

**RESEARCH
ARTICLE**

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Stock Market Reaction to Covid-19 Vaccination Rate: International Study

ABSTRACT

Objective: In this study, the relationship between the Covid-19 vaccination rates in different countries and the performance of stock market indices were examined. The study aims to supply further evidence for policymakers to promote vaccination programs.

Methods: In the study, stock market performances and Covid-19 vaccination data of a total of 49 countries in the MSCI indices were used. Countries are sorted and grouped according to the date they reached the 10%, 50%, and 75% vaccination rates. Afterward, t-tests were used to determine whether there was a difference between the stock market returns of the countries in different groups according to their vaccination performances.

Results: This research shows that countries with rapid Covid-19 vaccination have lower volatility and higher performance in the stock markets. It has been determined that the stock market performances are higher in the countries which reached the 10% and 50% vaccination level of the population earlier. No statistically significant relationship was found between reaching the 75% vaccination level and the stock market performance. The first quartile of countries that completed 10% vaccination earlier have %9.7 higher stock market performance on average between 31.12.2020-28.05.2021 than the countries in the last quartile. Research results are also robust when tested separately for developed and emerging markets.

Conclusions: The results of the study show that vaccination has a positive contribution to financial markets. It is thought that the findings obtained in the research provide important information for investors and policymakers.

Keywords: Covid-19, Vaccination, Stock Markets Indices, Returns of Stocks.

Borsanın Covid-19 Aşı Oranına Tepkisi: Uluslararası Çalışma

ÖZET

Amaç: Bu çalışmada, farklı ülkelerdeki Covid-19 aşılama oranları ile borsa endekslerinin performansı arasındaki ilişki incelenmiştir. Çalışmanın amacı, politika yapıcılara aşılama programlarını teşvik etmek için daha fazla kanıt sağlamaktır.

Gereç ve Yöntem: Çalışmada MSCI endekslerinde yer alan toplam 49 ülkenin borsa performansları ve Covid-19 aşı verileri kullanılmıştır. Ülkeler %10, %50 ve %75 aşılama oranlarına ulaştıkları tarihe göre sıralanmış ve gruplandırılmıştır. Daha sonra farklı gruplardaki ülkelerin hisse senedi getirileri arasında aşılama performanslarına göre farklılık olup olmadığını belirlemek için t testleri kullanılmıştır.

Bulgular: Bu araştırma, Covid-19 aşılama sürecini daha hızlı yöneten ülkelerin borsalarının daha düşük oynaklığa ve daha yüksek performansa sahip olduklarını göstermektedir. Nüfusları %10 ve %50 aşılama düzeyine daha erken ulaşan ülkelere borsa performanslarının diğer ülkelere göre daha yüksek olduğu tespit edilmiştir. %75 aşılama düzeyine ulaşmak ile borsa performansı arasında bir ilişki bulunamamıştır. %10 aşılama daha erken tamamlayan ilk %25'lik dilime giren ülkelerin, son %25'lik dilimdeki ülkelere göre 31.12.2020-28.05.2021 tarihleri arasında ortalama %9,7 daha yüksek borsa performansına sahip oldukları tespit edilmiştir. Araştırma sonuçları, gelişmiş ve gelişmekte olan ülkeler için ayrı ayrı test edildiğinde de istatistiksel olarak anlamlı ve geçerlidir.

Sonuç: Çalışmanın sonuçları, aşılamanın hisse senedi piyasalarına olumlu katkısı olduğunu göstermektedir. Araştırmada elde edilen bulguların yatırımcılar ve politika yapıcılar için önemli bilgiler sağladığı düşünülmektedir.

Anahtar Kelimeler: Covid-19, Aşılama, Borsa Endeksleri, Hisse Senedi Getirileri.

