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WHAT FACTORS INFLUENCE THE INCREMENTAL CAPITAL OUTPUT RATIO IN 8 ASEAN COUNTRIES?

Abstract. *This research aims at analysing the effect of Capital per Worker, Average of Schooling Length of Time, Corruption Perception Index, FDI Ratio in GFCF, and Trade Openness on the Incremental Capital-Output Ratio (ICOR) as a measure of investment efficiency in 8 ASEAN countries. This research uses a quantitative method with panel data consisting of 8 ASEAN countries, Philippines, Indonesia, Cambodia, Laos, Malaysia, Myanmar, Thailand, and Vietnam, and it was conducted in the 2010-2019 period. The results of research found that Capital per Worker, Corruption Perception Index, FDI Ratio in GFCF, and Trade Openness have a significant effect on ICOR in 8 ASEAN Countries. While Average of Schooling Length of Time has no significant effect on ICOR in 8 ASEAN Countries. Suggestions in this research to create investment efficiency in 8 ASEAN countries are to maintain and select the growth of Capital per Worker by recognising that increasing investment in the capital-intensive sector is a vital sector with a large spillover effect on the economy, increasing the quantity and quality of education, eradicating corruption, increasing FDI flows by increasing the country's competitiveness through creating a conducive business climate and providing various monetary and fiscal incentives, lowering export trade barriers, and trying to limit and substitute consumptive and high-dependence imported products by developing and producing them domestically.*

Keywords*: Incremental Capital-Output Ratio, Capital per Worker, Average of Schooling Length of Time, Corruption Perception Index, FDI Ratio in GFCF, Trade Openness*

JEL Classification: A11, B22, C01, C12, E66, F38

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1. Introduction

Capital formation becomes an engine of growth that is capable to spur economic activity and produce higher output in a country. The main thinkers of classical economics such as Adam Smith, David Ricardo and Thomas Malthus believe that productive investment and capital formation have a positive influence on the speed of the economic growth process. The formation of capital will provide various new production facilities that may increase the ability to produce the output and the added value, so in the future the output will increase and the economic growth can be realised.

Capital formation can be interpreted as a process of collecting assets from the proportion of income that is currently saved or invested to increase the output or income in the future. In other words, the capital used to increase the production capacity is based on the funds sourced from the income and savings. The higher the income in a country, the more adequate the level of savings as a source of capital formation will be. However, the condition that generally occurs in developing and poor countries is the difficulty of providing the sources of capital formation. People's low income in the developing and poor countries can only be used to meet all their needs, while only a small amount can be distributed as savings and investments.

According to Chenery & Strout (1966), limited sources of capital formation in the developing countries can be seen from the problem of the two gap problems as follows: the condition in which the domestic savings are unable to balance the investment opportunities (saving-investment gap), and the foreign exchange owned is unable to finance the import of capital and semi-finished goods required (foreign exchange gap). Bosworth & Collins (1999) argued that limited capital accumulation is the cause of low output in some developing countries, so that the limited capital will further slowdown the process of economic growth that is very important for the developing countries.

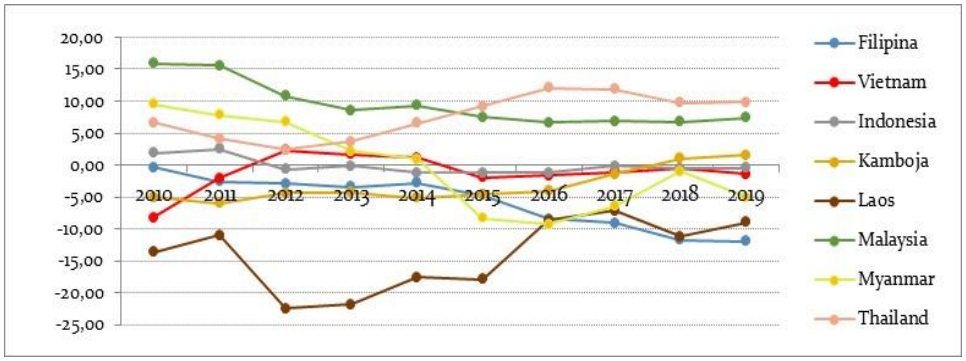

Figure 1. A Gap between Savings and Domestic Investment of 8 ASEAN countries

The Association of Southeast Asian Nations (ASEAN) is an organisation of countries in the Southeast Asia region whose majority members are the developing countries and those classified as having middle income, such as the Philippines, Indonesia, Cambodia, Laos, Malaysia, Myanmar, Thailand, and Vietnam. Meanwhile, Brunei Darussalam has been classified as a high-income country, even though it is still a developing country, and Singapore has become a developed country and has a high income. Based on Figure 1.1, 8 ASEAN countries classified as developing and middle-income countries experienced various conditions of saving-investment gap during 2010-2019. Based on Figure 1, Thailand and Malaysia each has a positive saving-investment gap value respectively, while other countries, Laos, Cambodia, Indonesia, Philippines, Vietnam, and Myanmar respectively, have ever had a negative saving-investment gap value.

