THE IMPACT OF COVID-19 PANDEMIC ON THE EXCHANGE RATE VOLATILITY OF THE RINGGIT MALAYSIA

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Abstract

The COVID-19 has affected countries globally, including Malaysia, putting the future of the global political, legal, environmental, technological, social, and economics at risk. Among other aspects, the impact of the pandemic towards currency's exchange rate and economic sustainability is one of the most critical concerns for many countries. The COVID-19 pandemic's effects are examined in this study towards Ringgit Malaysia's volatile exchange rate, and the need to manage these financial risks during the pandemic that could prolong and its nature is unpredictable. This paper studies the exchange rates of these top five countries' exports and imports partners according to the scale of trade value with Malaysia. These are the Hong Kong dollars (HKD), Singapore dollar (SGD), US dollar (USD), Singapore yuan (CNY), and Japanese yen (JPY). According to this study, the USD, HKD, or JPY appreciate along with the COVID-19 cases reported or total cases, whereas the CNY depreciates. Second, COVID-19 new cases do not correspond with COVID-19 cases recorded but do correlate with the SGD's depreciation. Lastly, the COVID-19 death cases correlates with appreciation of CNY and SGD but depreciates as against the USD, the HKD, and the JPY.

Keywords: COVID-19, exchange rate volatility, the Ringgit Malaysia.

1. INTRODUCTION

In the Chinese city of Wuhan, a newly emerged form of the contagious sickness known is COVID-19 was "discovered." On March 11, 2020, a meeting of the World Health Assembly referred to the epidemic as a "global health emergency." To date (20 September 2021), the WHO has recorded a total to 4,690,186 deaths with 228,394,572 cases of COVID-19 across the globe. Malaysia now has a case of COVID-19. On January 24th, 2020, the first human case of COVID-19 was discovered in Malaysia. At the time of this writing, Malaysia has recorded 2,097,830 confirmed cases of COVID-19 with 23,443 deaths as of 21 September 2021 (WHO, 2021), bringing the total number of deaths to 26,143 (MSN, 2021a). A total of 265 new Delta variant cases were found in Malaysia as of 31 August 2021 (The Star, 2021a), and another 475 new cases were identified as of 26 September 2021 (NST, 2021).

To stop the spread of Covid-19, the Malaysian government instituted a series of statewide lockdowns via the directional movement order (MCO). The first complete lockdown started on March 18, 2020. Phases of the MCO extension & relaxation in 2021 in 2020 removed prohibitions on items like assembly and international travel as well as the closing of companies, government facilities, and schools. Vaccination against COVID-19 started in countries around the world in early December 2020, with the first round of vaccines being administered in Malaysia on February 26 of the following year. For those who have received a full COVID-19 vaccination, Malaysia has eased some of the restrictions imposed by the National Recovery

Program as of August 10th (OSAC, 2021). As of 30 September 2021, the whole adult population of Malaysia (20,053,472) will have received a Covid-19 vaccine (The Star, 2021b).

The COVID-19 epidemic has utterly destroyed the global economy. The COVID-19 outbreak, according to the Organization of Economic Co-operation & Development (OECD), has disrupted society and the economy in general (OECD, 2020). According to the Food and Agriculture Organization (FAO), international food prices have risen sharply over the past decade, and many nations are still fighting to contain the COVID-19 pandemic's spread (MSN, 2021b). Impact has impacted stock liquidity in the market (Zaremba et al., 2021) and enforcement of lockdown has greatly disrupted commercial activity across sectors, impacting people's income and producing economic disruption inside the country. Thai exports increased 8.9% in August & 15.3% through the first 8 months of the year as a result of the lower baht, which has fallen more than 11% compared to the dollar thus far (Bloomberg, 2021b).

In February of 2021, the number of COVID-19 illnesses and deaths that were confirmed in Malaysia rose steadily. Compared to the same period in 2019, the first 4 months of 2020 saw a 3.5% decrease in commerce for Malaysia, with RM573.75 billion being the new total (Matrade, 2020). The GDP of Malaysia was reported to have dropped 3.4% from the previous quarter and from the same quarter the year before on 11 February 2021. The Malaysian economy fell 5.6% in 2020, the poorest year performance since the Asian Financial Crisis of 1998. (Bloomberg, 2021a). Amid continuing COVID-19 problems, Malaysia's key economic indicator fell for the fourth consecutive month for July 2021, falling by 0.6% month-over-month with four out seven factors declining (DOSM, 2021a). The Bursa Malaysia Index, the Real Import Price Index of Semiconductors, the Real Import Measure of Inflation for Many Other Basic Precious and Other Non-Ferrous Metals, and the Number of Recently Registered Companies are the four indices that are kept an eye on. The Bursa Malaysia Index is the most important of these four.

According to the Malaysian Department of Statistics (DOSM), the Consumer Prices Index (CPI) of Malaysia rose to 123.2 in June 2021 from 119.1 in the corresponding month of the previous year (DOSM, 2021b). Figure 1 shows an interesting finding from DOSM (2021b) to compare the price of Big Mac by selected countries that converted to Ringgit Malaysia as a reference to the currency conversion dated 15 July 2021.

