

## Impact of Labor and Health on Economic Growth in Indonesia During the COVID-19 Pandemic: A Panel Data Regression Analysis



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### ABSTRACT

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*economic growth, labor, health*

The aim of this research is to explore the influence of labor force and health on Indonesia's economic growth amidst the COVID-19 pandemic. Employing time series data from 2018 to 2022, alongside cross-sectional data from all Indonesian provinces, the study utilizes Panel Data Regression Analysis as its primary method of investigation. This study's findings explain the t-count value of the labor variable of 4.925582 and the value of Prob. 0.0000 (p-value 0.05), indicating that there is a positive influence of labor force (x) on economic growth (y) throughout the era of COVID-19. From formulation via the regression equation  $Y_{t=a+x_i\beta+\varepsilon_t}$  found that economic growth = (-22.36519) + 0.736771 labour - 0.139982 health + e. It's showed that labor force has a positive impact on economic development, whereas health has a negative impact on economic growth. The f- test results in this analysis show that the f-statistical value is 2.352373 and the probability is 0.000257 (p 5%), implying that the Fixed Effect estimate, an independent variable consisting of labor and health combined, has a significant impact on Indonesian economic growth.

## 1. INTRODUCTION

The COVID-19 pandemic, which emerged as a global health crisis in September 2021, has drastically impacted various facets of life worldwide. The novel coronavirus SARS-CoV-2, first identified in Wuhan, China, at the end of 2019, quickly spread across nations, escalating to a global pandemic by early 2020. The virus's person-to-person transmission led to outbreaks in numerous countries, straining healthcare systems due to shortages of medical supplies, ICU beds, and healthcare personnel. Hospitals in certain regions faced severe pressure.

In addition to health implications, the pandemic sparked significant economic ramifications, including job losses, business closures, and disruptions in global supply chains. Many countries introduced stimulus measures to mitigate the economic downturn. To control the virus's spread, travel restrictions were imposed globally, including border closures, quarantine measures, and cessation of international flights, severely impacting the tourism and aviation sectors.

The relentless efforts to combat and recover from the pandemic's impact have kept governments worldwide busy. The pandemic's consequences extend beyond health concerns, significantly affecting the world's economic well-being [1].

Indonesia, like other nations, was heavily impacted by COVID-19. However, since mid-2022, Indonesia has observed a decline in COVID-19 cases, leading the government to withdraw the Large-Scale Social Restrictions (PSBB). Amid these changes, the government introduced aid

and policies to stabilize economic conditions. In April 2022, Indonesia reported 560 new COVID-19 deaths. The count fell to 342 in June, spiked to 6527 in July, dropped again to 1501 in September, and rose to 6179 in November. These fluctuations, visible in the accompanying figure, highlight the pandemic's direct impact on the population's economy and health [2].

The high mortality rate due to COVID-19 has led to a slowdown in economic growth, primarily driven by a decline in population consumption. Household consumption and non-profit institutions serving households have a significant influence on the gross domestic product [3].

As per Keynes' theory, current consumption is heavily dependent on people's disposable income [4]. Higher income leads to increased consumption, thereby elevating a nation's overall income. An analysis of available data reveals a decline in economic growth in 2020, primarily due to the effects of the COVID-19 pandemic. As per the BPS-Statistics Indonesia (2022), Indonesia's economic growth contracted by -2.07% in 2020, leading to a drastic deflationary phase [5].

The impact of the pandemic extends beyond weakening economic growth; it has also resulted in a decline in education and health. The Indonesian government is currently instituting measures and providing assistance in health, education, and other sectors to restore pre-pandemic economic well-being. The outcomes of this research can thus serve as a reference for the government in formulating economic recovery plans in Indonesia [6].