The positive saving-investment gap, as occurred in Thailand and Malaysia, indicates a higher saving rate than the investment rate. In other words, the condition of a positive saving-investment gap indicates an unutilised investment potential in the domestic real sector, commonly known as over-saving or underinvestment. The excess funds from these savings can still be used to increase capital formation and economic growth in the country. Meanwhile, the negative saving-investment gap in other ASEAN developing countries such as Laos, Cambodia, the Philippines, Indonesia, Myanmar, and Vietnam illustrates the low ability of domestic savings to meet the required investment needs. So, this has an impact on the limited availability of domestic capital in these countries.

Table 1. Surplus/Deficit Condition of Current Account Balance in 8 ASEAN Countries (%PDB)

Countries	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Philippines	3.45	2.41	2.65	4.01	3.62	2.37	-0.38	-0.65	-2.56	-0.81
Indonesia	0.68	0.19	-2.66	-3.19	-3.09	-2.04	-1.82	-1.59	-2.94	-2.71
Cambodia	-8.73	-8.00	-8.63	-8.51	-8.64	-8.86	-8.66	-8.12	-11.78	-15.00
Laos	0.41	-2.36	-7.31	-7.84	-14.50	-15.76	-8.76	-7.48	-9.18	-5.21
Malaysia	10.06	10.90	5.19	3.47	4.39	3.01	2.37	2.81	2.24	3.37
Myanmar	3.18	-2.60	-2.10	-0.64	-3.25	-4.18	-2.64	-6.53	-2.81	0.32
Thailand	-3.37	2.54	-1.23	-2.10	2.86	6.92	10.51	9.63	5.61	7.03
Vietnam	-3.69	0.17	6.05	4.52	5.03	-1.06	0.30	-0.74	2.41	5.00

The problem of limited sources of capital formation can also be seen from the foreign exchange gap, which is known from the current account balance of a country. Current account balance is a record of a country's international transactions with other countries around the world in the form of trade in exports and imports of goods and services, investment income, and transfers. A positive or surplus current account balance indicates that a country's foreign exchange is capable of financing

various kinds of imports of the required capital goods. Meanwhile, a negative or deficit current account balance indicates that a country's foreign exchange is unable to finance the import of the required capital goods. Based on table 1, Cambodia, Indonesia, Laos and Myanmar respectively experienced deficits in the current account balance, while Philippine, Thailand and Vietnam experienced fluctuating conditions during 2010-2019. Malaysia has a current account balance that is always positive even though it has a downward trend. Cambodia is the country with the highest current account deficit with an average of 9.49% of GDP. If totally calculated, the contribution of the current account balance as part of GDP in the 8 ASEAN countries experienced a downward trend and the average contribution of the current account balance to GDP decreased by 0.14% per year during 2010-2019.

Based on Figure 1 and Table 1, it can be concluded that most of the 8 ASEAN developing countries with middle income indicate a double gap condition at the same time as occurred in Laos, Indonesia, Myanmar, Cambodia, and the Philippines, which made the sources of capital formation very limited. The use of foreign capital (capital inflow) such as foreign direct investment (FDI), foreign portfolio investment, foreign debt (ULN), and grant funds are frequently targeted and are generally used to overcome domestic capital problems. Although, on the other hand, the use of foreign funds is also at risk of causing dependence and has a negative impact on the economic stability of a country, especially in the form of foreign debt.

Foreign debt is an investment financing tool that has the highest economic risk compared to other foreign funds because it is vulnerable to causing a debt trap. The foreign debt also carries financial risk arising from movements in exchange rates, interest rates, and economic shocks that may affect the business environment. The history records how Indonesia experienced an economic crisis in 1997 begun with the Thai baht exchange rate crisis that then impacted on the depreciation of the rupiah. As a result, entrepreneurs find it difficult because they have to pay their maturing foreign debt obligations and pay for the necessary imported raw materials at very high prices. The monetary crisis then resulted in an increase in the external debt burden and caused an economic crisis in Indonesia. The ratio of Indonesia's foreign debt to Gross National Product (GNP) at the beginning of the crisis in 1997 was 65.10%, then increased very high to 168.20% in 1998.

Another very serious debt crisis is the case that hit Latin American countries in the 1980s, especially Argentina and Mexico. In addition, recently the term "Chinese Debt Trap" has emerged, which is a new model from China to gain power under the pretext of providing infrastructure assistance and loans to developing countries as members of the Belt and Road Initiative (BRI). China can take over the infrastructure projects it finances if the BRI country fails to repay the loan. As what has happened in which the ports of Sri Lanka and Pakistan have been taken over by China for 99 years because these countries failed to repay their loans (Priangani et al., 2021).

