

## Determinants of the current account balance in Indonesia

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### Abstract

The open economic system adopted by Indonesia disrupts the current account balance. This study aims to analyze and explained the causality of the current account balance with macroeconomic variables using the VAR (Vector Autoregression) approach. The data in this study used time series from 2005 quarter 1 to 2015 quarter 4. The results showed that macroeconomic variables have no causality relationship with current account balance in Indonesia. The research recommended to the financial policy authority relates to fluctuation macroeconomic variables for a policy-making basis on the current account balance in Indonesia, because the current account balance is one of the parameters for the performance of a country's economy.

**Keywords:** current account balance, macroeconomic variables, and economic openness.



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### Introduction

The current account balance shows how much of a country has been shopping for goods, payment services of foreign investment income and transfers compared to how much is generated from other countries. The current account imbalance has been a major source of concern by economists (Djeutem and Nguimkeu, 2013; Gossé and Serranito, 2014) Consequently, economists are trying to explain the changes in the current account balance to estimate the sustainable levels to cause required changes in the balance. Implications of imbalance and sustainability of the current account are important issues in international macroeconomics because the current account balance reflects the performance of the economy and as a measure to assess economic growth by policymakers and investors (Aristovnik, 2007; Cecen and Xiao, 2014; Gnimassoun and Coulibaly, 2014; Insel and Bulvarı, 2013; Sahoo et al., 2016; Turan et al., 2016; Wadud and Rahman, 2015).

The process of economic globalization will increase international trade and capital mobility resulting in the current account balance in some countries experiencing a deficit state (Cavdar and Aydin, 2015). The current account deficit is one of the main indicators of external imbalance of global economies (Duncan, 2016; Garg and Prabheesh, 2017; Gervais et al., 2016; Hobza and Zeugner, 2014; Tan et al., 2015). The concept of current account deficit has long been the focus of research debates for economic policy making (Belkar and Cockerell, 2007; Chen, 2011; Christopoulos and Leo, 2010; Elgin and Kuzubas, 2013; Unger, 2017; Yurdakul and Cevher, 2015).

Indonesia is one of the countries that embraces the open economy system. The realization of the open economic system is shown by the existence of international trade activities such as trade in goods and services between countries. The activities of international trade transactions are recorded

in the current account balance. Indonesia as a country involved in international trade resulted in the condition of Indonesia's current account balance is not balanced every year, the condition is known as surplus and deficit.

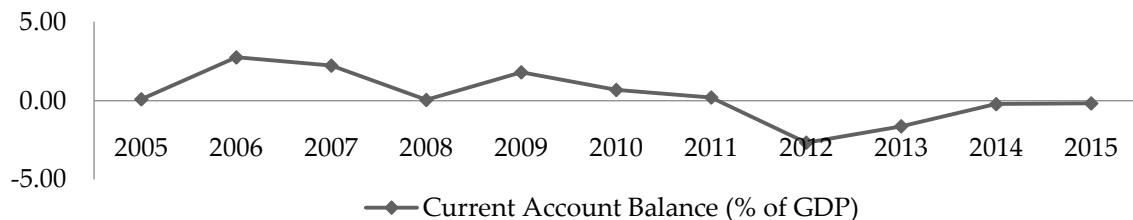


Figure 1. Current account balance of Indonesia (source: Fred economic data)

Based on figure 1, the current account condition in Indonesia has surplus in 2005 to 2011, but the current account condition has a sustained deficit in 2012 to 2015. The condition of the current account Indonesia fluctuating is inseparable from macroeconomic variable shocks. According to the theory of international financial economics that the condition of the current account is influenced by economic growth, exchange rate and inflation (Madura, 2008). Based on previous research conducted by (Barnes et al., 2010; Chen et al., 2012; Chinn and Ito, 2008; Gossé and Serranito, 2014; Kayıkçı, 2012; Kilian et al., 2008; Sadiku et al., 2015), which the current account balance is influenced by economic growth, exchange rate, inflation, economic openness, and foreign direct investment.