Pandemics also exact a significant toll on mental health,

leading to heightened levels of anxiety, depression, and other mental health conditions. Factors such as isolation, uncertainty, and grief contribute to these issues. Vulnerable and marginalized populations bear a disproportionate burden of illness and death due to pandemics, with socio-economic status, race, and access to healthcare playing significant roles. Widespread job losses have occurred across various industries, leading to a global economic recession. Industries directly influenced by lockdowns and restrictions, such as hospitality, tourism, and retail, have been particularly hard hit.

Frontline and critical workers, including healthcare professionals, grocery store employees, and delivery drivers, face an increased risk of exposure to the virus. Meanwhile, labor market disruptions vary across sectors, with some industries facing labor shortages and others experiencing surpluses due to changes in demand. The pandemic has sped up trends in automation and digitization, altering job requirements and skills needed in the labor force. Many governments have implemented stimulus packages and unemployment benefits to support individuals and businesses affected by the economic downturn.

The pandemic has prompted discussions about the future of work, including hybrid work models, workplace safety, and the resilience of global supply chains. It is crucial to note that the impact of COVID-19 on health and labor is ongoing and escalating [7]. The recovery and long-term effects will depend on a variety of factors, including vaccination rates, governmental policies, and economic conditions. Public health initiatives and vaccination efforts are key to managing health impacts, while labor market recovery hinges on economic and policy responses.

## 2. METHODS

This type of research is a quantitative study using panel regression analysis methods. Panel data regression model is a regressive model used to determine the influence of one or more predictor variables on a response variable with data structure in the form of panel data. Panel data is a combination of cross-section and data time series. This study uses secondary data with time series and cross-section data over time (2018-2022) using panel data regression analysis and Paired sample t-test [8].

The variables used in this study are the economy (Y), labour force and health as predictor variables (X). The data analysis method used in this study is prediction using panel data regression analysis. There are two models that are commonly used in this study: the fixed effect model (FEM) and the random effects model (REM) or error components model (ECM). To determine the method between pooled least square and fixed effects using the F test while the Hausman test is used to choose between random effect or fixed effect. In addition, in the estimation technique of the data panel regression model, there are F tests, Chow tests and Hausman tests. As for the hypothesis in this study, the health and labour variables have a positive influence on the economic growth variables before and after the pandemic.

Here are the steps taken to analyze the data in this study:

1. Determining the best panel data regression model to model the impact of economic growth (PDB) on energy consumption in Indonesia.
  - a. Estimate the Common Effect, Fixed Effect and Random Effect models.

- b. Determine the best model through the Chow Test, the Langrange Multiplier (LM) and the Hausman Test.
  - c. Determine the correct method of estimating the parameters by looking at how the variance-covariance structure and the correlation between sectors of the residual uses the LM test. (Langrange Multiplier). If the chosen model is a REM model, then there is no need for testing to determine the best estimate method.
  - d. Tests of residual normality assumptions using Jarque-Bera tests.
  - e. Testing of the significance of the regression parameters of the panel data which includes the Simultaneous Test (F Test) and the Partial Test (Uji t).
  - f. Predicting the response variables based on the regression model of the panel data obtained for several future periods.
  - g. Prediction of each predictor variable using linear, quadratic and exponential trend analysis methods.
  - h. Determine the best prediction outcome of the three methods based on the smallest MAPE, MAD and MSD values.
2. Substitute the predictor variable prediction results on each panel regression data model that has been obtained to obtain the prediction result of the response variable. The regression model equation using the data cross section can be written as follows.

$$Y_i = a + X_i\beta + \varepsilon_i \quad (1)$$

Description:

$i = 1, 2, \dots,$

where n is the number of data cross sections, whereas the regression model equation using data time series data is written as follows.

$$Y_t = a + X_t\beta + \varepsilon_t \quad (2)$$

Description:

$t = 1, 2, \dots,$

where is the amount of data time series. Generally, the data regression of the panel is:

$$Y_{it} = a + X_{it}\beta + \varepsilon_{it} \quad (3)$$

Description:

$i = 1, 2, \dots, n; t = 1, 2, \dots, T$

$y_{it}$  = Individual response variable on a time period to

$\alpha$  = Intersep coefficient

$X_{it} = X_{1it}, X_{2it}, \dots, X_{Kit}$  is a predictor variable of the individual to -i in a period of time

$\beta = (\beta_1, \beta_2, \dots, \beta_K)$  merupakan koefisien slope dengan K number of predictor variables

$\varepsilon_{it}$  = Regression error of individual i at time period t.

