IMPACTS OF COVID-19 ON THE RETURN OF SUSTAINABLE STOCKS OF THAILAND

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ABSTRACT

Objective: This study aimed to investigate the impact of Covid-19 pandemic and vaccination on the sustainable stock price in the Stock Exchange of Thailand (SET) which be controlled by economic factors (as consumer price index and exchange rate)

Method: This paper employs Panel Autoregressive Distribution Lag model. These panel data were collected from the 93 sustainable stocks in SET during January 2017 to September 2022.

Results: The empirical results reveal that the COVID-19 pandemic caused the decline of the stock price, while the vaccination caused of the price increasing. In addition, the exchange rate depreciation also pushed the stock price and consumer price index (CPI) increasing pull the price down.

Conclusion: The results of this study revealed the influences of a terrible incident as an obstacle for the economic sector at the global level, i.e., the COVID-19 pandemic and its solutions/vaccines, and the influences of economic factors affecting the prices in the sustainable stock group. Therefore, the use of measures to promote vaccination would reflect the investors’ confidence in sustainable stocks.

Keywords: sustainable stocks, vaccination, Coronavirus disease 2019.

IMPACTOS DA COVID-19 NO RETORNO DE AÇÕES SUSTENTÁVEIS DA TAILÂNDIA

RESUMO

Objetivo: Este estudo teve como objetivo investigar o impacto da pandemia de Covid-19 e da vacinação no preço sustentável das ações na Bolsa de Valores da Tailândia (SET) que é controlado por fatores econômicos (como índice de preços ao consumidor e taxa de câmbio)

Resultados: Os resultados empíricos revelam que a pandemia de COVID-19 provocou a queda do preço das ações, enquanto a vacinação provocou o aumento do preço. Além disso, a depreciação da taxa de câmbio também empurrou o preço das ações e o aumento do índice de preços ao consumidor (IPC) puxou o preço para baixo.

Conclusão: Os resultados deste estudo revelaram as influências de um terrível incidente como obstáculo para o sector económico a nível global, ou seja, a pandemia COVID-19 e suas soluções/vacinas, e as influências dos factores económicos que afectam os preços no mercado. Portanto, a utilização de medidas para promover a vacinação reflectiria a confiança dos investidores em stocks sustentáveis.


1 INTRODUCTION

Nowadays, there are various investment options for investors. One option is to invest in the stock market, e.g., the Stock Exchange of Thailand (SET), for speculation and other benefits in the forms of dividends and privileges coming with holding those securities. As such, investors have the freedom of choice for investment under different concepts and perspectives.

One of the current interesting issues is sustainability. When some economic activities contain some inappropriate characteristics because they focus on using resources with the best return without consideration of the current and future possible external effects on society and the environment, this could finally result in a social cost that could become higher costs in other aspects for businesses and consumers. In this regard, the Thailand Sustainability Investment (THSI) refers to a group of securities in the SET based on the sustainability assessment by the SET under questions in the dimensions of good governance and economy, the environment, and society. Each of these aspects must receive a score of at least 50%. Other qualification criteria are also taken into consideration. Moreover, registered companies in the list of sustainable stocks must be efficient for accepting the sustainability concept as part of their business implementation with consideration for risk management, preparation to deal with emerging risks, preparing to deal with the social as well as environmental changes, increasing competitiveness, and giving precedence to stakeholders in all sectors. For the examples of benefits that those companies would obtain from sustainability assessment, an assessment form could be used as a tool for business improvement and development.
to create opportunities, manage risks efficiently in the implementation process, and motivate other companies to develop organizations in accordance with sustainable business practices (Stock Exchange of Thailand, 2023).

The awareness of those problems has raised sustainability to be one of the key issues of people’s interest, including investors and entrepreneurs. Since 2015, SET has prepared the list of securities from a large number of companies in the stock market with their sustainable business implementation under the environmental concern, social responsibility, and good governance (environmental, social, and governance (ESG)/I) as another option for investors who want to follow responsible investment. In 2022, there were over 145 securities out of 165 in the list of sustainable stocks.

