Economic Growth: How Inflation and the Exchange Rate Work Through the Stock Market as a Mediating Variable

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Abstract

This study aims to investigate the impact of inflation and the exchange rate on economic growth through the stock market as a mediating variable. The analysis tool used a path model with monthly data. The research period lasted for 14 years from 2004 to 2017. The data was obtained from the Central Statistics Bureau, Bank Indonesia and Jakarta Stock Exchange. Case studies were conducted in Indonesia and the researcher took the Consumer Goods Index as a variable in the stock market. The results show that inflation and the exchange rates do not significantly affect economic growth through the stock market. Alternatively, the stock market is not an excellent mediating variable between inflation and the exchange rate on economic growth. The size of the stock market and the awareness of domestic investors when accessing the stock market is thought to be the factors that influence how the inflation and exchange rates work.

Keywords: Inflation, Exchange rate, Economic growth, Stock market, Consumer Goods Index

1. Introduction

Macroeconomic variables have been an important consideration, especially for economists, investors and policymakers. Several important macroeconomic variables have been subject to interesting research previously. The first variable is the inflation rate. Inflation is expressed as the percentage change in the aggregate price level over a period of time, typically a year (Ball, 2011). Ehigiamusoe & Lean (2019) expressed the inflation rate as macroeconomic instability.

Therefore inflation is a concern for all countries so then stability can be maintained (Pitia & Lado, 2015). The impact of inflation, although it differs among countries as to the extent, is a worldwide phenomenon (Kara & Nelson, 2002).

Second is the exchange rate variable. The exchange rate is the price currency used by the countries' citizens to trade with each other (Mankiw, 2016). Evans (2014) defined the exchange rate as the rate or ratio by which one of these currencies can be exchanged for any other at any given point in time. According to Yang & Zeng (2014), the exchange rate in many literature books is usually defined as the relative price levels between two countries rather than how much the currency can purchase in real terms. The effect of the exchange rate is according to the exchange rate regime adopted by the country. Besides, the impact of the exchange rate fluctuations is a contagion through different channels, such as the balance of payment, import price, FDI and many more. The changes in the exchange rates can determine how the monetary policy must be arranged (Clarida & Waldman, 2007).

Third is the primary concern of the macroeconomic variables, namely economic growth. Haller (2012) said that in a limited sense, economic growth is an increase of the national income per capita and it involves the expansion of the GDP, GNP and NI. The economic growth variable is strongly suspected as a factor that is vulnerable to the influence of inflation and exchange rates. According to Hossin (2016), inflation can reduce a country's competitiveness at the level of trade which in turn makes the trade balance deficit and economic growth. Vinayagathasan (2013) found that inflation hurts growth when it exceeds 5.43% but it has no effect below this level. Concerning the exchange rate, based on the Mundel-Flemming model, if depreciation occurs then it will increase the trade competitiveness, leading to an increase in the value of exports and economic growth. Habib, Mileva & Stracca (2016) reinforced that a real appreciation (depreciation) reduces (raises) significantly the annual real GDP growth.

In addition to the inflation and exchange rates as determining economic growth, there is an essential variable as part of the component of economic growth, namely investment. Investment plays an important role in economic growth throughout the world. For developed economies, they have shared in the global FDI inflow that grew to 59 % with the United States as the largest recipient of FDI, followed by the United Kingdom and China (UNCTAD, 2017). For Indonesia during the crisis of 1997 - 1998, investment grew far below its potential amount. A few years after the reform order, the government succeeded in implementing policies that made for stable economic growth. This fostered confidence in the investors including foreign investors, and thus this increased the FDI inflow (Ramachandran, 2014).

In 2012, investment contributed 33% to Indonesia's GDP (Ginting & Aji, 2015). The greater proportion of investment to GDP seems to influence how inflation and the exchange rate work together when influencing economic growth. Eggoh & Khan (2014) once said that inflation-growth relationships are sensitive to capital accumulation. Ogrokhina & Rodriguez (2019) also stated that financial market openness is needed to get the benefits of inflation targeting. Concerning the exchange rate, Gelman *et al* (2015) proved that the real effective exchange rate of investors is the net foreign holdings of their assets. Combes *et al.,* (2019)

also showed that financial flow can stimulate economic growth, which is where the real exchange rate and FDI play a role.

