STOCK PRICE VOLATILITY DURING COVID-19: EVIDENCE FROM HOSPITALITY FIRMS IN INDONESIA

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ABSTRACT

This study aims to measure the volatility of stock prices of hospitality firms in Indonesia during the Covid-19 pandemic. Using the stock prices data on hospitality firms and the Autoregressive Integrated Moving Average (ARIMA) methods. The results of the study obtained show that hospitality firms in Indonesia are still filled with uncertainty, as seen by the volatility of stock prices in each company. In addition, forecasting results using ARIMA show that the stock prices of several hospitality firms will be more stable in the future. However, several other firms will still be depressed by the impact of Covid-19.

1. INTRODUCTION

The first case of Covid-19 in Indonesia was announced in early March 2020, and by November 2020, the total number of positive cases in Indonesia had reached 418,375. As of November 2020, 349,497 patients had recovered, while 14,146 others had succumbed to the virus. Covid-19 not only has an impact on the health sector but also impacts the economic sector, especially in the financial market (Halisa & Annisa, 2020; Nasution et al., 2020; Zaenia & Utama, 2020). High financial market uncertainty is reflected in market volatility or global financial risk conditions that have returned to high levels. One of the indicators is the financial market volatility index (Volatility Index/VIX). Figure 1 on the next page show the volatility index (VIX) for the period January to April 2020.

Concerns due to Covid-19 also hit global financial markets, which indicates that during the period of the spread of Covid-19, financial markets experienced high uncertainty. This can be seen in the volatility index (VIX) in the January period of 12.85. While in the March period, the VIX rose to 82.69. Then, the VIX decreased in the third week of March and April period to 41.17. Haryanto (2020) explained that the VIX index above 30 implies that there is fear among investors. While the value of VIX below 30 shows the confidence of investors. The value of the VIX index during the Covid-19 pandemic was above 30, which indicates a risk or uncertainty.
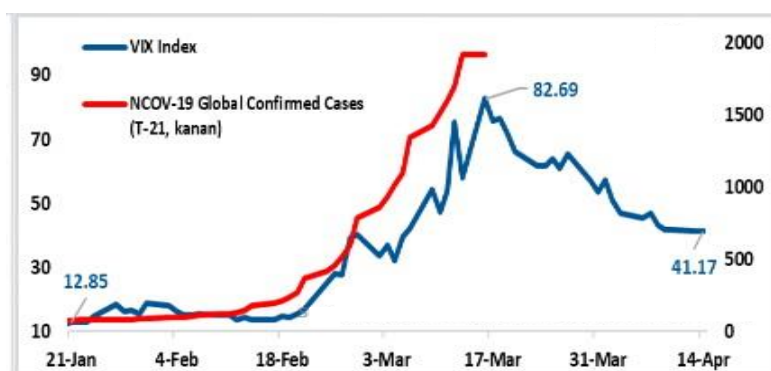
Figure 1. Market Uncertainty Rises in Anticipation of Covid-19
Source: Bank Indonesia (2020)

In the financial market, the sectors that the Covid-19 pandemic has also hit are also the tourism, hotel, and restaurant sectors (Esomar & Christianty, 2021; Nugroho et al., 2021). The fast-spreading Covid-19 is forcing individuals to reduce their mobility so that some activities are limited. As an illustration, some hotels cannot maintain the stability of their business, which impacts the dismissal of employees, thereby increasing the problem of unemployment. Hotels that are not able to keep the strength of their business are threatened with being delisted. The Indonesia Stock Exchange (IDX) has delisted several hotel companies such as Hotel Mandarine Regency Tbk (HOME) based on an announcement made by the Head of the IDX Corporate Assessment Division through the letter Peng-SPT-00005/BEI.PP3/02-2020, IDX has suspended HOME shares for 12 months and will reach 24 months on February 3, 2022. HOME has been added to the list of previously delisted companies, namely PT Grahamas Citrawisata Tbk (GMCW), from the Indonesia Stock Exchange since August 13, 2019.

Delisting itself means the delisting of a company's shares on the Indonesia Stock Exchange and making the company closed. With the delisting, the company can no longer issue shares so that the company's capital growth declines. Benny & Hutagaol (2013) suggested that delisting causes reduced capital growth, affecting investors, where investors lose the opportunity to profit from the shares invested. Covid-19 has also had a significant impact on the hotel and tourism sector and several other industries. Gandasari & Dwidienawati (2020) stated that Covid-19 is a global health crisis, a strong labor market, and an economic crisis that has substantially impacted society in Indonesia. In some tourist areas, such as Lombok, Bali, and Yogyakarta, there has been a decline in foreign visitors, with many cancellations of several international tourism agendas. Covid-19 has had a real and massive impact on global economic growth, as well as Indonesia.