Based on relevant theories and research, the relationship between independent variable with current account balance are; The first, according (Kayıkçı, 2012; Madura, 2008, p.34; Sadiku et al., 2015) the impact of economic growth on the current account balance is that if a country experiences an increase in economic growth with a relatively higher percentage than other countries, then its current account will decrease. If real income increases then consumption of goods will also increase as a portion of the increase in consumption will be realized in the purchase of imported products; The second, according (Chen et al., 2012; Gossé and Serranito, 2014; Kayıkçı, 2012; Madura, 2008, p.35; Sadiku et al., 2015) the effect of real effective exchange rate on the current account balance is that if the effective exchange rate of a country starts to rise relative to other countries, this will cause the current account balance to decrease as the products exported by the state it will become more expensive for the importing country. Consequently, demand for these products will decrease. Strong domestic currencies will worsen the current account balance if the traded products are price-elastic, ie sensitive to price changes; The third, according (Kayıkçı, 2012; Madura, 2008, p.34) the impact of inflation on the current account balance is that if a country's inflation rises relative to the inflation of its trading partner countries, its current account balance will decline. Consumers and cooperation within the country will buy more goods from abroad because of the high domestic inflation, while exports to other countries will decline; The fourth, according (Kayıkçı, 2012; Sadiku et al., 2015) the impact of openness on the current account balance is that if an economy that tends to be more open will be more attractive for foreign products to enter. Consequently, economic openness has a negative relationship to the current account balance; The fifth, according (Barnes et al., 2010; Kayıkçı, 2012; Sadiku et al., 2015) the effect of foreign direct investment flows on the current account balance is having a good impact on the current account balance. With an increase in foreign direct investment, the country's output will increase, which will lead to an increase in exports over imports.

The importance of this research about the current account balance are; the first, the current account balance describes the effect of foreign economic transactions on national income; the second, current account balance showing the structure and composition of economic transactions and the international financial position of a country; the third, to assist the government in taking policy.

Based on various relevant theories and research, the current account imbalance can not be separated from the influence of macroeconomic variables. The main purpose of this research is to answer some questions between current account deficits and broad set of macroeconomic variables, such as economic growth (GDP), real effective exchange rate (REER), inflasi (INF), openness (OPEN) and foreign direct investment (FDI) in Indonesia. In this respect, Vector Autoregression (VAR) methodology was employed to specify the determinants of the current account balance in Indonesia from 2005 quarter 1 to 2015 quarter 4.

## Method

The object of this research is Indonesia with research period from 2005: Q1 until 2015: Q4. The study used secondary data published by related institutions, namely Bank Indonesia (BI), Badan Pusat Statistik (BPS) and Fred Economic Data. In order for this study to be more focused and does not cause misinterpretation, Table 1 summarized the concepts and definitions of each variable are:

Table 1. Description of data and sources

Variable	Abbreviation	Description	Source
<b>Current Account Balance</b>	CAB	The current account balance (% of GDP)	Fred Economic Data
<b>GDP</b>	GDP	The growth rates of real GDP (%), base year 2010	Badan Pusat Statistik (BPS)
<b>Real Effective Exchange Rate</b>	REER	Real effective exchange rate, base year 2010 = 100	Fred Economic Data
<b>Inflation</b>	INF	Inflation as measured by the consumer price index	Bank Indoneisa
<b>Openness</b>	OPEN	Ratio of exports plus imports to GDP (% of GDP)	Fred Economic Data
<b>Foreign Direct Investment</b>	FDI	Foreign direct investments, net (% of GDP)	Fred Economic Data

The analytical tool used in this research is econometric model with VAR (Vector Autoregression) approach, which a system of equations to shows each variable as a linear function of the constant and lag values of the variable itself, its present in the explanatory variable system to analyze the system relations of time series variables and to analyze the dynamic impact of the disturbance factors contained in the system of those variables. The econometric model that will be analyzed in this research is

$$Y_t = c + \alpha_{1i} \sum_{i=1}^n CAB_{t-1} + \alpha_{2i} \sum_{i=1}^n GDP_{t-1} \alpha_{3i} \sum_{i=1}^n REER_{t-1} + \alpha_{4i} \sum_{i=1}^n INF_{t-1} + \alpha_{5i} \sum_{i=1}^n OPEN_{t-1} + \sum_{i=1}^n FDI_{t-1} + \varepsilon_t$$

Where  $Y_t$  is the dependent variable;  $c$  is constants;  $\alpha$  is coefficient;  $t-1$  is one period lagged value of the variable;  $\varepsilon$  is error term.

There are several steps done for VAR model analysis; the first is stationary test, in this research, stationary test was performed using Augmented Dickey Fuller Test (ADF) method. Stationary test is intended to look at different degrees or orders to how much data is observed to be stationary; The second is a cointegration test, to determine the long-term relationship between variables by using the Engle Granger method to determine whether the model to be used is VAR (Vector Autoregression) if there is no cointegration or VECM (Vector Error Correction Model) if there is cointegration; the third is optimum lag determination, there are several parameters that can be used to determine the optimal lag length, such as AIC (Akaike Information Criterion), SIC (Schwarz Information Criteria) and HQC (Hannan Quinn Criteria). The value seen is the smallest value of AIC, SIC and HQC; the fourth is

granger causality test, to see the direction of relationship between national income, real effective exchange rate, inflation, economic openness and foreign direct investment to current account balance in Indonesia; the fifth is impulse response function test (IRF), to track the effect of changing one standard deviation from one of the variable innovations to the present and future values of another variable in the VAR equation system. This method can be used to determine the response of an endogenous variable to a particular variable.