INTRODUCTION

Covid-19 was first detected in Wuhan, China on December 12, 2019. The disease was then reported to the World Health Organization as a mysterious respiratory disease, with its appearance in different people on December 31, 2020. This disease was initially perceived as a regional epidemic. After the virus was seen in the USA and Europe in January 2021, the size of the epidemic grew in a few weeks, and it became an important agenda item that the whole world followed carefully. On the rapid spread of the epidemic and death news from various countries, the World Health Organization (WHO) declared the Covid-19 pandemic on March 11, 2020 (1). This news led to a sharp contraction in economic activity in the world and high price volatilities in financial markets in a short period. These developments disrupted the production and supply chain in economically important countries such as China and the USA and directly or indirectly affected all world economies (2). The rapid spread of Covid-19 has created a contagion effect in the financial markets (3). While examining the effects and economic consequences of the pandemic, some authors used the term "Corononomics" (4; 5), while some authors preferred to use the term "Black Swan" (6, 7) The concept of "Black Swan", which was first mentioned by Taleb (8), has become frequently used in the literature for events that have unexpected and significant effects on the stock markets. Although it is difficult to predict the long-term effects and precise results of the Covid 19 pandemic, it is possible to examine the impact and depth of the shocks that occurred. Some studies have tried to explain the shocks caused by the Covid-19 pandemic by comparing it with the 2008 crisis, while some authors have tried to explain it by comparing it with other epidemics, financial crises, wars, and terrorist incidents (9; 10; 11; 12; 13). On the other hand, some studies have discussed the effects of Covid-19 in terms of behavioral finance using conceptual foundations such as herd behavior, investor sensitivity, and investor psychology (14; 15; 16; 17; 18).

The Covid-19 pandemic spread all over the world, starting from China, causing a decline in stock markets' performances and an increase in market volatility all over the world. Looking at the USA, it is seen that the market volatility experienced in 2020 is similar to the volatility experienced in the 2008 crisis, 1929 crisis, and 1987. The stock market volatility experienced in the first half of 2020 in the USA is more than the volatility caused by the Great Depression and the Spanish Flu pandemic (12). The reason behind the greater impact of Covid-19 compared to other pandemics is the growth and development of international investments and trade. The increase in market volatility has been valid not only for the USA but also for many countries around the world

(3; 19). This effect was not the same in all countries, for example, Yiu and Tsang (20) stated that in Asean5 countries (Philippines, Malaysia, Thailand, Indonesia, and Singapore) Covid-19 had a smaller impact than the global financial crisis in terms of both returns and volatility.

With the increase in Covid 19 cases, the pressure on the health care systems of all countries continues. The burden placed on the health system also creates stress for other sectors. In particular, government policies that are implemented to control Covid-19 cases increase uncertainty, anxiety and generally have negative effects on economic activity. It is known that the best way to reduce the burden on the health system is the vaccination. Vaccines with proven effectiveness in the disease have been found and new vaccine studies are continuing. With the availability of vaccines, the reopening of businesses and the vaccination programs of countries supported the performance in the stock markets from the beginning of 2021. With the initiation and acceleration of the vaccination program in the USA, the stress of the health system has decreased, consumer confidence has increased, and a positive atmosphere has been created in the financial markets (21). The arrival of the first coronavirus vaccines in early 2021 and the rapid start of vaccination programs in some countries have been the hope for recovery in the financial markets. Vaccinations not only reduce the load in health care systems but also improve economic activity. Millions of people invest in the stock market around the world, and financial stability is of great importance for savers. In addition, stock prices are also a leading indicator in determining the impact of certain economic events on the economy. In this study, to supply further evidence for policymakers to promote the vaccination programs, the relation between the vaccinated percentage of the population and stock market performances in different countries has been investigated.

Literature: With the emergence of COVID-19, many researchers have investigated the effects of the pandemic on the economy and financial markets (12; 14; 22; 23; 24; 25). The transformation of Covid-19 into a pandemic has had a rare impact on financial markets (26). This effect has been exacerbated by the restrictions and closures implemented to reduce the stress of the health system (22). Numerous studies have been conducted showing that the number of cases and deaths has a negative effect on the stock market performances (14). Some studies have shown that stock markets are significantly adversely affected by Covid-19 and are more sensitive to an increase in the number of infections rather than the number of deaths (14; 26). The negative effect of the increase in the number of deaths on the stock markets is more pronounced than the positive effect

of the recovered cases (27). Besides, India and Pakistan stock markets have achieved positive returns during the pandemic (28). A significant number of studies have investigated the relationship between Covid-19 and market volatility (29; 30). The relationship between stock returns and stock volatility became stronger during the Covid-19 pandemic process (31).