The capital management strategy is a key factor for a country in facing the dynamics of the economy that is full of challenges. In the process of economic development, efficiency in the allocation of existing economic resources is a matter that needs to be considered so that economic growth may provide the optimal results and avoid the waste. In addition, the competitiveness of a country will also increase in line with the increase in productivity and efficiency of its economic resources. The investors will prefer countries with a much higher level of investment efficiency to other countries with a much lower efficiency level to save the costs and to obtain the maximum profits.

Efficiency in production can be defined as a comparison between output and input, or the amount of the produced output from one of the used input. If the ratio of output to input is greater, the efficiency is said to be higher. Likewise, if the ratio of output to input is smaller, the efficiency is said to be lower. Regarding the investment, the Incremental Capital-Output Ratio (ICOR) is one of the calculation indicators that can generally be used to measure the level of investment efficiency in a country or region (Soumaila, 2017). ICOR is a quantity that shows the relationship between the amount of increase in output (ΔY) resulting from a certain increase in the capital stock (ΔK), or it can also be described as $K/\Delta Y$. The lower the ICOR value is, the higher the efficient level of investment will be. On the contrary, the higher the ICOR value is, the lower the level of investment efficiency in a country or region will be.

The ICOR value in developing countries is ideally expected to be around 3. Widodo (1990) in Imelda (2015) also argued that good investment productivity is indicated by ICOR values ranging from 3 to 4. This assumption arises because the developing countries generally tend to consider the number of production factor of abundant labour with the relatively inexpensive wages, while the sources of capital formation are quite limited due to the low incomes and savings. So that the economic sector in developing countries with a surplus of labour will be more labour intensive with a high labour intensity. In such circumstances, any additional capital stock will produce greater output than in developed countries, which are more dominated by capital intensive production patterns. So the ICOR value will tend to be of small value.

Table 2. ICOR value in 8 ASEAN countries (in US Dollar)

Countries	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Ave-rage
Philippines	2.71	5.16	3.02	2.99	3.45	3.84	4.03	4.25	4.81	4.86	3.91
Indonesia	5.36	5.54	5.82	6.26	6.87	7.06	6.81	6.84	6.80	6.95	6.43
Cambodia	2.98	2.63	2.79	2.95	3.14	3.26	3.43	3.27	3.09	3.37	3.09
Laos	3.31	3.64	4.42	4.04	4.37	4.66	4.81	4.71	5.18	6.91	4.61
Malaysia	3.26	4.53	4.95	5.92	4.63	5.34	5.96	4.69	5.44	5.48	5.02
Myanmar	2.50	5.55	4.41	4.09	4.29	5.29	5.97	5.22	5.82	6.01	4.92
Thailand	3.46	30.19	3.84	9.56	24.86	8.07	7.52	6.18	6.00	10.25	10.99
Vietnam	4.61	4.11	4.69	4.54	4.26	3.94	4.36	4.13	4.43	4.50	4.36

Table 2 shows the ICOR values in 8 ASEAN developing countries with middle income resulting in an increasing trend and most of them have values above 4 that represent less than ideal investment efficiency in these countries. Thailand is the least efficient with an average ICOR value of 10.99 during 2010-2019. Then it is followed by Indonesia with an average of 6.43, Malaysia is at 5.02 and Myanmar is at 4.92. Of these 8 countries, only Cambodia and Philippines that have an average ICOR value during 2010-2019 below 4, which is respectively 3.09 and 3.91 that illustrates the average efficient investment. However, ICOR in these two countries is also experiencing an increasing trend or towards lower efficiency levels every year.

Capital per Worker (Capital-Labor Ratio) is a ratio measure of the use of capital to the use of labor in the production process. In other words, Capital per Worker explains how much capital is distributed to each worker in a production process. Capital per Worker is also closely related to the productivity of capital and labor. With the increase in capital goods in the form of machinery, equipment, buildings, vehicles, technology and so on, workers can produce greater output at the same time, assuming that labor growth is lower than capital growth. However, when Capital per Worker increases, capital deepening occurs, which means that the distribution of capital among each worker becomes larger and the production process leads to a capital-intensive approach. So the increase in Capital per Worker will cause a decrease in investment efficiency.

Another determinant of investment efficiency is the quality of human resources. The quality of human resources can be a benchmark for good or bad managerial quality. Superior human resources through a good level of education are expected to be able to use and develop technology to utilise the resources owned by a country. So that the results will provide welfare for the community. The use of capital equipment and productive resources will be optimally utilised in countries with good levels of education. So that the obtained output will be greater with the existing capital.