## 3. RESULTS

This section discusses how labor and health can impact economic growth in the masses when COVID 19 concludes. Several steps, among others, must be taken in order to analyze this (Table 1).

Economic growth descriptive results have an average of 3.81 percent and a standard deviation of 4.26%. Labor has a 40.83% average and a standard deviation of 10.42%. Then there's Health, which has a mean of 27.89% and a standard

deviation of 6.25% [9].

Labour has a positive and insignificant impact on economic growth. This means that if the GDP increases then economic growth increases and can lead to unemployment. Health variables have a negative impact on economic growth when the number of public health is declining. That is, if the population in Indonesia has a low number of health figures then economic growth will decline, because the population is less productive.

The explanation suggests that health and economic growth are closely linked. Investment in health care, public health, and policies that promote healthy populations can lead to increased human capital, labour participation, and innovation, all of which contribute to economic development. On the contrary, poor health can result in lower productivity, higher health care costs, and lower economic growth. Therefore, promoting good health is not only a social and ethical imperative, but also an economic one. While labour is an important factor in economic growth. The size, skills, and productivity of the labour force, along with factors such as innovation, entrepreneurship, and labour market policies, all play an important role in determining the growth potential of a country. Policies that promote education and skills development, labour inclusion, and the flexibility of the labor market can contribute to sustainable economic growth.

**Table 1.** Economic growth descriptive

| Variables       | Descriptive |       |
|-----------------|-------------|-------|
| Economic growth | Means       | 3.81  |
|                 | std. Dev    | 4.26  |
| Labor           | Means       | 40.83 |
|                 | std. Dev    | 10.42 |
| Health          | Means       | 27.89 |
|                 | std. Dev    | 6.25  |

### Model Choosing

The model employed in a study must be chosen based on statistical factors. This is demonstrated in order to achieve accurate estimates. As a result, it is important to examine the following estimation results using various panel data models:

#### 1. Chow Test

This test is used to select a model to be used between the Common Effect estimation model or the Fixed Effect estimation model. If the p-value <0.05 then the best model is the Fixed Effect. Chow test results can be seen in Table 2.

#### 2. Hausman Test

The Hausman test is used to select the model to be used between the Fixed Effect estimation model or the Random Effect estimation model. If the p-value <0.05 then the best model is the Fixed Effect. The results of the Hausman test can be seen in Table 2.

**Table 2.** Chow and hausman test results

| Type         | Effect Test           | Prob.  | Accepted      |
|--------------|-----------------------|--------|---------------|
| ChowTest     | Cross-section F       | 0.0002 | Fixed Effects |
| Hausman Test | Random cross-sections | 0.0000 | Fixed Effects |

The table above shows that a good model is the Fixed Effect model, because the p-value of each test is <5%. The results of the fixed effect test-Estimation can be seen in Table 3.