Figure 1: Price of Big Mac by Selected Country – converted to Ringgit Malaysia
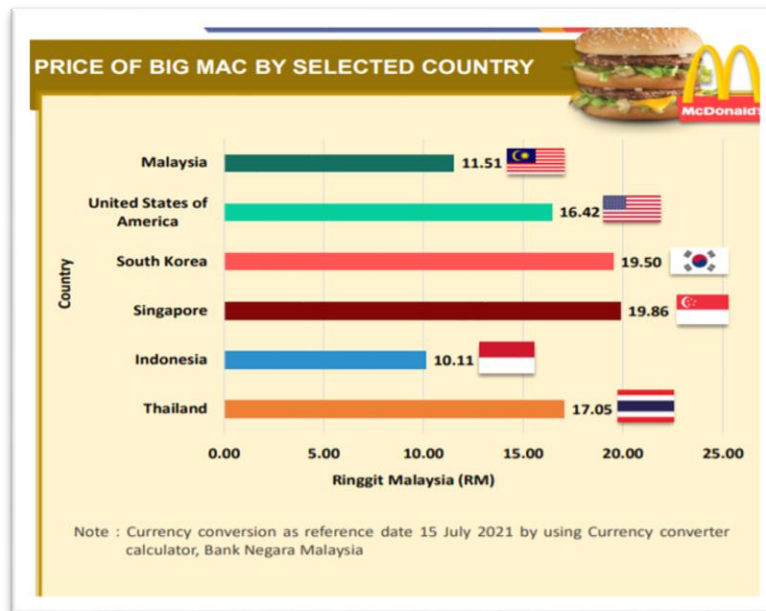
(Source: DOSM, 2021b)

According to market analysts, the Malaysian stock market was predicted to turn negative during September because to the prolonged dampening effect of Covid-19 instances, and on October 2, 2021, the local average lost 63.58 point month-on-month (m-o-m) (The Edge, 2021). According to the analysis, Malaysian stocks have historically had the most difficulty trading in September. September was the month when the market collapsed during 2000, 2001, 2003, 2008, & 2011. The course of the ringgit shows that the average Prior to the pandemic, the US dollar was worth RM4.10; by April 2020, it had fallen to RM4.35 a loss of 6.1 percent (NST, 2020). A rise of COVID-19 cases has reduced demand for the ringgit, causing it to decline further (The Star, 2021c).

The Government of Malaysia has made many measures to recover from the pandemic and lessen its economic impact. Party Leader Tan Sri Muhyiddin Yassin launched this sixth stimulus package on March 21, 2021. It will focus on 20 critical projects to enhance economic growth, big help, and extend targeted aid to the people and sectors affected by the epidemic (Borneo Post Online, 2021). Implementation of Budget 2021 (estimated at RM322.5 billion), the largest in Malaysia's history, is now underway, marking the fifth stage of a 6R Plan (Resolve, Resilience, Start, Recovery, Revitalize, and Reform) of the Economic and trade Recovery Program (Business Today, 2021).

The literature suggests that nations with rapid daily increases in COVID-19 instances also tend to have weaker currency. The purpose of this research is to determine how the COVID 19 epidemic has affected the fluctuation of the Ringgit Malaysian currency. Table 2 shows the top five countries' exports and imports partners according to the scale of trade value for January

to July 2020 and 2021 with Malaysia. These include countries from China, Singapore, the United States, Hong Kong, and Japan. In this project, we will study the exchange rates of these top countries, which are Chinese yuan (CNY), US currency (USD), Hong Kong dollars (HKD), Singapore dollar (SGD), or Japanese yen (JPY).

Table 2: Malaysia Top 5 Export & Import partners (RM Million)

COUNTRY	Currency	Export			Import			BALANCE OF TRADE	
		JAN - JUL			JAN - JUL			JAN - JUL	
		2020	2021		2020	2021		2020	2021
CHINA	CNY	85,191	103,218		4,589	130,178		(9,398)	(26,960)
SINGAPORE	SGD	77,525	95,789		41,902	50,227		35,622	45,562
UNITED STATES	USD	57,365	79,108		40,912	41,906		16,453	37,201
HONG KONG	HKD	37,281	41,569		7,509	9,924		29,773	31,645
JAPAN	JPY	36,586	42,879		33,923	42,584		2,662	295

Source: DOSM, 2021c

These findings may help key stakeholders, such as investors, better manage currency rate risk during the COVID-19 crisis. In addition, rising volatility in the foreign currency market poses risks to valuations or financial reporting, which end-users for foreign exchange instruments like corporations and commercial banks must be aware of? It is challenging to foretell the fate of this pandemic, especially in light of the diminishing efficacy of immunizations against the virus, and this crisis may last for some time. (Sanderson, 2021).

Overview the spread of COVID-19 in South Korea. Section 3 presents our empirical results, and Section 4 concludes the paper.

2. LITERATURE REVIEW

Numerous recent studies are investigating the impact of Covid-19 from different aspects, including political, legal, environmental, technological, social, and economical. As a result of the worldwide health crisis sparked by Covid-19, everyone on the planet has had to adjust their way of life. Since about 4 Oct 2021, there had been around 235 million recorded incidents and much more over 4.8 million people die across nearly 200 nations due to Covid-19, which is still spreading at this time (BBC, 2021). Scientific, clinical, epidemiological, and public health authorities need Covid-19 data to effectively combat the virus (Musa and Abdullah, 2020). Fernandes (2020) argued that the current COVID-19 updates and real time data could guide governments, companies, consumers to react and forecast the monetary stimulus to help sustain the coming risks. There is lack of prior research that researchers can use to compare with other global crises, like the worldwide influenza of 1918, 2013–2016 Ebola virus disease outbreak, 2008 financial crisis, etc.