The average of schooling length of time can be an illustration of the average of length of time people in a country take education. The greater the average of schooling, it is expected that human resources will be more educated and qualified. Thus, an increase in the length of time is, the education level of a country will be able to bring efficient investment due to better capital management.

The investment efficiency can also be affected by the level of corruption in a country (Swaleheen, 2007). Corruption is an act against the law by abusing the rights of other parties for profit. Corruption may lead to market integrity and weak implementation of good governance in both the private and public sectors. Khan & Jomo (2000) stated that the practice of rent seeking is a collaborative activity between entrepreneurs and the government to seek profit and enrich themselves by looking for gaps in public policies or budget allocations in government projects, leading to high corruption and making the economy development a high cost economy in Asia. Damanhuri (2010) in Hariyani et al. (2016) also argued that corruption will cause a high cost economy and hinder the process of economic growth through obstacles that occur

in investment. Thus, it is estimated that the more corrupt a country is, the less efficient the investment in that country will be.

Corruption Perception Index (CPI) is an index that measures the level of corruption in a country which assessment is published by an institution called Transparency International. Specifically, the CPI measures the level of corruption in a country based on the amount of abuse of power for personal gain among the government agencies and the integrity of people who have authority in a country. The CPI score ranges from 0 to 100 in which the higher the CPI value is, the lower the level of corruption in the country will be, and on the contrary, the lower or close to zero the CPI value is, the more corrupt the country will be.

The type of investment chosen is very influential on the reciprocal results obtained. Private sector investment is believed to be more productive than public sector investment because it has an incentive to bring profits and increase income. So that the higher the composition of private investment types is, the more positive the effect on investment efficiency will be.

Foreign Direct Investment (FDI) is one of the private investments which financing comes from foreign funds. Neoclassical growth theory thinks that FDI is able to increase the economic growth through its role in delivering funds to productive economic sectors that are lack of capital. Some observers agree that the capital sourced from FDI is the most potential one of foreign financing compared to other sources. FDI is an important means of technology transfer and has a greater contribution to the economic growth of a country than domestic investment. Therefore, the larger the FDI ratio in the total Gross Fixed Capital Formation (PMTB) is, the greater the investment productivity will be expected.

Openness in foreign trade (Trade Openness) has positive benefits for a country's economy, especially in providing new investment opportunities and strengthening relations between domestic and international markets. Trade openness means that trade barriers in a country to market goods and services will gradually decrease and disappear. Saidi & Hammami (2018) stated that high Trade Openness in a country is a good indicator of the ease of doing business and represents the simplicity of procedures in carrying out export and import operations for a company. So that investors will benefit from the country's comparative advantages by exporting to international markets and importing production inputs that are cheaper from other countries.

Trade Openness is described by the ratio between trades, exports plus imports to GDP in a country. The higher the ratio is, the more open the country's foreign trade will be. Likewise, if the ratio is low, the foreign trade in the country will be closed. In terms of investment efficiency, high trade openness will provide greater profit for each invested capital because the barriers to trade are decreasing. So that the market share will be wider and the additional costs that must be incurred to market an item will decrease and affect the increase in investment efficiency.

Based on this explanation, some developing countries in ASEAN still recorded less than ideal investment efficiency. Efficient investment is very important,

especially for developing countries that want to create a high level of economic growth so that the level of people's welfare immediately increases. This is also supported by the problem of limited sources of capital formation and high dependence on foreign capital, especially in the form of foreign debt that may threaten the economic stability at any time. Therefore, it is necessary to conduct further research to find out how much influence Capital per Worker, Average Years of Schooling, Corruption Perception Index, FDI Ratio in PMTB, and Trade Openness have on ICOR as a measure of investment efficiency in 8 ASEAN developing countries those are the Philippines, Indonesia, Cambodia, Laos, Malaysia, Myanmar, Thailand and Vietnam.

2. Method of Research

This research uses the quantitative type. Quantitative research is a method of research that has the full intention of testing the established hypothesis. This research uses secondary data type with data collection technique, which is documentation. The variable data used in this research are obtained from data sources originating from various reports and statistical documents that have been published and can be accessed on the official websites of relevant international institutions such as the United Nations Conference on Trade and Development (UNCTAD), the International Labor Organisation (ILO), United Nations Development Program (UNDP), World Bank, and Transparency International (TI). The data analysis technique in this research uses panel data regression with the help of Eviews 9.0 software. This research uses a time series for 10 years from 2010-2019 and a cross section of 8 ASEAN countries. In this research, ICOR becomes the dependent variable while there are 5 independent variables used as follows (1) Capital per Worker, (2) Average of Schooling Length of Time, (3) Corruption Perception Index (CPI), (4) FDI Ratio in PMTB, and (5) Trade Openness.