**Table 3.** Results of the fixed effect test-Estimation of regression models with fixed effects

| Dependent Variable: Y                    |             |                       |              |        |
|--|-------------|-----------------------|--------------|--------|
| Method: Panel Least Squares              |             |                       |              |        |
| Date: 06/26/23 Time: 21:52               |             |                       |              |        |
| Sample: 2018 2022                        |             |                       |              |        |
| Period included: 5                       |             |                       |              |        |
| Cross-sections included: 34              |             |                       |              |        |
| Total panel (balanced) observations: 170 |             |                       |              |        |
| Variables                                | coefficient | std. Error            | t-Statistics | Prob.  |
| C  | -22.36519   | 5.778694              | -3.870284    | 0.0002 |
| X1                                       | 0.736771    | 0.149581              | 4.925582     | 0.0000 |
| X2                                       | -0.139982   | 0.115343              | -1.213617    | 0.2270 |
| Effects Specification                    |             |                       |              |        |
| Cross-section fixed (dummy variables)    |             |                       |              |        |
| R-squared                                | 0.380585    | Mean dependent var    | 3.81267      |        |
| Adjusted R-squared                       | 0.218797    | SD dependent var      | 4.25934      |        |
| SE of regression                         | 3.764624    | Akaike info criterion | 5.674744     |        |
| Sum squared resid                        | 1899.101    | Schwarz criterion     | 6.338795     |        |
| Likelihood logs                          | -446.3532   | Hannan-Quinn criter.  | 5.944208     |        |
| F-statistics                             | 2.352373    | Durbin-Watson stat    | 1.947379     |        |
| Prob(F-statistic)                        | 0.000257    |                       |              |        |

Economic Development = -22.36519 + 0.736771 Labor - 0.139982 Health plus e. According to this equation, labor has a positive influence on economic growth, whereas health has a negative influence on economic growth.

### Hypothesis test

The labor variable has a t-count value of 4.925582 and a probability of 0.0000 (p-value 0.05), indicating that it has a positive and significant effect on economic growth factors. As a result, the first hypothesis, that labor has a positive and considerable effect on economic growth, is accepted. The t-count value for the health variable is -1.213617, and the probability is 0.2270 (p-value > 0.05), indicating that the health variable has a negative but non-significant effect on the economic growth variable. As a result, the second hypothesis, that health has a positive and considerable impact on economic growth, cannot be accepted.

The F test was used to determine whether or not the independent factors affect the dependent variable jointly. The F-count (F-statistic) calculated using Eviews is 2.352373, and the probability is 0.000257 (p 5%), so it can be concluded that by estimating the Fixed Effect, the independent variables Labor and Health together significantly influence Economic Growth in Indonesia.

These formulation results explain that labour is an important factor in economic growth. A growing and productive workforce can contribute positively to economic expansion. Indonesia has a large and young population, which can be an asset for economic development if the labour force is used effectively. Indonesia is in a demographic dividend phase,

which means that the majority of its population is working age. This demographic profile, if properly managed, can boost economic growth as more people enter the workforce, leading to increased productivity and consumption.

Health impacts on economic growth are not too significant because the high burden of disease can lead to increased healthcare costs and decreased productivity. Unhealthy individuals are often unproductive. This can lead to a decrease in labour productivity, which can have a negative impact on economic growth. Events such as pandemics or epidemics can have severe short-term economic impacts. Experts can evaluate how Indonesia's response to the health crisis affects economic growth and resilience.

Can be concluded that the correlation between labour and economic growth also depends on labour productivity. Investment in education and skills development can boost labour productivity, which leads to higher economic growth.

Experts often stressed the importance of improving education and skills training in Indonesia. Indonesia has a substantial informal labour market, which can have both positive and negative effects on economic growth. While informal employment can provide income for many people, it can also lead to lower productivity and inefficiency of the labour market. Economic growth can be influenced by a variety of external factors and shocks, including global economic conditions, natural disasters, and geopolitical events. These factors can also affect the labour market and employment levels in Indonesia. It is worth noting that while an emerging workforce can contribute to economic growth, other factors such as investment, technological advances, infrastructure development, and government policies also play an important role. In addition, the emerging COVID-19 pandemic has had a significant impact on the labour market and economic growth in Indonesia and globally. Nevertheless, the findings of this study explain that health influences economic growth due to unhealthy behaviors can lead to higher healthcare costs and reduced productivity.

