The efficiency of the Saudi Capital Market from its weak - form during the Corona pandemic (COVID-19) "A comparative study between the business sectors listed in the Saudi Capital Market"

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Abstract

The study aimed to identify the level of efficiency of the Saudi capital market and the business sectors included in it during the Corona pandemic, with a comparison between these sectors. The daily indices values of the capital market and the business sectors included in it were relied upon during the pandemic period from 2020 to 2022. The indicators were described through the arithmetic mean, standard deviation, and a graphical display of the trend graph for each indicator. To test the efficiency of the capital market and the sectors included in it, the Jarque – Bera test was used to test the Normality, the Run test to test the random walk of the indices values, and Augmented Dickey Fuller test (ADF) to test the stationary of the indices values series during the study period.

The most important results of the study were the inefficiency of the weak form of the Saudi capital market and the sectors included in it during the pandemic period. The study also found that the sectors most affected by the pandemic are the transportation sector, the construction sector, public utilities, the entertainment sector, and the retail sector for luxury goods. While the sectors least affected by the pandemic are the pharmaceutical sector, health care, food, energy, and the telecommunications sector.

The most important recommendations were that the individual investor should be careful when investing financially in business sectors that work in the field of entertainment and luxury goods in periods of natural crises, and it is preferable to invest in basic goods and services sectors, and the Capital Market Authority should educate investors on how financial investment is made in light of crises , while achieving high transparency, and fully providing data to investors so that no unusual returns or losses are achieved.

Introduction

Financial markets refer broadly to any marketplace where the trading of securities occurs, including the stock market, bond market, forex market, and derivatives market, among others. Financial markets are vital to the smooth operation of capitalist economies. (Hayes,2022) (1)

Financial markets, from the name itself, are a type of marketplace that provides an avenue for the sale and purchase of assets such as bonds, stocks, foreign exchange, and derivatives. Often, they are called by different names, including "Wall Street" and "capital market," but all of them still mean one and the same thing. Simply put, businesses and investors can go to financial markets to raise money to grow their business and to make more money, respectively. (CFI Team,2022) (2)

The inefficiency of the financial market raises doubts about the credibility of the buy-and-hold strategy, as it is a long-term investment strategy. This makes investors try to adopt another strategy, the strategy of penetrating or scraping the market, which is one of the short-term strategies that tend towards speculation. Which leads to the instability of the money market and its exposure to sharp changes (Al-Abd, 2013) (3).

The Saudi money market is an integral part of the global financial markets, especially after linking it to global indicators and its openness to foreign investors. Like the global financial markets, the Saudi money market was affected by the Corona crisis, as the Saudi money market declined by 1.54%; The

market lost an important part of its gains, similar to global markets, but it is remarkable that the index returned to achieve gains again despite the intensification of the Corona crisis, and its direct impact on the profits of listed companies, especially the petrochemical sector, the banking sector, and Aramco, which is heavy in the market, which confirmed the efficiency The Saudi Capital Market in Light of the Corona Pandemic, (Al-Arabiya, 2020) (4).

Research Problem

The Saudi money market is the largest Arab market in terms of the market value of registered shares and the value of the registered shares traded, which plays an important role in achieving economic growth.The existence of efficiency in the money market gives many advantages to the economy and the financial system, as it helps reduce the costs of financing with ownership and debt, and provide liquidity for new investments, in addition to reducing the degree of financial risk and providing financial tools that help to form savings and contribute to raising economic growth rates, Hence the main question of the study:

Is the Saudi capital market efficient at the weak and medium level? Is there a difference in the level of the values of the indices of the business sectors that make up the Saudi financial market during the period 2019-2020, the period of the pandemic?

Research Hypotheses

H: The Saudi stock market is an efficient market from the weak form during the Corona pandemic period.

Objectives of the Research

- Identifying the level of efficiency of the Saudi capital market during the Corona pandemic.

The importance of Research

Helping investors identify the extent of stability and efficiency of the Saudi stock market in light of crises, especially the Corona pandemic.

Theoretical framework

A financial market is a market in which people trade financial securities and derivatives at low transaction costs. Some of the securities include stocks and bonds, raw materials, and precious metals, which are known in the financial markets as commodities.(Williams,2018)(10)

Financial Markets include any place or system that provides buyers and sellers the means to trade financial instruments, including bonds, equities, various international currencies, and derivatives. Financial markets facilitate the interaction between those who need capital with those who have the capital to invest. (Federal Reserve Bank,2017) (21)

Types of financial markets

Within the financial sector, the term "financial markets" is often used to refer just to the markets that are used to raise finances. For long term finance, they are usually called the capital markets; for short term finance, they are usually called money markets. The money market deals in short-term loans, generally for a period of a year or less. Another common use of the term is as a catchall for all the markets in the financial sector, as per examples in the breakdown below. (Hayes, 2022)(1)

Market Efficiency

Market efficiency is when current market prices represent all essential financial information about an underlying asset or security. Financial news, research, economic, political, social variables, rumors, etc., can all affect the market value. An efficient market provides buyers and sellers equal access to precise and comprehensive asset-related data, allowing them to profit in a liquid and highly competitive market while limiting transaction costs, arbitrage opportunities, and above-market gains.(Wallstreetmojo Team)(6)

Figure (1) **Market Efficiency**
Source Wallstreetmojo Team

The term "efficiency" refers to the peak level of performance that uses the least amount of inputs to achieve the highest amount of output. Efficiency requires reducing the number of unnecessary resources used to produce a given output, including personal time and energy. (Caroline,2022)(8)