The panel data regression analysis model in this research is as follows:

$$ICOR_{it} = \beta_0 + \beta_1 MPT_{it} + \beta_2 RLS_{it} + \beta_3 CPI_{it} + \beta_4 RFP_{it} + \beta_5 TO_{it} + e_{it} \quad (1)$$

Description:

ICOR	: Incremental Capital-Output Ratio Variable
β_0	: Constanta
$\beta_1; \beta_2; \beta_3; \beta_4; \beta_5$	: Regression coefficient
MPT	: Capital per Worker Variable
RLS	: Average of Schooling Length of Time Variable
CPI	: Corruption Perception Index Variable
RFP	: FDI Inflow Ratio Variable in PMTB
TO	: Trade Openness Variable
e	: Error term (disturbing factor outside the model)
i	: Cross section data of 8 ASEAN countries
t	: Time series data for 2010-2019

3. Result and Discussion

In this research, the independent variables experienced the problem of multicollinearity, which is the existence of a high or perfect correlation between each independent variable. The existence of multicollinearity problems in Independent Variables will make the model have large variances and covariances, large determinant coefficient R^2 (R-square) but statistically many variables are insignificant, and the standard errors are sensitive to small changes in the data (Gujarati & Porter, 2009). Therefore, multicollinearity healing technique using data transformation method is chosen in this research. Data transformation is a fully intentional effort to make the scale of the original data measurement change into another simpler form. So that the observational data in the research can meet the assumptions that underlie the variance. According to Gujarati & Porter (2009), the transformation chosen to treat multicollinearity is first difference or delta.

Then the research model becomes as follows:

$$DICOR_{it} = \beta_0 + \beta_1 DMPT_{it} + \beta_2 DRLS_{it} + \beta_3 DCPI_{it} + \beta_4 DRFP_{it} + \beta_5 DTO_{it} + \mathcal{E}_{it} \quad (2)$$

Description:

DICOR	: Incremental Capital-Output Ratio Variable in the form of First Different
β_0	: Constant
$\beta_1; \beta_2; \beta_3; \beta_4; \beta_5$	: Regression coefficient
DMPT	: Capital per Worker in the form of First Different Variable
DRLS	: Average of Schooling Length of Time Variable in the form of First Different
DCPI	: Corruption Perception Index Variable in the form of First Different
DRFP	: Ratio of FDI inflow Variable in PMTB in the form of First Different
DTO	: Trade Openness Variable in the form of First Different
$\mathcal{E}$	: Error term in the form of First Different $(e_{it} - e_{it-1})$
i	: Cross section data of 8 ASEAN countries
t	: Time series data for 2010-2019

After conducting various stages to get the best model for panel data regression, the result is that the Common Effect Model with the Generalised Least Square (GLS) method and the cross-section Seemingly Unrelated Regression (SUR) is the best model. CEM by weighing the covariance coefficient of cross-section SUR is more efficient than the OLS method for estimating data with autocorrelation residuals.

Table 3. Estimation Result of Common Effect Model with GLS and Cross-Section SUR methods

Variables	Coefficient	Std.Error	t-Statistic	Prob.
C	0.727386	0.154341	4.712862	0.0000
DMPT	-0.005798	0.001148	-5.049849	0.0000
DRLS	-0.305466	0.793224	-0.385094	0.7014
DCPI	-0.208243	0.043516	-4.785430	0.0000
DRFP	-0.151771	0.016113	-9.419443	0.0000
DTO	0.067491	0.020240	3.334511	0.0014

Table 3 shows that the estimation results used in this research are the Common Effect Model with the Generalised Least Square (GLS) method and the cross-section Seemingly Unrelated Regression (SUR). The regression coefficient value for each research variable is as follows:

$$\begin{aligned} DICOR = {} & 0{,}727386 - 0{,}005798(DMPT) - 0{,}305466(DRLS) - \\ & 0{,}208243(DCPI) - 0{,}151771(DRFP) - 0{,}067491(DTO) + \varepsilon_{it} \end{aligned} \quad (3)$$

3.1. Effect of Capital per Worker on ICOR

Capital per Worker partially has a negative and significant effect on the ICOR in 8 ASEAN countries during 2010-2019. The regression coefficient value of the Capital per Worker variable is -0.005798. So, it can be interpreted that every time there is an increase in Capital per Worker in 8 ASEAN countries in a certain year with the previous year amounting to 1 US$ per Worker, then the ICOR value in 8 ASEAN countries in that year will experience an increase change from the previous year of 0.005798 with ceteris paribus assumption.

The results of research are not in line with the neoclassical growth production function model stating that capital and labour as production inputs have a substitution relationship or replace each other to produce certain outputs. So even though the increase in Capital per Worker illustrating that the use of capital in production inputs is getting bigger than the use of labour inputs, it cannot ensure that the investment efficiency will be lower. So in the results of this research, each addition of capital stock actually produces greater output or has increased investment efficiency. So that the ratio of the use of capital or labour in producing an output is not in line with what is expected in the theory of the neoclassical production function model, especially in 8 ASEAN countries.

