How The Effect of Economic Shocks on Regional Income? Period Before and During COVID-19: Case 18 Largest Cities In Indonesia

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Abstract. This study analyzes the economic shocks to regional income before and during COVID-19 in the 18 largest cities in Indonesia (DKI Jakarta, Bandung, Semarang, Surabaya, Medan, Palembang, Banjar Masin, Bandar Lampung, Makassar, Samarinda, Denpasar, Padang, Pontianak, Manado, Mataram, Pangkal Pinang, Ambon and Banten) for the period August-2018 until May-2021 using panel regression. The findings are that the economic shocks due to the spread of the COVID-19 pandemic have resulted in a decrease in regional income. Furthermore, economic conditions, employment opportunities and price stability have a positive and significant effect on regional income. Meanwhile, price expectations also have a positive but insignificant effect on regional revenues. The government needs to deal with the impact of the economic shocks caused by the COVID-19 pandemic, including maintaining the stability of control variables, providing stimulus for the business sector and strengthening people's purchasing power.

Keywords: Regional Income, Economic Shocks, Employment Opportunities, Price Stability, Price Expectations.

1. Introduction

Income stability is the main thing in ensuring that the economy can continue to grow [1] . However, the condition that occurs is that the economy is always in a very dynamic condition so that it cannot really ensure income stability for a country that adheres to an open economic system, such as Indonesia. In an open economic system, part of global conditions always has an influence on domestic stability conditions [2]. Thus, macroeconomic stability becomes very important, which includes income, price conditions and improvements in employment opportunities.

One of the impacts of global conditions on the economy is the economic contraction due to the COVID-19 pandemic, which was accompanied by the world geopolitical situation which took place in the third quarter of 2020 against the third quarter of 2019 experiencing a growth contraction of minus 3.49 percent which resulted in GDP growth in Indonesia being slowed down, with the decline starting to occur in 2020 when the pandemic began. Growth in the first quarter of 2020 was recorded at 2.97 percent. If it is calculated against the same quarter in 2019 of 5.07 percent, it means that there is a difference of minus 2.1 percent. Meanwhile, the difference in the second quarter is bigger, if it is calculated between the first quarter of 2020 of -5.32 percent against the second quarter of 2019 of 5.05, then there is a difference of -10.37 percent. The record number is different when compared to conditions before COVID-19. If you

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compare the first and second quarters of 2019 to 2018, the numbers tend to be stable with a fairly small difference. The difference between the first quarter of 2019 when compared to the first quarter of 2018 was 5.06 percent, an increase of 0.01 percent was recorded. If you compare the second quarter of the same two years, the difference in numbers will be minus 0.22 percent [3].

Based on this explanation, it can be seen that fluctuations in economic conditions are closely related to income conditions. Furthermore, relevant research states that the variables that affect income are economic conditions, employment opportunities, price stability and price expectations [4]-[12] which are described in the literature review section. Thus, the novelty of this research is to analyze economic shocks on regional income in the period before and during COVID-19 in 18 largest cities in Indonesia to maintain public welfare due to the outbreak of the COVID-19 pandemic which has an impact on slowing economic conditions, so this research will produce policies that addressed to the government in overcoming social and economic problems due to the COVID-19 pandemic.

2. Literature Review

Studies on economic conditions have been carried out by several previous researchers, including an analysis of the level of economic shocks in the metropolitan economy to see the effects of these shocks from one region to another such as adjustment and recovery of these areas, it was found that shocks can be of three types. First, shocks caused by a slowdown in the national economy. Second, shocks caused by a decline in certain industries, which are an important component of the region's export base. Third, other external shocks, such as natural disasters, closure of military bases, movement of important companies out of the area [4].

The economic shock that occurred to the Chinese population was due to the impact of the changing age profile with India on GDP per capita, so that China had to maintain the level of productivity growth because it only benefited slightly from increased labor force participation. Labor productivity in China has benefited from investment in education as the average education level of the population continues to increase which will indicate technological progress at the level of China's productivity increasing in the future [5].

Economic uncertainty, financial deregulation and money demand in Australia during the period 1976: 2 and 2008: 4 using Johansen cointegration to estimate long-run stationary relationships, it was found that there was a long-term relationship between money demand, economic activity, interest rates and prices. However, there is no long-run equilibrium relationship between money demand and its determinants. In addition, no cointegration relationship was found between financial deregulation, economic uncertainty and long-term interest rates for post-regulation and for the entire sample for the traditional money demand equation [6] .

Analysis of economic growth in landlocked developing countries (LLDCs), it was found that LLDSs hampered economic growth. However, good governance, trade openness, and coordination of infrastructure development with neighboring countries have a significant influence between LLDC and natural resources contributing to LLDC economic growth [7].