Several studies have established a link between the Covid-19 pandemic and financial market volatility. Attempts to understand the impact of Covid-19 on market volatility include an investigation by Baker et al. (2020) which identified the current pandemic as having the most significant effect on stock market volatility in the history of the pandemic. In addition, government restrictions on commercial activity and consumer restrictions explain the increase in volatility. Zaremba et al. (2020) examining whether the government's response to Covid-19 reduces global stock market volatility, finds a significant increase in stock market volatility in countries where governments are taking decisive action to curb the spread of Covid-19. Meanwhile, this study focuses on the hotel sector studied because it is a sector affected by Covid-19. After all, government regulations also limit the operations of this sector. Therefore, this study aims to measure the volatility of hospitality firms in Indonesia during the early Covid-19 period.

2. RESEARCH METHODS

This study uses secondary data with a quantitative approach. This study uses daily stock price data for hospitality companies in Indonesia, covering the period from March 2, 2020, to December 30, 2020. The data was obtained from the Indonesia Stock Exchange and yahoo finance. The ten companies are BAYU, FAST, JIHD, JSPT, INPP, PDES, PJAA, PNSE, PTSP, SHID.

To analyze the stock price volatility of hospitality companies in Indonesia, the method used is the Autoregressive Integrated Moving Average (ARIMA). Meanwhile, the model used is the Box-Jenkins technique (Widarjono, 2002). The Box-Jenkins model is usually referred to as the Autoregressive Integrated Moving Average (ARIMA) model. ARIMA model is a combination of autoregressive (AR) and moving average (MA) models. Both models require the analyzed data to move along a constant (stationary) average. If the data is not stationary, then the information is stationary through differentiation.

ARIMA combines autoregressive (AR) and moving average (MA) models through a differentiation process to ensure data stationarity. The ARIMA model has a time lag. The lag time of 1 period in the autoregressive process is called first-order autoregressive or AR(1). The symbol to represent the amount of time lag in the autoregressive process is p. The lag time of 1 period in the first-order moving average process or abbreviated as MA(1). The symbol for the amount of time lag in the moving average process is q. The p-value and q-value can be more than 1.

The ARIMA model for AR(p), MA(q), and the difference d times is ARIMA (p,d,q). For example, in an ARIMA process using first-order autoregressive, first-order moving averages, once differentiating to obtain stationary data, the writing is ARIMA (1,1,1). Gujarati (2003) describes the Box-Jenkins methodology into four steps: identification, estimation, diagnostic examination, and forecasting. For example, we will create a model to predict the value of Y. The general form of an autoregressive model of order p or AR(p) is:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + \cdots + \alpha_p Y_{t-p} + \varepsilon_t \dots\dots (1)$$

Where as:
Y_t : observed variables
α_0 : autoregressive constant
$\alpha_1 \dots \alpha_p$: parameter $Y_{t-1} \dots Y_{t-p}$

The general form of the q or MA (q) order moving average model is:

$$Y_t = \beta_0 + \beta_1 \varepsilon_{t-1} + \beta_2 \varepsilon_{t-2} + \cdots + \beta_q \varepsilon_{t-q} \dots\dots (2)$$

Where as:
Y_t : observed variables
β_0 : moving average constant
$\beta_1 \dots \beta_q$: parameter $\varepsilon_t \dots \varepsilon_{t-q}$

The general form of ARIMA model with a p-order autoregressive and q-order moving average is:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + \cdots + \alpha_p Y_{t-p} + \varepsilon_t + \beta_1 \varepsilon_t + \beta_2 \varepsilon_{t-1} + \cdots + \beta_q \varepsilon_{t-q} \dots\dots (3)$$

Where as:
Y_t : observed variables
α_0 : autoregressive constant
$\alpha_1 \dots \alpha_p$: parameter $Y_{t-1} \dots Y_{t-p}$
$\beta_1 \dots \beta_q$: parameter $\varepsilon_t \dots \varepsilon_{t-q}$