Covid-19 impact on the economy

The COVID-19 has had an impact on practically all economic sectors. The intricately connected global economy meant that an economic impact in one sector has far-reaching

spillover effects on others. For example, COVID-19 negatively dampened the global supply chains, and generating spillover effects on different channels of supplier networks (Fernandes, 2020). The business sector was heavily impacted due to this pandemic (Chen et al., 2020). Government policies implemented to buffer the impacts of the pandemic will eventually lead to global economic depression (Barro, Ursúa and Weng, 2020) and destabilize financial markets (Ramelli and Wagner, 2020).

Su et al. (2021a) discovered that the pandemic increased unemployment in Europe. Due to the lockout, many individuals were unable to work and businesses were unable to run, which decreased purchasing power and exacerbated poverty. (ILO) (2020). ILO (2020) reported that the informal economy was severely affected, endangering millions of lives. COVID-19's impact on oil prices have been studied extensively (Narayan, 2020).

Finance risk research on COVID-19 in other counties

Many papers study COVID-19's financial impact. COVID-19 shocks a country's market and financial system (Li and Yan, 2022). Mukhopadhyay (2021) analysed the consequences of the COVID-19 pandemic on the world's five largest economies and found that the pandemic had ripple effects (USA, China, Japan, Germany, & India). Zhang, Hu, and Ji (2020) found that pandemic-related economic losses have made global financial markets volatile and unpredictable. According to COVID-19 data, the government affects stock market returns and volatility (Chang, Feng, and Zheng, 2021). (Baker et al., 2020).

Factor affecting the exchange rate

Macroeconomic, fiscal, monetary, or financial aspects of activity have all been impacted by the epidemic, and it is obvious that the main determinants of exchange rates for big currencies such as the US dollar and euro have undergone significant shift (Konstantakis et al., 2021). During the outbreak, most governments shut down schools, limited travel inside their borders, and launched public awareness efforts to calm the currency markets (Feng et al., 2021). Feng et al. found that reduced volatility in exchange rates was a result of income support, fiscal policies, or international assistance (2021).

Prior research on COVID-19 impacts to exchange rate

Pandemics have an effect on currency values (Rizvi et al., 2020; Umar et al., 2021a & 2021b). After cases were confirmed, Feng et al. discovered that dollar movements in 20 nations were much greater (2021). One of the most important economic indicators that have been impacted by the pandemic is the value of currencies. Due to its volatility, it is highly unpredictable (Su et al., 2021b). According to Li et al. (2021), the number of COVID-19 deaths and cases in the United States and China has an effect on the value of the yuan. The effects of COVID-19 on the Thai currency, as reported by Gongkhonkwa (2021), are mixed. According to Blu Putnam (2020), nations with high daily surges in new COVID-19 instances saw national currencies decrease, therefore it was important to monitor the spread of the virus to explain currency fluctuations. In their analysis, Li et al. found a linear relationship between the currency and COVID-19 proxies (2021). When comparing COVID-19 to preCovid-19, that had a

statistically larger range of volatility, we find that the duration at high volatility has doubled (Konstantakis et al., 2021).

3. RESEARCH METHOD AND RESULTS

There have been some studies looking at how the COVID-19 epidemic affected currency rates in other nations, but Malaysia was not one of them. The correlation between COVID-19 outbreaks and the ringgit in Malaysia is the focus of this research. The theoretical foundation of this investigation is shown in Figure 1. The objective of this study is to determine whether or not there is a connection between the number of newly reported cases of COVID-19 in Malaysia and fluctuations in the value of the Malaysian ringgit, the Chinese yuan, the Singapore dollar, the United Kingdom pound, the Hong Kong dollar, or the Japanese yen (JPY). From March 2020 to October 2021, the Malaysia Bank and the Malaysian Ministry Of health collected this data, which is now openly accessible. In order to calculate how much the COVID-19 Pandemic affected the Malaysian Ringgit Exchange Rate, this study employed regression testing. Data was analysed by statisticians. SPSS 17.0 was used for the statistical analysis.
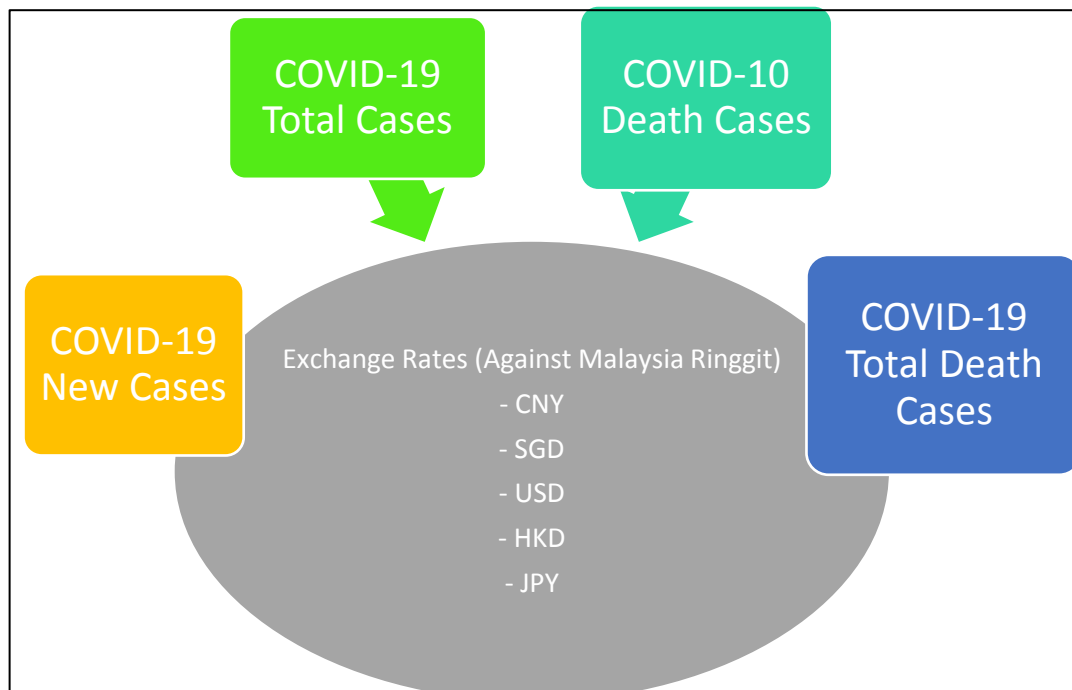
Figure 3 - The Conceptual Framework

