

The Effect of Coronavirus Spread on Exchange Rate (An applied study)

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Abstract

This study aims to measure the impact of Coronavirus Spread on currency exchange rate. The first hypothesis states that daily Coronavirus cases don't effect on currency exchange rate. The second hypothesis states that cumulative Coronavirus cases don't effect on currency exchange rate.

The study results show that there are positive and strong relationship between the daily Coronavirus cases and the currency exchange rate. This means that the higher daily Coronavirus cases, the higher currency exchange rate. Explanatory power of the model or the value of coefficient of determination (R^2) = 0.694 means that the independent variables included in the model (Daily Coronavirus cases) are explained almost (69%) from the variance in the dependent variable (currency exchange rate). So we can accept the alternative hypothesis of the first hypothesis daily Coronavirus cases effect on currency exchange rate.

The study results also show there are positive and strong relationship between the cumulative Coronavirus cases and the currency exchange rate. There significant. This means that the higher cumulative Coronavirus cases, the higher currency exchange rate. Explanatory power of the model or the value of coefficient of determination (R^2) = 0.784 means that the independent variables included in the model (cumulative Coronavirus cases) are explained almost (69%) from the variance in the dependent variable (currency exchange rate). So we can accept the alternative hypothesis of the first hypothesis cumulative Coronavirus cases effect on currency exchange rate.

Results indicate that currency Exchange rate seems to be sensitive to Coronavirus cumulative indicators more than daily ones.

Key Words: *Coronavirus, COVID- 19, currency exchange rate.*

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I. Introduction

The world is currently facing accelerated developments related to the emerging Corona virus epidemic (Covid 19), and countries around the world are collectively seeking to take precautionary and preventative measures to limit the spread of the virus and mitigate its effects, and perhaps the most important of these measures to limit its spread is to avoid direct contact and convergence between humans to the greatest extent possible and quarantine applications, including an almost complete cessation of trade, banking and travel. These and other measures on their importance have impacted the business environment in all countries of the region, Which necessitated many professional organizations and international companies to measure and study the global financial impact of this virus on the economies of these countries.

Recently, unique events of its kind appeared among the countries of the world, beginning with the developed world passing through the developing countries and continuing to spread and spread among the rest

of the world as a whole. The coronavirus epidemic called COVID-19 has disrupted the Chinese economy and is spreading worldwide. The evolution of the disease and its economic impact are very uncertain, making it difficult now for policy makers to measure its effect on the continuity of firms.

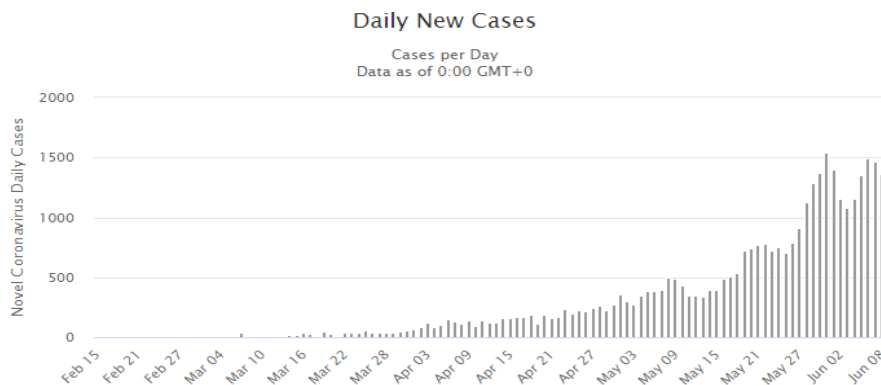
Commercial and consequently investment worldwide, and it is the Republic of China, where a virus has emerged that has spread among the countries of the world and affected the economies of countries, beginning with global financial markets in all countries and the circulation of shares and documents and investment in the global stock exchange, and even to small projects with limited income.

Threats posed by the coronavirus epidemic do not stop. More countries have imposed travel bans on millions of people and more people in more locations are placed with quarantine measures. Businesses do business with revenue losses and disrupted supply chains. Disruption of global supply chains due to factory closures has already revealed the vulnerabilities of many organizations. The epidemic has also led to significant volatility financial and commodity markets around the world.

There are already signs that the virus has had a significant impact on the global economy. Various governments announced measures to provide financial and non-financial resources assistance to disrupted industrial sectors and affected companies.

Thus, Egyptian economic also show the increasing of currency exchange between Egyptian bound with US Dollar. As report by Egyptian Stock Exchange during outbreak of COVID-19 in Egypt on March 2020. Therefore, government should take a serious action in order to avoid the economic recession. Thus, it is important to investigate the impact of COVID-19 into currency exchange rate between US dollar (USD) and Egyptian bound.