The steps or stages in making the ARIMA model can be explained in Figure 2 as follows.
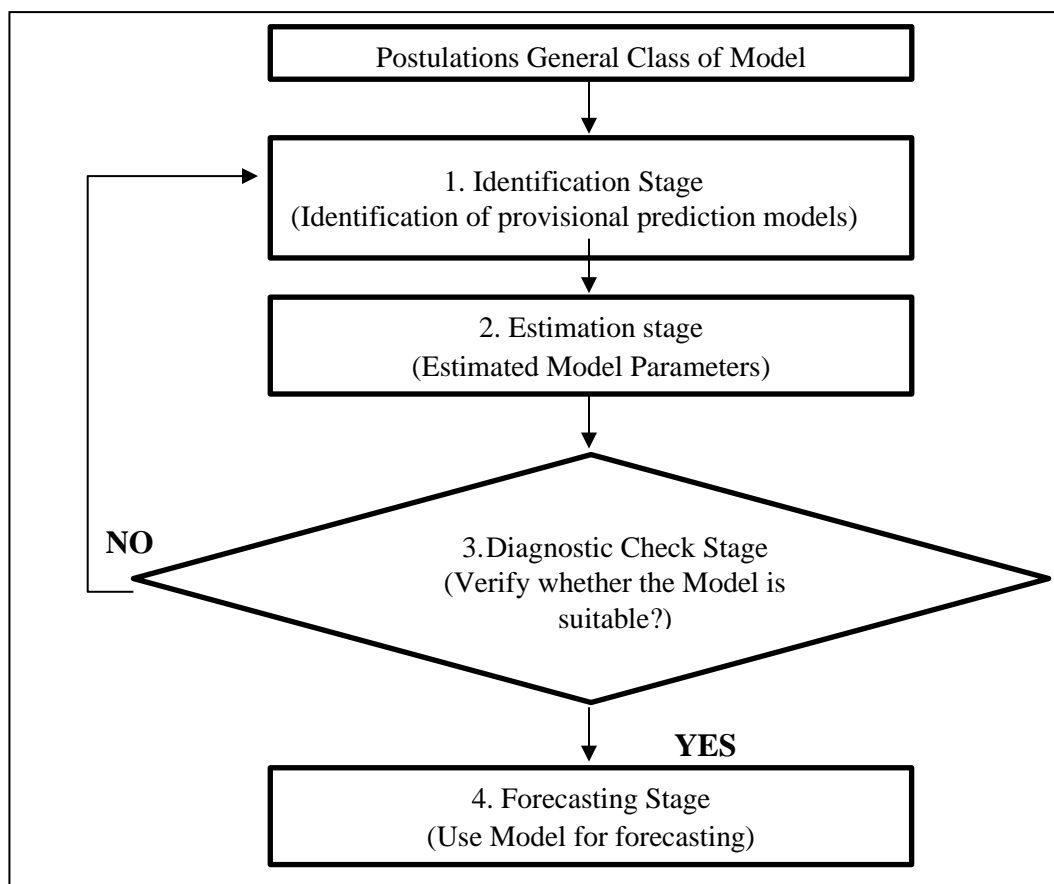

Figure 2. Stages of Making the ARIMA Model
Source: Author (2021)