The results of research differ from the findings of Lambsdorff (2003). In this research, Capital per Capita is used as a proxy that describes the use of capital rather than the use of human labour. While the productivity of capital described by

Capital per GDP is used as the Bound Variable. The results of research stated that Capital per Capita had a negative and significant effect on capital productivity in 69 countries. The greater the Capital per Capita in a country is, the lower the productivity of capital in that country will be. So that the decline in capital productivity will ultimately affect the efficiency of capital itself.

The results of research are in line with the research of Soumaila (2017) and Vanek & Studenmund (1968), which explain why the increase in the number of certain production inputs does not always result in decreasing efficiency. This research found that the relationship between changes in production input prices in the form of interest rates and labour wages is ambiguous and less convincing to affect the investment efficiency. The amount of capital per worker can be influenced by the availability of production input resources owned and the price of each of these production inputs such as interest rates and labour wages. The interest rate is the price required for each investment, while the wage for labour is the price required for each worker. However, in this research, the relationship between the number of inputs indirectly proxied through input prices does not produce definite results in influencing the ICOR or the investment efficiency.

3.2. Effect of Average of Schooling Length of Time on ICOR

The average of schooling length of time has a partially negative but statistically insignificant effect on ICOR in 8 ASEAN countries during 2010-2019. In other words, the effect of the average of schooling length of time on ICOR resulted in the same direction as expected but statistically insignificant. So it cannot be directly confirmed that the Average of Schooling Length of Time is able to affect the investment efficiency in 8 ASEAN countries during 2010-2019.

The insignificance of the Average of Schooling Length of Time variable is probably due to the growth of education levels in the 8 ASEAN countries that have not experienced significant growth or high levels of education, especially in the workforce, which is seen from the higher Average of Schooling Length of Time that is unable to show the actual quality of education. This may occur due to other problems such as mismatch of skills and jobs. The mismatch of skills and jobs can be in the form of under-education or over-education. Under-education is a situation in which the education of workers who work in certain business fields or types of work is lower than the average of education required in certain business fields or types of work. While over-education is a condition in which a job actually only requires workers with low education, but it is filled by workers who have higher education and skills. This means that the companies do not fully utilise the productive capacity of their workers (Sparreboom & Tarvid, 2016).

In Kampelmann & Rycx (2012) reported that under-education workers interfered with the company-level productivity, but in the case of over-education, a significant positive impact was found on productivity. Based on the research of Velciu (2017), in a short term over-education may have a positive impact on productivity for a company, but in the long term the mismatched workers will affect a decrease in job satisfaction and lower wages. Moreover, at the macroeconomic level, job mismatch means a loss of potential resources and human capital that may bring a negative impact on overall productivity. In the research of Tsang (1987), it found that over-education has a negative impact on job satisfaction. Meanwhile, job satisfaction has a positive and significant correlation with output. So it can be concluded that excess education has a negative impact on worker productivity.

3.3. Effect of CPI on ICOR

CPI has a negative and significant impact on the ICOR in 8 ASEAN countries during 2010-2019. The coefficient value of the CPI variable is -0.208243. So it can be interpreted that every time there is a change in the increase in CPI in 8 ASEAN countries in a certain year with the previous year amounted 1 point, the ICOR value in 8 ASEAN countries in that year will decrease from the previous year of 0.208243 with the assumption of ceteris paribus.

The negative effect of CPI on the ICOR generated in this research is in accordance with Schumpeter's theory, which explains that high government intervention in the economy may cause a slowdown in the process of economic growth, especially if this occurs in developing countries. The high level of government intervention will hinder the development of the private sectors that are rich in innovation and limit their freedom in entrepreneurship.

The increase in corruption level also shows that the performance of government offices and institutions as the counterweight of a market failure is getting worse. Based on institutional economic theory, institutions have a very vital role in determining the economic progress of a nation. So with a bad institutional condition, a slow economic rate will be obtained due to the large obstacles. Thus, the high levels of corruption provide a disincentive to entrepreneurship and productivity. So corruption will further worsen the market failures that in turn have an impact on the low investment efficiency.

This research is in accordance with the results of research of Soumaila (2017) and Swaleheen (2007), in which the three conducted research on the effect of corruption on ICOR. The three research bring the same conclusion that corruption has a negative and significant effect on the investment efficiency. Soumaila (2017) chose corruption to measure the impact of institutional quality on the investment efficiency. Soumaila's research (2017) uses the corruption index issued by the

International Country Risk Guide (ICRG) as a variable that represents the level of corruption in a country. According to him, corruption may affect the investment efficiency in both private and public sector investments. Meanwhile, in Swaleheen (2007) research, corruption has a negative impact not only on the investment efficiency but also on the investment choices. This effect is more felt in developing countries where corruption is high. Meanwhile, in Lambsdorff (2003) research, corruption proxied by CPI has a positive impact on the capital productivity.