3.1 Normality and Multicollinearity Test

The variables were normalised to ensure they fit the research model. A histogram tests normality. This graphical technique shows the skewness and kurtosis of a bell-shaped data set

with most scores in the middle. This was a multi regression test requirement. Field (2009) defines normally distributed data as skewness between 1 and 1. Negative skewness values indicate left-skewed data, and positive values indicate right-skewed data. Normal distribution kurtosis should be close to 0; 1 is acceptable (Field, 2009).

For sample sizes >300, data normality depends on histograms, skewness, and kurtosis. Absolute skewness of 2 or kurtosis (excess) of 4 can be used to determine normality (Kim H. Y., 2013). A multicollinearity test was also run to identify highly correlated independent variables that make it difficult to determine each variable's influence on the dependent variable. The Variance Inflation Factor (VIF) measures how well other variables explain others. Variable VIF should not exceed 10 as a rule.

3.2 Correlation Matrix & Regression Analysis

By using regression analysis, Gongkhonkwa (2021) examines how the COVID-19 pandemic affected the top 10 currencies in terms of their sale value with Thailand. To investigate the relationship between COVID instances and exchange rate, a correlation matrix or regression analysis were used. Following is the set of regression equations that was developed:

Chinese currency (CNY), Singapore dollars (SGD), US dollars (USD), Hong Kong dollars (HKD), and Japanese yen (JPY) exchange rates were each examined independently, resulting in the following regression equations (JPY):

$$EX_t = \alpha + \beta_1 X_{1} + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

EX   = Exchange Rate of five currencies (CNY, SGD, USD, HKD & JPY)

α = Intercept

X1   = COVID-19 new cases

X2   = COVID-19 total cases

X3   = COVID-19 death cases

X4   = COVID-19 total death cases

ε = Errors

3.3 Results and Findings

3.3.1   Descriptive Statistics and Histogram – Normality Test

Histogram analysis begins. Figure 4 depicts the behaviour of all variables, including Covid-19 cases, as well as the exchange rates of the top five countries from 18 March 2020 - the first day of Malaysia's total lockdown - to 15 October 2021. Total cases, new cases, deaths, and total death case distributions are skewed. The exchange rates follow a bell-shaped distribution in every respect. Rashed et al. (2020) found that daily COVID-19 reported cases have a bell-shaped or log-normal distribution throughout all 16 prefectures in Japan where the research

was carried out. Some of the curves in Gonçalves et al. (2021) appeared symmetric at first glance, however the bell shape is neither normal nor log-normal.

Mean, median, and standard deviation are displayed in Table 2 as descriptive statistics (standard deviation, skewness, and kurtosis). CNY is 0.62570, SGD is 3.06960, USD is 4.17509, HKD is 53.80645, and JKY is 3.88734. Daily COVID-19 new cases, total cases, new deaths, and total death cases average 4112.685, 417422.08, 48.0434, and 3479.20. Skewness is 2 and kurtosis is 4 for all variables. Kim H. Y. (2013) says this result is normal for regression analysis.

Histogram analysis begins. Figure 4 depicts the behaviour of all variables, including Covid-19 cases, as well as the exchange rates of the top five countries from 18 March 2020 - the first day of Malaysia's total lockdown - to 15 October 2021.

Total cases, new cases, deaths, and total death case distributions are skewed. All exchange rate variables have a bell-shaped distribution. Daily COVID-19 cases reported followed a bell-shaped and log-normal distribution, as found by the research of Rashed et al. (2020) throughout 16 prefectures in Japan. While the bell shape may resemble a normal and log-normal distribution at first glance, it is not.