Market efficiency refers to the degree to which market prices reflect all available, relevant information. If markets are efficient, then all information is already incorporated into prices, and so there is no way to "beat" the market because there are no undervalued or overvalued securities available. (The Investopedia Team,2022)(7)

The efficiency of the capital market is one of the thorny issues in modern financial thought, given the impact of the efficiency of the capital market on many parties, most especially the investors and the regulatory bodies on the market. (Al-Thunayan, 2021).(18)

Capital market efficiency is described as the quality of the securities to absorb the market conditions, reflect the effects on it, and incorporate all of the relevant information instantaneously. It means, in an efficient capital market, the price of shares is adjusted to its best level automatically depending on the nature and environment of the market. (Frank,2002).(19)

Important Market Efficiency

Financial markets can give an opportunity for you to invest money in shares (also known as equities) to build up money for the future.

Over a long period of time, this can often provide a better return than opening a savings account at your bank. But buying shares can be risky Opens in a new window. It is important to remember that the value of any investment can go down as well as up, and getting good returns in the past does not always mean they'll be good in the future.

Financial markets also allow people to take out insurance. Insurance companies need to use financial markets to make sure you will receive a pay-out if you have an accident, such as losing or damaging your mobile phone.

Financial markets enable lenders such as banks to borrow money. They make loans to people who want to borrow – whether that's attending university with a student loan, say, or buying a house with a mortgage.

Markets **provide finance for companies so they can hire, invest and grow**. They provide money for the government to help it pay for new roads, schools and hospitals. And they can help lower the costs you face buying food at the supermarket, taking out a mortgage or saving for your retirement. (Bank of England).

Without financial markets, capital could not be allocated efficiently, and economic activity such as commerce and trade, investments, and growth opportunities would be greatly diminished. (Hayes, 2022) (1)

How are market efficiency and market failure related?

Market efficiency influences the allocation of resources to generate consumer-friendly items. It refers to a market in which the value gained for commodities is equal to the value projected. On the other hand, market failure happens when resource allocation efficiency is not achieved. For example, the market is likely to fail when the price mechanism fails to account for all costs and benefits required for consumers to

buy and utilize an item. In other words, the market fails when price and quality do not match. (Caroline,2022) (8)

Efficient Market Hypothesis (EMH)

The Efficient Market Hypothesis (EMH) essentially says that all known information about investment securities, such as stocks, is already factored into the prices of those securities.[1] If that is true, no amount of analysis can give you an edge over "the market."

EMH does not require that investors be rational; it says that individual investors will act randomly. But as a whole, the market is always "right." In simple terms, "efficient" implies "normal."

For example, an unusual reaction to unusual information is normal. If a crowd suddenly starts running in one direction, it's normal for you to run that way as well, even if there isn't a rational reason for doing so. (Corporate Finance Institute) (11)

Market Efficiency Forms

There are three degrees of market efficiency.

Figure (2) **Market Efficiency Forms**

Source Wallstreetmojo Team

The weak form of market efficiency is that past price movements are not useful for predicting future prices. If all available, relevant information is incorporated into current prices, then any information relevant information that can be gleaned from past prices is already incorporated into current prices. Therefore, future price changes can only be the result of new information becoming available. The semi-strong form of market efficiency assumes that stocks adjust quickly to absorb new public information so that an investor cannot benefit over and above the market by trading on that new information. The strong form of market efficiency says that market prices reflect all information both public and private, building on and incorporating the weak form and the semi-strong form. Given the assumption that stock prices reflect all information (public as well as private), no investor, including a corporate insider, would be able to profit above the average investor even if he were privy to new insider information. (Fama, 1969)(5).

Literature

Ilias &, Nadja, (2022), (12) tested the Efficiency of the Saudi Financial Market (Tadawul) during an extended period (2018-2020). To test the random walk hypothesis (RWH), the study focused on three tests: (ADF), (Runs), and finally (BDS Statistic) test. The results concluded that the Saudi market is inefficient at the weak level, and this enables investors to predict the fluctuations of the future returns.

Salam, (2022), (13) tested the Egyptian Market Efficiency securities on the weak level, using the daily return index during the period 0222-2020, using the Dickey-Fuller Test (unit root test), and it has been found that the Egyptian market securities market is Efficient on the weak level of efficiency.

Alzaim, Alhouti & Kordi, (2022), (14) The equity capital market in Saudi Arabia evolved substantially since the beginning of a formal stock exchange in the 1980s. As shown in Figure 1, the total market capitalization has increased from SAR67 billion in 1985 to USD 9,102 billion in 2020, at a compounded annual growth rate of 14.6%. Over the same period, the total market capitalization as a percentage of GDP has increased from 17.8% in 2018 to 346.7% in 2020. At the end of 2021, there were more than 10 Global Industry Classification Standard sectors and 20 industry groups represented in the Saudi Exchange, with

over 200 listed equities. In terms of constituents and trading volume, the banks, consumer discretionary and staples, and materials are leaders, followed by real estate and industrials, which together account for 87% of the equity market. The same industry groups are most prominent in terms of market capitalization, although the energy sector has a significantly greater representation because of Saudi Aramco, which accounts for 72% of the market capitalization of the entire Saudi Exchange. The outlook for further diversification is positive because of several reform policies and incentives that are encouraging more entities to consider a public listing.