While some of the studies in the literature have examined the effects of Covid-19 in a particular country, some have tried to reveal the similarities and differences between countries by examining the effects of Covid-19 in different countries. Qudah and Houcine (32) investigated the impact of Covid-19 on stock returns in 6 regions (Africa, America, Eastern Mediterranean, Europe, Southeast Asia, and Western Pacific) classified by the World Health Organization (WHO). They reveal that the stock markets in the Western Pacific region have more negative abnormal returns than other regions, and all regions have experienced a decline between the 26th and 35th days after the first case was confirmed. Barut and Kaygın (33) investigated the existence of a relationship between stock market indices and the number of cases in 11 countries with the highest number of cases as of April 2020. They found that there is an interaction between the number of Covid-19 cases and the stock market indices of Turkey, Italy, Spain, the Netherlands, and China, on the other hand, there is no relationship with the stock market indices of Germany, France, Belgium, England, Switzerland, and the USA. Okorie and Lin investigated the contagion effect of Covid-19 on stock market returns and volatility in 32 countries most affected by the pandemic (3). They found that Covid-19 had a contagion effect on both returns and volatility, but this relationship disappeared over time. On the other hand, they also showed that the contagion effect is more pronounced in countries with a high number of cases than in countries with a low number of cases. In the study of Chaudhary et al. (29), the effect of Covid-19 on the return and volatility of the stock market indices of the 10 countries with the highest GDP was investigated. It has been found that in the 6-month period after the virus first appeared, negative average returns occurred in the stock markets of the countries examined, and volatility was higher than normal times, even though there was a recovery in the second quarter. Ashraf examined the relationship between the number of cases and deaths and stock market indices in 64 countries. According to the results, market reactions are stronger on average 40 to 60 days after the detection of the first case; and provided evidence that markets are more sensitive to an increase in the number of cases than to an increase in the number of deaths (14).

The Covid-19 vaccination process has also been one of the subjects of academic studies. Chan et al., (34) investigated the effects of clinical trial

stages of Covid-19 vaccines on global stock markets. They showed that it caused a positive and significant abnormal stock market return of around 8% on the first day of the trials. In particular, the positive effect of the start of the trials in the 3rd phase was higher and the vaccine candidates developed by the USA and China caused a more significant effect. Khalfaoui et al. (21) investigated the effects of daily case numbers, deaths, and vaccination numbers on the S&P 500 index. They revealed that the increase in vaccination has a strong and positive effect on the S&P 500 returns. Rouatbi et al. (35), in their study investigating the relationship between vaccination and stock market volatility of 66 developed and developing countries, found that mass vaccination significantly reduced stock market volatility. They also revealed that the effect of vaccines on stock market volatility is stronger in developed countries than in developing countries. Ngwakwe (36) examined the performance of 5 global stock market indices (Dow Jones, Shanghai, S&P, FTSE, and Euronext) covering the 7 months before the vaccine's arrival and the 7 months after the vaccination. In the study, pre-vaccination and vaccination periods were compared with the T-tests. It was determined that the arrival of the vaccine had a positive effect on the stock markets compared to the pre-vaccine period, and there was an increase between 7% and 20% in the stock markets returns with the arrival of the vaccine. Cong Nguyen To et al., (37), in their study, investigated the effect of vaccination rate on stock market indices of 15 developed and 19 developing countries. They revealed that mass vaccination reduces the volatility of stock markets in both developed and developing countries. They also emphasized that this effect is stronger in developed countries than in developing countries.

MATERIAL AND METHODS

The aim of this study is to examine the relationship between stock market returns and volatilities of countries with high or low Covid-19 vaccination rates. For this purpose, the index returns (38) in the MSCI developed and emerging markets indices were compared with the vaccination rates in these countries. Data on the indices were obtained from investing.com, and Covid-19 vaccination rates were obtained from <https://data.europa.eu/>, the official data site of the European Union. The index returns cover the period between 31.12.2020 (the date when the first vaccination data can be accessed) and 28.09.2021 (when the most up-to-date data available during the research). The number of developing countries included in the research is 26, and the number of developed countries is 23. Countries are sorted and grouped according to the date they reached the 10%, 50% and 75% vaccination rate. Afterwards, t tests were used to determine whether there was a difference between the stock market returns of the countries in different groups in different periods.

RESULTS

The countries included in the MSCI index, their level of economic development, and the dates

when 10%, 50% and 75% of the population were vaccinated in each country are shown in Table 1.