3. RESULTS AND DISCUSSION
3.1. RESULTS

One of the industrial sectors most affected by the Covid-19 pandemic is the hotel, restaurant, and tourism sub-sector. This is due to operational restrictions on specific business sectors due to the implementation of the PSBB, where most hotels and tourist attractions must temporarily close their businesses for an undetermined period (Lolu & Kelen, 2021). In addition, there is also a prohibition on eating on the spot at restaurants that operate so that most can only rely on purchases through applications or delivery. This impact was evident in the stock prices of several hospitality companies, such as PJAA (PT Pembangunan Jaya Ancol Tbk), which fell 2.17 percent at the beginning of the pandemic. The same thing also happened to PT Hotel Sahid Jaya International Tbk shares, which even fell in double digits, namely 13.85 percent. The figure 3 on the next page is the shared development of 10 hospitality companies in Indonesia during the Covid-19 pandemic in 2020.
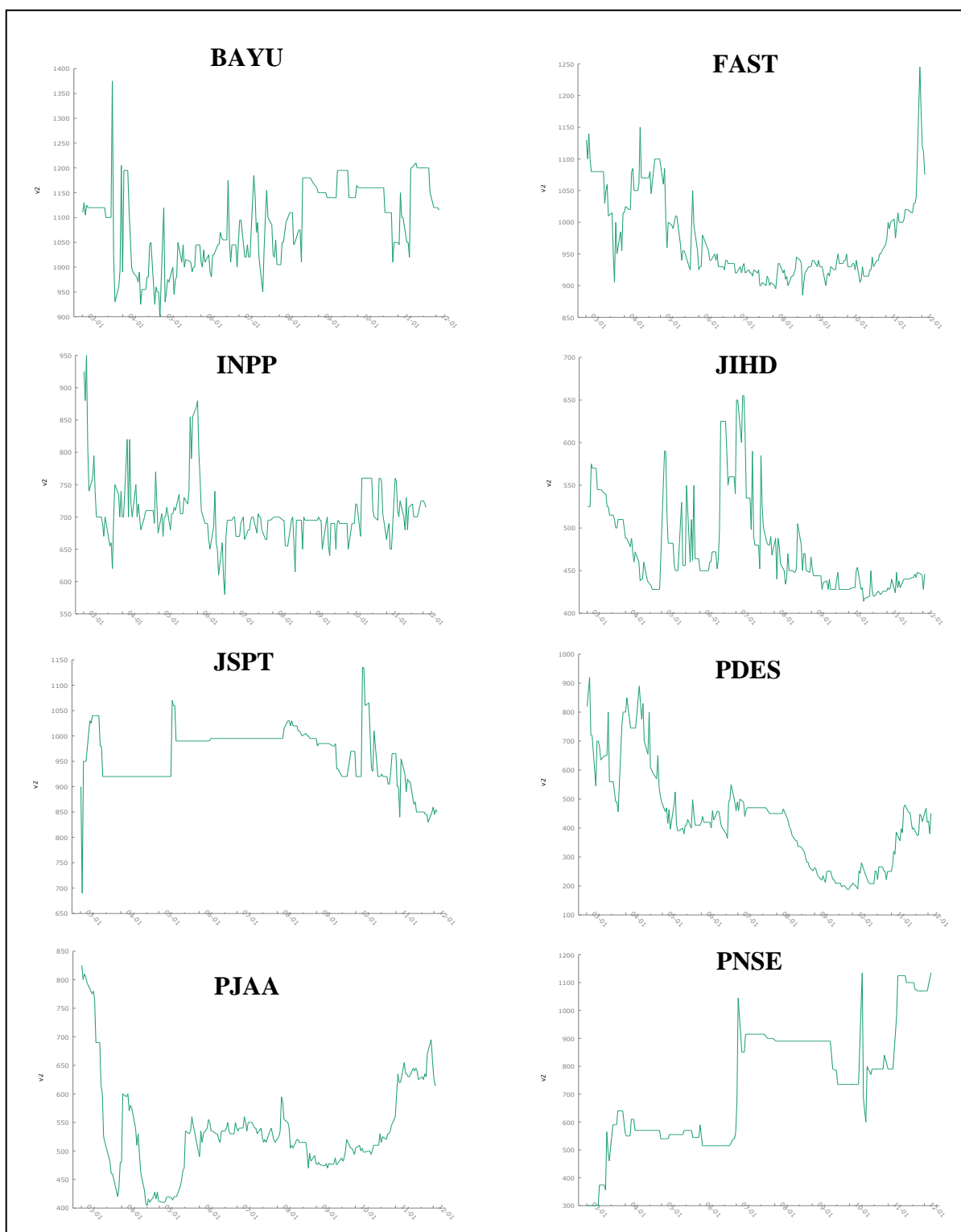
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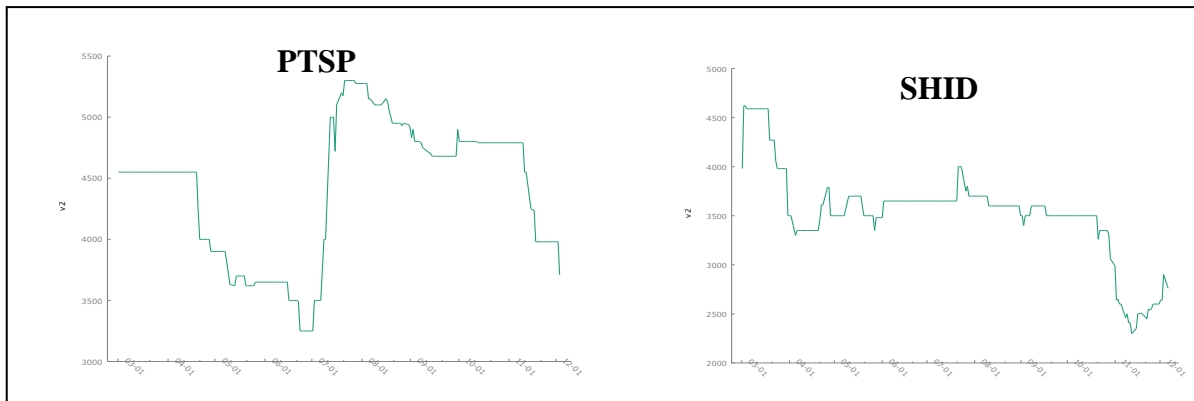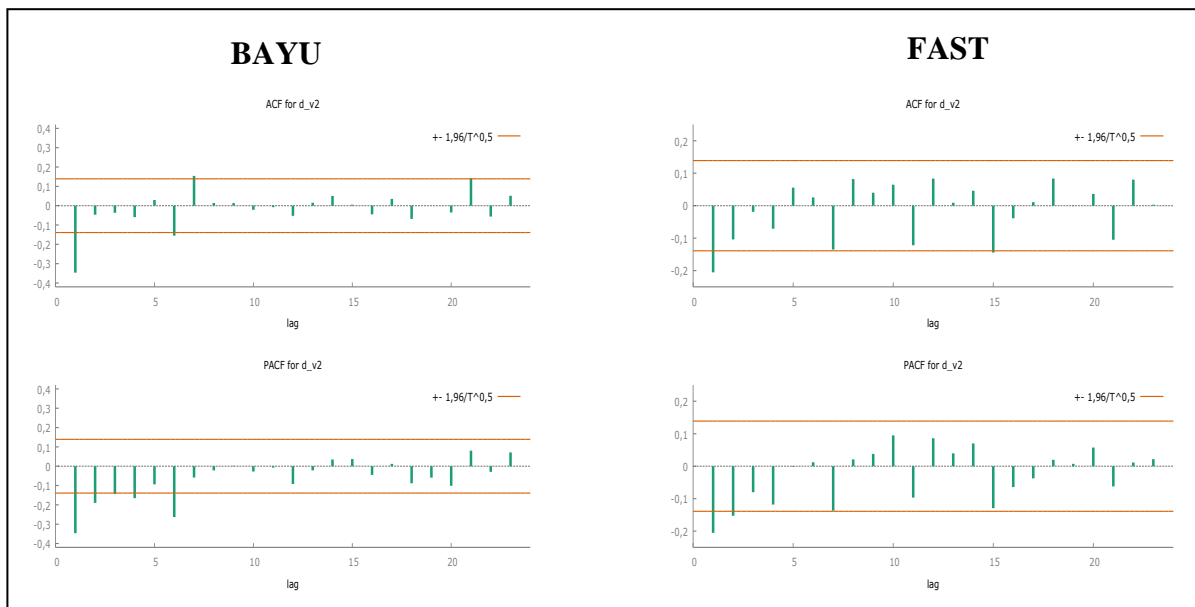