3.4. Effect of FDI Ratio in PMTB on ICOR

The FDI ratio in PMTB partially has a negative and significant effect on the ICOR in 8 ASEAN countries during 2010-2019. The regression coefficient value of the FDI ratio variable in PMTB is -0.151771. So it can be interpreted that every time there is a change in the increase in the FDI Ratio in PMTB in 8 ASEAN countries in a certain year with the previous year amounted 1%, the ICOR value in 8 ASEAN countries in that year will decrease from the previous year of 0.151771 with the assumption of ceteris paribus.

The results of research are in accordance with Schumpeter's growth theory that the capitalist system applied in the developing countries may accelerate the economic development in those countries. The capitalist system emphasises that the role of private sector in the economy will have a positive impact on the emergence of innovation, economic development, and increase in public output. So that the big role of the private sector and the low level of government intervention in the economy will facilitate the creation of new entrepreneurs who bring innovation to the business world. The emergence of new innovations expects that every process and economic activity becomes fast, efficient and generates greater profits. So that the process of economic growth and development will run well.

The results of research are also supported by research of Jayaraman & Ward (2004), which in their study concluded that the ratio of private investment, which is relatively larger than the public investment, has a positive effect on the investment efficiency in Fiji. This result explains that a larger share of private investment in the total investment will result in greater incentives than if total investment is supported by more public investment. As it is known that private investment has a greater incentive to bring profits than public investment. Then the pursuit of profit will lead to a more efficient use of capital resources.

In the research of M. S. Khan & Reinhart (1990), private investment is believed to have a productivity advantage rather than public investment. In this research, it was found that in the long run private investment has a greater marginal productivity than public investment in developing countries. While the research of Abdaljawwad & Sarmidi (2018) also agreed that private investment has a positive effect on the economic growth. Haque (2012) concluded in their own research that private investment has a much larger and important role in the process of economic growth in Bangladesh. Meanwhile, Makuyana & Odhiambo (2019) found that

private investment contributed more to economic growth than public investment in Malawi. The advantages of private investment over public investment in the process of economic growth are also reported in the research of Zou (2006) in Japan and the United States.

The results of research are also in accordance with the neoclassical growth theory, which believes that FDI is able to increase the economic growth through its role in delivering funds to the productive economic sectors that are lack of capital. So that with the new source of capital funds, the productive sectors that previously had stopped or grew slowly due to the lack of capital, are able to revive and grow more rapidly. In addition, the flow of FDI entering a country also allows for cooperation between foreign investors and existing local companies or industries, especially to meet the basic input needs required by new multinational companies that arise as a result of FDI. So indirectly, through the existing cooperation, it will affect the demand for capital goods, semi-finished goods, raw materials and other inputs that trigger the economic growth in FDI destination countries.

Another potential benefit is the emergence of new technologies, capital equipment and manufacturing expertise that are carried away by the flow of FDI into a country. FDI entering a country will transfer technology to the local investors through knowledge sharing in new innovations in production, research, development, and also lead to increased competition in trade resulting in industrial efficiency and effectiveness. Thus, the transfer of acquired skills, technology, managerial expertise, and governance practices within a certain time will help create productive and efficient management of the capital resources.

3.5. Effect of Trade Openness on ICOR

Trade Openness partially has a positive and significant effect on the ICOR in 8 ASEAN countries during 2010-2019. The regression coefficient value of the Trade Openness variable is 0.067491. So it can be interpreted that every time there is an increase in Trade Openness in 8 ASEAN countries in a certain year with the previous year amounted 1%, the ICOR value in 8 ASEAN countries in that year will increase from the previous year of 0.067491% with the assumption of ceteris paribus.

The results of research are not in line with the theory of economies of scale, which states that the increase in the company's production scale will reduce the average cost of production and generate profits. Through the increase in Trade Openness, business actors should benefit from the convenience of expanding market share due to an increase in economic cooperation on a larger scale. The companies can also take advantage of economies of scale and scope that represent the reduce in firm costs due to the increase in production scale (Becker-Blease et al., 2010; Leal-Rodríguez et al., 2015). However, this does not occur in the 8 ASEAN countries and the opposite is true.

The results of research are the same as those found in Lambsdorff (2003) research that Trade Openness has a negative effect on capital productivity. According to Lambsdorff (2003), different results from the theory occur because the

high Trade Openness in a country can have an impact on the amount of foreign capital that enters the country. So that the stock of capital owned will be greater and affect the lower productivity of capital. Lambsdorff (2003) also states that Trade Openness is wrong in describing a more competitive market because the Trade Openness of a country decreases with its size, for example with the population it has. The greater the population of a country is, the more trade will be carried out for the domestic market and not with foreign countries.