Investigating trade, investment and economic growth in New Zealand for the period 1954–2007, it found that there was consistent support for the long-term effects of trade and investment on output. Furthermore, there is a long-term positive and significant effect of exports and investment on output. The effect of imports on output is positive. The positive and significant long-term impact of exports and investment on output underscores the need for increased exports and increased investment to drive higher levels of output and economic growth [8].

Analysis of the effect of the effect of economic shocks on unemployment in peripheral European countries under EMU using the VAR structural model, it is found that the unemployment multiplier due to government expenditure shocks is higher than the multiplier associated with variable government revenue shocks by country. Furthermore, fiscal and financial shocks are not one of the long-term drivers of unemployment, but a more important role played by shocks throughout the Euro area, with a major role for general monetary policy shocks [9].

Based on the description of previous research, it can be seen that the novelty of this study is to analyze economic shocks in the period before and during COVID-19. The COVID-19 problem is a global problem that is increasingly plaguing economic conditions, especially the Indonesian economy. Initially, the economic impact of this virus only eroded the external side of the Indonesian economy by increasing a number of imported commodities from China.

3. Methodology and Data Analysis

The objects in this study are the 18 largest cities in Indonesia, namely DKI Jakarta, Bandung, Semarang, Surabaya, Medan, Palembang, Banjar Masin, Bandar Lampung, Makassar, Samarinda, Denpasar, Padang, Pontianak, Manado, Mataram, Pangkal Pinang, Ambon and Banten. This study uses secondary data which is grouped into two, namely the period before COVID-19 (August 2018 until December 2019), then during COVID-19 (January 2020 until May 2021). The data used in this study were obtained from the Publication of the Bank Indonesia Consumer Survey. Furthermore, this study uses a panel regression model, as follows:

$$RI_{it} = \alpha_0 + \alpha_1 ES_{1it} + \alpha_2 EC_{it} + \alpha_3 EO_{it} + \alpha_4 PS_{it} + \alpha_5 PE_{it} + \varepsilon_{it} \quad (1)$$

Where:

RI_{it} : Regional Income
ES_{it} : Economic Shocks
0 → Before COVID-19 (August 2018 until December 2019)
1 → During COVID-19 (January 2020 until May 2021)
EC_{it} : Economic Conditions
EO_{it} : Employment Opportunities
PS_{it} : Price Stability
PE_{it} : Price Expectations
α : Parameters
i : Cross Section
t : Time Series
ε_{it} : Error Term

Based on equation (1) above, the operational definitions of variables in this study are summarized in Table 1 below:

Table 1. Variable Description

Variable	Indicator
Regional Income (RI)	Regional income is measured using an income index calculated by the balance score method (net balance + 100) which shows that if the index is above 100 it means optimistic and below 100 means pessimistic

Economic Shocks (ES)	Economic shocks are a proxy for dummy variables to explain the effect of qualitative variables that cannot be measured, but can only be marked. The spread of the COVID-19 pandemic resulted in unstable economic conditions, where 0 = before COVID-19 (August 2018 until December 2019) and 1 = during COVID-19 (January 2020 until May 2021)
Economic Conditions (EC)	Economic conditions are measured using an index of economic conditions calculated by the balance score method (net balance + 100) which shows that if the index is above 100 it means optimistic and below 100 means pessimistic
Employment Opportunities (EO)	Employment opportunities are measured using the employment opportunity availability index which is calculated by the balance score method (net balance + 100) which shows that if the index is above 100 it means optimistic and below 100 means pessimistic
Price Stability (PS)	Price stability is measured using a price stability index calculated by the balance score method (net balance + 100) which shows that if the index is above 100 it means optimistic and below 100 means pessimistic
Price Expectations (PE)	Price expectations are measured using the price expectation index which is an estimate of the price level for the next 12 months calculated by the balance score method (net balance + 100) which shows that if the index is above 100 it means optimistic and below 100 means pessimistic

Hypothesis testing in this study is based on several approaches, namely the common effect model, fixed effect model and random effect model. In determining the approach to be used in this study, several tests will be carried out. The first is the Chow test to choose between the common effect model or the fixed effect model. The second is the Hausman test to determine the fixed effect model or the random effect model. The third is the Lagrangian test to determine the common effect model or the random effect model.

4. Research Result and Discussion

4.1. Research Result

This section will describe the statistical analysis and interpretation of the estimation results based on the approach described in the methodology section, which consists of the results of the panel regression stages.

Table 2. Chow Test Results

Effects Test	Statistics	Prob.
Cross-section F	1.5758	0.0067
Cross-section Chi-Square	27.4651	0.0056

Source: Author's Calculation.

Based on the results of the Chow test in Table 2, the fixed effect model is better than the common effect model because the probability value of the chi-square cross-section is less than 0.05. The next step is the Hausman test.

