The long-run and short-run impacts of investment, export, money supply, and inflation on economic growth in Indonesia

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ABSTRACT

The development of investment and export in Indonesia as well as money supply shows an increase, while the inflation rate shows a decline. Yet, this is not always followed by the increase of economic growth. This study aims to explain the relationship between investment, export, money supply and inflation with the economic growth in Indonesia. It used time-series data from the first quarter in 2001 to the fourth quarter in 2014 and were analyzed using multiple regression models with Error Correction Model (ECM) and classical assumptions. It showed that in short-run, there are significant effects of investment and export on economic growth while money supply and inflation do not have significant effects. This study also found that in in long-run, there are significant effects of investment, export, money supply and inflation on the economic growth in Indonesia. Bank Indonesia should apply a tight money policy consistently to achieve the long-run inflation target.

ABSTRAK

Perkembangan investasi dan ekspor di Indonesia menunjukkan peningkatan, demikian pula jumlah uang beredar, sementara tingkat inflasi menunjukkan penurunan, namun hal tersebut tidak selalu diikuti dengan meningkatnya pertumbuhan ekonomi. Studi ini bertujuan untuk menjelaskan hubungan antara investasi, ekspor neto, jumlah uang beredar dan inflasi terhadap pertumbuhan ekonomi di Indonesia. Penelitian ini menggunakan data time series dari kuartal pertama tahun 2001 hingga kuartal keempat tahun 2014 dan dianalisa dengan menggunakan model regresi berganda dengan Error Correction Model (ECM). Hasil studi menunjukkan bahwa dalam jangka pendek , investasi dan ekspor berpengaruh signifikan terhadap pertumbuhan ekonomi sementara jumlah uang beredar dan inflasi berpengaruh tidak signifikan terhadap pertumbuhan ekonomi. Hasil studi ini juga menemukan bahwa dalam jangka panjang , investasi , ekspor , jumlah uang beredar dan inflasi berpengaruh signifikan terhadap pertumbuhan ekonomi di Indonesia. Bank Indonesia harus menerapkan kebijakan moneter yang ketat secara konsisten pada pencapaian sasaran inflasi jangka menenngah.

1.   INTRODUCTION

The high and sustainable economic growth is the objective of the development that each country wanted to achieve. In addition, the economic growth depends on the availability of the production factors (population, human resources and capital accumulation) and the level of technological wills (Solow, 1956). It is also influenced by the factors from the economic system itself such as technology and knowledge investment that will improve productivities (Romer, 1986). The capital formation through investment will increase the production of goods or services used to suffice the societies' demands. The increase of production and the national income is not determined by the increase of production, but by the increase of community consumption that consequently causes the increase of goods or service demands. Therefore, when it sustainably occurs, it will increase the national income and the economic growth.

The increase of consumption, investment, and government spending as well as net export will increase the production of goods and services. Export has a positive impact towards the economic growth because it can increase the goods and service demands (Keynes, 1936).

Keynes (1936) also stated that the amount of money supply has a positive effect on the economic output and growth, which means the more increase of the money supply, the higher the economic growth.

The above is contradictory to the Mankiw (2003) who stated that in the economy, if the money supply is excessive, it will cause higher domestic inflation. This will also lead to consumers to prefer buying goods from other country than domestic goods. This is because domestic goods are more expensive. In turn, the public purchasing power will decrease because the output is not absorbed by the market and will consequently decrease the national income. Finally, the economic growth will also decrease. Ongoing inflation will reduce the economy activities of productive entrepreneurs. This causes the unemployment to increase due the decrease of public consumption and the national income. The low rate of inflation will lead to a positive impact because it can make people more interested in working, saving and investing. Conversely, the high rate of inflation (hyperinflation) will cause chaos and the sluggish economy.