FIGURE 1. TOTAL MARKET CAPITALIZATION AS A PERCENTAGE OF GDP, 1985–2020

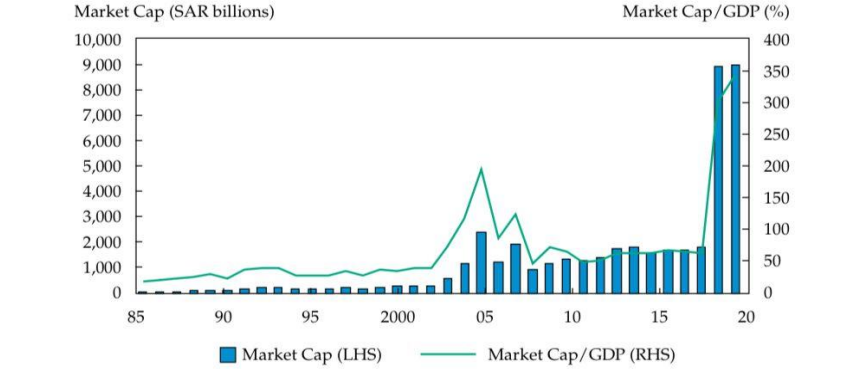

Figure (3) Total Market Capitalization

Source: Saudi Central Bank, "Annual Statistics 2020" (31 May 2021).

Kelikume, Ikechukwu; Olaniyi, Evans, Iyohab & Faith A. (2020), (15) investigated the weak axiom of the efficient market hypothesis (EMH) as it applies to fifteen (15) leading stock markets in Africa. There are currently over twenty-nine stock exchanges in Africa with a significant degree of disparities ranging from market size, trading volume, number of listed companies, access to funds, access to information to market standardization etc. The article deviated from the conventional linear approach of testing the efficient market hypothesis and the method of using the runs test for serial dependency to test the weak-form efficient market hypothesis. The paper adopted the wavelet unit root analysis-tool, which decomposed the stochastic processes into its wavelet components, with varying frequency band. The study found that institutional constraints have implications for the efficient market hypothesis and investment in the African stock market. The conclusions drawn from the study is the relevance of using past historical stock prices to predict the current earnings at stock markets in Africa, a negation of the efficient market hypothesis.

Hadhary & Ali, (2016), (16) tested the relationship between the recurrence of the financial crisis and the theory of efficient market that underpin our financial markets on the one hand, and its relation to the hypothesis of financial instability, and therefore search in one of the main reasons causing the recurrence of such crisis, and exit true treatment from our perspective and adopt policies that fit the reality of our financial markets.

Blume, (2007), (17) refers to the efficient markets hypothesis (EMH) maintains that market prices fully reflect all available information. Developed independently by Paul A. Samuelson and Eugene F. Fama in the 1960s, this idea has been applied extensively to theoretical models and empirical studies of financial securities prices, generating considerable controversy as well as fundamental insights into the price-discovery process. The most enduring critique comes from psychologists and behavioral economists who argue that the EMH is based on counterfactual assumptions regarding human behavior, that is, rationality. Recent advances in evolutionary psychology and cognitive neurosciences may be able to reconcile EMH with behavioral anomalies.

Study population and sample:

The study population is represented in the business sectors listed in the Saudi Stock market, and Table No. (1) shows all sectors listed in the Saudi Stock market.

Table No. (1) Business sectors listed in the Saudi stock market.

No	Sector	No of companies	No	Sector	No of companies	No	Sector	No of companies
1	Market	202	8	Material	42	15	Insurance	30
2	Food& Beverages	13	9	REITs	17	16	Media & Entertainment	2
3	Energy	5	10	Retelling	8	17	Pharma & Biotech	1
4	Commercial and Professional Services	4	11	Health Care	8	18	Telecommunication	4
5	Banks	11	12	Consumer Services	10	19	Utilities	4
6	Food & Staples Retailing	5	13	Real Estate Management and development	11	20	Consumer Durables	6
7	Transportation	6	14	Software & Services	3	21	Capital Goods	12

Source: Saudi stock market,2022.

Statistical methods.

- To describe the indicators, the mean, median, minimum, maximum, and standard deviation were used.
- To determine the extent to which the indicators follow the normal distribution, the skewness coefficient, the kurtosis coefficient, and the Jarque–Bera statistic were used.
- To test the hypothesis of the research, the Run test statistic, the Durban-Watson statistic, Dickey–Fuller were used.

Description of the study variables

Table (2) shows the statistical properties of the variables under study.