Figure 3. Development of Stock Prices of 10 Hospitality Companies in Indonesia in 2020
Source: Processed data (2021)

It can be seen in Figure 3 that, in general, these ten hospitality companies experienced a decline in stock prices due to Covid-19. Several companies such as PNSE and PTSP gradually rose in the third quarter of 2020.

The next step is to detect the stationarity of the data. To avoid spurious regression, the data used must be stationary (Sumaryanto, 2009). In this study, the stationarity of the data can be seen through the correlogram table and the ADF unit root test. To see whether the data is stationary or not in the correlogram method, it can be seen through the value of Partial Autocorrelation (PAC) and the importance of Autocorrelation (AC) at time lag two or time lag 3 to zero. The following figure 3 presents a correlogram of the share prices of hospitality companies in Indonesia for the period March to December 2020.

Figure 4. Correlogram of Hospitality Company Stock Prices in Indonesia for the Period March to December 2020
Source: Processed Data (2021)

Figure 4 on the previous page shows that the share price data for hospitality companies in Indonesia from March 2020 to December 2020 is stationary at the level. This can be seen in the PAC and AC values at time lag 3, which has gone to 0 or crossed the dotted line. Therefore, the data can be modeled using ARIMA, AR(p) d(0), and MA(q) methods. Then, the unit root test results using the ADF method can be seen in Table 1 below.

Table 1. Results of The Augmented Dickey Fuller (ADF) Unit Root Test

Code	Level	Information	1st Difference	Information
BAYU	0,3586	Not Stationary	$1,241e^{-018}$	Stationary
FAST	0,1025	Not Stationary	$2,404e^{-016}$	Stationary
INPP	$7,668e^{-007}$	Stationary		
JIHD	0,07747	Not Stationary	$1,593e^{-023}$	Stationary
JSPT	0,4425	Not Stationary	$1,709e^{-010}$	Stationary
PDES	0,4295	Not Stationary	0,004431	Stationary
PJAA	0,004921	Stationary		
PNSE	0,5639	Not Stationary	$4,448e^{-023}$	Stationary
PTSP	0,4305	Not Stationary	$2,387e^{-005}$	Stationary
SHID	0,08778	Not Stationary	$1,011e^{-014}$	Stationary

Source: Processed Data (2021)

Table 2 shows the ADF test results, indicating that the data is stationary at both the level and the first difference. It is said to be stationary if the ADF probability value is less than 0.05. So the ADF unit root test supports the conclusion that the data can be modeled with ARIMA.

After obtaining stationary data at the level, the following process is an analysis using the Box-Jenkins model, namely identification to determine the ARIMA model suitable or best for forecasting. This process will determine the value of p on AR(p) and q on MA(q). For this purpose, stock price data is made a correlogram. Autocorrelation function and partial autocorrelation function determine p on AR(p) and q on MA(q). Based on the autocorrelation plot (AC) and the partial autocorrelation plot (PACF), it can be seen in table 1 that the three figures are cut off (down drastically) in the first row. If the cutoff is on ACF and PACF, then the first probability is p=1 and q=0, then the second possibility is p=0 and q=1. So when combined with d whose value is known, then the possibility of ARIMA (p,d,f) is ARMA(1,0) which can be abbreviated as AR(1), ARMA model (0,1) can be abbreviated as MA(1) or ARMA model (1,1).