Based on the data from year 2001 to 2014, investment and export developments in Indonesia had shown its improvement. The financial sector was peroxided with by the amount of money supply, while the inflation rate decreased, not always followed by the economic growth. For example, in 2005/2006 investments, export, and money supplies increased while the inflation rate did not. However, the economic growth in Indonesia decreased by 0.19%. This is contrary to the period of 2003/2004 when the investment and export decreased and the inflation rate increased. But, the economic growth rate of Indonesia increased by 0.25%. Referring to this evidence, this study aims to examine and analyze the effect of investment, export, money supply and inflation on the economic growth in Indonesia.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Export and import have different impacts both in short-run and long-run on the economic growth in several countries (Ahmad, Afzal, & Khan, 2017; Bakari, 2017; Din, 2004; Dritsaki & Stiakakis, 2014; Mohsen, 2015). Generally, export has a positive effect on the economic growth (Keynes, 1936). In Nepal, India, and Sri Lanka, export has a positive impact towards the economic growth in short-run, but in Bangladesh and Pakistan, export has a positive impact towards the economic growth in long-run (Din, 2004). Conversely, in Gabon export positively affects the economic growth in short-run but negatively affect it in long-run (Bakari, 2017). In several countries, there is a two-way relationship between export and economic growth both in short-run and long-run (Dritsaki & Stiakakis, 2014; Mohsen, 2015). Export has proven to accelerate the economic growth especially in developing countries.

Investment is an important factor that affects the economic growth (Keynes, 1936). Investment is believed to promote the economic growth and boost productivities, especially in developing countries. Furthermore, the role of foreign investment in developing countries is dominant especially in encouraging the economic growth (Abbas, Akbar, Nasir, Ullah, & Naseem, 2011; Ameer & Xu, 2017; Riaz & Riaz, 2018; Ridzuan et al., 2018; Sothan, 2017) particularly in long-run investment.

Inflation does not always have an adverse impact on the economy; moderate inflation may even drive the production activities to increase profit. In consequence, the effect of inflation in each country is always related to the level of the inflation occurred. For example, in Jordan, inflation can cause the increase of interest rate and affect the economic growth (Saymeh & Orabi, 2013). It indicates that inflation does not have significant effect on the economic growth in South Asian countries (Abbas et al., 2011; Riaz & Riaz, 2018). In Jordan, inflation rate above 2% will give negative impact on the economy. Therefore, the Jordan central bank had to pay attention to the inflation phenomenon when applying new monetary policy (Sweidan, 2004). In Bangladesh, India, Pakistan and Sri Lanka, there is a long-run positive relationship between economic growth rates and inflation. Moderate inflation under 2 digits greatly contributes to economic growth, but the high inflation rate above 9% can lead countries to suffer (S. Hussain, 2011; Majumder, 2016). In Azerbaijan, the inflation threshold rate for the growth of GDP is 13 %. Inflation has a significant positive income statistically towards the GDP if it is under the threshold, but this positive effect will turn into negative when the inflation exceeds 13 %. The result of this study may benefit the monetary policy makers in keeping the inflation rate under 13 %to prevent its negative effect on the economic growth (Fakhri, 2011). Barro (2013)

also found that in 100 countries, the effect the 10 percent average increasing of inflation is the decreasing of GDP per real capita growth rate by 0.2 – 0.3%, point per year and the investment ration decreasing towards GDP by 0.4 – 0.6 point. Even though the negative effect of inflation on the growth seems small, the long-run effect on the life standard is very important.

The amount of money supply has important impact towards the long-run output growth rate in Bangladesh (M. E. Hussain & Haque, 2017). Study finding by Chaitip, Chokethaworn, Chaiboonsri, & Khounkhalax, (2015) explained about the relationship between the amount of money supply and the economic growth in a widespread area of AEC including Thailand, Indonesia, Singapore, Malaysia, Philippines, Vietnam, Laos, and Cambodia. There are contradictions between the economic growth aims and price stability in China. The government can apply the monetary policy in short-run, but they also should seek for new source to bring off the economic growth. Study by Inam (2014) showed the role of money supply in economic growth in Nigeria from 1985 to 2012. The money supply does not only give a positive impact on the economic growth in Indonesia and Nigeria. Study by Morteza & Farahani (2016) in natural-resource-producing countries and Babatunde & Shuaibu (2011) in Nigeria showed a positive and significant relationship between the amount of money supply and the provisional capital stock. Yet, a negative relationship was found between inflation and economic growth. The hypotheses to be tested in this study are 1) Investment has a significant effect on economic growth; 2) Export has a significant effect on economic growth; 3) The money supply has a significant effect on economic growth and 4) Inflation has a significant effect on economic growth.
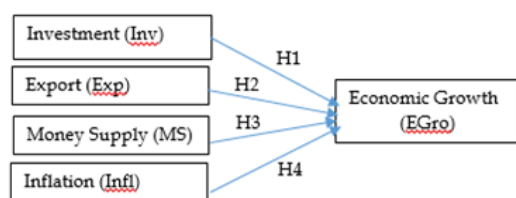

Figure 1 Conceptual Framework

3. RESEARCH METHOD

This study uses secondary data sample within 14 years that had been calculated during 2001-2014 using quartile data for export variable, money supply, inflation and economic growth.

