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The Impact of Covid-19 on Malaysian Edible Birdnest (EBN) Industry

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Abstract
The swiftlet industry is listed under 12 Entry Point Projects (EPP) under the Agriculture NKEA which is one of the cores of Economic Transformation Programme (ETP) as it can generate income for the nation. Although swiftlet ranching business or activities is a minor player compared to other establish business, it significant in their own way. They have contributed to exports and created a fair amount of employment. However, the pandemic Covid-19 outbreak has taken a toll on many sectors and industry players, inducing rising concerns nationwide over the country's economic outlook. The Movement Control Order (MCO), which is enforced until year 2021, will also dampen domestic economic activity. The primary objective of this study is to use the Vector Autoregressive (VAR) model to determine the

influence of Covid-19 on EBN export in Malaysia. The purpose of this study is to ascertain the influence of newly confirmed and fatal COVID-19 cases on EBN export in Malaysia. Granger causality analysis indicates a unidirectional causal relationship between EBN export (EBN) and coronavirus new cases (CNNCC) and coronavirus fatal cases (CNFC). According to the VAR data, confirmed coronavirus cases have a negative and significant effect on EBN export in Malaysia. This indicates that information on coronavirus positive cases is inversely correlated with EBN export. However, coronavirus fatal cases have a beneficial influence on EBN export, but the effect is statistically insignificant.
Keywords: Swiftlet, Covid-19, EBN Export

Introduction

The swiftlet ranching is firmly anchored on its potential for lucrative returns. The growing demand is derived especially from the rising affluence of Mainland Chinese and the world-wide trend of pharmaceutical and herbal products companies in using edible birdnest (EBN) as base materials for producing natural and organic extracts and products (Merican, 2007). Realizing the prospects of swiftlet ranching, the Malaysian government in 2010 has designated it as a high-growth sub-sector in the agriculture National Key Economic Area (NKEA). This activity has been earmarked as an Entry Point Project (EPP) under the Economic Transformation Programme (ETP) announced in late 2010 with the aim to turn it into an agro-business to serve the export market and to create a viable form of livelihood. Although swiftlet ranching business or activities is a minor player compared to other establish business, it significant in their own way. They have contributed to exports and created a fair amount of employment.

Malaysia exports EBN worldwide with the main export market being Hong Kong which covers 50 percent of Malaysia export then followed by China (8%), Taiwan (4%) and Macau (3%). As there is continued demand from importers countries especially China, the production of EBN is expected to increase.

Figure 1.1 above shows the worldwide export of EBN including to China, Hong Kong, Taiwan, Singapore, Japan, Brunei, USA and other countries from year 2010 to 2016 where the figures increased year by year. In 2010, EBN exports recorded a total of 108.89 metric tons and increased by 33.77 percent to 145.8 metric tons in 2011. In the middle of 2011, an embargo from China caused a sharp decline in the Malaysian EBN export. This led to decrease in export by 13.98 percent from 145.8 metric tons (2011) to 125.42 metric tons (2012). In 2014, there was a slight decline in export and only after the embargo was lifted that Malaysian export showed a positive trend which was 45.01 percent increase from year 2015 to 2016. In 2016, the total export was 381.3 metric tons with value of RM3.44 billion. There is a sharp increase from year 2017 until 2019 and then the trend quite slow in 2020. The increase is due to Malaysia's ability to produce quality nests especially for the Chinese market.

However, the pandemic Covid-19 outbreak has taken a toll on many sectors and industry players, inducing rising concerns nationwide over the country's economic outlook. The Movement Control Order (MCO), which is enforced until year 2021, will also dampen domestic economic activity. The swiftlet industry is not immune to this pandemic. In Indonesia, bird's nest prices have dropped sharply due to unexplained sales as more flights to China are closed and demand has dropped. With the above bear in mind, thus, this study wants to investigate at the impact of Covid-19 to the trade of Malaysian EBN.