Table 1. Countries Included in the MSCI Index, Level of Economic Development, Vaccination Dates of 10%, 50% and 75% of the Population

Development Level	Countries	10% Vaccination	50% Vaccination	75% Vaccination
Emerging	Argentina	11.04.2021	22.07.2021	N/A
Developed	Australia	23.05.2021	4.09.2021	N/A
Developed	Austria	17.03.2021	21.06.2021	N/A
Developed	Belgium	24.03.2021	15.06.2021	N/A
Emerging	Brazil	13.04.2021	4.08.2021	N/A
Developed	Canada	25.03.2021	22.05.2021	17.09.2021
Emerging	Chile	15.02.2021	20.05.2021	31.08.2021
Emerging	China	10.06.2021	26.08.2021	6.09.2021
Emerging	Colombia	22.05.2021	23.09.2021	N/A
Emerging	Czechia	24.03.2021	15.07.2021	N/A
Developed	Denmark	17.03.2021	17.06.2021	22.08.2021
Emerging	Egypt	27.09.2021	N/A	N/A
Developed	Finland	12.03.2021	12.06.2021	9.10.2021
Developed	France	23.03.2021	28.06.2021	9.10.2021
Developed	Germany	25.03.2021	17.06.2021	N/A
Emerging	Greece	26.03.2021	9.07.2021	N/A
Developed	Hong Kong	20.04.2021	17.08.2021	N/A
Emerging	Hungary	6.03.2021	19.05.2021	N/A
Emerging	India	14.05.2021	18.10.2021	N/A
Emerging	Indonesia	29.06.2021	N/A	N/A
Developed	Ireland	19.03.2021	22.06.2021	10.09.2021
Developed	Israel	31.12.2020	22.02.2021	N/A
Developed	Italy	25.03.2021	15.06.2021	1.10.2021
Developed	Japan	31.05.2021	16.08.2021	14.10.2021
Emerging	South Korea	28.05.2021	21.08.2021	27.09.2021
Emerging	Malaysia	14.06.2021	10.08.2021	6.10.2021
Emerging	Mexico	5.05.2021	4.10.2021	N/A
Developed	Netherlands	28.03.2021	20.06.2021	10.10.2021
Developed	New Zealand	7.06.2021	3.09.2021	25.10.2021
Developed	Norway	24.03.2021	1.07.2021	21.09.2021
Emerging	Pakistan	30.07.2021	N/A	N/A
Emerging	Peru	9.06.2021	2.10.2021	N/A
Emerging	Philippines	26.07.2021	N/A	N/A
Emerging	Poland	26.03.2021	18.08.2021	N/A
Developed	Portugal	25.03.2021	24.06.2021	14.08.2021
Emerging	Qatar	29.04.2021	1.06.2021	13.08.2021
Emerging	Russia	18.05.2021	N/A	N/A
Emerging	Saudi Arabia	27.06.2021	12.07.2021	N/A
Developed	Singapore	22.03.2021	21.06.2021	11.08.2021
Emerging	South Africa	2.08.2021	N/A	N/A
Developed	Spain	29.03.2021	21.06.2021	17.08.2021
Developed	Sweden	21.03.2021	4.07.2021	N/A
Developed	Switzerland	26.03.2021	30.06.2021	N/A
Emerging	Taiwan	4.07.2021	24.09.2021	N/A
Emerging	Thailand	30.06.2021	11.10.2021	N/A
Emerging	Turkey	30.03.2021	11.08.2021	N/A
Emerging	United Arab Emirates	23.02.2021	20.04.2021	13.07.2021
Developed	United Kingdom	25.01.2021	29.04.2021	N/A
Developed	United States	10.02.2021	1.06.2021	N/A

Resource: MSCI index and <https://data.europa.eu/> prepared by the author

The 49 countries within the scope of the study were divided into 4 different quartiles according to the dates of reaching 10% and 50% vaccination rates of their populations.

Since the number of countries with a vaccination rate of 75% is low, countries are

classified into two groups for analyzes made at this level. The dates of achieving 10% vaccination rate of different quartiles are shown in Table 2. The first 12 countries in the first quartile reached 10% vaccination level on 22.03.2021 and the last 13 countries on 27.09.2021.