Investment was calculated using interpolation formulation and data analysis technique was done by time-series data analysis. This Error Correction Model (ECM) is based on the fact in which the economic agent will always find such as what is planned is not always the same as the reality (Engle & Granger, 1987). This most likely happened due to shock variable. ECM is used to find out the effect of independent variable on the dependent variable in short-run and its rapid adaptation to get back to long-run balance of the time-dependent data for co-integrated variables.

The concept used to test stationary time-series data is the unit root test using the Perron-Philips test. If a time-series data is not stationary, it can be said that the data is facing the problem of unit roots. Philips-Perron (PP) makes unit root tests using nonparametric statistical methods in explaining the existence of autocorrelation between disturbing variables without including differentiation lag explanatory variables. The root test of the Philips-Perron unit is as follows:

$$\Delta Y_t = \gamma Y_{t-1} + e_t \quad\text{...1}$$
$$\Delta Y_t = a_0 + {}_\gamma Y_{t-1} + e_t \quad\text{..2}$$
$$\Delta Y_t = a_0 + a_1 T + {}_\gamma Y_{t-1} + e_t \quad\text{.......................................3}$$

Where T = is the time trend

The procedure to determine whether the data is stationary or not is done by comparing the statistical value of PP with its critical value, namely the statistical distribution of Mackinnon. The PP statistic value is indicated by the t-value of the koefisienY_{t-1} coefficient statistics in equations 1 to 3. If the absolute value of PP is greater than the critical value, the observed data shows stationary and otherwise the absolute value of the PP statistic is less than the critical value.

In order to avoid spurious regression problems, non-stationary data must be transformed into stationary data. The formulation of the integration degree test from PP is as follows:

$$\Delta 2Y_t = \gamma \Delta Y_{t-1} + e_t \quad\text{…………………………..............4}$$
$$\Delta 2Y_t = a_0 + \gamma \Delta Y_{t-1} + e_t \quad\text{…………………….............5}$$
$$\Delta 2Y_t = a_0 + a_1 T + \gamma \Delta Y_{t-1} + e_t \quad\text{………………..........6}$$

Where: $\Delta 2Y_t = \Delta Y_t - \Delta Y_{t-1}$

If the absolute value of the PP statistic is greater than the critical value of the Mackinnon statistical distribution at the first level differentiation, the data is said to be stationary at first degree. However, if the value is smaller

than the integration degree, the test needs to be continued at a higher differentiation so that the stationary data is obtained.

Next, a co-integration test was developed by Johansen to determine the co integration of a number of variables (vectors). If the disturbance variable does not contain unit roots or is said to be stationary data, the variables studied are co integrated which means having a long-term relationship. Co integration can only be done when the data used in research integrates to the same degree. If the data is all stationary, the classical assumption tests are carried out consisting of autocorrelation test, heteroscedasticity test and multicollinearity test

The ECM equation in this study is as follows :

$$EGro_t = C_0 + C_1Inv_t + C_2Exp_t + C_3MS_t + C_4Infl_t + C_5Inv_{t-1} + C_6Exp_{t-1} + C_7MS_{t-1} + C_8Infl_{t-1} + C_9ECT$$

$$DLnEGro_t = C_0 + C_1DLnInv_t + C_2DLnExp_t + C_3DLnMS_t + C_4DLnInfl_t + C_5LnInv_{t-1} + C_6LnExp_{t-1} + C_7LnMS_{t-1} + C_8LnInfl_{t-1} + C_9ECT$$

In which:

EGro	= Economic Growth
Inv	= Investment
Exp	= Export
MS	= Money Supply
Infl	= Inflation
$DlnEGro_t$	= Economic Growth (short-run)
$DLnInv_t$	= Investment (short-run)
$DLnExp_t$	= Export (short-run)
$DLnMS_t$	= Money Supply (short-run)
$DLnInfl_t$	= Inflation (short-run)
$LnInv_{t-1}$	= Investment(long-run)
$LnExp_{t-1}$	= Export (long-run)
$LnMS_{t-1}$	= Money Supply (long-run)
$LnInfl_{t-1}$	= Inflation (long-run)
C_0	= Constanta
C_1, C_2, C_3, C_n	= Regression Coefficient
D	= First Difference, such as $DlnInv_t = LnInv_t - LnInv_{t-1}$
ECT	= Error Correction Term