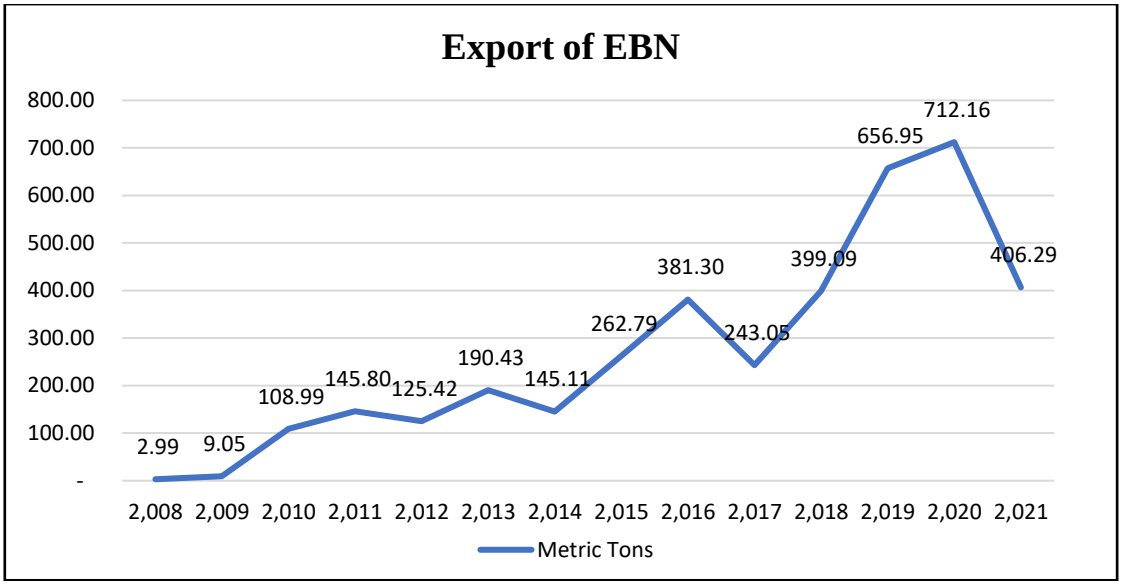

Figure 1.1: Export of EBN from Year 2008 –2021
(Source: Jabatan Kastam Diraja Malaysia, 2021)

The EBN sector is a revenue-generating industry for the Malaysian economy. As a result, there is a need to sustain this business for the purpose of the industry's players as well as the relevant government authorities. The primary objective of this study is to use the Vector Autoregressive (VAR) model to determine the influence of Covid-19 on EBN export in Malaysia. The purpose of this study is to ascertain the influence of newly confirmed and fatal COVID-19 cases on EBN export in Malaysia. This study makes a significant contribution by establishing information on how individual actors in the swiftlet ranching industry work to attain competitiveness during this challenge pandemic period.

Literature Review

EBN has been traded in Malaysia for the past 500 years and was traded between the Malay Archipelagos and Mainland China since the 16th century (Sankaran, 2001). Since 2008, EBN industry has grown rapidly in Malaysia and now commercially involves the conversion of human-centric buildings into structures for swiftlet nesting (Ibrahim et al, 2009; Tan et al., 2014; Looi & Omar, 2016).

The Growth of EBN Industry in Malaysia

According to Ya'acob, F. F et al (2021), swiftlet farming EBN is a high-value sector started by Malaysia's Prime Minister in 2007. It has been employed as part of the MOA's National Key Economic Areas programme (NKEA) Agriculture in order to reach a GNI of RM4.5 billion by 2020. The growth in trade is progressing as the demand for EBN increases yearly. In 1990, around 26,000 kilogram of EBN was traded in Malaysia. The EBN is one of the most expensive animal products, and it is often referred to as "East Caviar." The price of raw cleaned EBN was around RM20,000 per kilogram in China’s retail markets (Jing, 2020). The gross output value of EBN amounted to RM3.007 million per month and the global average demand for EBN is expected to be 12,000 metric tonnes per year, although total output from Southeast Asian countries is only about 500 metric tonnes (Ibrahim et al, 2015). However, Malaysia only produced up to 350 metric tons per year (Star Online, 2016). According to Jing (2020)

Malaysian bird's nest exports were valued RM1.3 billion in 2018, RM1.1 billion in 2019, and reach RM1.5 billion in 2020.

