

# The Effect of Macro Economy Variables on Stock Market Performance During Pandemic

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To Link this Article: <http://dx.doi.org/10.6007/IJAREMS/v11-i3/14695>

DOI:10.6007/IJAREMS/v11-i3/14695

**Published Online:** 14 September 2022

## Abstract

This study aimed to explore the relationship between macroeconomic variables and Malaysia's stock market index which is the FTSE Bursa Malaysia KLCI (KLCI) during pandemic happens in the world. The selected macroeconomic variables were the gross domestic product, inflation rate, exchange rate, interest rate and industrial production index were taken as independent variables as well as the period of the pandemic as a dummy variable while the stock market's KLCI was the dependent variable. To capture the maximum variation in the stock market, a time series analysis was done on monthly data from the year 2002 to 2020. The pandemic events which could affect Malaysia's stock market were Severe Acute Respiratory Syndrome (SARS), Swine Flu (H1N1), Middle East Respiratory Syndrome (MERS) and Coronavirus Disease 2019 (COVID-19). Multiple Linear Regression analysis was used to explore the statistical relationship and evaluate the hypothesis in this paper. The result showed a statistically significant positive relationship between gross domestic product and industrial production and a statistically significant negative relationship for the exchange rate. However, for inflation, interest rate and the dummy for a pandemic is statistically insignificant.

**Keywords:** Stock Market, Market Performance, Pandemic, Epidemic, Macro Economy.

## Introduction

The stock market in Malaysia is referred to as the FTSE Bursa Malaysia Kuala Lumpur Composite Index (KLCI) which is the primary index that investors use to gauge the stock market's overall performance. The index is comprised of the 30 largest companies by market capitalization that are listed on Bursa Malaysia (Ahmad et al., 2014). The Malaysian economy is recovering in 2021 after real GDP shrunk due to strict COVID-19 containment measures. By the end of 2021, the GDP expanded 3.1 percent with total funds raised in the capital market rising to RM130.9 billion out of which RM16.6 billion was raised by the equity market.

According to Lim and Sek (2013), high volatility in the stock market leads to a high range of possible returns which increased the risk. Prior research has shown that share price performance is a reliable predictor of present economic conditions, trends, and public confidence in economic performance. Zakaria and Shamsuddin (2012) most macroeconomics factors can affect the stock market. On the other hand, other studies found the macroeconomic variable is not reliable in predicting stock market performance. The health of the economy has no direct correlation with the stock market's success (Srinivasan, 2011). Humpe and Macmillan (2009) concluded that exchange rates had little effect on share prices and so should not be used in stock market forecasting.

Pandemic affects the economy not only seen in Malaysia but also in the worldwide economy. The data retrieved from the World Health Organization (WHO), the SARS outbreak in 2003, which infected 8,098 and killed 774 people globally, claimed only two lives in Malaysia. H1N1's real number of cases including asymptomatic and mild cases could be 700 million to 1.4 billion people globally with Malaysia having over 2,253 cases and 78 deaths. As for MERS which hit in 2012, as of 2021, there are 2,595 cases including 941 deaths, that have been reported by health authorities worldwide and only 2 cases in Malaysia. As for COVID-19, the global case has reached almost 300 million cases and more than 5 million deaths globally as well as in Malaysia more than 4.73 million cases and more than 36,000 deaths as of August 2022. Before COVID-19, other epidemics and pandemics had influenced the global economy which also have an impact on the stock market such as the Spanish Flu in 1918, Asian Flu in 1957, SARS in 2002, H1N1 in 2009, Ebola in 2014, MERS in 2012 and COVID-19 in 2019 (Salisu and Adediran, 2020). Al Awadhi et al (2020) states that COVID-19 has many impacts on the Malaysian economy due to lockdown and restriction movement that closed several sectors in 2020 and 2021. However, this study only focused on the pandemic that affects and had cases occur in Malaysia which includes SARS, H1N1, MERS and COVID-19.

### **Objectives of The Study**

This research is focusing on the period in which a pandemic occurred starting with SARS in 2002, H1N1 in 2009, MERS in 2012, and last but not least, COVID-19 in 2019. The objectives of this paper are as follows:

- First, is to ascertain the influence of macroeconomic variables on the stock market performance, this study includes macroeconomic variables such as gross domestic product, inflation rate, exchange rate, interest rate, and industrial production as the control variables.
- Second, to include the period of the pandemic as a dummy variable as one of the independent variables in this study to look at the impact of pandemic occurrence on the stock market. This is due to the limited number of researchers who have examined the pandemic that occurred in Malaysia from 2002 to 2020,

### **Literature Review**

The economic growth of a country may be measured and analyzed by using macroeconomic indicators. Over time, the stock market has a high correlation with macroeconomic indices (Srinivasan, 2011). Therefore, Zakaria and Shamsuddin (2012) argue that a country's macroeconomic variable is intimately connected to the stock market's discounted present value of predicted future cash flows. Both policymakers and investors should examine the impact of macroeconomic factors on stock markets (Maysami et al., 2004).