## Results and Discussion

Stationary test using Augmented Dickey Fuller (ADF) test, if the t-statistic of ADF test is smaller than the t-statistic of Critical Value (5%) then the data is stationary. Table 2 summarized the unit root test statistics, that only GDP is stationary at that level. While CAB, REER, INF, OPEN, and FDI are stationary at that first difference.

Table 2. Unit root test statistics

Variables	Unit root test on	ADF test	CV (5%)	Stationary
CAB	Level	-2.554124	-3,518090	No
	First difference	-7,102118	-3.520787	Yes
GDP	Level	-4,114812	-3,533083	Yes
	First difference	-59,03017	-3.526609	Yes
REER	Level	-2.158197	-3,518090	No
	First difference	-5,266335	-3.520787	Yes
INF	Level	-1,425169	-3.540328	No
	First difference	-5,796448	-3.540328	Yes
OPEN	Level	-3.067669	-3.520787	No
	First difference	-5,347439	-3.520787	Yes
FDI	Level	-3,327212	-3.529758	No
	First difference	-4,136850	-3,533083	Yes

Source: Authors'calculations

The cointegration test in Table 3, it can be concluded that variables CA, GDP, REER, INF, OPEN and FDI are not mutually cointegrated and have no long-term relationship because the trace statistics value is greater than the critical value (5%). It also means that research should be continued using the Vector Autoregression (VAR) model.

Table 3. Cointegration test statistics

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	Critical Value (5%)	Prob.**
None *	0.809171	137.4932	95.75366	0.0000
At most 1	0.517422	67.92534	69.81889	0.0701
At most 2	0.360206	37.32363	47.85613	0.3324
At most 3	0.227227	18.56608	29.79707	0.5244
At most 4	0.146223	7.739727	15.49471	0.4936
At most 5	0.025854	1.100150	3.841466	0.2942

Source: Authors'calculations

Determination of the optimum lag length in Table 4, the values seen are the smallest values of AIC, SIC and HQC. Based on the results of the optimum specification criterion of optimal lag length

in lag 5 because the AIC, SIC, and HQC values show the smallest value simultaneously, so the decision for the optimum lag is 5.

Table 4 . Optimal lag length specification criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-489.2602	NA	4318.937	25.39796	25.65389	25.48979
1	-364.0288	205.5080	45.52739	20.82199	22.61352	21.46477
2	-324.4597	52.75885	43.40513	20.63896	23.96608	21.83270
3	-230.0412	96.83941	3.183523	17.64314	22.50586	19.38784
4	-152.4913	55.67687	0.915540	15.51237	21.91069	17.80803
5	-4.607116	60.67044 *	0.022899 *	9.774724 *	17.70863 *	12.62134 *

Source: Authors'calculations

The granger causality test in Table 5, the result shows that all the variables tested with 95% confidence level no variables have causality relationship, but there are variables that have one-way relationship; the first, the national income affects the current account balance; the second, the current account balance affects real effective exchange rate and inflation, while the variables of economic openness and foreign direct investment have no causality relationship with the current account balance or one-way relationship.