We need to invest much more in public health and development in the richest countries, but also and especially in the poorest countries. Unfortunately, politicians continue to ignore the scientific evidence of the role of public health in improving quality of life and as a driver of economic growth. (Alber, 2020, P.2) **Figures (1) and (2)** illustrate the developments of Coronavirus spread during the research period, as follows: **Figures (1)**



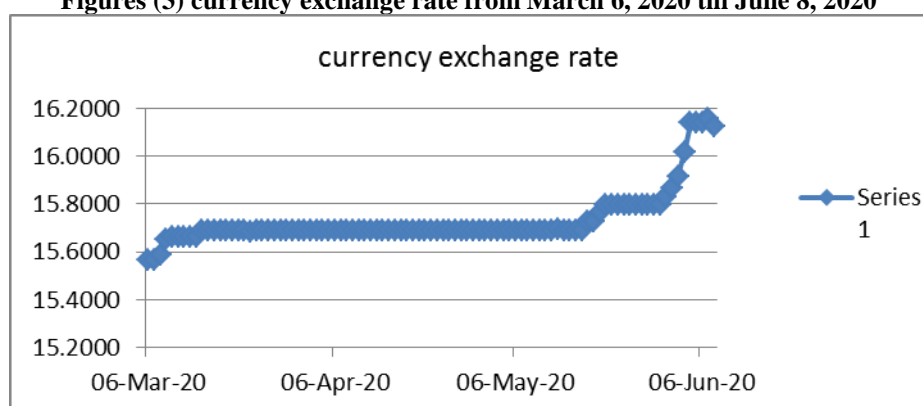
Source: <https://www.worldometers.info/coronavirus/country/egypt/>

Figures (2)



Source: <https://www.worldometers.info/coronavirus/country/egypt/>

Figures (3) currency exchange rate from March 6, 2020 till June 8, 2020



Source: by researchers depending on data from the Central Bank of Egypt

II. The Literature Review

The Prior studies related to Coronavirus are the following:-

Alber, (2020): investigate the effects of Coronavirus spread on stock markets. Coronavirus spread has been measured by cumulative cases, new cases, cumulative deaths and new deaths. This has been applied on the worst 6 countries (according to number of cumulative cases), on daily basis over the period from March 1, 2020 till April 10, 2020. Coronavirus spread has been measured by numbers per million of population, while stock market return is measured by Δ in stock market index. Results indicate that stock market return seems to be sensitive to Coronavirus cases more than deaths, and to Coronavirus cumulative indicators more than new ones. Besides, robustness check confirms the negative effect of Coronavirus spread on stock market return for China, France, Germany and Spain. However, these effects haven't been confirmed for Italy and United States.

Abd Elrhim & Elsayed, (2020): explore the effects of the spread of COVID-19 on global e-commerce companies, where the five largest e-commerce companies in the world were chosen in terms of revenues and market value, and they were as follows: American Amazon, Chinese Alibaba, Japanese Rakuten, German Zalando, United kingdom ASOS, has been Measuring the prevalence of corona virus by "cumulative infections" and "cumulative deaths" on a daily basis. Besides, it is measured through the values of both the "new corona virus cases" and the "new corona virus deaths" daily, the dependent variable reflects the response of the global e-commerce market to the impact of the spread of the corona virus and is measured by the daily returns of the shares of e-commerce companies to the global financial markets. This was applied on a daily basis from 15 March 2020 to 25 May 2020. The results of the descriptive analysis of the returns of the e-commerce companies showed that the companies achieve positive daily returns by calculating the average daily returns. The results of the aggregate model, according to the Beta Standardized Coefficients test, indicate the most important independent variables and an impact on the returns of shares of global electronic trading companies, a variable (total deaths) was the degree of its impact in the first rank, in the second rank a variable (total cases) and in the third variable (new cases).

Elsayed and & Elrhim, (2020): examine the effects of COVID-19 spread on Indices Sectoral of The Egyptian Exchange .Coronavirus spread has been measured by "Coronavirus cases" and "Coronavirus deaths" on daily basis. Besides, it's measured by each of "new Coronavirus cases" and "new Coronavirus deaths", in terms of Egypt's population. The dependent variable reflects the response of the Egyptian sectorial indicators to the spread of the Corona virus and is measured by the returns of the daily sectorial indicators for the Egyptian stock market. This has been applied on daily basis over the period from March 1, 2020 till May 10, 2020. Results indicate that the return of the stock market sectors seems to be more sensitive to cumulative indicators of mortality than daily deaths from corona virus, and new cases more than cumulative cases of corona virus. The coefficient of determination between the independent variables and the variable belonging to 4 sectors is (IT, Media & Communication Services 0.393, Industrial Goods, Services and Automobiles 0.470, Health Care & Pharmaceuticals 0.327, Basic Resources 0.266).