There are many factors that increases the demand for Malaysian EBN, among them is the fact that Malaysian EBN has better quality because the product from this country is safe and free of diseases, the product is widely accepted in the international market and Malaysia has in place a good system on tracking and traceability (MARDI, 2012). The Malaysian government recognizes the economic potential of the EBN industry. Thus, many strategies have been established to support the development of this industry. One of such strategy is identifying EBN industry as one of the 16 entry point project (EPP) initiatives in the Economic Transformation Program (ETP) of Malaysia (Rabu and Nazmi, 2011).

The Obstacles in EBN Industry

The EBN industry in Malaysia faced difficult times in 2011 when the Chinese government placed a ban on EBN and EBN based products from Malaysia. This ban was due to high level of nitrite (NO2) found in Malaysian EBN (Tangjitmanngamkul, J., 2019). This ban was a hard hit on the Malaysian EBN market and swiftlet ranching industry as it caused a drop in demand for EBN which resulted in a much lower price of EBN. However, the price of raw EBN after the embargo is still low ranging and the price rise has been very slow, but Malaysia still manages to solve these problems and the Malaysian government is committed to ensure that the EBN industry is growing rapidly. Malaysian EBN industry providing a Veterinary Health Mark (VHM) certificate from the Department of Veterinary Services, Certification and Accreditation Administration of China (CNCA) of the Ministry of Health (MOH) and Inspection Detection of Radio Frequency Identification (RFID), a system for detecting the place of origin of the EBN to ensure that Malaysian EBN quality is the best in the world (Thorburn, 2015)

The COVID-19 has not only affected countless human lives all over the world, but it has also been predicted to have a potentially adverse impact on the global economy (Rajamoorthy, Y. 2020). With the pandemic disease Covid-19 outbreak on January 2020, Malaysia government enforced the Movement Control Order starting from 18th March 2020 to seriously break the chain of COVID-19 (Shah et al, 2020). Industries such as travel, leisure and hospitality, tourism, airline, retail and many more are severely affected by this pandemic. In Malaysia, the COVID-19 epidemic has checked the resilience of the agriculture sector (Adnan & Nordin, 2021). In addition to this, Malaysia's economy is likely to be affected due to the rapid slowdown of China's global trade activities.

Methodology

Data

This study adopts time series data over a period of five years across the Malaysian EBN export. The main data sources include Jabatan Kastam Diraja Malaysia data. In this research paper, 53 observations and weekly data based on January 2020 to December 2020 were used after adjustment by using Eviews.

Estimation Technique and Analysis Procedure

This study uses an ex-post facto design and an event study approach. The event study approach is thought to be appropriate since a specific event, in this example the coronavirus outbreak, is investigated in relation to its impact on a topic of interest, such as EBN export. In a similar vein, historical data on coronavirus was compared to historical data on EBN export in order to demonstrate a causal association between coronavirus and EBN export. To

understand the impact of covid-19 on Malaysian EBN trade, first, the data from Jabatan Kastam Diraja Malaysia between January 2020 to December 2020 will be used analyse the short-term trade impact of the COVID-19 pandemic in Malaysia. Second, Vector Autoregression (VAR) model will be used as he estimation technique of the study for estimation and forecasting.

Descriptive Analysis

The purpose of descriptive analysis is to investigate the distribution (frequency distribution), central tendency (mean, median, and mode), and dispersion using descriptive analysis (variance and standard deviation).

Vector Autoregression (VAR)

The study's estimation method is the Vector Autoregression (VAR) model. VAR is a versatile and simple model for multivariate time series data that is autoregressive in nature, and it is used for data description, estimation, and forecasting (Suharsono, 2017). It can also be used to track short-term changes in variables and has more accurate forecasting capabilities (Cuvak & Kalinauskas, 2009). All variables are considered endogenous in the VAR model. As a result, each variable is expressed as a function of its lag value as well as the lag values of other variables in the model. In this study, the six-stage estimation approach for VAR given by Suharsono et al. (2017) is applied in the estimate procedure. The following are the steps in doing a VAR: testing data stationarity and degree of integration; determining lag length; granger causality test; and VAR model estimation.