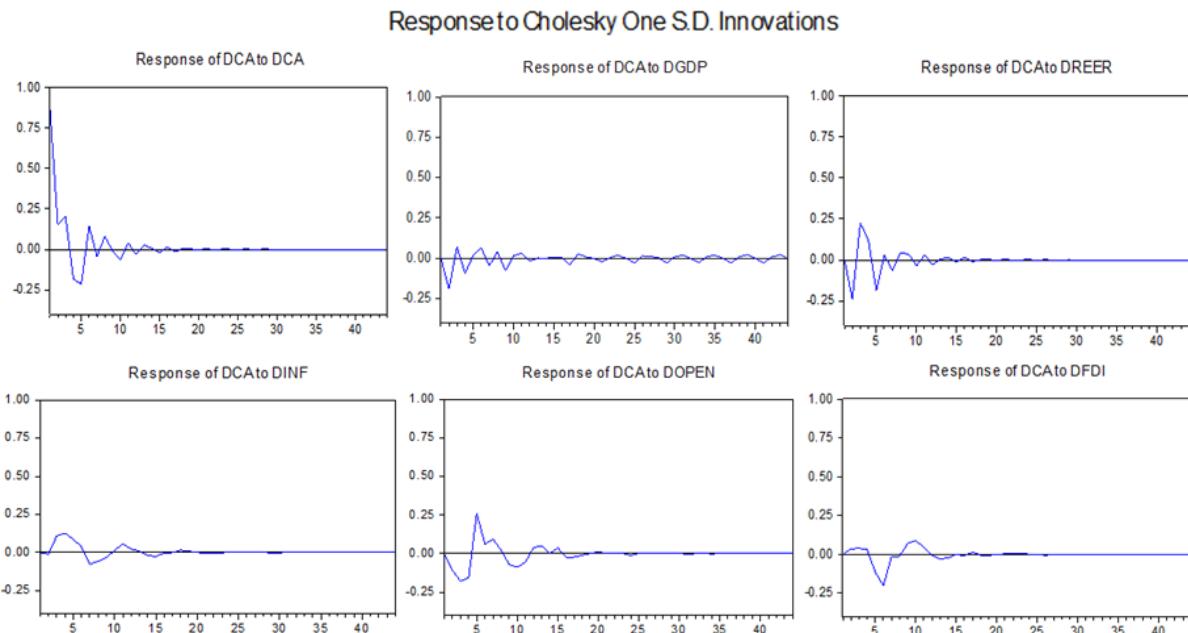
Table 5. Granger causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
<b>GDP does not Granger Cause CA</b>	39	0.51271	0.6763
<b>CA does not Granger Cause GDP</b>		4.92070	0.0060
Null Hypothesis:	Obs	F-Statistic	Prob.
<b>REER does not Granger Cause CA</b>	39	6.32201	0.0016
<b>CA does not Granger Cause REER</b>		1.16094	0.3389
Null Hypothesis:	Obs	F-Statistic	Prob.
<b>INF does not Granger Cause CA</b>	39	4.13304	0.0133
<b>CA does not Granger Cause INF</b>		1.32153	0.2834
Null Hypothesis:	Obs	F-Statistic	Prob.
<b>OPEN does not Granger Cause CA</b>	39	1.01471	0.3982
<b>CA does not Granger Cause OPEN</b>		0.30023	0.8250
Null Hypothesis:	Obs	F-Statistic	Prob.
<b>FDI does not Granger Cause CA</b>	39	0.39746	0.7557
<b>CA does not Granger Cause FDI</b>		1.60007	0.2075

Source: Authors'calculations

The Impulse response function test (IRF) in Figure 2; the first is response of current account balance to national income, the shock that occurs on the national income is not always positive response in the early quarter to the tenth quarter due to responded very volatile responding positively and negatively (up and down). In the eleventh quarter until the sixteenth the fluctuations began to shrink and approach the balance point. While in the seventeenth quarter and so on the shock that occurred in the national income again fluctuated; the second is response current account balance to real effective exchange rate, the shock that occurs in real effective exchange rate at the beginning of the period or the first quarter until the sixth quarter responded to fluctuations that responded

positively and negatively (up and down). Further in the seventh quarter until the twelfth quarter the fluctuations began to shrink. In the thirteenth quarter onwards, real effective exchange rate again reached equilibrium; the third is response current account balance to inflation, the shocks that occur in inflation at the beginning of the period or the first quarter until the eleventh quarter responded fluctuate that is responding positively and negatively (up and down). Further in the twelfth quarter until the fifteenth of the fluctuations began to shrink. In the sixteenth quarter and beyond, inflation again reached equilibrium; the fourth is response current account balance to economic openness, the shock that occurs in the economic openness at the beginning of the period or the first quarter until the twelfth quarter responded to fluctuate that is responding positively and negatively (up and down). In the thirteenth until the eighteenth quarter the fluctuations began to shrink. In the nineteenth quarter onwards, the economic openness came back to balance; the fifth is response current account balance to foreign direct investment, the shock that occurs in foreign direct investment at the beginning of the period or the first quarter until the twelfth quarter responded to fluctuate that responded positively and negatively (up and down). In the thirteenth quarter until the nineteenth quarter responded to fluctuations began to shrink. In the twentieth quarter onwards, foreign direct investment is balanced.



Source: Authors' calculations, 2018

Figure 2. Response of current account balance to shocks in all variables

#### **Causality between the current accounts balance and national income in Indonesia**

Based on Granger Causality Test results can be seen that the national income affects the current account balance, while the current account balance does not affect the national income. The result of this research is consistent with (Kayikçi, 2012; Sadiku et al., 2015).

The national income that affects the current account balance is due to the fact that if a country experiences an increase in national income with a relatively higher percentage of other countries, then the country's current account balance will decrease as the national income increases, the consumption of goods and services will also increased, whereby a portion of the increase in consumption will be realized in the purchase of imported products, so that it will affect the current account condition of a country.