4. DATA ANALYSIS AND DISCUSSION

Before regressing with the ECM test, a root test of the Philips-Perron (PP) unit was carried out to determine whether the data is stationary or not. Based on the results of the PP test, only the EGro and Exp variables are stationary at the level. Therefore, it needs to be continued

with the first integration degree test. Based on the results of the first degree of integration test seen from Philips-Perron all variables are stationary because the probability value is smaller than the significant level of 0.05 so that it can be said that the data is stationary at first degree. Next is the co-integration test to give an initial indication that the model used has a co integration relation. Based on the results of the Johansen integration co-test, there is a trace statistic value of 1310,553 > critical value of 69.81889, as well as the maximum eige statistic value of 1228,313 > critical value of 33.87687. This means that the observed variables are mutually integrated or have long-run relationships.

The prerequisite test findings show that the data is not stationary at the level and co integration step, next the ECM estimation was done. Table 1 is the ECM regression model result:

Table 1
SHORT-Run ECM Estimation Result

Variable	Coefficient	Prob.
Constans	-2,167159	0,0558
DLnInvt	0,056004	0,0443*
DLnExpt	0,07563	0,0342*
DLnMSt	0,477849	0,7469
DLnInflt	0,093767	0,2188
ECT	-0,41121	0,0000*

Source : Precessed Data
Asterisk (*) denotes significant at the a = 0,05

Based on Table 1, investment and export have a significant effect on economic growth in the short-run, but money supply and inflation have no significant effect. After obtaining the short-run ECM estimation result, the next step is finding the long-run coefficient that needs to be calculated by summing the coefficients of each long-run variable, $LnInv_t$ $LnExp_t$ $LnMS_t$ $LnInfl_t$ and Error Correction Term (ECT) coefficient and then divided by ECT coefficient as seen in Table 2. Based on Table 2, all the independent variables namely investment, export, money supply and inflation have significant and positive effects in the long-run.

ECT is the indicator used to determine whether the model specification is valid or not. The ECM method of the two-step EG model is valid for use if the ECT coefficient is declared statistically significant. Based on the ECt test in Table 1, it was found that in the ECM method

using the Engle-Granger two-step model, the coefficients were statistically significant so that the ECM method with a valid Engle-Granger two-step model could be used. The negative and significant error correction model coefficient values indicate a short-run adjustment process to support the long-run stability of the model used. Therefore, in this study the ECM method used was only a two-step Engle-Granger model. The Engle-Granger two-step ECM method will be used to analyze the long-term and short-term relationships between investment, exports, money supply and inflation towards economic growth.

Table 2
Long-Run ECM Estimation Result

Variable	Coefficient	Prob.
Constans	-1,18959579	0,0000*
LnInvt	0,07209273	0,0000*
LnExpt	0,0912001	0,0000*
LnMSt	0,31086039	0,0000*
LnInflt	0,08426143	0,0000*

Source : Precessed Data
Asterisk (*) denotes significant at the a = 0,05

The Effect of Investment on Economic Growth
The ECM estimations reveal that investment has a positive and significant effect on the economic growth in Indonesia both in the short-run and long run. This finding is supported by Abbas et al. (2011); Ameer & Xu (2017); Riaz & Riaz (2018); Solomon (2011); Sothan (2017) that investment has positive and even significant effect on the economic growth. This is also in accordance with Keynes (1936) that the increased investment will increase production that it can absorb human resources and increase the national income. Consequently, it will also increase the economic growth.

Investment plays an important role in the Indonesian economy, both domestic investment and foreign investment that have a large proportion of Indonesia's total investment. Domestic investors invest more in the secondary sector, namely the food industry, also in the primary sector, namely in food crops and plantations. It is different from foreign investors who invest more in the transportation, warehouse and telecommunications sectors, other transportation and transportation equipment industries that encourage investment growth in Indonesia.

The prospects and economic growth in Indonesia are still attractive to foreign investors, especially Japan, South Korea, China and the United States. The development of foreign investment in Indonesia in 2012 to 2016 increasingly showed a positive progress in various sectors. Moreover investment where capital investment is indeed carried out in almost all existing sectors, such as in the development sector, tourism sector, transportation sector, mining sector and investment in Indonesia in other sectors in accordance with regulations and approval from the government. Additional investors glance at the conditions and regions of Indonesia which they think have advantages such as the mining sector or other sectors that they can use.