Table (2) The statistical properties of the variables

	Mean			Maximum			Minimum			Standerd Diviation			Co-officient of Variation		
Period	Before	Concurrent	After	Before	Concurrent	After	Before	Concurrent	After	Before	Concurrent	After	Before	Concurrent	After
TASI	3952.3	3693.5	9918.3	4723.7	4505.5	11939.5	3378	2788.4	7864.7	333.6	456.6	1177.6	8.4	12.4	11.9
Banks	3956.1	3892.8	7594.1	4713.3	5346.3	9329.1	3390.8	2822.3	4801.6	286.8	661.6	1287.1	7.2	16.9	16.9
Material	4619.1	4450.9	6615.9	5079.2	5202.3	8306.8	3466.4	3466.4	4877	401.1	455.2	922.1	8.6	10.2	13.9
Capital Goods	3956.1	3892.8	7594.1	4713.3	5346.3	9329.1	3190.8	2822	4801.6	286.8	661.6	1287.1	7.2	16.9	16.9
telecommunication	6416.8	6134	7619.1	7160.2	6748.7	8739.9	5401.9	4852.2	6528	356.5	455.2	571.2	5.5	7.4	7.5
Commercial Services	4351.4	3756.3	4289	4771.8	4231.3	4935.9	4069.3	3198.9	3884.1	163.5	300.8	230.3	3.7	8	5.4
Consumer Services	3631.9	3404.2	4559.8	4288.8	4231.8	5380	3195.8	2743.6	3568.5	268.1	410.3	451.1	7.4	12	9.9
Energy	4880.8	4972.8	5505.3	5719.1	5631.5	5917.3	4135.9	4248.7	5148.4	382.9	322.9	137.9	7.8	6.5	2.5
Food & Beverages	4219.2	4952.8	5636.6	4627.3	5894.3	6362.4	3615.6	3570.8	5133	184.9	602.9	275	4.4	12.2	4.9
Health Care	3748.4	4036.6	6686.6	3956.7	5359.5	8632.7	3465.3	3009.6	5126.7	118.9	693.2	1063.5	3.2	17.2	15.9
Insurance	4333.3	4607.9	6330.7	4765.7	6194.2	7574.2	3320.7	3349.6	5361.4	162.8	672.1	469.7	3.8	14.6	7.4
Consumer Durables	3469.7	3478.8	3748.4	3795.3	4872.3	3956.7	3112.5	2703.3	3465.3	174.7	583.3	118.9	5.03	16.8	3.2
Media	9743	7701.3	14126.2	12029	10445.8	23149.9	7694.6	6098.9	8905.4	1080	930.4	4680.2	11.1	12.1	33.1
Pharma	3515	3864	5820.4	3845.6	4887.8	7968.3	3126.6	3021.1	4254.6	140.2	437.3	948.4	3.9	11.2	16.3
Utilities	4137.3	3556.9	5172.8	4646	3920.4	6251.8	3487.1	3235.6	3902.4	353.7	138.2	641.4	8.5	3.9	12.4
Real Estate	3111.1	2691.6	3304.1	3387.7	3409.8	3709.9	2758.9	2294.4	2831.3	142	296.3	246.1	4.6	11	7.4
REITs	3845.9	3787.8	4605.5	4377.2	4578.5	5221.3	3524.6	3501.7	4063.1	218.2	211.6	336.1	5.7	5.6	7.3
Retelling	7437.3	6859.9	9622.8	8015.1	8614.2	95911.1	6733.9	5203.6	11444	259.2	809.7	7902.8	3.5	11.8	31.8
Transportation	5614.5	3860.3	5518.3	6465.3	4659	6465.3	4130.9	3091.1	4092.3	660.4	467.4	712.6	11.8	12.1	12.9

Source: Output of statistical analysis

Table (2) illustrates that the Saudi financial market during the pandemic period was exposed to sharp fluctuations in the values of the general market index "TASI", and the values of the indices of the business sectors that make up the market. With regard to the general index of the Saudi stock market TASI, it is clear that there was a sharp decline in the value of the index during the period during the pandemic from February 2020 to February 2021, as the average value of the index before the pandemic (the period between February 2019 to February 2020) was 3952.31 points, and it collapsed during the pandemic period; It reached 3693.5, which is the lowest average value that the index has reached for a long time, but it rose again after the beginning of the discovery of the vaccine and the beginning of its abundance and taking the vaccine. It rose to an average of 9918.3 points. And that is with standard deviation coefficients before the pandemic of 333.6 points, during the pandemic of 456, and after the pandemic of 377 points, and this indicates that the rate of risk to which the money market was exposed during the pandemic is greater than before and after the pandemic. This indicates that the money market has recovered after the pandemic period.

Figure (2) illustrates this development in the average values of the TASI money market index, as the figure shows that the market index at the end of the fourth quarter of 2019 and the beginning of the first quarter of 2020 reached its maximum and then began to collapse from the end of the first quarter of 2020 to reach its maximum. In the collapse in the second quarter of the year 2020, then the market began to gain confidence and began to recover at the end of the third quarter of the year 2020, then it relapsed and the decline returned to the beginning of the year 2021, so at the beginning of the first quarter of the year 2021 the market began to recover and became better than it was before the pandemic, The return of the market fluctuates up and down, but it is better than before the pandemic. Thus, we find that:

- The sectors most affected by the pandemic are the transportation sector, the real estate sector, the public utilities sector, the commercial and consumer services sector, the entertainment sector, and the luxury goods retail sector. 3860.3 points, although before the pandemic it was 5614.1 and after it 5518.3. Likewise, the real estate sector was the index value before the pandemic 3111.1, during the pandemic 2691.6 and after the pandemic 3304.1. As for the public utilities sector, before the pandemic, the index value was 4137.3, during the pandemic it was 3556.9, and after that it was 5172.8. While the entertainment sector reached 9743 before the pandemic, 7701.3 during the pandemic and after the pandemic it reached 14126.2. Commercial services reached 4351.4 before the pandemic, 3756.3 during the pandemic, and 4289 after the pandemic.
- As for the sectors that were least affected by the pandemic, rather there was a slight increase in the value of their index during the pandemic, which are the pharmaceutical and health care sectors, food production, and energy, which are all vital and main sectors that satisfy the basic and basic needs of the members of society. Although the value of the index reached 3515 before the pandemic, and after the pandemic it reached 5820.4 points. And the health care sector reached 4036.6 points during the pandemic, although before the pandemic it reached 3798.4 points, and after the pandemic it reached 6686.6 points. We also find the food sector. The value of the index amounted to 4952.8 during the pandemic, although it was 4219.2 before the pandemic and after the pandemic it reached 5636.6. Likewise, the energy sector. We find that the average value of the index during the pandemic was 4972.8, while before the pandemic it was 4880.8 and after the pandemic 5505.3.
- For the rest of the other sectors, we find that there is a noticeable decrease in the value of the index during the pandemic, and it was able to rise after the pandemic period.
- We find that all sectors have high coefficients of variation, and this reflects the extreme fluctuation in the value of the indicators during, before and after the pandemic, but we find that the media and entertainment sector is the most risky sector, as its coefficient of variation reached 33.1 after the pandemic, despite achieving the highest average value of the index after the pandemic, and we also find The luxury goods sector is one of the most risky sectors. Where the coefficient of difference was 31.8.
- This indicates that in the period of natural crises that affect all economic sectors, it is preferable to invest in sectors that provide the basic needs of society such as food, energy, health care and medicines. more return.

Normality Test for Variables:

It is clear from Table (3) that the Saudi money market index does not follow the normal distribution during 3 periods before, during, and after the Corona pandemic, as we find that the Jarque-Bera coefficient during the three periods is 24, 7.5, and 32.5, all of which are at a significant level of less than 0.05. This is confirmed by the values of the skewness and kurtosis coefficients, and this confirms that the general market indices and sector indices tend to skew and skew, whether positive or negative, as if the value of the kurtosis coefficient is greater than 3, the distribution is excessive, meaning that the values are distributed with a large dispersion around the middle, while if the coefficient is Less than 3, the values of the indicator are distributed in a pointed manner, and we find that the skew coefficients are either greater than zero or less than zero, which means that there are some indicators with a positive skew distribution, while others have a negative skew, which indicates an asymmetric distribution.

Table (3): Normality of Variable

	Skewness			Kurtosis			Jarque-Bera			P-Value		
الفترة	Before	Concurrent	After	Before	Concurrent	After	Before	Concurrent	After	Before	Concurrent	After
TASI	0.88	0.1	0.04	2.8	1.9	1.5	32.5	7.4	24.9	0	0.03	0
Banks	0.85	0.55	0.29–	3.2	2.3	1.81	30.8	9.7	19.5	0	0.007	0
Material	1.1–	0.3–	0.06–	3.2	2.1	1.7	54.6	6.9	16.9	0	0.03	0
Capital Goods	0.85	0.55	0.29–	3.2	2.3	1.8	30.8	9.7	19.5	0	0	0
Telecommunication	0.35–	1.08–	0.04	2.6	3.06	1.7	6.1	28.3	17.8	0.04	0	0
Commercial Services	0.66	0.03–	1.05	2.4	1.7	3.3	21	9.03	52	0	0.01	0
Consumer Services	0.99	0.38	0.12	2	1.7	1.9	41	12.5	14	0	0.01	0
Energy	0.16	0.18	0.79	1.7	2.5	4.7	19.8	2	64.1	0	0.36	0
Food & Beverages	0.74–	0.29–	1	3.1	1.2	3.5	23	19.6	48.7	0	0	0
Health Care	0.67–	0.36	0.14	2.6	1.7	1.4	20.7	13	30	0	0.01	0
Insurance	0.56	0.25	0.52	3	2.2	2.3	13.5	5.1	17.7	0.01	0.07	0
Consumer Durables	0.34–	0.95	0.67–	2.3	2.7	2.6	10.6	22.3	20.7	0.04	0	0
Media	0.01–	1.2	0.49	2.2	3.8	1.4	6.3	40.9	39.3	0.04	0	0
Pharma	0.37	0.32	0.64	2.4	2.4	2.3	10.2	4.4	23.7	0.05	0.11	0
Utilities	0.49–	0.27	0.23	1.5	2.4	0.23	30.6	3.8	17.3	0	0.14	0
Real Estate	0.06–	1.2	0.01–	2.2	3.3	1.5	7.2	33.1	24.5	0.02	0	0
REITs	0.89	1.06	0.15	2.9	3.9	1.3	33.6	31.5	30.7	0	0	0
Retelling	0.02	0.45	0.09	2.8	2.4	1.3	7.3	0.34	7.3	31.8	0.02	0
Transportation	0.47–	0.03–	0.33–	1.7	1.7	1.5	25.5	9.9	27.4	0	0.06	0

Source: Output of Statistical Analysis

Therefore, you can say that the money market index (TASI) and the sector indices during the years 2020 to 2021 are not distributed in a normal and symmetrical manner, and this indicates, in principle, the inefficiency of the money market and the market sectors. This is except for the energy, health care and public utilities sector, as the probability value for them is greater than 0.05 during the pandemic period, with a slight kurtosis ranging between 2.9, 2.5, which is close to 3, and a slight skew that ranges between 0.32, 0.18, which is close to zero, and this may indicate the efficiency of the energy and medicine sector. public facilities during the Corona period.

The development of the Saudi public money market index (TASI) and the values of sectors indicators during the three study periods (before the pandemic period, during the pandemic period, and after the pandemic period).

Figure (4) shows the development of the Saudi Public Stock Market Index (TASI) during the three study periods (before the pandemic period, during the pandemic period, and after the pandemic period).