Lyocsa and Molnar (2020) argue that investor is fear of the pandemic resulting in a loss of value in the stock market. The stock market in Malaysia often reacts to economic crises, including pandemics, defying the weak form of the Efficient Market Theory (Murthy et al., 2017). The spreading of the pandemic has increased the financial risk on the global stock market (Liu et al., 2020). It was established that the intensity of a pandemic harms a sector that has a high degree of human interaction (Kandil et al., 2007). Research done by Ichev and Marinc (2018), found that there is a negative correlation between the pandemic Ebola Virus on the stock market.

#### *Gross Domestic Product*

Gross Domestic Product (GDP) is defined as the value of finished products and services generated by different production units inside a country's territory in a given year (Hsing, 2011). (Lee and Chen, 2022). Wang (2011) discovered that the association between GDP and the stock market is non-existent during pandemics. The volatility of GDP was not strongly connected to the volatility of stock market returns (Zakaria and Shamsuddin, 2012). Li et al (2021) provide more evidence that stock market performance and GDP growth declined dramatically during the pandemic.

#### *Inflation*

Inflation is the steady increase in the price of goods and services (Hossain, 2012). Inflation is a key macroeconomic issue that affects stock prices (Gupta and Inglesi-Lotz, 2012). Wongbampo and Sharma (2002) found that Malaysia's stock market had a negative correlation with inflation. Tokic (2020) suggests that the pandemic's long-run effect will be a linear acceleration in inflation. Since the pandemic has disrupted the supply chain (Usman, Ali, Riaz, Riaz, and Zubair, 2020), the spirals of uncertainty produced in the product's market may harm the stock market's performance. Other research had found no correlation between stock prices and inflation (Kimani and Mutuku, 2013).

#### *Exchange Rate*

Aman et al (2017); Goda and Priewe (2020) emphasized that the epidemic had little effect on the exchange rate. Kandil et al (2007) argue that the exchange rate fluctuates according to supply and demand. The exchange rate may affect the stock price in a variety of ways. Dimitrova (2005) suggested that the changes in exchange rates influence a firm's competitiveness, which affects the stock price and the product produced by the company. Thus, in the medium term, the effect of foreign exchange on exports assessed in domestic currency will be reflected in the economy (Yunita and Robiyanto, 2018).

#### *Interest Rate*

The study discovered a negative relationship between interest rates and the KLCI return. This is consistent with Teitey (2019) study, which examined the Ghana stock market and discovered a negative and statistically significant relationship between stock prices and interest rates. In contrast, Khan and Mahmood (2013) assert that a positive and significant relationship exists between financial institutions and insurance companies listed on the Karachi Stock Exchange. A study conducted by Murthy, Anthony and Vighnesvaran (2017) examined the factors affecting the Kuala Lumpur Composite Index (KLCI) Stock Market Return in Malaysia from 1997 to 2015 and discovered no significant relationship between the KLCI return and interest rates.

### *Industrial Production*

Industrial production is another macroeconomic indicator that influences the Malaysian stock market (Ab Rahman et al., 2013). After the financial crisis of 2008, Ooi et al (2014) revealed a correlation between industrial production and market return. They found that industrial production had a significant impact on the KLCI, ranging from negative to positive. Liu and Shrestha (2008) discovered that industrial production has a long-term positive relationship with the China stock market index. In comparison to the industrial sector, the pandemic has benefited the health and telecommunications businesses, but damaged energy and transportation, causing their stock values to drop (Ramelli and Wagner, 2020).