The work of Gonçalves et al. demonstrates this (2021). Table 2 displays descriptive data including mean, median, and standard deviation (standard deviation, skewness, and kurtosis). Here are the rates of exchange: For example, you can exchange 1 CNY for 0.62570 SGD, 3.06960 USD, 53.80645 HKD, and 3.88734 JPY. Every day, on average, there are 4112.685 new cases, 417422.08 total cases, 48.0434 fatalities, and 3479.20 deaths due to COVID-19. All variables have a skewness of 2 and a kurtosis of 4. Kim H. Y. (2013) says this result is normal for regression analysis.
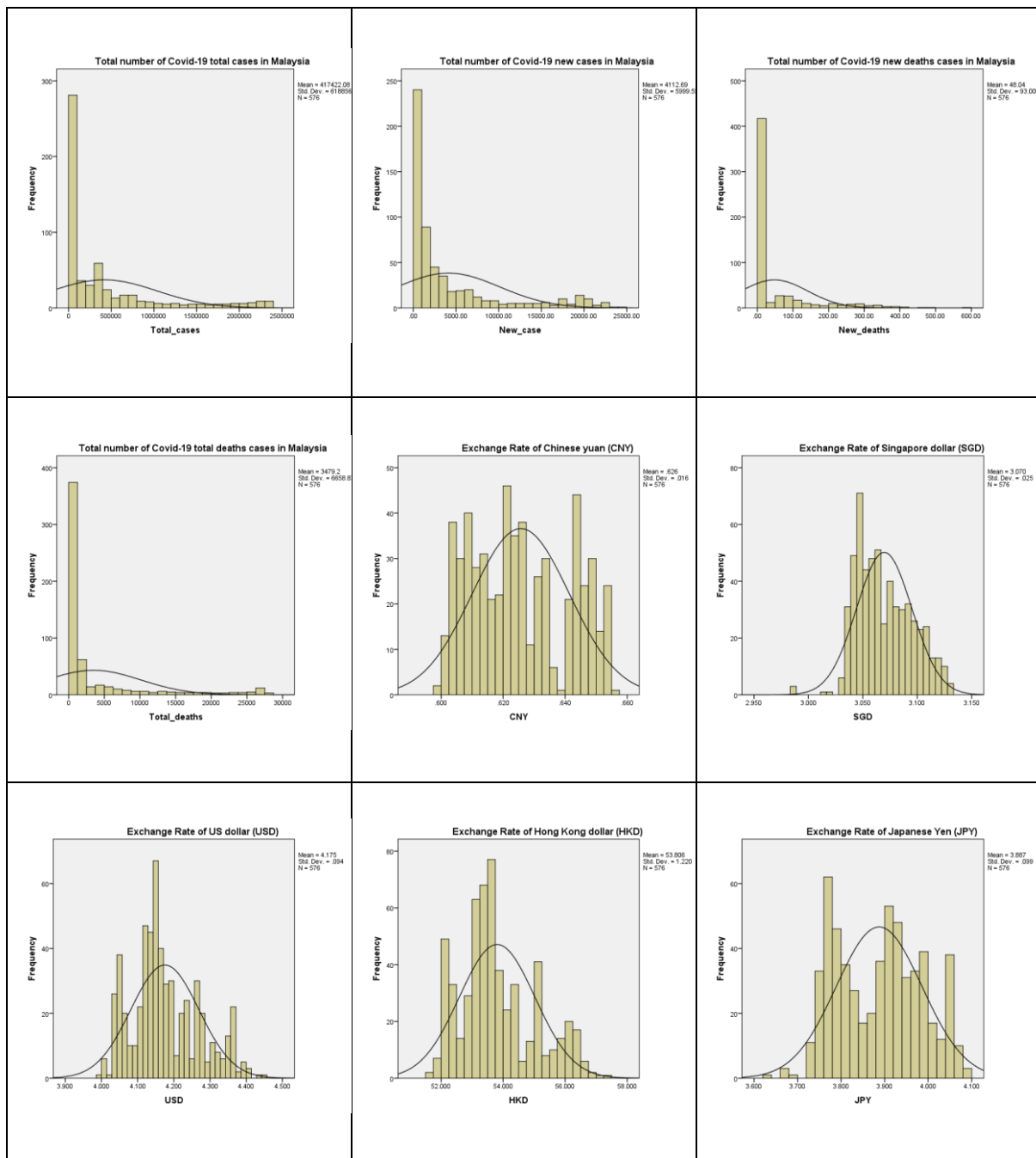
Figure 4: The following graph shows the exchange rates for the following currencies: the Chinese Yuan (CNY), Singapore Dollar (SGD), United States Dollar (USD), Hong Kong Dollar (HKD), and Japanese Yen. It also depicts the entire number of Covid-19 new cases, total Covid-19 cases, total Covid-19 new deaths cases, and total Covid-19 total cases (JPY)

Table 2: Descriptive Statistics

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
New_case	576	1.00	24599.00	4112.6858	5999.54980	1.762	.102	2.019	.203
Total_cases	576	673	2369613	417422.08	618856.541	1.807	.102	2.288	.203
New_deaths	576	.00	592.00	48.0434	93.00766	2.488	.102	6.207	.203
Total_deaths	576	2	27681	3479.20	6658.871	2.399	.102	4.794	.203
CNY	576	.599	.655	.62570	.015701	.238	.102	-1.182	.203
SGD	576	2.987	3.133	3.06960	.025444	.312	.102	-.335	.203
USD	576	3.997	4.445	4.17509	.094121	.530	.102	-.350	.203
HKD	576	51.548	57.291	53.80645	1.219813	.617	.102	-.311	.203
JPY	576	3.638	4.093	3.88734	.098579	.071	.102	-1.049	.203

