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Abstract: A country's economy will face problems related to inflation. High demand, rising production costs, and an increase in the money supply have been the causes of inflation in many countries. The development of trade activities between countries puts currency exchange rates and import levels can also cause inflation. This study reveals the differences in inflation response as a result of currency exchange rate movements (IDR; CNY; YUAN; and SGD against USD), as well as imports in the period before and during Covid-19. By using panel data regression with the Fixed Effect (FE) approach, the results show that the inflation response in each country (Indonesia, China, Japan, and Singapore) as a result of changes in each country's currency exchange rate against USD is negative and significant, as well as imports with a negative but insignificant effect. The difference in inflation response as a result of exchange rate and import movements before and during Covid-19 shows differences in the intercept of the inflation response. When during the Covid-19 Pandemic, there was a decline in the domestic price level, despite the depreciation of the currency and an increase in imports. The decline in the price level is more due to the economic conditions in the observed country experiencing sluggishness, increased imports lead to high competition in the commodity market, decreased purchasing power and in turn lead to a decline in the domestic price level. In analysing inflation, it is important to consider inflation control policies that include aspects of competition in the domestic economy, as well as consider shocks from the aspect of world security stability that can cause problems for a country's economy.

Keywords: Partner, Movement, Import, Covid, Inflation

CHAPTER 1. INTRODUCTION

Inflation has an impact on reducing people's welfare if the magnitude of the increase has exceeded the limit in the mild inflation criteria. Inflation types are divided into four levels: mild inflation of 5 per cent, moderate inflation of 5 - 10 per cent, severe inflation of more than 10 per cent, and hyper inflation of more than 50 per cent (Mankiw & Taylor, 2014; Nanga, 2001). The inflation rate in a country can be influenced by changes in currency exchange rates against other countries' currencies (Devia & Fadli, 2022; Karahan, 2020; Sihotang & Nopeline, 2020). In addition to currency exchange rates, the inflation rate is also influenced by a country's import dependence on commodities from other countries (Anggrasari & Mulyo, 2019; Mankiw & Taylor, 2014; Mishkin, 2013; Nanga, 2001). In connection with the establishment of relationships in international trade activities, placing
4 (four) countries as Indonesia's main trading partners, namely China, Japan, the United States and Singapore. Indonesia's import level in the period 2022.Q4 reached 238.9 billion USD, while the four main trading partner countries (China 2735.8 billion USD; Singapore 478.5 billion USD; and Japan 896.1 billion USD) (https://www.bi.go.id, 2023).

The inflation rate when it is less than 5 per cent, does not cause serious problems for a country's economy, because in the economy to spur the production side also requires adjustments in the price level (Devia & Fadli, 2022; Love & Wen, 2014; Putra, 2022), although the occurrence of inflation will reduce the level of welfare of a country's people (Jovanovic, 1982; Love & Wen, 2014).

The occurrence of inflation can be seen from the perspective of demand and cost pressures (Chen et al., 2014; Chu & Lai, 2013; Devia & Fadli, 2022; Gordon, 1975; Karahan, 2020; Oktavia & Wabiyudi, 2022; Ruprah & Luengas, 2011; Sihotang & Nopeline, 2020). Inflation can also be considered a monetary phenomenon (Chu & Lai, 2013; Crowder, 1995). The inflation rate that occurred in Indonesia in the 2022.Q4 period reached 5.51 per cent, Singapore at 6.70 per cent, Japan at 3.80 per cent, and China at 1.60 per cent (https://www.bi.go.id, 2023). This inflation rate shows the problems faced by each country in dealing with inflation are different in the period before Covid-19 and during Covid 19. The Covid-19 pandemic that occurred had an impact on the inflation rate (Cavallo, 2020; L. Z. He & Huang, 2023). The Covid-19 condition is important in the development of the research model, so that it can provide results regarding differences in inflation response as a result of changes in the IDR exchange rate against the currencies of 3 (three) trading partner countries in Asia, imports, and conditions before and during Covid-19 in each country observed.

CHAPTER II. LITERATURE REVIEW

2.1 Inflation

Inflation is a problem for a country's economy. Inflation is seen as the tendency of increasing prices of goods and services in general and continuously in a certain period (Jovanovic, 1982; Oktavia & Wabiyudi, 2022; Putra, 2022; Sihotang & Nopeline, 2020). The causes of inflation can be seen from the demand side, cost pressures, and the result of the money supply (Love & Wen, 2014; Oktavia & Wabiyudi, 2022; Putra, 2022; Sihotang & Nopeline, 2020). This research is based on the view that inflation is a monetary phenomenon through growth in the money supply (Chu & Lai, 2013; Ruprah & Luengas, 2011; Van, 2020). An increase in the money supply in a country will drive inflation and have an impact on the economy, as well as a decrease in the level of public welfare (Chen et al., 2014; Chu & Lai, 2013; Jovanovic, 1982; Kong et al., 2000; Love & Wen, 2014; Oktavia & Wabiyudi, 2022; Van, 2020).