The next step is a model estimation and selecting the best ARIMA model used for forecasting. After estimating the model, the following estimation results are obtained.

Table 2. ARIMA Estimation Results and Selection of The Best Model

Code	Model	AIC	SIC
BAYU	ARIMA (1,1,1)	2176,073	2189,226
	ARIMA (1,1,2)	2153,299	2169,740
	ARIMA (1,1,3)	2160,385	2180,115
	ARIMA (1,1,4)	2158,033	2181,051
FAST	ARIMA (1,1,1)	1889,517	1902,670
	ARIMA (1,1,2)	1880,410	1896,851
INPP	ARMA (1,0)	2001,787	2011,682
	ARMA (0,1)	2058,414	2068,309
	ARMA (2,0)	1996,531	2009,724
	ARMA (3,0)	1997,114	2013,605
	ARMA (4,0)	1999,040	2018,829
JIHD	ARIMA (1,1,1)	1910,246	1923,379
	ARIMA (1,1,3)	1910,660	1930,360
	ARIMA (3,1,1)	1903,293	1922,992
JSPT	ARIMA (1,1,1)	1983,981	1997,134
	ARIMA (1,1,4)	1984,078	2007,096

Code	Model	AIC	SIC
PDES	ARIMA (1,1,1)	2133,813	2146,966
PJAA	ARMA (1,0)	1779,839	1789,734
	ARMA (0,1)	2146,767	2156,662
	ARMA (1,0,1)	1780,803	1793,996
PNSE	ARIMA (1,1,1)	2206,860	2220,034
	ARIMA (1,1,3)	2206,611	2226,371
	ARIMA (4,1,1)	2201,572	2224,625
	ARIMA (4,1,3)	2204,867	2234,507
PTSP	ARIMA (2,1,2)	2414,413	2434,143
	ARIMA (4,1,4)	2414,071	2446,954
	ARIMA (2,1,4)	2412,891	2439,197
	ARIMA (4,1,2)	2411,822	2438,128
SHID	ARIMA (2,1,2)	2326,545	2346,274

Source: Processed Data (2021)