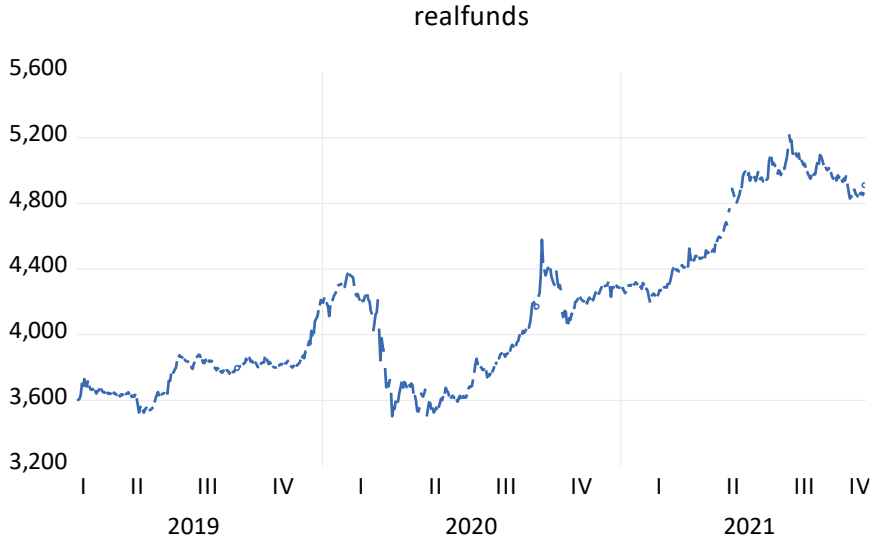

Figure (4): The development of the Saudi Stock Market Index (TASI) during the three study periods (before the pandemic period, during the pandemic period, and after the pandemic period).

It is clear from Figure (4), which shows the development of the value of the Saudi money market (TASI) during the study periods, that there is a complete collapse of the Saudi money market index, especially in the first quarter of 2020, which is the period of the beginning of the pandemic, and the collapse continued until the end of the second quarter and from the beginning of the third quarter of 2020 The market began to recover with the beginning of the appearance of the vaccine to replace it in 2021, then the market began to recover from the second quarter of 2021 to achieve a better index value than before the pandemic

The development of the sector indices listed in the Saudi stock market during the study period.

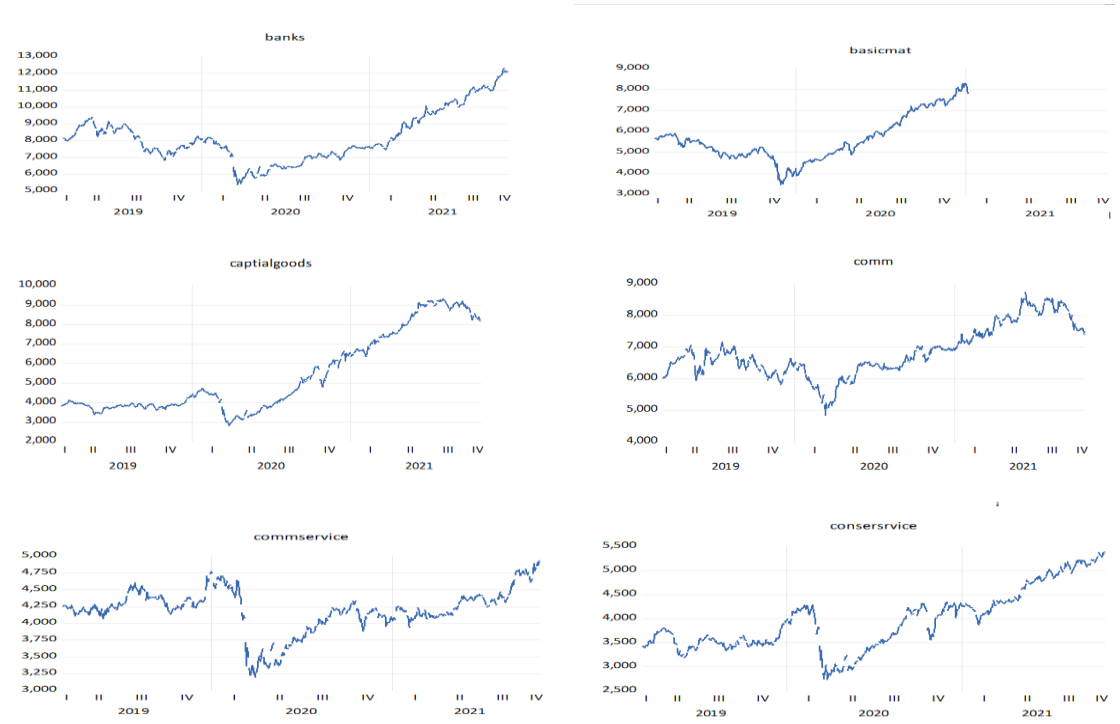

Figure 5) The development of the index of some sectors listed in the Saudi Stock Exchange (basic materials sectors, banks, communications, capital goods, consumer services, commercial services) Source: Output of Statistical Analysis