The Effect of Export on the Economic Growth
Based on the short-run ECM estimation, export has a positive and significant effect on the economic growth in Indonesia, also in long-run, export has also a positive and significant effect on the economic growth in Indonesia. This study finding is in line with that by Ahmad et al. (2017); Bakari (2017); Din (2004); Dritsaki & Stiakakis (2014); Mohsen (2015). The estimation result also supports the Keynes (1936) statement that export has positive and significant effect on the economic growth because the increase of export activity will increase the production and cause the needs of human resources. It eventually can reduce the unemployment. The increase of the income level will induce the society's consumption and improve the economic growth.

The above evidence is in accordance with the theory of international trade. If the number of goods or services exported abroad is increasing, the country must produce more goods and services as well. The more items exported to foreign countries, the more capital flows into the country. The capital inflow will be managed through capital funding for large, small, and medium enterprises. This will increase the output of both goods and services that will increase economic growth in the long run. Increased exports will encourage an increase in domestic production. Increased production will drive the wheels of the domestic economy so that economic growth increases

The Effect of Money Supply on the Economic Growth
Based on the short-run ECM estimation, the money supply has a positive but not significant effect on the economic growth in Indonesia,

while in long-run the money supply has a positive and significant effect on the economic growth in Indonesia. This is due to the increase in the money supply, so that public consumption will increase. The producers are encouraged to produce more goods and increase outputs. This will affect income per capita and increase economic growth.

The money supply has a positive impact towards the economic growth if the amount of money supply is not too much or too little. If the money supply increase is too high it will decrease the value of the money, therefore, it will cause inflation. The inflation will cause the purchasing power to decrease, so the produced goods will not be absorbed by the markets, lead to the decreasing of production. The decreasing of production will reduce the national income, that if it goes for a long time it will shrink the economic growth. This study finding is supported by the study results of Babatunde & Shuaibu (2011); Chaitip et al. (2015); Dingela & Khobai (2017); M. E. Hussain & Haque (2017); Inam (2014); Tiwari (2016); Zapodeanu & Cociuba (2010). Money in economic activities has effect in increasing the efficiency of economic activities in general. Growing Economy needs money that is useful in facilitating the payment process, therefore the more money supply in community means the economic activity runs well because the people's income increases.

The Effect of Inflation on the Economic Growth

The result of short-run ECM estimation shows that inflation has a positive but not significant effect on the economic growth in Indonesia, while in long-run inflation has a positive and significant effect on the economic growth in Indonesia. This finding is in line with the study by Fakhri (2011); Majumder (2016); Mallik & Chowdhury (2001). As the result of increase of prices in the market, the purchasing power will decrease. In this condition, the produced goods are not absorbed by the market, and consequently, it can decrease the production. The decrease of production will decrease the national income. Thus, when it occurs in long period it will decline the economic growth. However, in the long-run, the consumption behavior of the people will usually adjust to market prices, especially for the fulfillment of basic needs.

In the long run the government will also carry out inflation control policies and policies that encourage increased employment opportunities so that income will increase. Such estimation is not in line with the study by Barro (2013); Saymeh & Orabi (2013); Sweidan (2004) that stated that inflation has a negative and significant effect on the economic growth.

The increase of world's demand will encourage the increase of international commodity prices, both oil and gas and non-oil and gas which ultimately will put pressure on the global inflation. Such inflation is extremely influenced by the price of fluctuating foodstuffs (volatile foods such as rice, red and green choli) which in 2003 accounted for -0.6% and in 2004 became 1.3%. The development of volatile foods inflation is due to the policy of rice import ban to avoid the decline of rice prices during the harvest season. In addition to that condition, the development of domestic rice prices are also influenced by the development of international rice prices during 2004.

5. CONCLUSION, IMPLICATION, SUGGE-STION, AND LIMITATIONS

The short-run ECM estimation shows that investment and export have significant effect on economic growth in Indonesia, while money supply and inflation did not significantly affect. The long-run ECM estimation shows investment, export, money supply, and inflation have a significant and positive impact on economic growth. In addition, Bank Indonesia should implement a tight money policy consistently to achieve the medium-term inflation target. The increase of world demand urges the international commodity process and eventually puts pressure on the global higher inflation. The inflation trend of volatile food is caused by the policy of rice import ban to prevent the decline in rice prices during the harvest season. In addition to this, there is also an increase of international rice prices. This study has limitations regarding the number of observations, because it still needs to be added to the year of observations such as at least 30 years. This is due to the condition that investment is still considered to have a more consistent impact on the long-run.

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