3.3.2 Multicollinearity Test

Table 3: Summary table for Multicollinearity Test

Independent Variables	Collinearity Statistics	
	VIF (Before)	VIF (After)
New_case	10.638	7.155
Total_cases	48.964	4.261
New_deaths	7.558	6.880
Total_deaths	35.007	-

a. Dependent Variable: CNY, SGD, USD, HKD & JPY

In addition, a multicollinearity test was also conducted to identify highly correlated independent variables that might make it hard to determine the separate influence of each independent variable on the relevant dependent variable.

Based on the results in Table 3, the Variance Inflation Factor (VIF) values (before) were in the range of 7.558 to 48.964. The majority of VIF values for the independent variables were more than 10, so we can assume a multicollinearity problem. The total deaths variable is omitted. The multicollinearity test was rerun and shows that the VIF values (after) are from 7.155 to 4.261, which do not exceed ten which means there are no multicollinearity problems. As such, this analysis will continue and focus on the daily statistic of new cases, total cases, and new death.

3.3.3 Correlation Matrix

		New_case	Total_cases	New_deaths	CNY	SGD	USD	HKD	JPY
					Correlations				
New_case	Pearson Correlation	1	.859**	.915**	.801**	.668**	-.058	-.110**	-.524**
	Sig. (2-tailed)		.000	.000	.000	.000	.168	.008	.000
	N	576	576	576	576	576	576	576	576
Total_cases	Pearson Correlation	.859**	1	.853**	.784**	.593**	-.073	-.130**	-.646**
	Sig. (2-tailed)	.000		.000	.000	.000	.081	.002	.000
	N	576	576	576	576	576	576	576	576
New_deaths	Pearson Correlation	.915**	.853**	1	.677**	.587**	.015	-.034	-.447**
	Sig. (2-tailed)	.000	.000		.000	.000	.712	.416	.000
	N	576	576	576	576	576	576	576	576
CNY	Pearson Correlation	.801**	.784**	.677**	1	.725**	-.266**	-.318**	-.776**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	576	576	576	576	576	576	576	576
SGD	Pearson Correlation	.668**	.593**	.587**	.725**	1	.118**	.074	-.483**
	Sig. (2-tailed)	.000	.000	.000	.000		.005	.077	.000
	N	576	576	576	576	576	576	576	576
USD	Pearson Correlation	-.058	-.073	.015	-.266**	.118**	1	.998**	.580**
	Sig. (2-tailed)	.168	.081	.712	.000	.005		.000	.000
	N	576	576	576	576	576	576	576	576
HKD	Pearson Correlation	-.110**	-.130**	-.034	-.318**	.074	.998**	1	.621**
	Sig. (2-tailed)	.008	.002	.416	.000	.077	.000		.000
	N	576	576	576	576	576	576	576	576
JPY	Pearson Correlation	-.524**	-.646**	-.447**	-.776**	-.483**	.580**	.621**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	576	576	576	576	576	576	576	576
**. Correlation is significant at the 0.01 level (2-tailed).									

Table 4: Correlations Matrix

The Pearson correlation coefficient is used to analyse the linear relationships between Covid-19 occurrences and the rates of a Chinese yuan (CNY), Singapore dollars (SGD), American dollar (USD), Hong Kong dollars (HKD), and Japanese yen (JPY) (see Table 4). Except for USD with COVID-19 initial, total, and death cases or HKD for COVID-19 death cases, where the connection is not statistical significant because the p-value is bigger than the significance level, all variables are important at the 5% level. There is inconclusive evidence about the significance of the association between the variables.

The result from the correlation matrix to summarize the correlations between all variables is as follows:

For CNY and SGD, the coefficient of correlation is within 0.587 to 0.801, indicating a strong linear positive correlation between the variables. The relationship is positive because as one COVID-19 new, total and death cases increases, the CNY and SGD exchange are also increases.

For USD, not significant for all variables.

For HKD, the coefficient of correlation for COVID-19 new and total cases is -0.130 to -0.110, indicating a weak linear negative correlation between the variables. Besides, COVID-19 death cases are not significant.

For JPY, the coefficient of correlation is between -0.447 to -0646, which indicates a moderate linear negative correlation between the variables.