The current account balance that does not affect the national income is due to the components affecting national income in a country based on expenditure approach is public consumption, investment, government expenditure and net exports. Therefore, an increase or decrease in the

current account of a country does not directly affect the national income condition, because the balance of transactions records the accumulation of exports of goods, services exports, net investment income and net transfer payments.

#### **Causality between the current account balance and real effective exchange rate in Indonesia**

Based on the Granger Causality Test results can be seen that the real effective exchange rate does not affect the current account balance, while the current account balance affects the real effective exchange rate. The result of this research is consistent with (Chen et al., 2012; Gossé and Serranito, 2014; Sadiku et al., 2015).

The current account balance affects the real effective exchange rate because when the current account surplus is increasing, it will affect the exchange rate that is the appreciation. This unidirectional relationship occurs because at the time of export increase, the current account balance will experience a surplus condition which will increase the demand for domestic currency which resulted in rupiah appreciation. While at the time of the current account deficit, this will affect the stability of the exchange rate, this is because the negative perception appears to the state of the economy, investors will attract foreign capital out which resulted in depreciation of the rupiah exchange rate is higher.

Real effective exchange rate does not affect the current account balance caused by the instability in the exchange rate considering in 2008 the global economic crisis, this is due to the uncertainty of the global economic conditions resulting in a slowdown in global economic growth which also affects the Indonesian economy, especially the exchange rate. The instability of the exchange rate in giving a positive impact can not yet occur. In addition, these results are possible because of other factors of macro variables are more powerful in influencing the current account balance.

#### **Causality between the current account balance and inflation in Indonesia**

Based on Granger Causality Test results can be seen that inflation does not affect the current account balance, while the current account balance affects inflation. The result of this research is consistent with (Kayikçi, 2012).

The current account balance affecting inflation is due to an increase in current account surplus, which will affect inflation, which is the decrease of inflation. This unidirectional relationship is due to the increasing export volume, the current account will experience a surplus condition because output has increased more than the total domestic demand, resulting in a decrease in inflation. While the current account deficit will also affect the inflation condition, this is because when the current account deficit condition occurs, the output in the country will decrease inadequately to domestic demand, thus causing an increase in inflation.

Inflation did not affect the current account balance, caused by the instability of inflationary conditions in Indonesia, due to high inflation in 2005 due to price increases of all groups of goods and services, then in 2006 the inflationary conditions in Indonesia experienced a very significant decline that continued until the year 2007 and when at the time of the global economic crisis in 2008 the inflation in Indonesia experienced a rebound and then declined significantly in 2009. In addition, this condition is due to the uncertainty of the global economy resulting in a slowdown in global economic growth that also impact the Indonesian economy, especially against inflation.

#### **Causality between the current account balance and economic openness in Indonesia**

Based on the Granger Causality Test results it can be seen that the economic openness does not affect the current account balance and current account balance does not affect the economic openness, there is no causality relationship between the current account balance with the economic openness. The result of this research is consistent with (Sadiku et al., 2015).

The no two-way causality relationship between current account balance and the economic openness in Indonesia is due to the current account condition and economic openness in Indonesia experiencing instability due to the global economic crisis in 2008, then in 2009 experienced significant improvements and in 2010 until with the year 2015 again experiencing a declining situation, so that the current account balance and economic openness in the short term do not affect each other due to these fluctuating conditions, so it takes a long time to influence each other until the condition is stable.

#### **Causality between the current account balance and foreign direct investment in Indonesia**

Based on the Granger Causality Test results it can be seen that foreign direct investment does not affect the current account balance and current account balance does not affect the foreign direct investment, there is no causality relationship between the current account balance with foreign direct investment. The result of this research is consistent with (Barnes et al., 2010).

There is no two-way causality or direction between the current account balance and foreign direct investment in Indonesia, due to the condition of the balance of transactions and foreign direct investment running in Indonesia experiencing instability due to the global economic crisis of 2008. Imbalances of current account conditions and foreign direct investment in Indonesia resulting in the amount of foreign direct investment takes a long time to have a causal relationship with the current account balance in Indonesia, due to the slowdown in the Indonesian economy due to the global economic slowdown, in addition to foreign direct investment entering Indonesia is permanent because short-run current account can not affect foreign direct investment.

## **Conclusions**

The conclusion of this research indicates that there are variables that have a one-way relationship ie the national income affects the current account balance and current account balance effect the real effective exchange rate and inflation, while the variables of economic openness and foreign direct investment have no relationship to the current account balance in Indonesia.

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