The increase in Trade Openness in a country must be accompanied by an increase in the quality of good human resources so that its function to absorb technological advances from trade liberalisation may run well. According to the research of Grossman & Helpman (1991), the positive effect of Trade Openness on the economic growth may occur depending on the abundance of international knowledge. It is also supported by Grossman & Helpman (1991), which told that imports are an important channel for the transfer of knowledge and advanced technology that triggers the increase in productivity and competition in the domestic economy.

Another reason why the results of research are different from the theory is because the Trade Openness in the 8 ASEAN countries are mostly contributed by high imports rather than exports. So that if the goods imported are consumptive and non-productive goods, the Trade Openness will not have a good impact on the economic growth and the investment efficiency.

Based on the results of research conducted by Vanek & Studenmund (1968), the import ratio in GNP has a positive and significant effect on ICOR or a negative and significant effect on the investment efficiency in underdeveloped and developed countries. Meanwhile, in Swaleheen (2007) research, the effect of the import ratio on GDP can be different depending on the characteristics of a country. The research found that the ratio of imports to GDP has a negative effect on the investment efficiency in countries with high levels of corruption, middle income and high income. While the positive influence is experienced by countries with low levels of corruption and low income. These results show that good quality institutions are able to provide good import policies and countries with low incomes tend to require large capital for their economic development, so that large imports may increase the investment efficiency.

4. Conclusions

Based on the description that has been disclosed in the discussion, some conclusions can be drawn as follows: 1) The Capital per Worker has a negative and significant effect on ICOR. 2) The Average of Schooling Length of Time has a negative but insignificant effect on ICOR. 3) CPI has a negative and significant effect on ICOR. 4) FDI ratio in PMTB has a negative and significant effect on ICOR. 5) The Trade Openness has a positive and significant effect on ICOR.

Suggestions that can be put forward in this research is to create the investment efficiency in 8 ASEAN countries as follows: 1) controlling and maintaining the growth of Capital per Worker by choosing a productive capital-intensive business sector. Governments in the 8 ASEAN countries need to enforce a strong selection and consideration of new investments that enter the capital-intensive sector by considering that the sector is the vital one that has a large spillover effect on the economy given the limited sources of capital formation and the large potential for the high labour. Given that there is still the possibility of the law of diminishing returns on each production input, it is also necessary to maintain a balance in the growth of production inputs, both capital and labour, and to improve the quality of each of these production inputs. 2) Even though statistically the Average of Schooling Length of Time has no significant effect on ICOR, the 8 ASEAN countries still have to increase the level of education by providing easy access to education that is carried out evenly in various regions and community groups. In addition, the 8 ASEAN countries also need to improve the quality of education through the increase in investment in education, both by the government and the private sector, especially in professional education that is oriented to the world of work such as vocational education. In addition, it is necessary to harmonise the educational curriculum with the needs of the labour market. So that unemployment, job mismatches, and weak technology diffusion processes that may occur can be avoided and facilitate the process of investment efficiency. 3) Since the CPI has a negative and significant effect on the ICOR, efforts that need to be made are those that lead to corruption eradication activities, such as the creation of various policies and legal instruments aimed at eradicating and reducing the level of corruption. In addition, reforms are also required to the bureaucratic system that measures performance based on performance targets and achievements, simplification of procedures, and bureaucratic transparency so that the potential for corruption can be reduced. 4) Encouraging an increase in FDI flows into the 8 ASEAN countries, such as increasing promotion and competitiveness through monetary and fiscal incentives and creating investment policies that are more transparent, attractive, and competitive. In addition, it requires regulations to select FDI flows into the economic sectors that are adapted to the needs and potential of the resources they have, require the technology transfer for multinational companies or provide the license agreements so that multinational companies are willing to transfer technology, and improve supervision and protection for business actors to avoid monopolistic practices in the domestic market in line with the entry of multinational companies. 5) Related to the Trade Openness variable, it is necessary to increase the exports and maintain or limit the imports only to imports of productive capital materials and seek to substitute the consumptive imported products and have a high dependence by developing and producing them domestically. Increasing the exports can be done by reducing barriers in the form of tariffs, quota restrictions, and licensing that are difficult for the export-oriented companies and industries as well as increasing promotion and support to business sectors that have the potential in the form of

comparative and competitive advantages to be able to compete in the international market. In addition, it is necessary to increase the absorption capacity of technology both in physical infrastructure and human resources. The government also needs to diversify the export and import partner countries to avoid dependence and spillover effects that may disrupt the domestic economy when the export and import partner countries experience a crisis by increasing the international cooperation bilaterally, regionally and multilaterally to expand the market reach.

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