### **Research Methodology**

The study tries to investigate the effect of the change in independent which are the gross domestic product, inflation rate, exchange rate, interest rate and industrial production during the pandemic on the dependent variables which is the stock market performance in Malaysia. The study focused on Malaysia's macroeconomic variables and the stock market during the pandemic. The period of the pandemic is taken as a dummy variable and only for selected months in which there were disease infection cases in Malaysia. The dummy for pandemic also was taken as an independent variable by using the dummy numbered "1" for the month in which there were cases of disease infection or the dummy numbered "0" for the month in which there is no disease infection case occurred in Malaysia between 2002 to 2020 such as Severe Acute Respiratory Syndrome (SARS), Swine Flu (H1N1), Middle East Respiratory Syndrome (MERS) and Coronavirus Disease 2019 (COVID-19). The data accumulated from the year 2002 until 2020 for the time horizon to develop a time series study which is on monthly basis. The data comprise 166 observations from 2002 to 2020 on monthly basis. All the variables are logged by using a natural logarithm (LN) for easy to evaluate the result. Last, but not least, the regression analysis conducted for this study is to determine the effect of macroeconomic variables on the stock market during the pandemic in Malaysia from 2002 until 2020.

### **Results**

To test the relationship between stock market performance and macroeconomic variables during the pandemic, this study runs the secondary data by using regression analysis using E-views software to identify the outcome of the relationship between independent and dependent variables. In this research analysis, all the data are converted into the natural logarithm and pandemic as a dummy variable by only selecting the month affected by the disease in Malaysia.

### *Descriptive Analysis*

Table 1 below shows the descriptive analysis of macroeconomic variables such as gross domestic product (GDP), inflation rate (INF), exchange rate (ER), interest rate (IR), and industrial production (IP) on the stock market during the pandemic for adjusted 166 observations.

Table 1

*Result of Descriptive Analysis*

	KLCI	GDP	INF	EX	IR	IP
Mean	7.1664	1.6181	-1.6332	1.2689	1.1593	4.6565
Median	7.3053	1.6898	-1.5560	1.2885	1.1537	4.6410
Maximum	7.5405	2.0042	1.1743	1.5010	1.3737	4.9798
Minimum	0.3270	-1.4446	-6.2461	1.0837	0.7275	4.2774
Std. Dev.	-0.7037	0.3655	1.0558	0.1104	0.1375	0.1451
Skewness	2.1044	-5.0517	-0.9958	0.0990	-0.9793	-0.1930
Kurtosis	2.1040	35.659	5.5089	1.8938	4.2934	3.0155

The stock market performance (KLCI) has a mean value of 7.1664 and a median value of 7.3054. There is skewness in the stock market of -0.7606. The kurtosis of 2.1044 indicates the stock market has a smaller tail than the normal distribution since it is less than 3. Next, there is also a mean of 1.6181 and a median of 1.6898 in the Gross Domestic Product (GDP). There is an overall skewness in the GDP of -5.0517. To put it another way, the kurtosis for GDP is 35.6595 which indicates that GDP has an even larger tail than the normal distribution. Third, the inflation rate (INF) is the sole variable with a negative mean and median of -1.6332 and -1.5560, respectively. Additionally, the inflation data is negatively skewed at -0.9958 and has a kurtosis of 5.5089. Compared to a normal distribution, the inflation's tail is greater than 3. Fourth, a mean of 1.2689 and a median of 1.2885 characterize the exchange rate (EX). The exchange rate has a reasonable spread with a maximum and minimum of 1.5010 and 1.0837. With a skewness of 0.0990, the exchange rate is positively skewed. Finally, industrial production (IP) has a mean value of 4.6565 and a median value of 4.6410, respectively. The IP skewness is negative. Using IP, the kurtosis value is 3.0155, which is higher than the normal distribution.

*Correlation Analysis*

The correlation analysis is to determine the correlation between two variables. Table 2 below showed the positive and negative correlation, as well as the degree of correlation between the variables, are two aspects of the correlation finding that need to be assessed. For each variable, we conduct two sided tests with a 5 percent threshold of significance.

Table 2

*Result of Correlation Analysis*

	KLCI	GDP	INF	EX	IR	IP
GDP	-0.1739 -2.2618 *0.0250	1.0000 - -				
INF	0.0723 0.9281 0.3547	-0.1426 -1.8456 0.0668	1.0000 - -			
EX	-0.2383 -3.1417 *0.0020	-0.1104 -1.4230 0.1566	0.0522 0.6698 0.5040	1.0000 - -		
IR	0.4317 6.1291 *0.0000	-0.2080 -2.7236 *0.0072	0.0964 1.2405 0.2166	0.1680 2.1819 0.0305	1.0000 - -	
IP	0.8512 20.7712 *0.0000	-0.3181 -4.2965 *0.0000	0.1060 1.3657 0.1739	0.1886 2.4590 *0.0150	0.5706 8.8971 *0.0000	1.0000 - -
PAN	0.0255 0.3271 0.7440	0.1514 1.9615 0.0515	0.0691 0.8868 0.3765	0.2684 3.5687 *0.0005	-0.3076 -4.1397 *0.0001	0.0718 0.9219 0.3580

\*Significant at 5 percent level.