Abu Bakar, N & Rosbi, S, (2020): study the effect of Coronavirus diseases (COVID-19) on the equity market index and currency exchange rate. This pandemic creates unstable economic environment and unbalance financial situation in worldwide because many economic activities are ceased down. The important of this finding will help government body to understand the current condition during coronavirus disease 2019 (COVID-19) outbreak. In addition, the findings will assist policy makers to develop solution in stabilizing economic situation in COVID-19 outbreak. In the same time, this study helps investors to monitor the equity market to develop investment portfolio to gain better return and reducing loss.

McKibbin, W& Fernando,R,(2020): The outbreak of coronavirus named COVID-19 has disrupted the Chinese economy and is spreading globally. The evolution of the disease and its economic impact is highly uncertain, which makes it difficult for policymakers to formulate an appropriate macroeconomic policy response. In order to better understand possible economic outcomes, this paper explores seven different scenarios of how COVID-19 might evolve in the coming year using a modeling technique developed by Lee and McKibbin (2003) and extended by McKibbin and Sidorenko (2006). It examines the impacts of different scenarios on macroeconomic outcomes and financial markets in a global hybrid DSGE/CGE general equilibrium model. The scenarios in this paper demonstrate that even a contained outbreak could significantly impact the global economy in the short run. These scenarios demonstrate the scale of costs that might be avoided by greater investment in public health systems in all economies but particularly in less developed economies where health care systems are less developed and population density is high.

After reviewing all previous studies researcher concluded that:-

- The scarcity of researches conducted in the effect of Coronavirus spread on currency exchange rate (An applied study in Egypt).
- Most studies have focused on economic and financial effects of Coronavirus spread in general without focusing on its effects on currency exchange rate in particular

III. Research problem and questions

The research problem can be summarized on the following questions: -

- 1- Does daily Coronavirus cases effect on currency exchange rate?
- 2- Does cumulative Coronavirus cases effect on currency exchange rate?

Research objective

The main objective of this study is to measure the effect of Coronavirus cases effect on currency exchange rate.

Research hypotheses

From previous researches on Coronavirus effects, the study hypotheses are:-

First hypothesis: daily Coronavirus cases don't effect on currency exchange rate.

Second hypothesis: cumulative Coronavirus cases don't effect on currency exchange rate.

IV. Research Methodology

The researcher will be relying on a combination of inductive and deductive approaches to carry out two types of study are as follows:

A- **An Analytical study:** - through the analysis of books, periodicals, theses related to Coronavirus spread.

B- **An Empirical study:** - The study period has been applied on case of Egypt (according to number of daily and cumulative cases), on daily basis over the period from March 6, 2020 till June 8, 2020.

V. Measuring Variables and Developing Hypotheses

Coronavirus spread has been measured by “Coronavirus cases on daily basis. Besides, it’s measured by each of “daily” and “cumulative Coronavirus cases in terms of country population. The dependent variable reflects the currency exchange rate response to Coronavirus .the following table represent research variables.

Table (1): Research variables

Variables	Calculation	Sig
Exchange Rate**	Daily Exchange Rate	ER
Daily Cases**	Daily Cases	DC
Cumulative Cases**	Cumulative Cases	CC

Source: by researchers

Firstly to test the study hypotheses we will show the descriptive Statistics that provide information on the characteristics of data used in the analysis in order to determine the attributes and trends of the research sample towards the study hypotheses, thus the below table will offer mean, Std. Dev. and Std. Error Mean .

Descriptive Statistics

		Daily Cases	Cumulative Cases	Exchange Rate
N	Valid	95	95	95
	Missing	0	0	0
Mean		373.09	7791.31	15.729755
Median		189.00	3659.00	15.689900
Std. Deviation		425.234	9393.313	.1148231
Variance		180824.257	88234334.129	.013
Skewness		1.404	1.399	2.595
Std. Error of Skewness		.247	.247	.247
Kurtosis		.902	1.022	6.772
Std. Error of Kurtosis		.490	.490	.490
Minimum		0	12	15.5647
Maximum		1536	35444	16.1542

Source: Data processing output using SPSS v.26

Testing the first hypothesis using Pearson correlation

Results of the correlation analysis between daily Coronavirus cases and currency exchange rate

Correlations			
		Daily Cases	Exchange Rate
Daily Cases	Pearson Correlation	1	.833**
	Sig. (2-tailed)		.000
	N	95	95
Exchange Rate	Pearson Correlation	.833**	1
	Sig. (2-tailed)	.000	
	N	95	95

Source: Data processing output using SPSS v.26

The above table showed that the correlation coefficient between independent variable (daily Coronavirus cases) and the dependent variable (currency exchange rate) $r = .833$. It indicates that there are positive and strong relationship between the independent variable and the dependent variable. There significant levels (Sig.) = 0.000 less than (.05 level of significance). This means that the higher daily Coronavirus cases, the higher currency exchange rate. So we can accept the alternative hypothesis of the first hypothesis daily Coronavirus cases effect on currency exchange rate

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.833 ^a	.694	.691	.0638661

Source: Data processing output using SPSS v.26

The above table showed that

Independent variable significance:

Explanatory power of the model or the value of coefficient of determination ($R^2 = 0.694$) means that the independent variables included in the model (Daily Coronavirus cases) are explained almost (69%) from the variance in the dependent variable (currency exchange rate).