After obtaining the best model for this research, the next step is forecasting.
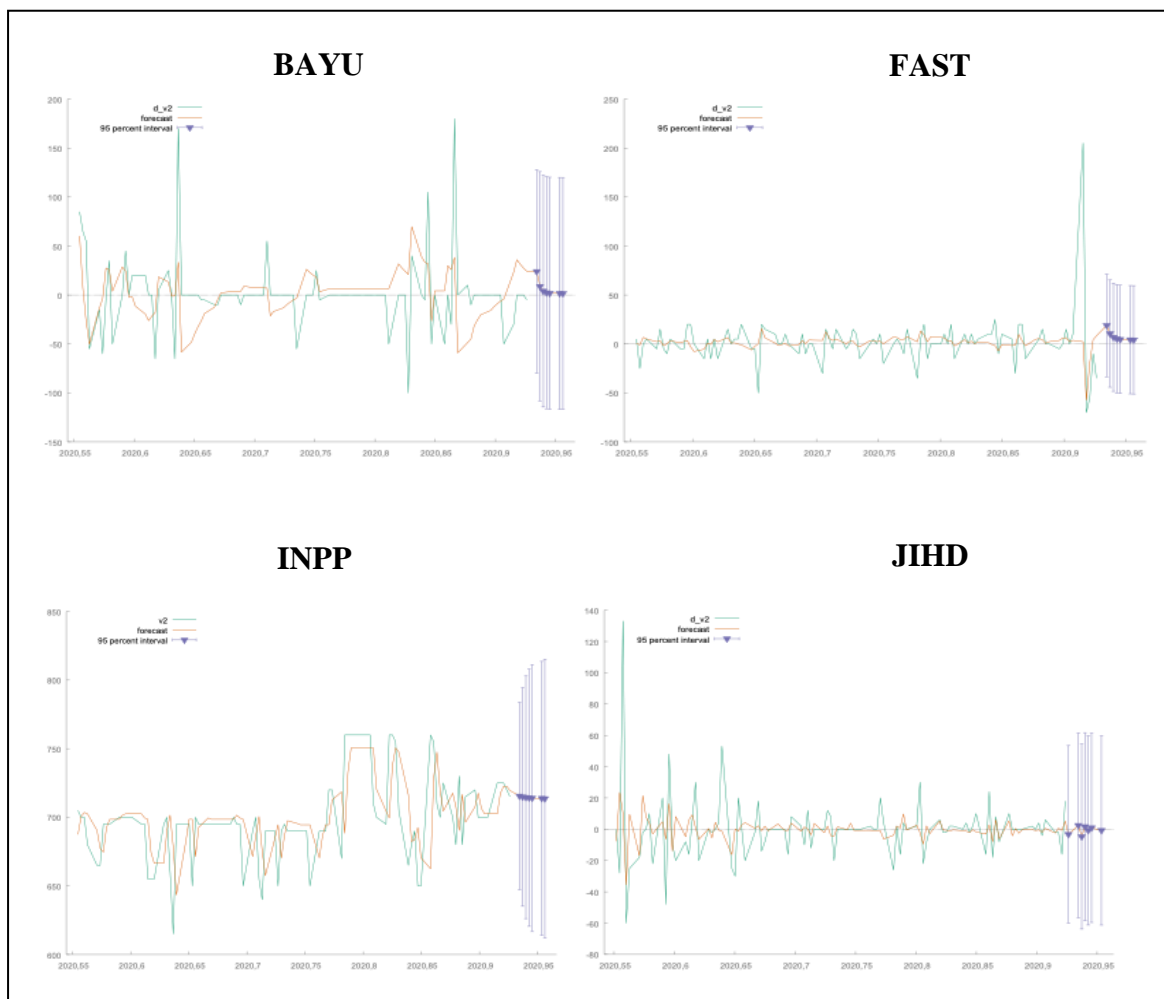
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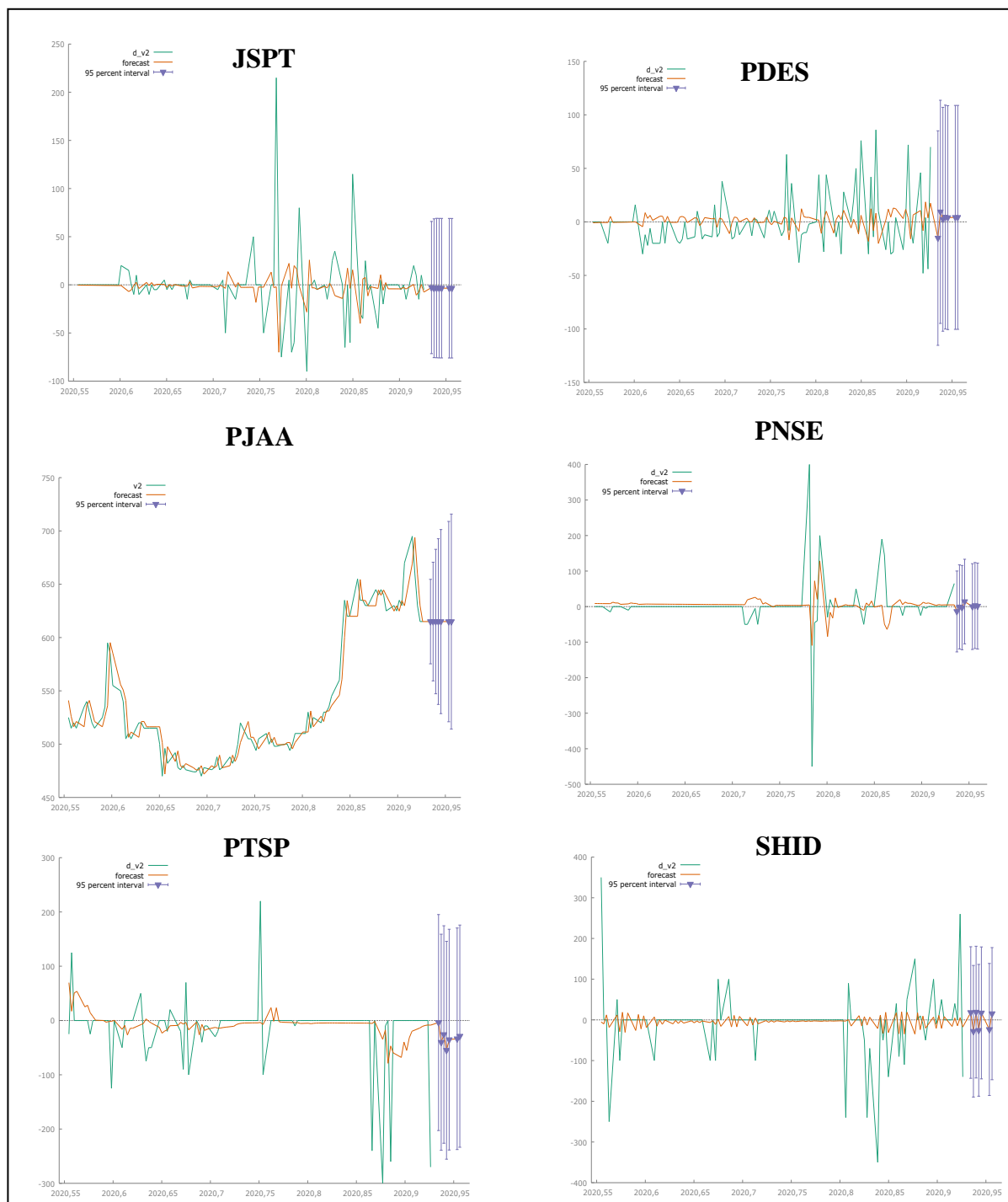

Figure 5. Forecasting Hospitality Firms Stock Prices in Indonesia
Source: Processed Data (2021)

The forecasting results shows that the stock prices of several hospitality companies will be more stable. However, several hospitality companies are also still under pressure due to the impact of Covid-19. The companies that are predicted to be stable are JIHD, JSPT, PDES, PJAA, and PNSE. Meanwhile, several other hospitality companies such as BAYU, FAST, INPP, PTSP, and SHID are predicted to be still depressed by the impact of Covid-19.