2.2 Exchange Rate

The exchange rate is defined as the value of a country's currency when exchanged for another country's currency (Branson, 2022; Froyen, 2013; Hadi, 2020; Isard, 1995; Krugman & Obstfeld, 2005; Mankiw & Taylor, 2014; Melvin, 1985; Mishkin, 2013; Nanga, 2001). The exchange rate indicates how much value of a particular currency can be exchanged for a unit of another currency. For example, if the USD/IDR exchange rate is 8,000, it means that 1 USD can be exchanged for Rp8,000, meaning that to get 1 USD, it takes Rp8000. Writing the exchange rate by putting IDR against USD is referred to as direct quotation (Hadi, 2020).

The effect of exchange rates on inflation is seen as a monetary phenomenon, this is explained through the weakening of the exchange rate (depreciation) against other countries' currencies, as a result of a decrease in demand for domestic currency, while the amount of domestic money in circulation increases faster than the increase in demand for money, will cause an increase in the price level of domestic goods and services (Bilson & Richard C. Marston, 2007; Buffie et al., 2017; Francesco & Azz, 1997; Mankiw & Taylor, 2014; Moosa & Bhatti, 2009; Xie & Chen, 2019). The relationship between exchange rates and inflation is also explained through the Purchasing Power Parity or PPP approach (Edwards, 2014; J. A. Frenkel, 2014; Q. He et al., 2021; Hsing, 2015, 2016; Kia, 2013; MacDonald, 2007; Musa, 1978; Rapach & Wohar, 2004; Umoru, 2013; Yohan, 2001).
2.3 Import

Imports are defined as activities in trade relations between countries through agreements to bring goods or services from abroad into the country (Aggppong & Anyars, 2022; Krugman & Obstfeld, 2005; Mayesti et al., 2021; Musa, 1978; Mussa, 1986; Nguyen et al., 2021; Odili, 2015; Oluymeni & Isaac, 2017). Import activities involve the purchase and transport of goods or services from foreign countries for the purpose of raw materials, auxiliary materials, services, whether for resale, consumption, and use in the production process of producing other goods (Nguyen et al., 2021; Odili, 2015; Oluymeni & Isaac, 2017; Sahminan, 2005; Sweidan, 2013; T.Y & Tarmidi, 2021).

The effect of imports on inflation is related to currency exchange rates between countries as a reference in payments. An increase in the price of imported goods and services as a result of the depreciation of the domestic currency will lead to an increase in the cost of production of goods or services for the importing country, consequently through pressure on the production cost side will trigger inflation for the importing country (Krugman & Obstfeld, 2005; Levi, 2009; Mankiw & Taylor, 2014; Manurung & Manurung, 2009; Nanga, 2001; Nguyen et al., 2021; Sugharti et al., 2020; Sweidan, 2013; T.Y & Tarmidi, 2021).

2.4 Covid-19

Covid-19 is a serious contagious infectious disease caused by the SARS-COV-2 virus that damages tissues in the respiratory tract and has affected millions of people worldwide. Covid-19 was first discovered in Wuhan, Hubei Province, China in late 2019 (Dineri & Cutcu, 2020; Feng et al., 2021; https://www.who.int, 2020; Kwasi et al., 2022; Olivia et al., 2020). The effect of Covid-19 on inflation is characterised by activity restrictions that cause pressure on the economic side, production activities in the global economy are hampered and cause scarcity, thus driving up prices. The pressure of Covid-19 on the economy, even welfare in each country, means that the differences in inflation faced by each country due to Covid-19 (Cavallo, 2020; Chen et al., 2014; L. Z. He & Huang, 2023).