However, there was a critical incidence between 2019-2022 that affected people’s livelihood and the economy worldwide, i.e., the Coronavirus disease 2019 (COVID-19) pandemic. During that time, the stock indices in the sustainable stock group showed that the overall price of this group was clearly reduced since the end of February 2020, or at the beginning of the pandemic nationwide in Thailand. When price trending became higher, this finally showed some similar characteristics to the pre-pandemic phase since the end of 2020, or before Thailand had been delivered the first set of vaccines. After that, the index changed with continuous consistent characteristics until the country could control the pandemic by the end of October 2022 (Figure 1).

![Figure 1. Comparison of the SETTHSI index based on the COVID-19 pandemic in Thailand.](image)

Source: Modified from the Stock Exchange of Thailand (2023B).

The total change of the sustainability stock index contained some characteristics that confirmed the negative impacts of the COVID-19 pandemic on the overall perspectives of the sustainability stocks and positive impacts of vaccination. However,
this change could have also been caused by other economic factors, e.g., consumer price index (CPI) and exchange rate (EX) as representatives of the factors to be considered by investors for planning their investment. For this reason, conclusions of the influences of those phenomena on the prices of the sustainability stock group would need to be made, so it would not be necessary to consider the influences of other economic factors that could cause incomplete study results.

Thus, this study aimed to consider the influences of the COVID-19 pandemic and the impacts of vaccination on the return of the sustainable stocks based on the level of the prices in this group in order to describe the results of the phenomena. In addition, the results of this research would be useful to support the planning or decision-making for interested investors in this stock group. The results could also be used to support the understanding of investors toward the changes of the prices of the sustainability stock group during the COVID-19 pandemic, and the impacts on the prices of those securities after vaccination. Moreover, the results could be applied for investment planning and speculation in the future.

2 THEORETICAL FRAMEWORK

This study is based on the concept of a valuation model, which explains that the asset value is the proxy of the expected return on present value for the asset holding of investors. The variation of asset value is probably influenced by many factors which may have an effect on the expected return, such as business performance, economic factors, the situation of each industry as the result of Dewi et al. (2023) investors which found that the financial ratios, governance and macroeconomic indicators can be used as a investors possibility of financial distress because the investor usually use news to help the choosing investment and financial planning (Murhadi et al., 2023).

Point to economic factors, the inflation and exchange rates (Ex) may influence the expected return of stock because these factors probably effect on the cost of business and the customer behavior. There are numerous studies that investigate the issue. For example, Doho et al. (2023) studied the indices of all stock groups in the West African market, which was sensitive to inflation. Likewise, this was the same as setting from the inflation rate to the securities prices in the non-financial group, which was part of the Dow Jones Industrial Average (DJIA)30 and the securities prices as part of NASDAQ100 in the US stock market (Eldomiaty et al., 2020). The relationship of the CPI was also considered,
as it was one of the factors used to reflect inflation. According to the study of Attarit (2021), it was found that the CPI had a relationship in the opposite direction with the securities prices in the transportation group of the SET.

Simultaneously, when considering the influences of the EX, Eldomiaty et al. (2020) found a relationship of the stocks in the opposite direction in the non-financial group as part of the DJIA30, along with the same results for stocks as a component of NASDAQ100 in the US stock market. This conformed to Attarit (2021), who found a relationship in the opposite direction between the EX of the Thai Baht and US dollar of the securities prices.

When considering the SET, Tangchongrach (2020) found that the securities prices indices of the SET were the factor related to the securities price in the energy and utility groups in the same direction. Likewise, Rattanaampol et al. (2021) found that the assessment results of the environmental operation, good governance, and P/BV ratio were the factors affecting the securities prices of the sustainable stock group in the SET in the same direction.

Furthermore, it was found that another impact of the COVID-19 pandemic was the inefficient US stock market (Hong et al., 2021). In developing countries, e.g., Turkey, India, Thailand, and China, the return of securities usually fluctuated more than that of the developed countries, e.g., the USA, UK, Mexico, and France due to incidences during the pandemic. The initial period of the pandemic, the highest death toll, the highest number of new patients, lower oil price, the lockdown measures, travel restrictions, and motivation measures, all caused less asymmetric information and less technical efficiencies of stock market operations (Farooq et al., 2022).