3.3.4 Multiple Regression Analysis

This section summarises the outcomes of a regression model constructed to investigate the association between a single continuous predictor and response. The Covid-19 instances are related to the exchange rates of the top five nations, as shown by the regression model. These five countries use the Chinese yuan (CNY), United States dollars (USD), Hong Kong dollars (HKD), Singapore dollar (SGD), and Japanese yen (JPY):

Table 5: Results of Regression for Chinese Yuan Exchange Rate

Model (Adjusted R^2 = 0.719)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.615	.000		1394.920	.000*
New_case	2.273E-6	.000	.868	14.694	.000*
Total_cases	1.290E-8	.000	.509	11.151	.000*
New_deaths	-9.310E-5	.000	-.552	-9.516	.000*

(Note: The dependent variable is CNY where adjusted R^2 = 0.719, F = 492.069, sig = 0.000; * represents significant at 5 percent significance level)

You can see the results of the regression analysis performed on the Chinese Yuan Currency Rate as well as the independent variables in Table 5. The Chinese Yuan Currency Exchange model described above has an excellent fit, as indicated by the model's adjusted R2 value. To paraphrase the figure, we might say that the model accounts for 71.9% of the total variation. Above the threshold of 30% considered adequate in a social science study, the regression fitted is good (Field, 2009). So, it seems reasonable to use this as an example.

The F results of the test of 492.069 (sig=0.000), which represents the statistical significance of the whole regression at the 5% level, shows this. The statistics also demonstrate a statistically meaningful difference in the number of cases reported, the total amount of instances, as well as the death rate (Sig=0.000) at the 5% significance level. This demonstrates how all three factors are interconnected and impact the value of the yuan. The Covid-19 new investigation

has the greatest beta score at 0.868 %, which suggests that for every one percentage increase in new cases, the Chinese Yuan Currency Yuan will climb by 0.525 percent.

The regression equation for Chinese Yuan Exchange Rateis as follows:

EX_{CNY} = 0.615 + 2.273E-6 (COVID-19 new cases) + 1.290E-8 (COVID-19 total cases) - 9.310E-5 (COVID-19 death cases)

Table 6: Results of Regression for Singapore dollar Exchange Rate

Model (Adjusted R^2 = 0.450)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.057	.001		3056.258	.000
New_case	3.158E-6	.000	.745	9.006	.000*
Total_cases	5.018E-9	.000	.122	1.913	.056
New_deaths	-5.424E-5	.000	-.198	-2.445	.015*

(Note: The dependent variable is SGD) where adjusted R^2 = 0.450, F = 158.128, sig = 0.000; * represents significant at 5 percent significance level)

Above, Table 6 displays the results of a regression study performed on the Singapore Exchange Rate and several explanatory factors. The Chinese Yuan Currency Exchange model described above has an excellent fit, as indicated by the model's adjusted R2 value. The figure shows that the adjusted R2is 45.0%, indicating that the model adequately explains the data and leading us to infer that the fitting of the analysis is good, since it is greater than the cutoff value of 40%. According to the findings of the F test, which came in at 158.12 and had a significance level of 0.000, the overall regression has a level of statistical significance that is significant at the 5% level. The findings also suggest that new cases and death cases are, respectively, positive and negative significant impacts at significance levels of 5 percent (Sig = 0.000). However, the total case is insignificant (sig=0.056), and it explains that the total case has no relationship and no influence on the Singapore Dollar Exchange Rate. Besides, Covid-19 new cases are again the highest beta score (0.745) in the model.

The regression equation for Singapore Dollar Exchange Rateis as follows:

EX_{SGD} = 3.057 + 3.158E-6 (COVID-19 new cases) - 5.424E-5 (COVID-19 death cases)

Table 7: Results of Regression for US dollar Exchange Rate

Model (Adjusted R^2 = 0.038)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	4.186	.005		855.027	.000
New_case	-5.272E-6	.000	-.336	-3.072	.002*
Total_cases	-3.322E-8	.000	-.218	-2.587	.010*
New_deaths	.001	.000	.509	4.747	.000*

(Note: The dependent variable is USD where adjusted R^2 = 0.038, F = 8.584, sig = 0.000; * represents significant at 5 percent significance level)

The findings of a regression research between the US Dollar Exchange Rate and the independent variables are shown in Table 7 above; the adjusted R2 value is 3.8%, indicating that the model can only explain 3.8% of the variation. The F results of the test of 8.584 (sig=0.000) shows that the overall association is significant just at 5% level of significance. In addition to the total case's (Sig=0.000) substantial positive influence at such a 5-percent significance level, the data show that new instances (Sig=0.002) or total events (Sig=0.010) are substantial negative influences.

The regression equation for US Dollar Exchange Rateis as follows:

EX_{USD} = 4.186 - 5.272E-6 (COVID-19 new cases) - 3.322E-8 (COVID-19 total cases) + 0.001 (COVID-19 death cases)

Table 8: Results of Regression for Hong Kong dollar Exchange Rate

Model (Adjusted R^2 = 0.052)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	53.998	.063		857.209	.000
New_case	-7.312E-5	.000	-.360	-3.311	.001*
Total_cases	-5.275E-7	.000	-.268	-3.193	.001*
New_deaths	.007	.001	.523	4.915	.000*

(Note: The dependent variable is HKD where adjusted R^2 = 0.052, F = 11.475, sig = 0.000; * represents significant at 5 percent significance level)

The results of a regression analysis between the Hong Kong Exchange Rate in Dollars and some independent variables are presented in the table that can be found above. Given that the corrected R2 value represents 5.2 percent of the variance that can be accounted for when describing the model, we are able to draw the conclusion that the fit of the regression is not very strong.

According to the outcome of the F test, which was 11.475% (sig=0.000), the overall regression satisfies the criteria for statistical significance at the 5% level. The results show that there is a significantly negative influence from cases reported (Sig=0.001) and from total cases (Sig=0.001) at the 5% level, as well as a significantly positive influence from total cases (Sig=0.000) at the same level.