CHAPTER III. STUDY METHOD

This research is focused on the observation period 2010.Q1-2022.Q2, in measuring the response of inflation in Indonesia, China, Japan, and Singapore as a result of the movement of each currency exchange rate (Rupiah (IDR/USD; Yen/USD; and Singapore Dollar (SGD/USD)), the amount of imports, as well as conditions before and during Covid-19 (as a dummy variable, namely 0 for the period before Covid-19, and 1 for the period during Covid-19). Developing a research model by including Covid-19 in the panel data regression model is expected to show the magnitude of the difference in the intercept or slope, which will then be used to explain the differences in inflation in each country before and during Covid-19. The use of panel data regression will provide efficient estimation results through the selection of the Pool Less Square (PLS), or Fixed Effect (FE), or Random Effect (RE) approach as the basis for showing the estimation results (Antoch et al., 2018; Baltagi, 2005; Gozali, 2009; Greene, 2003; Widarjono, 2009; Wooldridge, 2002).

CHAPTER IV. RESULT AND DISCUSSION

1.1 Result

The panel data regression approach to be used requires testing to determine the selection of an efficient approach as the basis for analysis. Based on the results of the Chow Test calculation, the result shows that the right approach is FE. The equation of the FE approach obtained is as follows.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient Std. Error</th>
<th>t-Statistic Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXC</td>
<td>-0.000335 8.31E-05</td>
<td>-4.028301 0.0001</td>
</tr>
<tr>
<td>MP</td>
<td>-0.000379 0.000449</td>
<td>-0.843415 0.4000</td>
</tr>
</tbody>
</table>


The equations based on the FE approach generated for the inflation response in each country based on the substitution of the coefficients in Table 1 are described in the following sections.

\[
\begin{align*}
\text{INFINA} &= 8.54351855 - 0.0003345574461*\text{EXCINA} - 0.0003789185904*\text{MINA} - 0.6358650029*\text{CVIDINA} \\
\text{INFCN} &= 3.264160058 - 0.0003345574461*\text{EXCCN} - 0.0003789185904*\text{MCN} - 0.6358650029*\text{CVIDCN} \\
\text{INFJP} &= 0.8350747586 - 0.0003345574461*\text{EXCJP} - 0.0003789185904*\text{MJP} - 0.6358650029*\text{CVIDJP} \\
\text{INFSG} &= 1.990633144 - 0.0003345574461*\text{EXCSG} - 0.0003789185904*\text{MSG} - 0.6358650029*\text{CVIDSG}
\end{align*}
\]

The equation generated from the FE approach in showing the response of inflation as a result of the movement of the country's currency exchange rate (Indonesia or INA; China or CN; Japan or JP; and Singapore or SG in the period before and during Covid-19 provides differences in the intercept value of inflation in each country. This difference in detail is presented in two different conditions, namely:

4.1. Response Before Covid-19

\[
\begin{align*}
\text{INFINA} &= 8.54351855 - 0.0003345574461*\text{EXCINA} - 0.0003789185904*\text{MINA} - 0.6358650029*\text{CVIDINA} \\
\text{INFCN} &= 3.264160058 - 0.0003345574461*\text{EXCCN} - 0.0003789185904*\text{MCN} - 0.6358650029*\text{CVIDCN} \\
\text{INFJP} &= 0.8350747586 - 0.0003345574461*\text{EXCJP} - 0.0003789185904*\text{MJP} - 0.6358650029*\text{CVIDJP} \\
\text{INFSG} &= 1.990633144 - 0.0003345574461*\text{EXCSG} - 0.0003789185904*\text{MSG} - 0.6358650029*\text{CVIDSG}
\end{align*}
\]

The response of inflation when there is a movement in currency exchange rates IDR/U$D; CNY/U$D; JPY/U$D; and SGD/U$D, as well as imports in the pre-Covid-19 period shows differences in the intercept, with the effect of each variable (exchange rates and imports) for each country observed is negative, meaning that an increase in the amount of exchange rates and imports causes a decrease in inflation.

4.1.2. Inflation Response During Covid-19

\[
\begin{align*}
\text{INFINA} &= 7.907654 - 0.0003345574461*\text{EXCINA} - 0.0003789185904*\text{MINA} \\
\text{INFCN} &= 2.628295 - 0.0003345574461*\text{EXCCN} - 0.0003789185904*\text{MCN} \\
\text{INFJP} &= 0.19921 - 0.0003345574461*\text{EXCJP} - 0.0003789185904*\text{MJP} \\
\text{INFSG} &= 1.354768 - 0.0003345574461*\text{EXCSG} - 0.0003789185904*\text{MSG}
\end{align*}
\]
The response of inflation when there is a movement in currency exchange rates IDR/USD; CNY/USD; JPY/USD; and SGD/USD), as well as imports during Covid-19 shows a difference in the low intercept than before Covid-19, with the effect of each variable (exchange rates and imports) for each country observed is negative. When Covid-19 spreads to the 4 observed countries, it shows a phenomenon of price decline over time (deflation) during Covid-19.