Table 2. Quartiles of Countries Ranked by Date of Reaching the Vaccination Rate of 10% of the Population

Quartile	10% Vaccination Reach Date of all countries in the quartile	Countries
1 st Quartile	22.03.2021	Israel, United Kingdom, United States, Chile, United Arab Emirates, Hungary, Finland, Denmark, Austria, Ireland, Sweden, Singapore
2 nd Quartile	29.03.2021	France, Belgium, Norway, Czechia, Canada, Italy, Germany, Portugal, Switzerland, Greece, Poland, Netherlands
3 rd Quartile	28.05.2021	Spain, Turkey, Argentina, Brazil, Hong Kong, Qatar, Mexico, India, Russia, Colombia, Australia, South Korea
4 th Quartile	27.09.2021	Japan, New Zealand, Peru, China, Malaysia, Saudi Arabia, Indonesia, Thailand, Taiwan, Philippines, Pakistan, South Africa, Egypt

In Table 3 stock market performances of different quartiles, described in Table 2, have been shown. Periods have been determined according to completion of 10% vaccination in different country quartiles. The number 1 group includes the 12 countries that fall into the 25% quintile with the fastest access to vaccination; group 4 includes 13 countries that fall into the last 25% quintile. Whether there is a difference in the average stock

market index performances of these country groups was measured with the t test. When Table 3 is examined, it is seen that the average return of the 1st Group was 7.6% in the first period, while the average return of the 4th Group was 2.4%. In all periods, it is seen that the average returns of the countries, that completed 10% vaccination faster, are higher than the other countries and the results are statistically significant.

Table 3. t-test Showing the Performance Differences of Stock Market Indices of Countries Ranked by Date of Vaccination of 10% of the Population

Panel A- 1 vs. 4	31.12.2020-22.03.2021	31.12.2020-29.03.2021	31.12.2020-28.05.2021	31.12.2020-27.09.2021
1- Average Return	7.6%	8.5%	12.7%	18.4%
4- Average Return	2.4%	2.8%	3.0%	3.9%
1- Variance	0.2%	0.2%	0.4%	0.7%
4- Variance	0.4%	0.4%	0.8%	1.1%
Probability	0.036	0.022	0.005	0.001
t stat.	2.420	2.701	3.551	4.576
Panel B- 1+2 vs. 3+4	31.12.2020-22.03.2021	31.12.2020-29.03.2021	31.12.2020-28.05.2021	31.12.2020-27.09.2021
1+2- Average Return	6.5%	7.5%	12.6%	17.8%
3+4- Average Return	1.5%	1.7%	4.6%	7.2%
1+2- Variance	0.2%	0.2%	0.3%	0.6%
3+4- Variance	0.3%	0.3%	0.8%	2.0%
Probability	0.002	0.000	0.000	0.002
t stat.	4.282	5.068	5.291	4.080

In Figure 1, the vaccination rate and stock market returns in 49 countries included in the MSCI indices are presented. It is seen that the index

returns of the countries with high vaccination rates are above the average in all 4 periods covered in the research.

