relevant to the content of this article.

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