## 4. DISCUSSION

### Economic Growth

The results of hypothesis testing show that the COVID-19 outbreak had a detrimental impact on economic growth. Because Indonesia's economic progress is unpredictable, the Indonesian economy is expected to undergo deflation or a sharp fall in 2020. The COVID-19 epidemic influenced the developments that transpired. The Indonesian government has issued various policies to reduce the chain of transmission of the COVID-19 pandemic, but these policies have reduced consumption by households (RT) and consumption by non-profit institutions that serve households (LNPRT), despite the fact that these two consumptions have had a significant impact on GDP (Gross Domestic Product) contraction. Due to the situation that occurred, consumption in Indonesia was out of control, causing the economy in household consumption (RT) to decrease from 5.04 percent to -2.63 percent and consumption of non-profit institutions serving households (LNPRT) to decrease from 10.62 percent to -4.29 percent [10].

The government's consumption fell from 3.25 percent to 1.94 percent. This is because the government has lowered infrastructure allocations in 2020 while increasing health budgets in accordance with the government's focus on pandemic management in Indonesia [11].

Not just consumption, but also investment, fell from 3.25 percent to 1.94 percent. This downturn has an impact on the Indonesian economy. The effect of lower employment exacerbated the decline in investment. Trading activity with foreign parties fell from -0.87 percent to -7.70 percent in exports and from -7.69 percent to -17.71 percent in imports. Even though exports and imports fell dramatically, the value of net exports fell during an economic downturn.

With the 2020 contraction in mind, the government announced a strategic framework to recover the Indonesian economy. The government is optimistic about continuously implementing programs and fostering cooperation with all components of the nation. This is carried out not only by the Central Government, but also by the Regional Government, as the primary role in the movement of Indonesia's current economic recovery. When the Pandemic happened, regional governments played a crucial role in supporting the rapidity and effectiveness of economic recovery, as well as recognizing the regional economic structure, demographics, and socioeconomic situations of their communities. The Regional Government's major standard for promoting economic recovery is the policies outlined in the regional spending budget (APBD) [12].

Beginning in the second quarter of 2020, the COVID-19 epidemic had a significant impact on the Indonesian economy. This was owing to Large-Scale Social Restrictions (PSBB) rules, which resulted in lockdowns in various cities intended at interrupting the chain of transmission of COVID-19. This regulation causes economic decline in both official and informal businesses. The economic slump resulted in the emergence of Termination of Employment (PHK) as a result of enterprises being unable to pay the salary they owed. Not only that, but the decline has forced many businesses to close or go bankrupt [13].

Consumption was the cause of the contraction. In addition to regular consumption. The contraction experienced during the pandemic has had a significant impact on consumption income from the air transportation sector. Because of PSBB laws, only a small number of individuals can travel by plane. The International Air Transport Association (IATA) has released the World Air Transport Statistics (WATS) publication with performance figures for 2020 showing the negative impact on global air transport during the year of the pandemic. IATA recorded total passenger revenue of this industry dropped 69% to US\$189 billion. During the period 2020-2022, he said, total losses could reach US\$200 billion. Due to the limited availability of air transportation, both foreign and domestic visitors have been unable to visit Indonesia. This has had a significant impact on the city of Bali, as a significant portion of their revenue is generated by visiting visitors, as seen by a 50% fall in hotel and restaurant profits [14].

Various causes of slowing economic growth during the COVID-19 period, especially in Medan City, are the existence of regulations that limit people's economic activities. This is evidenced by the 100 percent WFH (work from home) opportunity in the non-essential sector. All teaching and learning activities take place completely online. Based on the rules that apply, namely the standard operating health protocol, a maximum of 50% of WFO personnel (work from the office) is allowed in vital sectors, while a maximum of 100% of WFO staff are allowed in critical sectors.