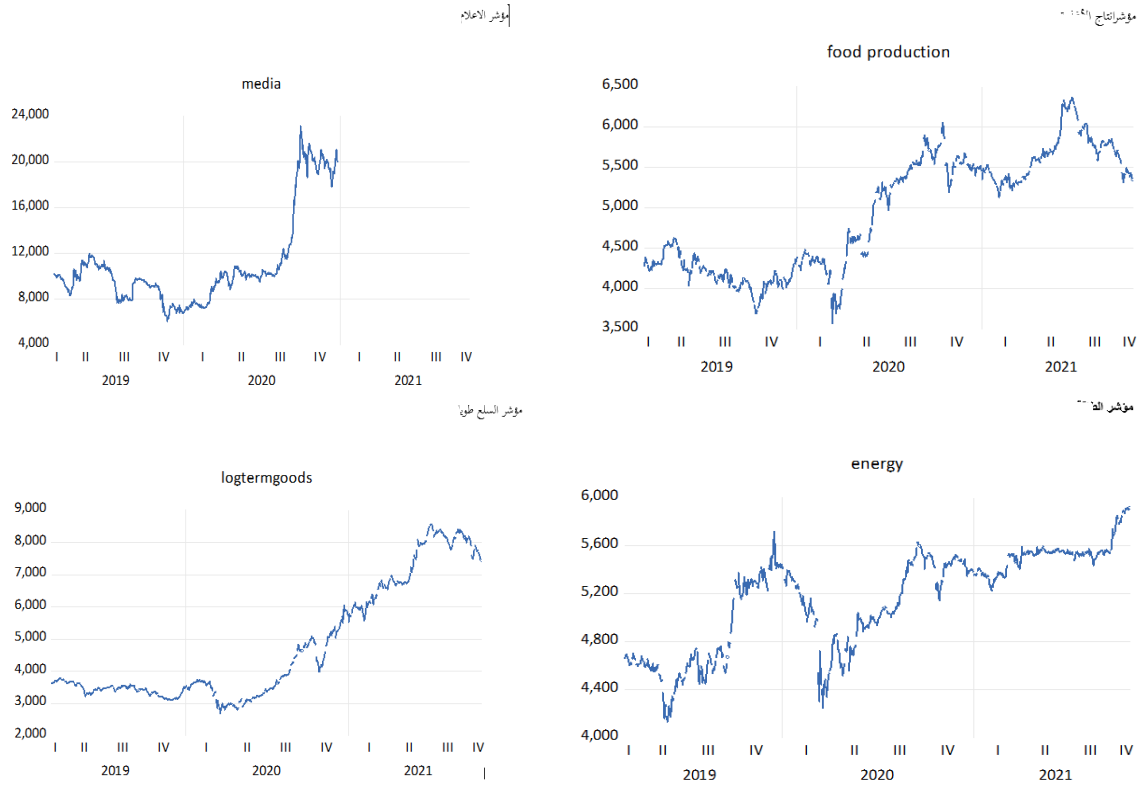

Figure (6) The development of the index of some sectors listed in the Saudi stock market (Food, energy, health care, insurance, long-term commodities, media and entertainment sectors) Source: Output of Statistical Analysis

Figure (7) The development of the index of some sectors listed in the Saudi Stock Exchange (Pharmaceutical sectors, health care, public utilities, real estate development, real estate funds, transportation, luxury goods) Source: Output of Statistical Analysis

figures (4), (5), (6), (7) illustrate that there was a collapse of the market index and the indices of other sectors during the pandemic period, but it began to recover at the end of 2020, and the beginning of 2021. However, we find that the pharmaceutical sector is the sector that preserved Despite its stability during the pandemic, it preceded all other sectors in the rise and recovery. And that the sectors that collapsed faster were the luxury goods sector. As for the sectors that recovered after the collapse quickly, they are

the capital goods sector, banking, communications, basic materials, and health care. We find that the sectors most affected and the fastest to collapse are the transport sector, real estate and public utilities, and therefore it can be said that the Saudi capital market and its sectors responded to a large and rapid degree to the Corona pandemic, as it responded when the vaccine was discovered and announced, which reassured investors and restored trading activity in the stock exchange.

Hypothesis test:

H: The Saudi stock market is an efficient market from the weak form during the Corona pandemic period.

Table 4 shows the results of the hypothesis test as follows:

Table 4: The Results of hypothesis test

	Run test			Auto-correlation	Stationary test			
	Run test Statistic	Z	Sig	DW	ADF	Lag	P-value	Stationary period
TASI	8550.5	24.1-	0	1.98	22.73-	0	0	Constant with first difference
Banks	7841.8	25.11-	0	2	21.9-	0	0	Constant with first difference
Material	5402.2	24.7-	0	1.98	22.78-	0	0	Constant with first difference
Capital Goods	4409.7	24.7-	0	1.99	23.1-	0	0	Constant with first difference
Tele-communication	6676.6	24.1-	0	1.99	23.97-	0	0	Constant with first difference
Commercial Services	4220.8	4220.8	0	1.98	24.08-	0	0	Constant with first difference
Consumer Services	3849.3	25.3-	0	1.98	23.65-	0	0	Constant with first difference
Energy	25.3-	23.8-	0	1.99	20.49-	1	0	Constant with first difference
Food & Beverages	5215.7	25.1-	0	1.97	23.2-	0	0	Constant with first difference
Health Care	4057.1	25.7-	0	1.98	24.59-	0	0	Constant with first difference
Insurance	4756.6	25.5-	0	1.99	19.63-	1	0	Constant with first difference
Consumer Durables	3696.9	24.6-	0	1.99	23.15-	0	0	Constant with first difference
Media	10019.8	24.4-	0	1.99	21.91-	0	0	Constant with first difference
Pharma	3938	25.1-	0	1.98	23.16-	0	0	Constant with first difference
Utilities	4401.1	23.2-	0	1.98	24.2-	0	0	Constant with first difference
Real Estate	3112.5	22.9-	0	1.98	19.24-	1	0	Constant with first difference
REITs	4077.2	25.2-	0	1.99	24.75-	0		Constant with first difference
Retelling	7756.6	25.3-	0	2	24.65-	0	0	Constant with first difference
Transportation	4254.1	25.2-	0	1.98	22.76-	0	0	Constant with first difference