From the empirical background, it can be said that one of the factors determining the way that the inflation and exchange rate works on economic growth is the level of investment, especially the accumulation of capital or financial flow. One means of investing in terms of capital is the stock market. Therefore the author wants to try to examine the impact of the inflation and exchange rates by considering the existence of mediating variables in the form of a stock market. The author conducted the research in Indonesia by taking the Consumer Goods Industry index as a case study on the stock market. Testing will be carried out using the path method with a 14-year research period from 2004 to 2017.

In Indonesia, the stock market mainly trades with the Jakarta Stock Exchange (JSX) and Indonesia Composite Stock Price Index (ICI) as the indicators of the performances of the stock markets. The ICI has several indexes, and one of them is the Sectoral Index. The Consumer Goods Index is a part of the Sectoral Index in JSX. Alfred in Fuad (2013) shows that the Consumer Goods index sector contributes to ICI growth by more than 50 %.

2. Literature Review

2.1 Understanding Inflation and Exchange Rate

Samuelson (2004) stated that inflation occurs when the general price level increases. On the other hand, Mankiw (2016) said that inflation is prompted by the growth of money supply. Inflation measurements can be done by calculating the average change in the price increase of goods and services during a specified period (Labonte, 2011). Patel & Villar (n.d.) expressed the inflation measurement as the concept of a "composite good" whose price is measured by a cost-of-goods index.

Garń, Robert, & Sims (2018) defined the exchange rate in two. First, the exchange rate in real terms measures how many home goods one foreign good will purchase. Second, the exchange rate in nominal term measures how many units of home currency one unit of foreign currency will purchase. Snowdon & Vane (2005) express the exchange rate as domestic currency in terms of foreign currency.

Some of the previous researchers concluded that several factors also influence the way that inflation works and the exchange rates, which makes them have an indirect effect on economic growth. Eggoh & Khan (2014) said that inflation is sensitive to a country's level of financial development, capital accumulation, trade openness and government expenditures. Arestis & Baltar (2018) prove that a real exchange rate can stimulate investment and reinforce the existing productive sector. Ribeiro, McCombie & Lima (2019) state that the real exchange rate only affects growth indirectly through its impact on functional income distribution and technological innovation.

2.2 Indonesia Stock Market and Consumer Goods Index

The Indonesia Stock Exchange is a combination of the Jakarta Stock Exchange and the Surabaya Stock Exchange. On July 13th 1992, the Jakarta Stock Exchange was privatized and

became the PT. Jakarta Stock Exchange. Then in 2007, the Surabaya Stock Exchange merged with PT Bursa Efek Jakarta and was renamed the PT. Indonesian Stock Exchange.

Generally, an investor uses the Indonesian Composite Index (ICI) to evaluate Indonesia's stock market performances. In ICI, there are some sectoral indexes. One of them is the Consumer Goods Index. The Consumer Goods Industry has recorded an ever increasing trend (OJK, 2010). Even the most robust supports the ICI. Up until 2017, the consumer goods industry index reached 2861.39 while the ICI reached 6355.65 (OJK, 2017a).

2.3 Economic Growth

Economists have expressed economic growth in many ways. Parkin (2012) defined the economic growth rate as the annual percentage change of real GDP. Wilson *et al.* (n.d.) described economic growth as an increase in production and it is generally measured by the increase in Gross Domestic Product (GDP) or Gross National Product (GNP). Haller (2012) reinforced that positive economic growth is recorded when the annual indicators of macro-indicators are higher than the average rhythms of growth in the population.