There is a weak and negative correlation between GDP and KLCI. This is because the correlation coefficient is negative, which is considerably different from the absolute value of 1. The correlation's significance is evaluated only by comparing the p-value of 0.0250 to the 5 percent level of significance. As a consequence, the p-value of 0.0250 is less than 0.05, indicating that GDP and the stock market are statistically significant. Next, for the inflation variable, the p-value was 0.3546 more than 5 percent. The inflation is insignificant correlation with the stock market. Additionally, whether the shift is made to the right or left, the stock market is unaffected. The correlation for the inflation variable is 0.0723. This suggests that inflation has a slight positive correlation with the stock market since the result is positive but not near to the absolute value of 1.

Furthermore, the exchange rate (EX) variable shows the correlation is a negative correlation with the stock market during the pandemic at -0.2382. According to the result of the p-value, the exchange rate has a very low value of probability only 0.0020. This indicates that the exchange rate p-value is less than the 5 percent level significant and the exchange rate is significant with the stock market during the pandemic. This means the movement of the exchange rate during a pandemic is a significant opposite movement of the stock market during the pandemic. Besides, interest rate (IR), the independent variable, shows a positive correlation with the stock market. The correlation between these two variables is 0.4317 and might be considered poor because it is not near the absolute value of 1. Concerning the stock market during the pandemic, the IR has a value or p-value of 0. This indicates that the IR is completely or very highly correlated with the stock market during the pandemic.

The last macroeconomic variable for this study is industrial production (IP). Industrial production has a positive correlation with the stock market during the pandemic and the value of correlation can consider as close to 1 with the value of 0.8512. This correlation value is the highest among other variables. For the p-value, the industrial production is also as 0 value which means that the industrial production is strongly or 100 percent significant with the stock market during the pandemic. Lastly, the pandemic was classified as a dummy variable that has a positive correlation with the stock market when the pandemic occurred from 2002 to 2020 with a value of 0.0255. The p-value of the pandemic is more than 5 percent which is 0.7440. This indicates that the pandemic is not significant with the stock market during the pandemic.

### Regression Analysis

The regression test is a method for determining the degree and nature of the connection between the dependent variable and each of the independent variables. The regression used the data of natural logarithm for all non-dummy variables, therefore, the regression analysis result is shown in the Table 3 below:

Table 3

#### Result of Regression Analysis

Variable	Coefficient	Std. Error	t-Stat	Prob.
C	-1.5621	0.3190	-4.8968	0.0000
GDP	0.0759	0.0243	3.1263	0.0021*
INF	0.0019	0.0080	0.2339	0.8154
EX	-1.2049	0.0771	-15.6258	0.0000*
IR	-0.1062	0.8600	-1.2351	0.2186
IP	2.2037	0.7228	30.2967	0.0000*
PAN	-0.0068	0.0309	-0.2199	0.8263

R-squared	0.8970	Mean dep. var	7.1664
Adj. R-squared	0.8932	S.D dep var	0.3270
S.E. of reg	0.1069	Akaike info. criterion	-1.5929
Sum squared resid	1.8164	Schwarz criterion	-1.4617
Log likelihood	139.2138	Hannan-Quinn criter.	-1.5397
F-statistic	230.9015	Durbin-Watson stat	0.3647
Prob(F-statistic)	0.0000		

Notes: The dependent variable is Stock Market (KLCI). The independent variables are Gross Domestic Product (GDP), Inflation Rate (INF), Exchange Rate (EX), Interest Rate (IR), Industrial Production (IP) and Pandemic (PAN) as dummy variable.

\*Significant at 5 percent level.

The study analyses the regression test to determine the effect of macroeconomics on the stock market during the pandemic. The result in regression model coefficient determines ( $R^2$ ) resulted in adjusted r-square is 0.8932 which mean regression is to explain the phenomenon of 89.32 percent and the remaining 10.68 percent is explained by the other factors not considered in the study.

According to the result of the least squares regression, the gross domestic product has a coefficient of positive 0.07592. This means that every one percent increase in the gross domestic product results in a 7.592 percent rise in the stock market during the pandemic, assuming all other variables remain constant. The changes in the gross domestic product would have a statistically significant impact on the stock market during the pandemic. Next, for every one percent increase in inflation, the stock market increases by 0.1870 percent, assuming all variables stay constant. The probability value is 0.8154, more than the 5 percent level of significance. Therefore, failure to reject the null hypothesis. Thus, this study may infer that the inflation rate is insignificant to the stock market during the pandemic.