3 METHODOLOGY

3.1 DATA

This was a quantitative study using secondary data for the analysis of the panel data in order to compare the influences of the COVID-19 pandemic on the return of sustainable stocks. The panel data in this study contained a time series as monthly data between January 2017-September 2022. Ninety-three items of cross-sectional data were also used, as they were considered as securities with trade data during that time. The following were the data used in this study.
1. Securities prices in the sustainable stock group (Price), which referred to the closing price of the 93 securities in this group with trade throughout the time of the study. The data were collected from the database of the SET (2023B).

2. The EX referred to the EX of the Thai Baht per 1 US dollar. The data were collected from the database of the SET (2023).

3. The CPI referred to the general CPI with 2019, as the base year. The data were collected from the database of the trade economic indices (2023).

4. The duration of the COVID-19 pandemic referred to a dummy variable during the pandemic. The value was set as 0 from January 2017 to December 2019, and set as 1 from January 2020 to September 2022.

5. The post-vaccination phase referred to a dummy variable during the COVID-19 vaccination in Thailand. The value was set as 0 from January 2017 to January 2021, and set as 1 from February 2021 to September 2022.

3.2 DATA STATIONARITY TEST (UNIT ROOT TEST)

Because the panel data included the qualities of cross-sectional and time series data altogether, there could be an emergence of spurious regression, which would usually be found in the analysis of the regression equations for nonstationary time series data at the data levels.

Thus, all data used in this study were brought to consider the data stationarity by the panel unit root test (Levin, Lin, and Chu (LLC) test of Levin et al. (2002), and the Fisher augmented Dickey full (ADF) test of Maddala and Wu (1999)). This was developed based on the unit root test for the time series data. The test was applied from the model of the ADF test as follows:

\[
\Delta y_{i,t} = \rho_i y_{i,t-1} + \sum_{j=1}^{p_i} \varphi_{i,j} \Delta y_{i,t-1} + z_{i,t}^\prime \gamma + u_{i,t} \quad \text{Eq (1)}
\]

Where,

\[ y_{i,t} \quad \text{The considered variable,} \]
\[ z_{i,t} \quad \text{The deterministic component,} \]
\[ u_{i,t} \quad \text{The stationary process} \]

With the key hypothesis as follows:
\[ H_0: \rho = 0 \quad \text{or} \quad \text{All variables contain a unit root.} \quad \text{Eq (2)} \]

\[ H_1: \rho < 0 \quad \text{or} \quad \text{Stationary data} \quad \text{Eq (3)} \]

Simultaneously, the Fisher ADF test of Maddala and Wu (1999) used the combination of the p-value from the unit root test of each set for consideration of the qualifications of the data stationarity based on the key hypotheses like Equations (2) and (3).

Because both tests were applied from the ADF test, the qualities of the models could be considered in three patterns, i.e., no trending and intercept, with trending, and with trending and intercept. These patterns were set based on a deterministic component of \( z_{i,t} \) in each model.

In case those data were not stationary at the data level, the relationship of those variables could be reliable in the case the long-term relationship was found (Cointegration) from the independent variables to the dependent ones. The long-term relationship test required stationary data. In the case those data were stationary at different levels but less than the second difference, the relationship of the independent variables affecting tourists would need to be brought for a cointegration test, and short-term equilibrium adjustment by the panel autoregressive distribution lag (ARDL) in the next step.