3. Research Method

In this research, the author used path analysis. The consideration was due to there being more than one dependent variable and the existence of intervening variables before the final variable. Streiner (2005) stated that path analysis is capable of testing a model possessing several dependent variables. There is a "chain" effect in terms of their influence (see Figure 1). The study period started in 2004 to 2017 and used monthly data.
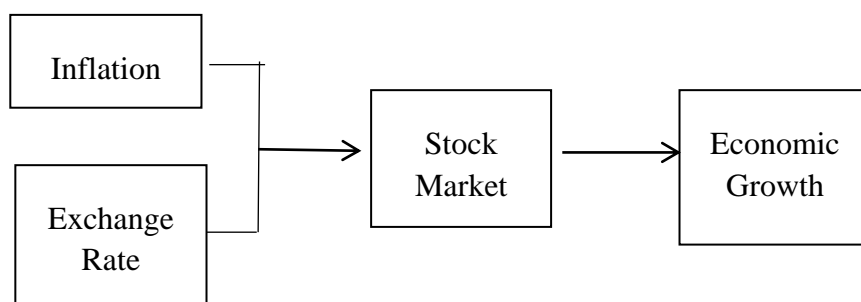

Figure 1. Path Model, the Effect of Inflation and Exchange Rate on Economic Growth through Stock Market

The author used the consumer price index data for the inflation variables. Concerning the exchange rate, author used the real exchange rate of Rupiah against USD. As for the stock market, it used the Consumer Goods Index. For economic growth, the author used the percentage change in real GDP.

4. Result and Discussion

4.1 Assumption Test

The author used AMOS software for the data analysis. There were two assumptions for the requirements of the path model. First, the assumption requirement must be fulfilled, namely the normality assumption. Table 1 shows the value of the CR Multivariate Normality of | -2.408 |, which is greater than 1.96 (obtained from the Standard Normal Statistics Table 5%). It means that the data is abnormally distributed. However, based on the central limit argument, if the sample gets bigger, then the statistics will be normally distributed. With a 168 sample size, the data is deemed to fulfill the central limit argument, meaning that the assumption of normality can be ignored.

Table 1. Result of Normality Test

Variable	Min	max	skew	c.r.	kurtosis	c.r.
Exchange Rate	8455.000	14650.000	.750	3.919	-1.042	-2.723
Inflation	104.600	164.010	.542	2.836	-.319	-.834
Stock Market	206.360	2861.390	.237	1.238	-1.523	-3.981
Economic growth	-10.500	11.390	-.316	-1.650	2.006	5.243
Multivariate					-2.605	-2.408

Source: Output of AMOS

The second assumption is that there are no outliers. The test author used the Mahalanobis distance (Md). The Mahalanobis distance was evaluated using the free degree as much as the number of parameters in the model used, which was = 11 where the statistical table was 31,264. The rules of decision making are as follows: if the Md observation point> 31.264, then it can be concluded that the observations contained an outlier, whereas if the Md observation point <31.264, then it can be concluded that the observation involves no outliers. The whole Mahalanobis d-squared observation based on Table 2 has a value between 2.685 – 9.387, which is smaller than 31.264. Therefore, no outlier assumption has been fulfilled.

In addition to seeing the value of Mahalanobis d-squared, whether the no outlier assumption is fulfilled or not, it can also refer to the values of p_1 and p_2. The number of p_1 and p_2 indicates the significance value. If the value of p_1 and p_2 <0.05, then there are outliers. Based on Table 2, the values of p_1 and p_2 have values between 0.052 - 1,000, so therefore the assumption of there being no outliers is fulfilled.

Table 2. Result for No Outlier Assumption

Observation number	Mahalanobis d-squared	p1	p2
67	9.387	.052	1.000
68	9.357	.053	.999
65	9.146	.058	.996