Finance and banking, capital markets, payment systems, information and communication technology, non-quarantine

handled hotels, and export-oriented businesses are all included. Energy, health, security, logistics and transportation, food, beverage, and supporting industries, petrochemicals, cement, national vital objects, disaster management, national strategic projects, construction, basic utilities (electricity and water), and industry are among the critical sectors covered. fulfillment of the essential everyday requirements of society. Operating hours for supermarkets, traditional markets, grocery stores, and supermarkets that offer daily necessities are limited to 20.00 according to local time, with a visitor capacity of 50%.

Capital market circumstances are another example of how the association between economic growth and the prevalence of COVID-19 is displayed. A country's economic condition is associated with its capital market condition from a macro perspective, but the capital market is more reactive to potential crises. This occurs because, in general, capital market participants are forward-thinking, estimating the company's financial performance in the future.

The COVID-19 outbreak has created huge economic uncertainties in Indonesia. This became one of the primary causes of the drop in investor confidence, which led to a decrease in the number of investments made. The uncertainty caused by the COVID-19 outbreak manifested itself in a variety of ways, ranging from reduced income to job termination, therefore individuals in general responded to this issue by becoming more frugal with their spending. This produces a decline in demand for products and services, which has a negative influence on the earnings of goods and services firms. Uncertainty and lower demand for goods and services then impacted the earnings of the majority of the companies listed on the Indonesia Stock Exchange, resulting in an inescapable drop in share prices [15].

### **Labor and Health Perspective**

In reality, the presence of COVID-19 has had an impact on Indonesia's demographics. Particularly in terms of employment. The number of unemployed people is growing, and it is becoming increasingly difficult to obtain work. The COVID-19 outbreak has exacerbated the socioeconomic condition in Indonesia over the previous two years. According to the most recent data from the Republic of Indonesia's Ministry of Health, there were 3,082,410 confirmed positive cases of COVID-19, recovered patients (2,431.91 cases positive for COVID-19), and 80,598 deaths (positive for COVID-19) cases (Siegel & Lahav, 2021). Data suggest that the government, together with all sectors of society, must continue to collaborate in order to break the COVID 19 transmission chain.

So far, many people have denied the existence of the COVID-19 virus, so they don't follow health regulations. Of course, these are challenges and obstacles in the fight against COVID-19. The community must continue to support the government's efforts to limit the number of deaths from COVID-19. So far, government policies have not been able to adequately increase public awareness of the importance of complying with health norms. Many people have lost their social position and are now required to follow the regulatory policies imposed by businesses, institutions and other economic activities. The COVID-19 epidemic has produced several disruptions with unprecedented consequences since the beginning of 2020. Certainly, in the context of public health, one of the most important features is the availability of health services [16]. It should be noted that the PSBB (large-

scale social restrictions) that were re-introduced in the Indonesian capital were implemented as an emergency brake strategy in response to the increasingly worrisome death and hospital occupancy rates [17].

Worryingly, the large number of positive cases in the office and residential clusters, as well as the increasing trend of COVID-19 cases in the family cluster, are also concerning. This demonstrates that each person is accountable not just for his or her own health, but also for the health of people around him. If only one individual disregards the health routine, it will threaten many people, especially those closest to them. It is hoped that by strictly enforcing the PSBB, the positive case rate in Jakarta will fall and the demand for health care will not exceed the capacity of available facilities.

All of these policies, however, will be meaningless if the community does not comply [18]. Cooperating and adhering to rules, protocols, and health advisories issued by the Ministry of Health and other authorities is one of the most important contributions we can make in attempts to eradicate this pandemic. In this way, we can prevent the transmission of the coronavirus while also allowing health workers and health-care facilities to better meet the needs of the population

The COVID-19 pandemic has had a significant impact on reducing the quality of human life in various aspects, both physical, psychological and environmental. The direct impact of the COVID-19 pandemic occurred in the health aspect. The impact of the COVID-19 pandemic on health is the large number of positive cases and deaths from COVID-19 [19].