3.3 SHORT-TERM AND LONG-TERM EQUILIBRIUM TEST BY THE PANEL ARDL

The model of the panel ARDL is basically an econometrics model to consider a short-term and long-term relationship of the panel data in the study with lower stationarity than the second difference. This study mainly considered the relationship of the independent variables on the Price using the models with the influences of intercept and linear trending in the study as follows:

ARDL long-term model:

\[
\text{Price}_{i,t} = \alpha_i + \xi_i t_i + \sum_{j=1}^{P} \alpha_{1,i,j} \text{Price}_{i,t-j} + \sum_{j=0}^{q_1} \alpha_{2,i,j} \text{CPI}_{i,t-j} + \sum_{j=0}^{q_2} \alpha_{3,i,j} \text{Ex}_{i,t-j} + \epsilon_{i,t}
\]

Eq (4)

Vector error correction mechanism (VECM) from the ARDL model:
\[
\Delta \text{Price}_{i,t} = \alpha_i + \xi_i t_i + \psi_i \text{ECM}_{i,t-1} + \sum_{j=1}^{p} \alpha_{1,i,j} \Delta \text{Price}_{i,t-j} + \sum_{j=1}^{q_1} \alpha_{2,i,j} \Delta \text{CPI}_{i,t-j} + \sum_{j=1}^{q_2} \alpha_{3,i,j} \Delta \text{Ex}_{i,t-j} + \epsilon_{i,t}
\]  
Eq (5)

Where,

\begin{align*}
\text{Price} & = \text{Securities price} \\
\text{CPI} & = \text{Consumer price index} \\
\text{Ex} & = \text{Exchange rate} \\
\text{ECM} & = \text{Speed of adjustment} \\
i & = \text{Securities in the sustainable stock group (Stocks 1-93)} \\
t & = \text{Month 1-20}
\end{align*}

In the case of cointegration, the coefficients of ECM_{i,t-1} that required significantly negative values were considered. The influences of COVID-19 and the vaccines of the models were brought for consideration, too, as per the following models.

ARDL long-term model:

\[
\text{Price}_{i,t} = \alpha_i + \xi_i t_i + \sum_{j=1}^{p} \alpha_{1,i,j} \text{Price}_{i,t-j} + \sum_{j=1}^{q_1} \alpha_{2,i,j} \text{CPI}_{i,t-j} + \sum_{j=1}^{q_2} \alpha_{3,i,j} \text{Ex}_{i,t-j} + d_4 \text{Covid} + d_5 \text{Vaccine} + \epsilon_{i,t}
\]  
Eq (6)

VECM from the ARDL model:

\[
\Delta \text{Price}_{i,t} = \alpha_i + \xi_i t_i + \psi_i \text{ECM}_{i,t-1} + \sum_{j=1}^{p} \alpha_{1,i,j} \Delta \text{Price}_{i,t-j} + \sum_{j=1}^{q_1} \alpha_{2,i,j} \Delta \text{CPI}_{i,t-j} + \sum_{j=1}^{q_2} \alpha_{3,i,j} \Delta \text{Ex}_{i,t-j} + d_4 \text{Covid} + d_5 \text{Vaccine} + \epsilon_{i,t}
\]  
Eq (7)

Where,

\begin{align*}
\text{COVID} & = \text{The duration of COVID-19 as a dummy variable during the COVID-19 pandemic with the value = 0 from January 2017 to December 2019, and = 1 from January 2020 to September 2022.} \\
\text{Vaccine} & = \text{The post-vaccination phase, i.e., a dummy variable during the COVID-19 vaccination with the value = 0 from January 2017 to January 2021, and = 1 from February 2021 to September 2022.}
\end{align*}

**4 RESULTS AND DISCUSSION**

From the results of the unit root test using the LLC test (Table 1), it was found that all three variables were stationary at various data difference levels. To clarify, the Price contained data stationarity at the data levels by considering the models with
intercepts. Simultaneously, the EX and CPI were stationary at the first difference according to the stationarity test in all three models.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data Level</th>
<th>First Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No trending and intercept</td>
<td>Intercept</td>
</tr>
<tr>
<td>Price</td>
<td>2.5462</td>
<td>-1.3674*</td>
</tr>
<tr>
<td>EX</td>
<td>4.0226</td>
<td>13.1082</td>
</tr>
</tbody>
</table>

Note: *** *, **, * = A significance level of 0.01, 0.05, and 0.1, respectively. Source: Author’s calculation.