Observation number	Mahalanobis d-squared	p1	p2
69	9.068	.059	.989
66	9.030	.060	.972
7	8.942	.063	.948
8	8.921	.063	.898
57	8.808	.066	.855
51	8.700	.069	.805
59	8.665	.070	.719
5	8.636	.071	.619
6	8.629	.071	.502
15	8.627	.071	.384
1	8.544	.074	.321
10	8.535	.074	.231
2	8.533	.074	.156
64	8.502	.075	.108
4	8.466	.076	.074
3	8.385	.078	.057
9	8.292	.081	.046
11	8.089	.088	.055
63	7.973	.093	.050
35	7.911	.095	.038
60	7.765	.101	.040
50	7.702	.103	.031
137	7.463	.113	.049
49	7.287	.121	.062
62	7.002	.136	.118
48	6.470	.167	.396
23	6.347	.175	.422
61	6.253	.181	.426
47	6.198	.185	.398
81	5.933	.204	.569
12	5.914	.206	.510
22	5.807	.214	.538
109	5.751	.219	.519
46	5.462	.243	.727
13	5.088	.278	.924
45	4.928	.295	.956
21	4.886	.299	.951

Observation number	Mahalanobis d-squared	p1	p2
110	4.749	.314	.970
136	4.749	.314	.956
44	4.581	.333	.979
56	4.548	.337	.976
58	4.501	.342	.974
43	4.288	.368	.993
164	4.256	.373	.992
42	4.199	.380	.992
20	4.093	.394	.995
111	4.049	.399	.995
100	4.031	.402	.994
108	4.006	.405	.992
139	3.997	.406	.989
70	3.925	.416	.991
140	3.903	.419	.989
87	3.868	.424	.988
88	3.863	.425	.982
116	3.819	.431	.982
138	3.636	.458	.996
141	3.629	.459	.993
41	3.608	.462	.992
71	3.604	.462	.988
37	3.418	.490	.998
162	3.381	.496	.997
163	3.365	.499	.997
36	3.344	.502	.996
38	3.322	.505	.995
72	3.307	.508	.993
40	3.286	.511	.992
115	3.271	.514	.989
19	3.264	.515	.985
86	3.231	.520	.984
39	3.217	.522	.980
24	3.201	.525	.975
161	3.178	.528	.971
145	3.164	.531	.964
85	3.116	.539	.968

Observation number	Mahalanobis d-squared	p1	p2
107	3.074	.546	.970
158	3.048	.550	.966
84	3.015	.555	.965
151	3.006	.557	.955
160	2.974	.562	.954
135	2.951	.566	.948
112	2.924	.571	.943
159	2.916	.572	.929
52	2.910	.573	.909
157	2.891	.576	.896
152	2.870	.580	.885
14	2.858	.582	.863
25	2.796	.593	.888
114	2.772	.597	.879
156	2.771	.597	.845
113	2.771	.597	.804
106	2.755	.600	.781
155	2.729	.604	.768
154	2.722	.605	.728
153	2.707	.608	.698
77	2.701	.609	.650
34	2.686	.612	.617
148	2.685	.612	.556

Source: Output of AMOS

4.2 Result of Path

Based on Table 3, there are two indirect effects. First, there is the indirect effect between the inflation on economic growth through the stock market which obtained a coefficient of 0.005, which is not significant. In other words, the stock market is not a mediating variable between inflation and economic growth. Second, there is an indirect influence between the exchange rate on economic growth through the stock market, which obtained a coefficient of 0.046 which is not significant. In other words, the stock market is not a mediating variable between the exchange rate and economic growth.

Table 3. Analysis of Path Model: Mediation Effect Through Stock Markets

Indirect Effect	Direct Effect Coefficient		Indirect Effect Coefficient	Information
Inflation→ Stock market → Economic growth	Inflation →Stock market = 0.088 *	Stock market → Economic growth = -0.059ns	0.005	Not Signifikan
Exchange rate → Stock market → Economic growth	Exchange rate →Stock market = 0.793 *	Stock market → Economic growth = -0.059ns	0.046	Not Signifikan