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Toleranc e	VIF
1	(Constant)	15.646	.009		1790.708	.000		
	Daily Cases	0.000225	.000	.833	14.520	.000	1.000	1.000

Source: Data processing output using SPSS v.26

The regression equation is as follows:

$$Y = a + BX + E$$

$$ER = 15.646 + 0.000225 DC + E$$

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.860	1	.860	210.840	.000 ^b
	Residual	.379	93	.004		
	Total	1.239	94			

Source: Data processing output using SPSS v.26

F-Test results indicates that the effect of the independent variable on the dependent variable is significant, because the level of significance=.0.000 is less than (. 05 level of significance). **Accordingly to the previously mentioned results we reject the null hypothesis (H0): daily Coronavirus cases don't effect on currency exchange rate and accept the alternative hypothesis (H1): daily Coronavirus cases effect on currency exchange rate.**

Testing the second hypothesis using Pearson correlation

Results of the correlation analysis between cumulative Coronavirus cases and currency exchange rate

Correlations			
		Cumulative Cases	Exchange Rate
Cumulative Cases	Pearson Correlation	1	.886**
	Sig. (2-tailed)		.000
	N	95	95
Exchange Rate	Pearson Correlation	.886**	1
	Sig. (2-tailed)	.000	
	N	95	95

Source: Data processing output using SPSS v.26

The above table showed that the correlation coefficient between independent variable (cumulative Coronavirus cases) and the dependent variable (currency exchange rate)r =.886, It indicates that there are positive and strong relationship between the independent variable and the dependent variable. There significant levels (Sig.) = 0.000 less than (. 05 level of significance).This means that the higher cumulative Coronavirus cases, the higher currency exchange rate. **So we can accept the alternative hypothesis of the first hypothesis cumulative Coronavirus cases effect on currency exchange rate.**

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.886 ^a	.784	.782	.0536339

Source: Data processing output using SPSS v.26

The above table showed that Independent variable significance:

Explanatory power of the model or the value of coefficient of determination ($R^2 = 0.784$) means that the independent variables included in the model (cumulative Coronavirus cases) are explained almost (69%) from the variance in the dependent variable (currency exchange rate) .

Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients Beta	T	Sig.	Collinearity Statistics	
		B	Std. Error				Tolerance	VIF
1	(Constant)	15.645	.007		2183.660	.000		
	Cumulative Cases	0.000011	.000	.886	18.380	.000	1.000	1.000

Source: Data processing output using SPSS v.26

The regression equation is as follows:

$$Y = a + BX + E$$

$$ER = 15.645 + 0.000011 CC + E$$

ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.972	1	.972	337.832	.000 ^b
	Residual	.268	93	.003		
	Total	1.239	94			

Source: Data processing output using SPSS v.26

F-Test results indicates that the effect of the independent variable on the dependent variable is significant, because the level of significance=.000 is less than (.05 level of significance). **Accordingly to the previously mentioned results we reject the null hypothesis (H0): cumulative Coronavirus cases don't effect on currency exchange rate and accept the alternative hypothesis (H1): cumulative Coronavirus cases effect on currency exchange rate.**

VI. Summary and Concluded Remarks

This paper attempts to investigate the effects of Coronavirus spread on currency Exchange rate. Coronavirus spread has been measured by cumulative cases, daily cases. This has been applied on Egypt, on daily basis over the period from 06/03/2020 till 08/06/2020 .

Most of the previous studies deal with the economic effects of the COVID-19 epidemic, while this study studies its effects on Exchange rate. Moreover, it considers all the signs of infection, whether cumulative or daily.

Results indicate that currency Exchange rate seems to be sensitive to Coronavirus cumulative indicators more than daily ones.

Accordingly to the previously mentioned results we reject the null hypothesis (H0): daily Coronavirus cases don't effect on currency exchange rate and accept the alternative hypothesis (H1): daily Coronavirus cases effect on currency exchange rate.

Accordingly to the previously mentioned results we reject the null hypothesis (H0): cumulative Coronavirus cases don't effect on currency exchange rate and accept the alternative hypothesis (H1): cumulative Coronavirus cases effect on currency exchange rate.

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