PRESS
17th International Symposium on Management (INSYMA 2020)

Measuring Economic Growth Through National Income Elasticity

M.S. Sundari & M. Ariani
University of Surabaya, Surabaya, Indonesia

ABSTRACT: In the Industrial Revolution Era 4.0 all countries must face increasingly fierce competition from the flow of goods/services, labor, and capital. Exports and investments are the keys to national economic growth. All of this will affect the amount of national income, which will determines the size of economic growth. The amount of national income can be influenced by several factors, including exports and investments made. Through the concept of elasticity, people can clearly see the magnitude of the influence of the variable Foreign Investment (FDI) and Export (X) on National Income, in this case, GDP. The results of the calculation with the concept of elasticity show that when the Export and FDI variables increase, the GDP variable rises but not as much as the increase in Exports and FDI. The GDP response is a small or low response (inelastic). However, when the export and FDI variables go down, the GDP variable actually rises higher than changes in exports and FDI.

Keywords: Elasticity, Export (X), Foreign Investment (FDI), National Income (GNP) and Economic Growth

1 INTRODUCTION

Every country wants a rapid economic growth. The existence of economic openness causes various facilities and challenges to be faced. Cross-country relations are increasingly easy to reach, both for the flow of goods/services, resources, and information technology. This is a challenge for countries to be able to compete with other countries in all respects, primarily through international trade. International trade is a cross-border sale and purchase transaction or across state lines, involving two or more parties. Economic growth can be assessed through various aspects, including aspects of increased production of goods and services, aspects of employment with low underemployment (unemployment), aspects of the stability of prices of goods (inflation), aspects of the amount of investment (domestic and foreign), or also the amount of net exports that can generate foreign exchange for economic development.

The amount of production or income nationally, and domestically is one indicator of economic growth. The increase in national income can be seen from a large number of Gross Domestic Product (GDP) produced every year. National income can be calculated through several approaches, namely: production approach, expenditure approach and income approach. Through these three approaches, Dornbusch et al. (1998) stated: "the identity between produced and sold output is Y = C + I + G + NX". This shows that the amount of national product / national income (Y) is determined by the amount of public consumption (C), private investment (I), government expenditure (G) and net exports (X-M). Therefore, a country will experience economic growth if there is an increase in national income (i.e., increased output) caused by high exports and investment. Of the four national income determinants, this study only analyzes foreign investment and exports of goods/services in the formation of national income. The following Table 1 shows fluctuations in the amount of investment (FDI), exports, and national income (GDP) in five years (2014-2018) (BPS 2019;BKPM 2019).

Table 1 Export Value, Foreign Investment (FDI), and Indonesian GDP Over the 2014-2018 period (in million US$)

Year	Export	Foreign Investment (FDI)	GDP at Current Price
2014	175,980.0	28,529.6	8,564,866.6
2015	150,366.3	29,275.9	8,982,517.1
2016	145,186.2	28,964.1	9,434,613.4
2017	168,828.2	32,239.8	9,912,703.6
2018	180,012.7	29,307.9	10,425,316.0

Source: Biro pusat Statistik (2019)

Table 1 shows exports that experienced fluctuations with a decline until 2016, after which it continued to increase until 2018 with values exceeding 2014. The FDI experienced fluctuations up and down from year to year, with the highest value in 2017 with a value of US $ 29,307.9 million. Unlike exports and FDI, national income (GDP) increased from 2014 to 2018 with increases of US $ 417,650.5 million (4.9%), US $ 452,096.3 million (5.0%), US $ 478,090.2 million (5.1%), and US $ 512,612.7 (5.2%).

Research generally analyzes the extent to which the relationship or influence of a variable on other variables, as conducted by Jufrid, et al. (2016) in examining the GDP variable with the exchange rate and investment variables, where the results indicate that GDP has a positive and significant relationship with foreign exchange rates and foreign investment. The study analyzed how the response of a variable if other variables change, not whether there is a relationship or influence between these variables. This response can be seen from the magnitude of the coefficient of elasticity. Elasticity measures the sensitivity of one variable to another. Specifically, elasticity is a number that shows the percentage change that occurs in one variable as a reaction to every 1 percent change in other variables (Pindyck and Rubinfeld, 2013).

1.1 Limitation and Formulation of Problems

The problem of this study is limited to the determination of the National Income Elasticity using the Export Elasticity (EYx) and Foreign Investment Elasticity (EYF) to determine Economic Growth in the 2014-2018 analysis period.

The formulation of the problem is "How is the response of the National Income (GDP) if there is a change in Exports (X) and Foreign Investment (FDI) in driving Economic Growth?"

1.2 Economic Growth and National Income

Economic growth is an indicator to find out how much the success of a country's economic development and as a determinant of the subsequent development policies (Mankiw, 2007). Economic growth will improve the welfare of the community and increase the ability to carry out the subsequent development. Skipton (2007), in his working paper, stated that the impact of trade openness on the level of private investment, in the long run, affects indirect economic growth.