The regression equation for Hong Kong Dollar Exchange Rateis as follows:

EX_{HKD} = 53.998- 7.312E-5 (COVID-19 new cases) - 5.275E-7 (COVID-19 total cases) + 0.007 (COVID-19 death cases)

Table 9: Results of Regression for Japanese Yen ExchangeRate

Model (Adjusted R^2 = 0.467)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	3.936	.004		1029.041	.000
New_case	-4.568E-6	.000	-.278	-3.406	.001*
Total_cases	-1.420E-7	.000	-.891	-14.151	.000*
New_deaths	.001	.000	.568	7.099	.000*

(Note: The dependent variable is JPYwhere adjusted R^2 = 0.467, F = 167.318, sig = 0.000; * represents significant at 5 percent significance level)

Japanese Yen Currency Exchange Regression Analysis Exhibited by Independent Variables Table 9. A 46.7% increase in R2 indicates that more of the observed data may be used to explain the model. The regress fit is satisfactory because it is greater than the minimal detectable value. At the 5% level of significance, the total regression has a F value of 167.318 (sig=0.000), indicating its importance. At the 5% level, it was discovered that all three variables were statistically significant. There are substantial negative affects from both the number of new cases (Sig=0.001) and the total number of cases. The death case (sig=0.000) is a positive influence on the Japanese Yen Exchange Rate. Besides, Covid-19 total cases are the highest beta score (-0.891) in the model.

The regression equation for Japanese Yen Exchange Rate is as follows:

EX_{JPY} = 3.936 - 4.568E-6 (COVID-19 new cases) - 1.420E-7 (COVID-19 total cases) + 0.001 (COVID-19 death cases)

4. DISCUSSION AND CONCLUSION

The impact of the COVID-19 cannot be measured or forecast accurately as no one can estimate how long it will end in the world or should we live together with the virus and continue to our lives to work, trade, study, etc. Today (6 November 2021), based on the Malaysia Ministry of Health, Malaysia is recorded 75.4% of the total population that Whether it be a 2 vaccine or even a single-dose vaccine, 492,054 boosters have been given to date. We believe the COVID 19-vaccines can minimise the danger of getting or transmitting the virus which causes COVID-19, thus governments are working around the world to provide the vaccine exercise. This is the sole option for reviving an economy, and the process is still in its early stages in many countries.

An examination of the impact of numerous factors on the currency rate is of paramount importance when making decisions about international trade or policy proposals because of the centrality of the currency in gaining insight into a country's financial status. So, we look at how the Chinese yuan (CNY), Singapore dollars (SGD), US dollar (USD), Hong Kong dollars (HKD), & Japanese yen (JPY) compare to one another and how it relates to the number of new, total, death, and complete death COVID-19 cases in Malaysia.

As shown above, COVID-19 outbreaks in Malaysia have both positive and negative effects just on Ringgit Malaysia currency rate. Table 10 displays the trend of the link between COVID19 instances and the appreciation (negative relationship) and devaluation (positive relationship) of the Chinese yuan (CNY), Singapore dollars (SGD), Exchange rates for the US dollars (USD), Hong Kong currency (HKD), or Japanese yen (JPY).

Table 10: Direction of Relationships

Variables	Covid-19 New Cases	Covid-19 Total Cases	Covid-19 Death Cases
Chinese yuan (CNY)	+	+	-
Singapore dollar (SGD)	+	NA	-
US dollar (USD)	-	-	+
Hong Kong dollar (HKD)	-	-	+
Japanese Yen (JPY)	-	-	+

In conclusion, the results show that:

Firstly, COVID-19 new cases are associated with all exchange rates where appreciation (negative relationship) of the USD, HKD, and JPY and depreciation (positive relationship) of the CNY and SGD.

Secondly, With the exception of SGD, COVID-19 total cases are correlated with all currency rates no correlate with total cases where appreciation (negative relationship) of the USD, HKD, and JPY and depreciation (positive relationship) of the CNY.

Lastly, COVID-19 death cases are associated with all exchange rates where appreciation (negative relationship) of the CNY and SGD and depreciation (positive relationship) of the USD, HKD, and JPY.

This finding is consistent with those of Rizvi et al. (2020) & Umar et al. (2021a & 2021b), who also discovered that the breakout of the pandemic has an effect on the fluctuations inside the foreign exchange market. This confirms the findings of Gongkhonkwa (2021), who looked at how the COVID-19 epidemic affected the value of the top 10 currencies. Findings show that COVID-19 cases and currency values are negatively correlated in both Thailand and Malaysia, however the direction of a correlation varies per country. For instance, despite the Covid-19 pandemic stopping all traditional bilateral interaction, commercial and trade interactions between China and Malaysia continued to flourish, and collaboration between the two countries did not stop (The Star, 2021d).

As the number of COVID-19 instances between nations varies, this study offers new perspectives on the examination of currency exchange rates. Singapore reported an increase in COVID-19 cases and recorded 3,496 new cases on 2 November 2021 (Mediacorp. 2021). NST (2021b) reported that China placed a city of four million under lockdown on 2 November 2021 in a bid to put a stop to the domestic COVID-19 outbreak again.

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