Model Specification

This work defined the functional correlation between coronavirus and EBN export using Ahmed's model (2020). In terms of area, industry, and frequency of data set, this study differs from Ahmed (2020). Equations (1) to (3) below describe the VAR models used in this investigation.

$$EBNt = EBNt-1 + CNNCCt-1 + CNNFCt-1 + ut1 \quad (1)$$
$$CNNCCt = CNNCCt-1 + EBNt-1 + CNNFCt-1 + ut2 \quad (2)$$
$$CNNFCt = CNNFCt-1 + EBNt-1 + CNNNCt-1 + ut3 \quad (3)$$

Where;

EBNt indicates the weekly closing prices of stocks at the Nigerian Stock Exchange,
CNNCCt denotes the weekly new number of confirmed cases of COVID-19 in Malaysia,
CNNFCt signifies the new number of weekly COVID-19 fatal cases and
ut1−4 denote the error terms.

Result and Discussion

Analysis of Short-Term Malaysian EBN Trade Impact During The COVID-19 Pandemic

This section used the data published in the Statistic Department of Malaysia and Malaysian External Trade Statistics between December 2019 and January 2020. The discussion only focuses
on the short-term trade impact of the COVID-19 pandemic in Malaysia. The Malaysian total import, export and trade balance has been up and down during the period of March 2020 to December 2020 (Table 1). As the infection started in Wuhan, China, in early March 2020, and

China is our biggest exporters, Malaysian exports is less than imports caused the trade balance negative from July to November 2020 and become positive in December 2020.

Table 1: Summary of Malaysia's External Trade

	Total Export (RM Million)	**Total Import (RM Million)**	**Trade Balance (RM Million)**	**Total Trade (RM Million)**
Mar-20	12851.3	30413.2	-17561.9	43264.6
Apr-20	7855.95	209.26	7646.69	8065.21
May-20	36191	0	36191.03	36191
Jun-20	23276.3	518.72	22757.57	23795
Jul-20	31081.2	604475	-573394	635556
Aug-20	17833.2	17107.6	725.63	34940.8
Sep-20	24281.6	26428.2	-2146.56	50709.8
Oct-20	240823	832943	-592120	1073766
Nov-20	45949.1	153833	-107884	199782
Dec-20	41103.5	27895.3	13208.16	68998.8

Descriptive Analysis

The statistical behaviour of the variables in Table 2 shows that throughout the 53 weeks of investigation, the average weekly export of EBN in Malaysia (EBN) was 8.445905. EBN rises from a low of 5.557793 to a high of 12.21397 during the time, with a standard deviation of 1.103360. The EBN export, on the other hand, is positively skewed (0.661426), with a kurtosis of about 5. The export is considered to be normally distributed when the Jarque-Bera (5.04846) with a probability value (0.12486) is less than the ideal p-values.

Table 2 also shows that the average number of new confirmed (positive) coronavirus cases in Malaysia (CNNCC) is 6.885836 per week, with an average of 1.87 deaths. The confirmed cases range from 3.828641 to 9.430600, with a minimum of 3.828641 and a maximum of 9.430600. This is in contrast to fatalities and recoveries, which both have a minimum of 0 cases but a maximum of 9.430600 and 3.761200 people, respectively.

The two coronavirus indicators in this study (CNNCC and CNNFC) are negatively skewed, unlike the EBN export (EBN), which is positively skewed. All other indicators (EBN, CNNCC, and CNNFC) are close to zero.

With kurtosis greater than 1, EBN, CNNCC, and CNNFC are classified as leptokurtic. Both CNNCC and CNNFC are stated to pass the normality test based on their respective J-B statistics.