One indicator of economic growth is by seeing the magnitude of national income. The amount of national income is determined by a large amount of gross domestic product produced each year. "GDP is the total market value of a country output. It is the total market value of all goods and services produced within a given period of time by factors of production located within a country". (Case et al. 2015). In line with this, GDP is a measure of annual economic output or the total value of goods and services produced in a country. An economy will grow if the total amount of output or the total allocation of production of goods and services in a specific year is more significant than the previous year.

1.3 Determinants of National Income

Many factors can determine the amount of national income, as in the formula previously explained, namely Y = C + I + G + (X - M). As Samuelson (1995) stated, "The gross domestic product (or GDP) is the most comprehensive measure of a nation's total output of goods and services. It is the sum of the dollar values of consumption, gross investment, government purchases of goods and services, and net exports produced within a nation during a given year". This net export shows a positive value, which means exports are greater than imports, which means there are foreign exchange earnings that can be used for development. Export (X), according to Baldwin (2005), refers to one of the economic sectors that plays an essential role through expanding markets between countries, whereby expanding in an industry, encouraging expansion also in other industries, and subsequently encouraging other sectors to grow.

Besides exports, another factor that is also an important determinant of national income is an investment (I). Investment activities are carried out by the private sector both from domestic and abroad. This investment can be in the form of direct and indirect investments with a term. This is reinforced by Sunariyah (2010) that said the investment is an investment for one or more assets that are owned and usually for a long time in the hope of getting a profit in the future. The movement of capital inflows will increase employment opportunities, which then increase people's income. The types of investment can be divided into three forms, namely: a) public / private investment: investment made by the government or private, b) domestic/foreign investment: an investment that comes from domestic or foreign, and c) gross/net investment: gross investment and net of depreciation minus. Domestic investment is domestic investment, while foreign investment is a foreign

investment (Sitompul, 2007). The presence of foreign investment provides benefits in accessing markets abroad because, through joint ventures, foreign companies can also function as a catalyst for the emergence of other domestic exporters (Winantyo, 2008).

2 RESEARCH METHODS

This study is limited to the scope of the size of exports, foreign investment (FDI), and Indonesia's Gross Domestic Product (GDP) as determinants of economic growth over the 2014-2018 period. Data to be analyzed in this study are quantitative data sourced from secondary data that is data derived from Indirect sources of articles, research journals, BPS, Bank Indonesia, BKPM (Badan Koordinasi Penanaman Modal), and other related institutions.

The method used in the analysis is a quantitative descriptive method that is by outlining to get a picture of the problem and looking at the relationship between variables using the national income elasticity model based on the rate of change in exports to the rate of change in national income and the rate of change in foreign investment against the rate of change in national income.

General Elasticity Formula: (Nicholson, 1995).

$$EBA = \frac{percent\ tge\ change\ in\ B}{percentage\ change\ in\ A} = \frac{\Delta B/B}{\Delta A/A} = \frac{\partial B}{\partial A} x \frac{A}{B}$$

Where:
EBA = Elasticity
A = Dependent Variable
B = Independent Variable

The national income elasticity model used in this study is *the Export Elasticity of National Income (EYx)* and *the Foreign Investment Elasticity of National Income (EYF).*

$$EYX = \frac{\Delta X/X}{\Delta Y/Y} \text{ and } EYF = \frac{\Delta Fi/Fi}{\Delta Y/Y}$$

Where:
EYX = Export Elasticity of National Income
ΔX / X = Rate of change in Export
EYF = Foreign Investment Elasticity of National Income
ΔFi / Fi = Rate of change in Foreign Investment
ΔY / Y = Rate of change in National Income (GDP)

3 RESULTS AND DISCUSSIONS

Based on data on exports, foreign investment, and the national income available in Table 1, the magnitude of the national income elasticity by looking at changes in the Export (X) variable, the Foreign Investment variable (FDI) and the National Income (GDP) variable can be calculated. The results of this calculation can be seen in Table 2.

Table 2. Results of Calculation of Export Elasticity from National Income and Foreign Investment Elasticity from National Income Over the 2014-2018 period (in million US $)

Year	ΔX/X (%)	ΔFi/Fi (%)	ΔY/Y (%)	EYX (4 : 2)	EYF (4 : 3)
(1)	(2)	(3)	(4)	(5)	(6)
2014-2015	-25,643.7 (-14.6)	746.3 (2.6)	417,650.5 (4.9)	- 0.36 (*inelastic*)	1.87 (*elastic*)
2015-2016	-5,150.0 (-3.4)	-311.8 (-1.1)	452,096.3 (5.0)	- 1.47 (*elastic)*	- 4.73 (*elastic*)
2016-2017	24,641.9 (16.3)	3,275.7 (11.3)	478,090.2 (5.1)	0.31 (*inelastic*)	0.45 (*inelastic)*
2017-2018	11,184.5 (6.6)	-2,931.9 (-9.1)	512,612.7 (5.2)	0.78 (*inelastic)*	- 0.57 (*inelastic*)

In Table 2, it can be seen that Exports experienced a decline from 2014 to 2016, after which it increased, and the highest increase was in 2016/2017 (16.3%). The export elasticity of national income (EYx) is negative and positive. Negative shows the relationship between Exports and GDP is the opposite, while positive shows the direct relationship between Exports and GDP. The magnitude of the average export elasticity < 1 *(inelastic*), this shows the response of GDP to changes in Exports is *small* except in 2015/2016 which shows *elastic* where GDP rose 1.5 times when Exports fell 1 time.