Furthermore, similar results were found by the unit root test (Fisher ADF unit root test) (Table 2). To clarify, all three variables were stationary at various data difference levels. The Price contained data stationarity at the data levels by considering the models with intercepts. Simultaneously, the EX and CPI were stationary at the first difference according to the stationarity test in all three models.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Data Level</th>
<th>First Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No trending and intercept</td>
<td>Intercept</td>
</tr>
<tr>
<td>Price</td>
<td>51.3807</td>
<td>262.063***</td>
</tr>
<tr>
<td>EX</td>
<td>41.7074</td>
<td>48.6233</td>
</tr>
<tr>
<td>CPI</td>
<td>2.3794</td>
<td>0.2609</td>
</tr>
</tbody>
</table>

Note: *** *, **, * = A significance level of 0.01, 0.05, and 0.1, respectively. Source: Author’s calculation.

According to the results of the unit root test, it could be concluded that all three variables were stationary at various data difference levels. Thus, the panel ARDL was used to consider the cointegration and short-term relationship of the variables.

The testing process of the impacts of COVID-19 and the vaccines on the Price by the panel ARDL started from the long-term relationship test of the economic factors, i.e., the CPI and EX on the Price. In the case there was a long-term relationship in a certain model, the influences of COVID-19 and the vaccines were considered in the next step.

According to the results of the estimated relationship from the CPI and EX to the Price, cointegration was found in those relationships. To clarify, ECM_{i,t-1} in the short-term
relationship was considered with significantly negative values (Table 3). According to the results of the estimated long-term relationship, it was found that the CPI had a relationship in the opposite direction with the Price. The increase of the CPI by 1 unit caused the Price to be reduced by -0.7968 Thai Baht on average. In contrast, it was found that the EX affected the Price in the same direction. To clarify, the increase of the EX by 1 unit caused the Price to significantly increase by 0.8521 Thai Baht, which had a 99% confidence. Additionally, when considering the short-term equilibrium, it was found that all independent variables adjusted to the long-term equilibrium at 10.69%, which had a 99% confidence.

Table 3: Panel ARDL model: Long-term relationship.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Eq (1)</th>
<th>Eq (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI</td>
<td>-0.7968***</td>
<td>-0.1069***</td>
</tr>
<tr>
<td></td>
<td>(-6.6326)</td>
<td>(-18.2453)</td>
</tr>
<tr>
<td>EX</td>
<td>0.8521***</td>
<td>0.1199</td>
</tr>
<tr>
<td></td>
<td>(7.534)</td>
<td>(1.1179)</td>
</tr>
</tbody>
</table>

Note: ***, **, * = A significance level of 0.01, 0.05, and 0.1, respectively.
Source: Author’s calculation.

As shown in Table 4, when the impacts of COVID-19 and vaccinations were also considered, cointegration was found. When the coefficient of ECM_{t-1} with the significantly negative value at 99% confidence in the short-term relationship model, it implied the influences of the CPI and EX of the vaccines and COVID-19 on the Price. To clarify, when considering the long-term equilibrium, it was acknowledged that the COVID-19 pandemic caused the Price to be significantly reduced by 0.9931 Thai Baht, which had a 99% confidence. Vaccines also caused the Price to significantly increase by 4.1142 Thai Baht, which had a 99% confidence. Other than this, the long-term relationship also indicated that the increase of the CPI by 1 unit caused the Price to be reduced by -0.5121 Thai Baht on average. The increase of the EX by 1 unit caused the Price to significantly increase by 0.3357 Thai Baht, which had a 99% confidence.
Table 4: Panel ARDL model: Long-term relationship with COVID-19 and vaccines.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Eq (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>CPI</td>
<td>-0.5121****</td>
</tr>
<tr>
<td></td>
<td>(-4.5214)**</td>
</tr>
<tr>
<td>EX</td>
<td>0.3357****</td>
</tr>
<tr>
<td></td>
<td>(3.0663)**</td>
</tr>
<tr>
<td>COVID-19</td>
<td>-0.9931**</td>
</tr>
<tr>
<td></td>
<td>(-2.1251)**</td>
</tr>
<tr>
<td>Vaccines</td>
<td>4.1142****</td>
</tr>
<tr>
<td></td>
<td>(10.268)**</td>
</tr>
</tbody>
</table>