Source: output of Data analysis

It is clear from Table No. (4) that the Run test for the movement of price fluctuations of the Saudi stock market index "TASI" indicates that price movements are not random, given that the "z" value of the

randomness test is -24.1 at a significant level (0.001), in order that Price movements are characterized by randomness. Therefore, the market is not characterized by a random movement of the index values.

We also find that the Augmented Dickey - Feller test to test the Stationary of the price series indicates that the price series during the study period is free from the unit root, as the value of the expanded Augmented Dickey Feller "ADF" reached -22.73 with a period of zero lag at a significant level of 0.000, and the series is stationary at the first difference with Constant, and this indicates Price fluctuations do not change randomly, but they are Stationary. The Durban-Watson statistic is close to 2, as this reflects the absence of Autocorrelation of the first degree of statistical errors for the values of the series, and this reflects the independence of the index values across the series, and therefore it can be said that the Saudi stock market is not characterized by efficiency at the weak form during the study period. That is, the movements of the index values do not reflect the historical data. Thus, we cannot accept the hypothesis.

As for the business sectors listed in the Saudi Stock Exchange, are they characterized by efficiency from the weak level or not? Referring to Table (4), we find the following:

- The run test of the series of values of the sectors' indices listed in the Saudi stock market indicates that the movement of the indices' values is not random, because for all indices we find that the z values are higher than 1.92 at a significant level of 0.000, while for the indicator to be characterized by randomness, it must be less than the absolute value of z is less than 1.96 and that the level of significance should be more than 0.05 and thus all sectors are not characterized by the random movement of the values of their indicators.
- The Durbin-Watson test to verify the existence of autocorrelation indicates that all values of Durbin-Watson for the entire sectors are close to 2 and this indicates the absence of autocorrelation from statistical errors.
- the Augmented Dickey - Feller test indicates stationary or stability of the time series for the values of the indicators, where the value of the Augmented Dickey Feller "ADF" ranged between -19.24 and -24.65, all of which are significant at a level less than 0.0001 with a slowdown period ranging between zero and one and a level of stability stationary at the Constant and the first difference. This indicates that price fluctuations do not change randomly but are stationary.

Results

The most important results of the study are as follows:

- The sectors most affected by the pandemic are the transportation sector, the real estate sector, the public utilities sector, the commercial and consumer services sector, the entertainment sector, and the luxury goods retail sector.
- The sectors least affected by the pandemic, but there was a slight increase in the value of its index during the pandemic, are the pharmaceutical and health care sectors, food production, and energy, which are all vital and main sectors that satisfy the basic and main needs of members of society.
- All business sectors have high standard deviation, and this reflects the strong fluctuation in the value of indicators during, before and after the Corona pandemic.
- In a period of pandemic that affect all business sectors, it is preferable to invest in sectors that provide the basic needs of society, such as food, energy, and health care.
- The capital market index (TASI) and the sector indices during the years 2020 to 2021 are not distributed in a normal and symmetric manner, and this indicates, in principle, the inefficiency of the capital market and the market sectors.
- There is a collapse of the market index and other sector indices during the pandemic period, but it began to recover at the end of 2020 and beginning of 2021.
- The Saudi capital market and the business sectors are not characterized by efficiency at the weak form during the study period.
- The average value of the market index "TASI" are better than the average of the rest of the sectors.

Research Recommendations:

Based on the above results of this study, the researchers recommend the following:

First: Recommendations directed to the investor in the capital market:

- In the event of natural disasters and crises, investors should focus on sectors of basic needs, such as food, health care, medicine, and energy.
- In periods of prosperity, the investor can go to the entertainment sectors, and luxury goods, as they achieve the highest return, but riskiest.
- The individual investor does not rush in periods of crisis to random selling, waits, keeps the securities, relies on the fundamental, technical analysis of the securities, the investor fails to follow the study of historical data, takes decisions based on them makes the market less efficient, and there is a rush towards buying or selling securities without studying.

Second: Recommendations addressed to the Capital Market and Financial Intermediaries Authority:

- The capital market should spread the culture of financial investment, also launch awareness, and training courses for investors through its platform on how to assess the situation and variables and how to make investment decisions.
- Transparency in providing data, analysis tools, and advice online to make the right decision.
- Developing a system, developing the capital market platform in a way that enables the investor directly to evaluate shares and make good decisions.
- Establishing an early warning system for the capital market in order to detect financial and environmental risks that may affect stock prices. With the training of investors and brokerage firms, it is good to estimate environmental variables and analyze them, and to provide the results of the analysis to all investors.
- The necessity of establishing specialized educational institutes, training centers, holding international scientific conferences and seminars, to qualify the human cadres necessary to work in the emerging financial markets.
- Decision makers to work on following up efforts in the field of supporting the stock market, by increasing its efficiency and liquidity.

Third: Recommendations addressed to researchers

- Researchers should study the behavior of the individual investor and identify the determinants of his investment decisions in times of crisis.

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