3.2. DISCUSSION

Volatility is critical to the operation of financial markets. Volatility is a barometer of financial risk or uncertainty surrounding investments in financial assets (Baek et al., 2020). Volatility is also called "market mood" to see whether prices are rising sharply or stock prices are weakening. Based on ARIMA's estimation results, stocks that experienced a downward trend at the beginning of Covid-19 were PJAA or Pembangunan Jaya Ancol shares. This was triggered by the Covid-19, so that PJAA suffered a loss in its business which reached Rp 10.37 billion in the first quarter of 2020.

PT Pembangunan Jaya Ancol Tbk (PJAA) again suffered losses in the next quarter, even up to Rp 146.28 billion, after its profit was corrected by 306 percent. As is known, if the company suffers a loss, it is not obliged to distribute dividends to investors. In addition, these losses also provide a negative stigma for investors. The results of research support this by Baek et al. (2020) that volatility is influenced by specific economic indicators and is sensitive to Covid-19 news. Negative and positive Covid-19 information are both significant, although negative news is more impactful.

PJAA also experienced a cessation of operations starting March 14, 2020, due to Covid-19. The end of operations follows the Instruction of the Governor of DKI Jakarta No. 16 of 2020 concerning Increasing Awareness of the Risk of Transmission of Corona Virus Disease (Covid-19). This certainly has an impact on the operational activities and profitability of PJAA. Zaremba et al. (2020), from the results of their research, show that stock market volatility increases in countries where the government is taking strict measures to curb the spread of Covid-19, such as information campaigns and the cancellation of public events.

Next, several stocks have a peak point simultaneously; their stock prices have fallen, which means they experience relatively high volatility, namely JSPT or Jakarta Setiabudi shares and PTSP or Pioneerindo Gourmet International. The results of this study are in line with (Baker et al., 2020). They identified a pandemic and have found that the current pandemic has had the most significant impact on stock market volatility in the history of the pandemic.

For JPST, the drop in stock prices was caused during the Covid-19 pandemic; tourism in Bali was closed from foreign tourists, thus making the company's financial condition depressed, where 50% of the total rooms were on the island of Bali. Meanwhile, PTSP, which is engaged in the restaurant business, has 161 outlets that are temporarily closed because they cannot cover most of the operational costs due to the impact of Covid-19.

The forecasting results show that JIHD, JSPT, PDES, PJAA, and PNSE are predicted to be more stable in the future. Meanwhile, several other hospitality companies such as BAYU, FAST, INPP, PTSP, and SHID are expected to be still depressed by the impact of Covid-19. Therefore, several policies and anticipation are needed from capital market players or regulators.

Policies that can be taken by companies or issuers affected by Covid-19 by implementing cost efficiency due to losses experienced. For investors and conducting fundamental analysis in making investments, it is also essential to pay attention to the level of stock volatility. Next, stock investors who will invest can choose sectors that are not too affected by the pandemic, such as the food and beverage industry and the health sector.

Another policy that an authority can apply is to encourage the prevention of short selling. Short selling itself is a transaction in stock trading when investors and traders borrow funds to sell shares that are not owned at a high price in the hope that they will buy when the stock price drops. As a result of these activities can push down the cost of shares. Especially during a negative sentiment situation due to Covid-19, the stock market itself is experiencing a downward trend.

4. CONCLUSION

After measuring volatility and forecasting using ARIMA, several conclusions can be drawn. First, the stock that has chosen a downward trend and experienced quite a bit of volatility due to Covid-19 is Pembangunan Jaya Ancol or PJAA. Second, stocks with relatively high volatility are JSPT or Jakarta Setiabudi and PTSP or Pioneerindo Gourmet International.

Several policy recommendations can be a reference for regulators, investors, and issuers. For issuers/companies experiencing high volatility due to Covid-19, they can reduce losses due to Covid-19 by implementing cost efficiency. Furthermore, investors who invest in shares can pay attention to stock volatility in making decisions to buy shares or sell shares. Investors who will support their capital can choose sectors that are not too affected by the pandemic, such as the food and beverage industry and the health sector. The policy that an authority can apply is to encourage the prevention of short selling, which can promote higher stock volatility.

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