Table 3. Hausman Test Results

Test Summary	Chi-Sq. Statisic	Prob.
Cross-section Random	0.0000	1.0000

Source: Author's Calculation.

Based on the results of the Hausman test in Table 3, the random effect model is better than the fixed effect model because the probability value of the chi-square cross-section is greater than 0.05. The next step is the Lagrangian test.

Tablel 4. Lagrangian Test Results

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	1.8637	3.8516	5.7153
	(0.0022)	(0.0497)	(0.0168)

( ) indicates the probability. Source: Author's Calculation.

Based on the results of the Lagrangian test in Table 4, the probability value for cross section and time is less than 0.05. So the best estimation method is the random effect model. Based on the stage test for selecting the best panel regression model, the interpretation stage of the research results uses a random effect model.

4.2. Discussion

$$RI_{it} = 0.023 - 1.965\ ES_{it} + 1.451\ EC_{it} + 2.306\ EO_{it} + 6.505\ PS_{it} + 0.177\ PE_{it} + \varepsilon_{it} \quad (2)$$

(0.0081) (0.0483) (0.0000) (0.0000) (0.0229) (0.4921)

F-statistic: 67.62 and R-squared: 0.8891

(0.0000)

( ) indicates the probability

Based on the information in equation 2, the interpretation of the estimation results from the panel regression model with the random effects model approach in this study include:

First, the results of the analysis for the F test are that economic shocks, economic conditions, employment opportunities, price stability and price expectations together affect regional income in the 18 largest cities in Indonesia because the probability of the F test is significant (0.0000 < 0.05).

Second, the results of the analysis for the t test include the results of the analysis for economic shocks that have a negative and significant effect (0.0483 < 0.05) meaning that economic shocks due to the spread of the COVID-19 pandemic have an effect on regional income, an increase in the COVID-19 pandemic by 1 point resulted in a decrease in regional income. of –1,965 points assuming cateris paribus. The results of this study support the findings [7]–[9]. The paralysis of the economic sector due to the increase in the COVID-19 pandemic is getting worse with the lockdown on all community economic activities which accelerates the increase in the number of unemployed because many employees are laid off from their jobs so that regional incomes have decreased. Furthermore, economic conditions have a positive and significant effect (0.0000 < 0.05) on regional income in the 18 largest cities in Indonesia, if there is an increase in economic conditions by 1 point, the regional income condition will increase by 1,451 points with the assumption of cateris paribus. The results of this study support the findings of [10]–[12]. Improved economic conditions will increase the demand for goods and services

which will be responded to by all economic sectors, which will increase regional income. Then, employment opportunities also have a positive and significant effect (0.0000 < 0.05) on regional income in the 18 largest cities in Indonesia, if there is an increase in employment opportunities of 1 point, regional income will increase by 2,306 points with the assumption of cateris paribus. The results of this study support the findings of [13]–[15]. Increasing employment opportunities through increasing government or private projects, more companies operating and easier access to credit to banks will increase regional income. Meanwhile, price stability also has a positive and significant effect (0.0229 < 0.05) on regional income in the 18 largest cities in Indonesia, if there is an increase in price stability of 1 point, economic conditions will increase by 6,505 points with the assumption of cateris paribus. The results of this study support the findings of [16]–[18]. The condition for creating price stability as indicated by low inflation through the availability of affordable prices, availability of supply and smooth distribution is a prerequisite for regional income stability. Finally, price expectations have a positive but not significant effect (0.4921 > 0.05) on regional income in the 18 largest cities in Indonesia. Price expectations are a picture of prices in the future whose conditions are assessed based on people's perceptions. Price expectations tend to experience uncertainty from the internal and external sectors and the range of the period is quite long compared to now, so this does not have a significant effect on regional income.

Third, the coefficient of determination (R-squared) obtained is 0.8891, which means that variations in regional income changes can be explained by economic conditions, employment opportunities, price stability, price expectations and economic shocks due to the spread of the COVID-19 pandemic of 88.91 percent, while the rest is explained by by other variables not included in the analysis model in this study.

5. Implication and Suggestion for Future Research

Some strategies that can be taken by the government include considering the condition of people's income due to a decrease in overall economic activity such as providing direct cash assistance which will be used directly by the community to be able to meet basic needs that may not be met due to reduced working time and possible termination of employment. Furthermore, the provision of stimulus for the business sector to reduce the potential for layoffs, such as the issuance of recovery bonds, is expected to reduce cash flow pressures for the real sector, which in turn can reduce layoffs. Lastly, strengthening people's purchasing power, such as maintaining the condition of people's consumption growth because it has a large enough role in national economic growth. Suggestions for future researchers are to analyze the impact of economic shocks in the short and long term on various macroeconomic indicators for the period before and during COVID-19, so that research results and policy recommendations to the government will be more specific to maintain people's welfare.

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6. References

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