The magnitude of the coefficient of foreign investment elasticity in 2014/2015 and 2015/2016 shows a value > 1 (*elastic*), meaning there is a tremendous response from GDP when FDI changes, meaning FDI has a significant influence on GDP. A tremendous but negative response shows that when FDI falls by 1%, GDP rises by 5% (five times the decrease in FDI). 2016/2017 and 2017/2018 have inelastic elasticity, where if FDI experiences significant changes, the effect on GDP is small.

3.1 The Relationship of National Income Elasticity with Economic Growth

The relationship between national income (GDP) can be seen from the equation Y = C + G + I + (X-M). From the results of testing through export elasticity and foreign investment elasticity of national income, elasticity coefficient numbers are *positive/negative and greater / smaller* than one. This shows that there is a direct and opposite relationship between Exports and FDI with GDP. The results show that when Exports or FDI fall, GDP rises more than the decline in Exports or FDI. This means that in that year, *other factors outside of exports and FDI, namely C and G, affected GDP* so that the decline in exports and FDI *did not affect* GDP. However, when exports and FDI increase, there is an influence on GDP, even with a small response (*inelastic*).

Higher exports and foreign investment can increase national income (GDP) due to increased foreign exchange earnings and the entry of foreign investment into a source of national economic development. *GDP has a positive and significant relationship with foreign investment* (Jufrid, 2016) The economy will further develop because of the higher absorption of labor and the people's income will also increase, eventually will encourage economic growth.

4 CONCLUSION

From the results of the discussion, it can be concluded that: The amount of exports and foreign investment (FDI) affects national income (GDP), which will ultimately affect economic growth. National income (GDP) has *a low response* when exports and foreign investment (FDI) increase. This is evidenced by the magnitude of the elasticity coefficient <1 (*inelastic*). When exports and FDI decrease, the coefficient shows a negative value, it means that National Income is not influenced by exports and FDI but by other variables, namely C (public consumption expenditure) and G (government expenditure). This also means that economic growth will increase not caused by exports or FDI.

REFERENCES

Badan Pusat Statistik. 2019. *Trade Balance Ekspor Impor Indonesia*. Jakarta: BPS

Badan Koordinasi Penanaman Modal. 2019. https://www.bkpm.go.id, downloaded: October, 10, 2019

Bank Indonesia. 2019. https://www.bi.go.id, downloaded: October, 10, 2019

Baldwin. 2005. *Pengantar Ekonomi Industri: Pendekatan Struktur, Perilaku dan Kinerja Pasar*. Yogyakarta: BPFE IKAPI members

Case, Karl E. Ray C Fair. *and* Sharon E.Oster. 2017. *Principles of Economics*. Global Edition. Boston: Pearson.

Dornbusch, Rudiger. Stanley Fischer *and* Richard Startz. 1998. *Macroeconomics.* Seventh Edition. International Edition. New York: McGraw-Hill Com

Jufrid Firdaus. Mohd, Nur Sjechbalad. Moch Nasir. 2016. Analisis Pengaruh Investasi. *Jurnal Perspektif Ekonomi Darussalam*. Vol 2. No 1. March 2016

Mankiw, N. Gregory. 2007. *Makro Ekonomi*. Edisi keenam. Imam Nurmawan [Penerjemah]. Jakarta: Erlangga

Nicholson,Walter. 1995. *Microeconomic Theory: Basic Principles and Extensions*. Sixth Edition. International Edition. Orlando: The Dryden Press

Pindyck, Robert S and Rubinfeld Daniel.L. 2013. *Microeconomics*. Eight Edition. New York: Prentice Hall

Samuelson, A.Paul. William D, Nordhaus. 1995. *Economics*. International Edition. United State of America: McGraw-Hill.Inc

Sitompul, Novita Linda. 2007. Analisis Pengaruh Investasi dan Tenaga Kerja terhadap PDRB Sumatera Utara. *Thesis*. Medan : Sekolah Pascasarjana Universitas Sumatera Utara.

Skipton, Chuck. 2007. Trade Openness, Investment, and Long-Run Economic Growth. *A working paper presented at the '07-'08 Southern Economics Association (SEA) Meetings*. New Orleans, LA. November 18-21.

Stanley, Fischer and Richard Startz. 1998. *Macro Economics.* Seven edition. International Edition. North America: McGraw-Hill Companies, Inc.

Sunariyah. 2010. *Pengantar Pengetahuan Pasar Modal*. Sixth edition. Yogyakarta: UPP-AMP YKPN.

Winantyo, R., Sjamsul Arifin, Rizal A., Djaafara, Aida S. 2008. *Masyarakat Ekonomi ASEAN (2015): Mempercepat Sinergi ASEAN di Tengah Kompetisi Global*. First edition. Jakarta : Gramedia.