Source: Output of AMOS

From the results of the study, it shows that inflation and the exchange rate does not have an indirect effect on economic growth through the stock market. This shows that investment in the Indonesian stock market does not affect the way that inflation and the exchange rate work in terms of influencing economic growth. This is not in accordance with the initial assumption that investment can affect the way that inflation and the exchange rate works. This is possible due to several things. First is the low contribution of the Consumer Goods Industry on sustaining GDP growth. Basirat, Mehdi & Nasirpour (2014) reinforced this in their research where the financial markets, as the mediation variable, showed that the role and size of the financial markets as an intermediation will determine whether the effect of inflation and the exchange rate on economic growth will be significant or insignificant. During the author's study period, the proportion of stock traded on GDP ranges on average around 11%. The proportion of Consumer Goods Industry stock traded in 2004 - 2011 reached an average of 2% of GDP and this increased to 6% -8% of GDP after 2011 up until 2017 (see Figure 2).
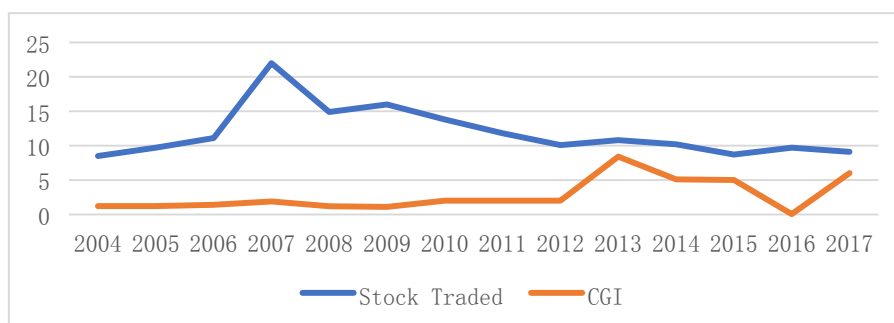

Figure 2. Proportion of Stock Traded on GDP

Source: World Bank, processed

The second factor that is thought to cause investment to not significantly affect the way that inflation and the exchange rate works in reference to influencing economic growth is the liquidity of the stock market. Alajekwu & Achugbu (2012) and Cooray (2010) revealed that

the size and liquidity of the stock market determines its role in economic growth. The role of the stock market will be rejected by countries with a small and less liquid stock market (Boubakari & Jin, 2010). Based on the financial inclusion index, the capital market, which the stock market is a part of, has the lowest rank at only 0.1% in 2013 and 1.3% in 2016 (OJK, 2017b). This shows that almost nobody has an awareness of accessing the stock market per one hundred people in 2013 and only one person per one hundred in 2016 had access to the stock market.

The third factor is the lack of integration in the stock market and economic growth. Hong Vo *et al* (2019) confirmed that the rapidly growing stock market in high-income countries is more integrated with economic growth compared to upper-middle income countries. Indonesia is categorized as an upper-middle income country. In 2017, Indonesia's GDP was ranked 16th in the world with a total GDP of 1,015,421 million of US $ dollars (World Bank, 2019). If talking about the ease of investment and business in Indonesia, then it is still relatively difficult. Indonesia's Ranking Ease of Doing Business is 91 (BKPM, 2017). This is thought to be the cause of foreign investors preferring to invest in other countries, especially developed countries.

5. Conclusion

The impact of inflation and the exchange rate on economic growth in Indonesia through the stock market is not significant. In other words, the stock market is not a mediating variable and it does not affect the way that inflation and the exchange rate work in terms of influencing economic growth. Several factors are thought to be the cause. First is the size of the Indonesian stock market. The stock market in Indonesia is not fully developed and it is not highly active. It was recorded during the author's study period that the proportion of stock traded on GDP ranged around 11% on average. The proportion of Consumer Goods Industry stock traded in 2004 reached an average 2% of GDP and this increased to 6% -8% of GDP after 2011 up until 2017. The second factor is the less liquid nature of the Indonesia stock market. Based on the financial inclusion index, the capital market, that the stock market is a part of, has the lowest rank, coming in at only 0.1% in 2013 and 1.3% in 2016. Third is the lack of integration in the stock market and economic growth and the ease of opening a business and investment in Indonesia. It is still relatively difficult. Indonesia's Ranking Ease of Doing Business is at 91 in the world.

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