1.2 Discussion

The different inflation responses of the four countries are affected by the movement of each country's currency exchange rate (IDR; CNY; JPY; and SGD) against USD. In this finding, it shows that if the exchange rate depreciates, it will cause a decrease in the domestic price level or deflation (with a significant effect at the 5% confidence level). Meanwhile, changes in the amount of imports will have a negative but insignificant effect on inflation at the 5% confidence level.

In the context of domestic currency depreciation, it will cause the price of imported goods and services to be expensive (Fawaz, 2021; L. Z. He & Huang, 2023; Karahan, 2020; Kong et al., 2000; Oktavia & Wahyudi, 2022; Van, 2020), which will push up inflation. The results of this study do not support some of these findings. The decline in the inflation rate as a response to the depreciation of the domestic currency exchange rate against USD, the decline in the inflation rate that leads to deflation is more due to economic conditions outside normal conditions (before Covid-19), so that the decline in the price level of goods and services (Covid-19 conditions cause a decrease in the domestic demand side in each country. Even the economies of these four countries experienced a decline (economic contraction) due to restrictions on social activities (lockdown) and business closures (Deng, 2023; Dimitra, 2023; L. Z. He & Huang, 2023; Wulandari, 2023) (L. Z. He & Huang, 2023). The response of the inflation rate during the Covid-19 period when there was a depreciation showed a downward trend in the price level of domestic goods and services, this was due to the shock caused by Covid-19 rather than due to the depreciation of the domestic currency against USD.

An increase in a country's imports will lead to a decrease in the price of goods and services, as a result of increased domestic competition which has an impact on reducing the price and services exchanged (Deng, 2023; Gordon, 1975; Herawati et al., 2022; Sihotang & Nopeline, 2020). The increase in imports during the Covid-19 Pandemic caused the availability of goods in the country to be abundant, and while the occurrence of restrictions during Covid-19 caused a decrease in prices. Under conditions of activity restrictions due to Covid-19, although there is a decrease in domestic price levels, domestic purchasing power is weakened, and the impact on people's welfare levels decreases (Cavallo, 2020; Chen et al., 2014; L. Z. He & Huang, 2023; Index et al., 2024; Kong et al., 2000; Love & Wen, 2014; Wulandari, 2023). The difference in inflation rates in the 4 observed countries is more due to shocks due to Covid-19 than fluctuations in exchange rates and import levels of each observed country. The difference in inflation rates before and during Covid-19, characterised by a lower inflation rate during Covid-19, does not indicate a high level of welfare, but a deterioration in the welfare of the people in the observed countries amid a decrease in the inflation rate (Chen et al., 2014; Deng, 2023; L. Z. He & Huang, 2023; Index et al., 2024; Love & Wen, 2014).

CHAPTER V. CONCLUSION AND SUGGESTION

1.3 Conclusion

Based on the findings in this study, it can be concluded that the inflation rate in the 4 (four) countries observed (Indonesia, China, Japan, and Singapore) is different before and during Covid-19. Inflation before Covid-19 is higher than the inflation rate during Covid-19. The Covid-19 event can be considered as a shock that causes a decrease in the economic activity of the observed countries, thus giving a difference in the intercept amount of each country. The response of inflation to the depreciation of the domestic currency exchange rate, and imports to inflation is negative, meaning that the depreciation of the exchange rate, and imports cause a decrease in the price level in each country that is more caused by Covid-19. The level of public welfare when there is a decrease in the price level, does not necessarily improve the welfare of the people in the observed countries, because the
impact of the Covid-19 Pandemic has proven to make economic activity decline, and even the world economy has experienced a recession, so that each country (Indonesia, China, Japan, and Singapore) plays a policy in anticipating the impact of the global economic recession.

1.4 Suggestion

Based on the results and discussion in this study, a number of suggestions are made:

1. The inflation response due to changes in a country's currency exchange rate and import level is negative both before and during the Covid-19 Pandemic, so it is important to include global health risk variables as important variables in the study of inflation.

2. The negative response of inflation as a result of changes in the exchange rate (depreciation) and an increase in a country's imports, is evidence of the cause of inflation differences in the 4 (four) countries observed, therefore in inflation control policies also involve aspects of domestic competition characterised by increased imports will have an impact on high local producer competition so that they decide to determine a competitive price reduction due to increased imports.

3. The estimation of results in panel data regression is based on the FE approach, but it is necessary to consider shocks from the aspect of world security stability that can be included in the research model.

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