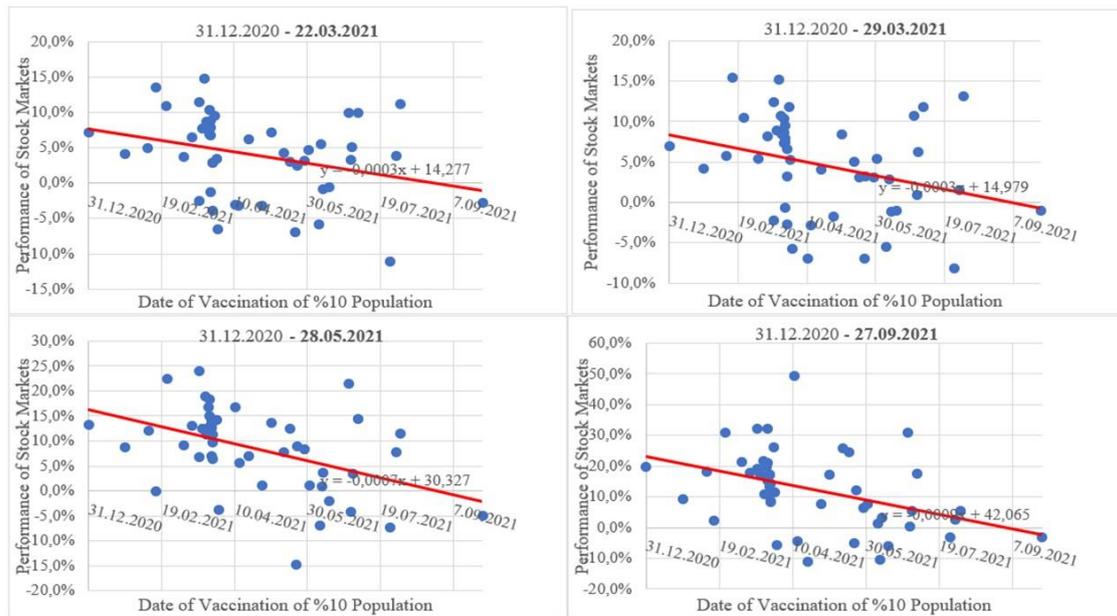


Figure 1. The Relation Between Vaccination Rate and Performance of Stock Market Indices in Each Country Listed in MSCI Developed and Emerging Markets

In the second stage, countries were divided into 4 different quartiles according to the dates of their population reaching 50% vaccination rates. The country quartiles created are shown in Table 4. Indonesia, Philippines, Pakistan, South Africa,

Egypt, which are among the countries in the 4th group, have not yet reached the 50% vaccination rate at the time of the research. These countries are also included in Group 4.

Table 4. Quartiles of Countries by Date of Reaching the Vaccination Rate of 50% of the Population

Quartile	50% Vaccination Reach Date of all countries in the quartile	Countries
1st Quartile	17.06.2021	Israel, United Arab Emirates, United Kingdom, Hungary, Chile, Canada, United States, Qatar, Finland, Belgium, Italy, Denmark
2nd Quartile	09.07.2021	Germany, Netherlands, Austria, Singapore, Spain, Ireland, Portugal, France, Switzerland, Norway, Sweden, Greece
3rd Quartile	03.09.2021	Saudi Arabia, Czechia, Argentina, Brazil, Malaysia, Turkey, Japan, Hong Kong, Poland, South Korea, China, New Zealand
4th Quartile	28.10.2021*	Australia, Colombia, Taiwan, Peru, Mexico, Thailand, India, Russia, Indonesia, Philippines, Pakistan, South Africa, Egypt

* For the 4th group, because of 10% vaccination has not been completed yet, 28.10.2021 has been used which is the most recent date for which data are available.

Similar to the results in Table 3, it is seen in Table 5 that the stock market performances of the countries that manage the vaccination process

quickly are higher than the other countries. The results are statistically significant.

Table 5. t Test Showing the Performance Differences of Stock Market Indices of Countries Ranked by Date of Vaccination of 50% of the Population

Panel A- 1 vs. 4	31.12.2020-17.06.2021	31.12.2020-09.07.2021	31.12.2020-03.09.2021	31.12.2020-25.10.2021
1- Average Return	12.5%	12.6%	17.9%	19.4%
4- Average Return	4.5%	4.1%	7.2%	10.7%
1- Variance	0.4%	0.4%	0.5%	0.8%
4- Variance	1.1%	0.9%	1.3%	1.2%
Probability	0.031	0.017	0.012	0.040
t stat.	2.501	2.870	3.070	2.363
Panel B- 1+2 vs. 3+4	31.12.2020-17.06.2021	31.12.2020-09.07.2021	31.12.2020-03.09.2021	31.12.2020-25.10.2021
1+2- Average Return	13.8%	13.2%	18.0%	19.4%
3+4- Average Return	6.4%	5.5%	9.1%	12.1%
1+2- Variance	0.3%	0.3%	0.5%	0.7%
3+4- Variance	1.2%	1.1%	1.9%	3.4%
Probability	0.005	0.002	0.007	0.084
t stat.	3.560	4.098	3.366	1.916

In the third stage, it was analyzed how the stock market performances of the countries that reached the 75% vaccination rate differ from other countries. In this context, considering the number of countries reaching the 75% vaccination level, 49

countries included in the study were divided into 2 different groups. The countries that reached the 75% vaccination level (Group 1) and the countries that did not reach this level as of the date of the research (Group 2) are presented in Table 6.