Short-term relationship

<table>
<thead>
<tr>
<th>Variable</th>
<th>Eq (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>ECM_{t-1}</td>
<td>-0.1301****</td>
</tr>
<tr>
<td></td>
<td>(-16.9753)**</td>
</tr>
<tr>
<td>D(CPI)</td>
<td>0.1348</td>
</tr>
<tr>
<td></td>
<td>(1.1342)</td>
</tr>
<tr>
<td>D(EX)</td>
<td>-0.8986****</td>
</tr>
<tr>
<td></td>
<td>(-6.6598)**</td>
</tr>
<tr>
<td>D(COVID)</td>
<td>-1.4698****</td>
</tr>
<tr>
<td></td>
<td>(-3.0335)**</td>
</tr>
<tr>
<td>D(VACCINE)</td>
<td>0.4861</td>
</tr>
<tr>
<td></td>
<td>(1.005)</td>
</tr>
<tr>
<td>C</td>
<td>9.7698</td>
</tr>
<tr>
<td></td>
<td>(8.4831)**</td>
</tr>
</tbody>
</table>

Note: ***, **, * = A significance level of 0.01, 0.05, and 0.1, respectively.

Source: Author’s calculation.

According to the results, it was found that the COVID-19 pandemic caused a reduction of the Price. The vaccines also caused an increase of the Price. In this regard, a relationship in the opposite direction was found from the CPI to the Price, and a relationship in the same direction from the EX to the Price.

To discuss the above, the results showed that the influences of the COVID-19 pandemic and vaccines were similar to the study of Farooq et al. (2022) and Hong et al. (2021), who explained that the pandemic caused fluctuations in the market, asymmetric information/data, and low technical performance of the implementation in the stock market due to obstacles during the pandemic. Even so, the influences of vaccination helped regain the confidence from the investors.

For a while, the relationship between the CPI and Price conformed to the study of Attarit (2021). This explained that the CPI was a factor reflecting general product prices. Thus, investors would have to decide between spending money on investment for a future return or on consumption, which would be more necessary for living. The result of this part implied that a higher CPI caused a larger allocated amount of money for consumption because it was required for survival. Hence, the investors would need to hold those reduced stocks, thus resulting in lower stock prices.
As for the relationship between the EX and Price, the results were different when compared to previous studies, e.g., Attarit (2021) and Eldomiaty et al. (2020). This could be due to the characteristics of the studied stocks and the differences of the stock market in each country. However, the relationship between the EX and Price in the same direction could have been caused by the motivation of international investors when the Thai Baht depreciated. This led to the higher price of those stocks.

The results of this study revealed the influences of a terrible incident as an obstacle for the economic sector at the global level, i.e., the COVID-19 pandemic and its solutions/vaccines, and the influences of the economic factors affecting the securities prices in the sustainable stock group. Thus, investors in this group of the SET should pay attention to news about important circumstances in the world as well as economic information/data for planning appropriate investment strategies, i.e., planning for buying, holding securities, and selling securities under those circumstances. Additionally, the Office of the Securities and Exchange Commission (SEC) should design appropriate measures to deal with the uncommon fluctuation of the levels of the securities prices that could occur during similar phenomena in the future.

5 CONCLUSIONS

This study aimed to examine the impact of the COVID-19 pandemic and vaccines on the changes of security prices in the price of the SET by analyzing the econometrics model using panel data with monthly time series data from January 2017 to September 2022. Ninety-three items of cross-sectional data were considered as securities with the trade prices at that time. The result reveals a long run positive impact the exchange rate on the stock price and the inverted direction of the customer price index. For a while, this study confirmed the negative effect of the CUD-19 pandemic and the positive effect of the vaccine available on the stock price. Therefore, the use of measures to promote vaccination would reflect the investors’ confidence in sustainable stocks.

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REFERENCES