Table 2: Descriptive Statistics

	EBN	CNNFC	CNNCC
Mean	8.445905	1.872547	6.885836
Median	8.461012	2.302585	6.652863
Maximum	12.21397	3.761200	9.430600
Minimum	5.557793	0.000000	3.828641
Std. Dev.	1.103360	1.301566	1.717236
Skewness	0.661426	-0.305762	-0.046655
Kurtosis	5.830412	1.558235	1.802193
Jarque-Bera	5.04846	3.781169	2.225316
Probability	0.000540	0.150984	0.328684
Observations	53	53	53

Stationarity Analysis

In addition to the stationarity test, the augmented Dickey-Fuller (ADF) test was used to identify the order of variable integration. As seen in Table 3, only EBN is stationary (in levels), but the other two (CNNFC and CNNCC) are not but become stationary at the first and second differences.

Table 3: Augmented Dickey-Fuller (ADF) Test

Variables	Levels	First Difference	Second Difference
EBN	-7.201106***	-	-
CNNCC	1.547890	-2.399115	-5.079418***
CNNFC	-2.439365	-6.520899***	-

Note: ***, ** and * rejection of the hypothesis of presence of unit root at 1%, 5% and 10% levels respectively, when the p-value is less than 1%, 5% and 10%.

Optimum Lag Selection

The optimal lag for model estimation, whose findings are provided in Table 4, demonstrates that all criteria unequivocally recommend lag order 4 as the optimal lag for model estimation in this investigation. This is because the information criteria with the smallest value is optimal.

Table 4: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1075.140	NA	1.30e+17	47.91731	48.03776	47.96221
1	-1061.759	24.38221	1.07e+17	47.72263	48.20440	47.90223
2	-1050.938	18.27523	9.92e+16	47.64170	48.48481	47.95600
3	-1033.066	27.80181	6.79e+16	47.24736	48.45180	47.69637
4	-990.9947	59.83418*	1.61e+16*	45.77754*	47.34332*	46.36125*

Note: LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion

Granger Causality Analysis

Table 5 summarises the VAR Granger causality/block exogeneity Wald tests. The causality analysis reveals no indication of a causative relationship between coronavirus and EBN export in Malaysia. This is because the Wald test statistics indicate p-values greater than or equal to the 0.10 level of significance. This resulted in the non-rejection of the coronavirus and EBN export causation hypothesis. However, there was a one-way causal relationship between EBN export (EBN) and coronavirus new cases (CNNCC). This is based on Wald test results with a p-value (0.0001) less than 1%, indicating that the null hypothesis of no causality between EBN and CNNCC is rejected. Similarly, for coronavirus fatal cases (CNFC) and coronavirus new cases (CNCC), the p-value (0.0733) is less than the 10% significant level.

Table 5: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: EBN				
Excluded	Chi-sq	df	Prob.	Decision
D(CNFC)	0.147899	2	0.9287	CNFC⇎EBN
D(CNCC)	0.048566	2	0.9760	CNCC⇎EBN
Dependent variable: D(CNCC)				
Excluded	Chi-sq	df	Prob.	Decision
EBN	13.57070	2	0.0011*	EBN⇒ CNCC
D(CNFC)	5.226740	2	0.0733*	CNFC⇒CNCC
Dependent variable: D(CNFC)				
Excluded	Chi-sq	df	Prob.	Decision
EBN	2.763796	2	0.2511	EBN⇎CNFC
D(CNCC)	2.902764	2	0.2342	CNCC⇎CNFC

Note: ⇎ denotes no causality; ⇒ signifies unidirectional causality

Vector Autoregression Analysis

Traditionally, the VAR model has been used when the series have the same integration order but are not mixed order. Thus, this study differentiated the two non-stationary variables (CNNCC and CNNFC) in order to make them stationary, bringing all four variables up to the level of stationarity. This is consistent with Garca-Ascanio and Mate's hypothesis (2010). The result of the VAR model of the effects of coronavirus' new confirmed cases (CNNCC) and coronavirus fatal cases (CNNFC) on EBN export in Malaysia is depicted in Table 6.