Table 6. Country Groups Established by Level of Achieving 75% Vaccination Rate

Group	50% Vaccination Reach Date of all countries in the quartile	Countries
1 st Group	28.10.2021	United Arab Emirates, Singapore, Qatar, Portugal, Spain, Denmark, Chile, China, Ireland, Canada, Norway, South Korea, Italy, Malaysia, Finland, France, Netherlands, Japan, New Zealand
2 nd Group	-	Israel, United Kingdom, Hungary, United States, Belgium, Germany, Austria, Switzerland, Sweden, Greece, Saudi Arabia, Czechia, Argentina, Brazil, Turkey, Hong Kong, Poland, Australia, Colombia, Taiwan, Peru, Mexico, Thailand, India, Russia, Indonesia, Philippines, Pakistan, South Africa, Egypt

The comparison of the stock market performances of the 1st group countries that have completed 75% vaccination and the 2nd group countries that have not reached this level yet is presented in Table 7. According to the results obtained at this stage, there is no statistically significant difference between the countries that have completed 75% vaccination and those that have not yet completed it, in terms of stock market performances.

Table 7. t Test Showing the Performance Differences of Stock Market Indices of Countries That Completed 75% Vaccination

	31.12.2020-25.10.2021
1 (Completed %75 Vaccination)	
Average Return	14.2%
2 (Not completed)	
Average Return	16.6%
1- Variance	1.2%
2- Variance	2.8%
Probability	0.601
t stat.	0.541

Developed countries have both progressed faster in the vaccination and have superior financial capabilities when fighting the covid-19 pandemic. Therefore, there are also differences in the performance of stock markets arising from the development level of countries. To refine this effect and test the robustness of the results, countries were divided into developed and developing countries. Afterwards, the countries in each group were divided into two different groups according to the dates of reaching the 10% vaccination level. Each sub-group has same number of countries which are ranked by the vaccination date of 10% of the population. In this way, regardless of the level of development, the effect of vaccination on stock markets could be determined. According to the results presented in Table 8, the rate of vaccination is effective in the performance of stock markets separately in developed and emerging markets.

Table 8. t Test Showing the Performance Differences of Stock Market Indices of Countries Ranked by Date of Vaccination of 10% of the Population for Developing and Developed Countries Separately

31.12.2020-28.05.2021	Developed Markets	Emerging Markets
1- (Completed 10% vaccination earlier) Average Return	13.8%	12.5%
2- (Completed 10% vaccination later) Average Return	6.4%	4.5%
1- Variance	0.3%	0.4%
2- Variance	1.2%	1.1%
Probability	0.005	0.031
t stat.	3.560	2.501

DISCUSSION AND CONCLUSION

In this study, it is aimed to examine the relationship between the Covid-19 vaccination rate and stock market index returns. The data set of the research consists of the returns of the stock market indices included in the MSCI developed markets and emerging markets indices between 31.12.2020 - 28.09.2021 and the vaccination rates in these countries. 49 countries, consisting of 23 developed and 26 developing countries, were divided into 4 different groups according to the dates of reaching 10% and 50% vaccination rates of their populations, and 2 groups according to the status of reaching 75% vaccination rates.

It has been determined that the stock market performances of the countries that reach the 10% and 50% vaccination level of the population earlier are higher than the other countries. No relationship was found between reaching the 75% vaccination level and the stock market performance. Research results are also robust when tested separately for developed and emerging markets.

As a result of the study, it can be said that two main inferences were reached. First, similar to Chan et al., (34), Khalfaoui (21) and Ngwakwe (36), it was found that stock market returns increase as the vaccination rate increases. Secondly, similar to Rouatbi et al. (35) and Cong Nguyen To et al., (37), it has been observed that the volatility in the stock markets of countries with low vaccination

rates is high. In addition, research results are robust in both developed and emerging countries. Vaccination has contributed to stock performance and financial stability, regardless of countries' development and their ability to fight the pandemic.

In summary, research findings show that countries with rapid Covid-19 vaccination have lower volatility and higher performance in the stock markets. The results of the study show that

vaccination has a positive contribution to financial markets. It is thought that the findings obtained in the research provide important information for investors and policy makers. The study is limited to the countries included in the MSCI indices between 31.12.2020 - 28.10.2021. For future studies, it may be suggested to researchers to analyze the relationship between stock market returns of different sectors and vaccination rates.

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