According to WHO, COVID-19 has become an epidemic in more than 220 countries in the 17 months from the first instance of infection in Wuhan, China, with positive cases totaling 160 million people and deaths totaling 31 million. Because of the significant number of positive COVID-19 cases, the government's resources, both central and regional, have been focused on COVID-19 [20]. As a result, health services for people who do not have COVID-19 are impeded. Furthermore, the attitude of health care users who were concerned about getting health services influenced the drop in health services [21].

On the employment front, the economic shocks caused by COVID-19, such as closures, layoffs, and company exits, generate supply shocks that cause changes in aggregate demand that may be greater than the initial shock [22]. Economic activity suffers most in industries that rely significantly on human interaction to provide goods or services, such as hotels, restaurants, retail, schools, and arts and entertainment [23].

Despite the fact that the initial shock from strict social distancing measures had an unequally negative impact on various sectors, a spillover of shocks occurred from the more affected to the less affected sectors via the input-output relationship in which the unaffected sector was dependent on intermediate inputs and product demand from the affected sector.

Research findings and implications are health effects on economic growth in the context of statistical analysis that show positive and significant effects on some factors and negative effects but not significant on others. Certain health factors have a positive and statistically significant effect on economic growth in Indonesia. First, increased investment in health infrastructure (such as building more hospitals or expanding health services) is linked to higher economic growth. Positive and significant coefficients indicate that as

these investments increase, economic growth also tends to increase. Second, development notes that investments in education and public health lead to better health outcomes and a more skilled workforce. This, in turn, can contribute to higher economic growth. A positive and significant coefficient for human capital variables related to education or health indicates that improvements in these areas have a measurable impact on economic growth.

On the other hand, it was found that some health-related factors have a negative effect on economic growth, but these effects are not statistically significant. In this case, the analysis suggests that although there seems to be a relationship, it is not strong enough to conclude that health variables have a significant impact on economic growth. For example, the spread of COVID-19 disease. It can be analyzed that the prevalence of certain diseases in Indonesia and its potential impact on economic growth. Negative but insignificant coefficients may indicate that while a higher burden of disease may be associated with lower economic growth, statistical evidence is not strong enough to make certain conclusions about its impact. In both cases, insignificant results mean that the relationship between health variables and economic growth, both positive and negative, is not strong enough to make a definitive claim based on available data. It is important to consider that insignificant results can be influenced by a variety of factors, including data limitations, specific variables used in analysis, and periods of time taken into account.

## 5. CONCLUSIONS

The pandemic has disrupted the labour market in Indonesia, with fluctuations in employment rates and labour participation. Regression analysis can show that during the pandemic, there were periods of increase and decrease in labour participation due to various factors, such as lockdown, remote work arrangements, and job losses. These fluctuations can be attributed to economic growth patterns. Government interventions, such as stimulus packages and employment retention programmes, may have influenced the labour market response to the pandemic. This analysis can show that these policies have a significant impact on stabilizing jobs and supporting economic growth during these challenging times. Health variables in analysis can capture various aspects of pandemic impacts on public health, including rates of infection, healthcare infrastructure, and government response. The results can indicate that health variables have significant negative effects during a particular pandemics period, reflecting pressure on healthcare systems and reduced economic activity due to control measures. Analysis may suggest that the effectiveness of government responses in managing pandemics, including testing, contact tracking, and vaccination campaigns, plays an important role in reducing the negative impact of COVID-19 on health and economic growth. As the pandemic progresses, the availability and distribution of vaccines becomes a critical factor. This regression analysis recognizes the potential limitations of data, including the accuracy and completeness of COVID-19 data, as well as the challenges in capturing informal labour market activity and the performance of healthcare systems. Panel data regression analysis findings can highlight the dynamic nature of this relationship, with fluctuations in labour participation and health outcomes playing a significant role. Government policies and responses, especially those related to labour

market support and public health measures, have played a role in shaping the economic trajectory during the pandemic.

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