Besides, the result for the exchange rate. The exchange rate coefficient suggests that for every one percent increase in the exchange rate, the stock market will fall by 120.49 points assuming other variables are constant. The probability value of 0, is less than the 5 percent significance level. Thus, exchange rate would have a significant negative influence on the stock market during the pandemic. Furthermore, the coefficient for the interest rate suggests that for every one percent increase in the interest rate, the stock market will fall by 10.62 points by assuming other variables are constant. The probability value of the interest rate is 0.2186 which is more than the 5 percent level of significance. Thus, the changes in the interest rate are an insignificant influence on the stock market during the pandemic.

Moreover, the industrial production result. The Industrial Production Index indicates that for every one percent increase in industrial production, the stock market rise by 220.37 points, assuming all other variables remain constant. The probability value is 0, less than the 5 percent significance level. As a result, industrial production would have a positive and significant impact on the stock market during the pandemic. Lastly, the pandemic which classifies as a dummy variable indicates that every case that happened in a month will fall the stock market by 0.67 points, assuming all other variables remain constant. The probability of a pandemic is 0.8263 which is more than a 5 percent level of significance. As a result, the pandemic would have a negative and insignificant direct impact on the stock market during the pandemic.

## **Conclusion**

This study found a positive and statistically significant relationship between GDP and stock market performance during the pandemic. This is supported by Boonyaman (2014); El-Nader and Alraimony (2011), who found the positive and significant result between GDP and stock market throughout the pandemic is due to consumers' continued consumption of oil, gas, and home needs. Previous research had demonstrated that the relationship between inflation and the stock market can be both significant and insignificant (Min et al., 2017). Therefore, the result of this study is inflation had a positive and statistically insignificant with the stock market during the pandemic.

This study found that the exchange rate is negative and statistically significant on the stock market during the pandemic. Teitey (2019) study found a negative relationship between the exchange rate and the stock market where the exchange rate is not only affecting the return of multinational companies but also affects the returns of domestic firms. This study found that the interest rates have a negative and statistically insignificant effect on the stock market during the pandemic. This result is consistent with Murthy et al (2017) found that

interest rate is a negative and statistically insignificant relationship with the stock market during a pandemic is due to the fluctuation and policy implemented by the government until the investor or trader rebalancing strategies that divide investment into another instrument.

The result of this study showed that industrial production is positive and statistically significant with the stock market during the pandemic. This is supported by Ramelli and Wagner (2020) where during the pandemic health and telecommunication are the ones of the sector that give an impact on the stock market. The pandemic has a negative and statistically insignificant with the stock market. However, the research from Ichev and Marinc (2018), who find the pandemic Ebola harms the stock market. Besides, the insignificant result is due to the effect in the long run between the pandemic and the stock market.

#### *The Implication of the Study*

The findings of this study will aid stock market participants in diversifying their portfolios to lessen the risk of stock market investment during the pandemic. This paper will help investors to understand how the stock market is affected by macroeconomic variables as non-diversifiable components of risk involved in investment. This is because, during the pandemic, there will be a major movement in stock market performance especially due to the adverse performance of the economy. Moreover, the understanding of the association between the stock market and macroeconomic indicators during a pandemic, from the government's perspective, can be a valuable tool for policymakers to foresee future economic and stock markets when the new pandemic happened again in Malaysia or worldwide. Finally, academics can utilize this study article as a tool or reference to generate a new hypothesis that will improve future studies on the stock market during a pandemic.

#### **Limitation of the Study**

Firstly, the limitation of this study is the Malaysia stock market index is not comprising all sectors in Malaysia. The KLCI only focused on certain companies that have a higher market capitalization than Malaysian-listed companies. Secondly, the macroeconomic indicators used in this study cannot be generalized to represent the whole condition of economic performance. This is because each economic variable represents a certain section of economic performance in the country which in turn is affected by different variables. Lastly, the accuracy and reliability of data also limit the reliability of the study results. The data collected from the stock market might have an adjustment from the real data.

#### **Recommendations for Future Research**

First, future research studies on the factors that affect the stock market may select stock market index by sector. The usage of different indexes may assist to broaden the scope of this study subject. The second point is that future studies may make use of additional macroeconomic factors to examine the relationship between macroeconomic variables and the stock market during the pandemic. Finally, other macroeconomic factors may be used to get a different outcome, which can then be used for the reliability conclusions.

#### **Acknowledgement**

We are grateful to the grant sponsored for the Publish and Cherish @ UiTM CJ Project by Universiti Teknologi MARA Cawangan Johor which funded the publication for this article.

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