According to Table 6, lag 4 of the stock price (EBN(-4)) has a negative and non-significant influence on the stock price in its original(level) form. In other words, previous EBN exports do not always indicate current EBN exports in Malaysia. Coronavirus [D(CNNFC(-4)] fatal cases have a positive but insignificant effect on EBN export in Malaysia. This indicates that information about coronavirus fatalities is favourably associated with EBN export, although the association is not statistically significant. Additionally, coronavirus confirmed cases are adversely associated with EBN export and statistically significant. This indicates that coronavirus confirmed cases have potential impact to decrease EBN export in Malaysia.

In summary, the non-statistical significance of the one measures of coronavirus suggests that, though potentially encouraging, fatalities cases of coronavirus are not significant determinants of EBN export in Malaysia. However, the confirmed cases of coronavirus is one of determinants of changes in the EBN export in the Malaysia. The overall result shows

goodness of fit of the VAR model with R squared of 0.859098 and statistically significant at 0.01 level. This demonstrates that endogenous variable systemic fluctuation is explained by both its own lag and the lag of other endogenous variables. Simultaneously, the magnitude of R squared adjusted is 0.806260 after degrees of freedom are taken into account.

Table 6: Vector Autoregression Estimates

Variables	Coefficient	t-statistic	Standard Error	p-value	Result
EBN	-0.08423	-0.28136	0.29936	0.6299	Negative, non-significant
CNFC	1.06E-05	0.41980	2.5E-05	0.5237	Positive, non-significant
CNCC	-0.017625	2.07856	0.00848	0.00412	Positive, significant at 5%
C	11070.66	1.44216	7676.44	0.3697	Positive, non-significant
R-squared	0.859098				
Adj. R-squared	0.806260				
F-statistic	16.25902				

Post-Estimation Diagnostics

The outcomes of the post-estimation diagnostic tests are summarised in Table 7. As seen in Table 7, the hypothesis of no residual heteroscedasticity is not rejected by the Chi-square statistic (72.25366) and related high p-value (0.7191). As a result, the model appears to be homoscedastic. Similarly, the VAR residual serial correlation LM test statistics (LRE=4.676673 and Rao F-stat=0.510424) and associated p-values (0.8619) indicate that the hypothesis of no serial correlation cannot be rejected. This means that the VAR model is not susceptible to serial correlation. The J-B value for the VAR residual normality test is 2794.488, and the related p-value (0.0000) is less than the 1% significance limit. This indicates that the null hypothesis of model normality is rejected at the 1% level. Lütkepohl (2006) argues that while non-normality does not invalidate a large number of statistical processes used in VAR models, model improvement is still achievable. Despite the model's lack of normality, its estimates are valid.

Table 7: Post Estimation Diagnostic Tests

Diagnostic Tests of:	Test statistics	P-value
VAR Residual Heteroscedasticity	Chi-sq: 72.25366	0.7191
VAR Residual Serial Correlation LM	LRE stat: 4.676673	0.8615
	Rao F-stat: 0.510424	0.8619
VAR Residual Normality	J-B: 2794.488	0.0000

Conclusion

This study examined the number of fatal and positive coronavirus new cases in Malaysia over a 53 week period and its impact on EBN export. Granger causality analysis indicates a unidirectional causal relationship between EBN export (EBN) and coronavirus new cases (CNNCC) and coronavirus fatal cases (CNFC). According to the VAR data, confirmed coronavirus cases have a negative and significant effect on EBN export in Malaysia. This indicates that information on coronavirus positive cases is inversely correlated with EBN export. However, coronavirus fatal cases have a beneficial influence on EBN export, but the

effect is statistically insignificant. Overall, the COVID-19 pandemic has a mixed impact on Malaysian EBN export. This virus will
will certainly affect the global economic crisis as well as Malaysian trade especially EBN export. This is because Malaysian main exporter is China. To overcome this, there should be a greater reduction in imports than the reduction in exports to sustain Malaysia's GDP in the upcoming recession. Further studies on EBN trade and coronavirus nexus can be conducted by integrating macroeconomic variables as independent variables to look the direction of this variable toward EBN trade.

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