



Explaining the factors affecting the profitability of pharmaceutical companies with an emphasis on the conditions of risk and crisis

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ABSTRACT

In recent years, companies have always faced various risks and crises. The Covid-19 virus, which started in China in 2019, spread all over the world and affected all global markets. This virus has created many economic and financial effects for various businesses, including the pharmaceutical industry. The purpose of this research is to identify the factors affecting the profitability of pharmaceutical companies in critical situations such as the Corona virus. In order to identify the factors affecting profitability in the conditions of the corona virus, a number of valid articles were first studied and some factors were identified as variables affecting profitability. After this stage, the relevant factors were given to the experts to reach a final consensus on the variables. At this stage, the opinions of 20 experts with high working experience in the pharmaceutical industry were used. Variables Size, financial risk-taking, Leverage, cash, fixed asset, growth(sale), industry, corporate governance, GDP, inflation, currency and working capital were identified as profit predictors in the conditions of the coronavirus. Pharmaceutical companies should form a risk management committee so that they can maintain their profitability in critical situations such as the corona virus.

Keywords: Profitability, pharmaceutical companies, risk, crisis

1. Introduction

Today's world is very different from before and is constantly faced with various risks. In today's competitive world, achieving profitability is the most important concern of company shareholders. Therefore, in order to maintain their position, managers should be able to pay attention to the existing risks in order to increase their profitability in addition to taking reasonable risks. Factors that affect profitability either originate from the company's internal factors or from environmental factors. Management of internal factors is possible by planning and paying attention to internal controls, but environmental factors require more detailed and intelligent planning. The emergence of crises such as the Covid-19 virus is an example of these environmental factors that, if the factors affecting it are properly taken into account along with the existing risks, it will become an opportunity for some industries such as the pharmaceutical industry and will improve the state of the gross domestic product of countries. will be. The Covid-19 virus, which started in China in 2019, spread all over the world and affected all global markets. Global indices were also severely attacked. This virus caused many social, economic and health problems. This virus has created many economic and financial effects for various businesses, including the pharmaceutical industry. Considering that this virus affects the risk and profits of companies, it will cause a major crisis and high costs for pharmaceutical companies [1-4].

In Iran, problems in the supply of raw materials have reduced the production and sales of some companies since January 2019. This decrease in production and sales has caused drug shortages in several products. The outbreak of the corona virus has had a double effect on the pharmaceutical industry; Due to compliance with protocols including wearing masks and washing hands, the percentage of common diseases such as colds and allergic and seasonal diseases decreased drastically, which resulted in a sharp decrease in the demand for antibiotic products. Also, due to the high allocation of hospital capacity to corona patients, surgeries for other diseases also decreased, and as a result, the products used in the operating room faced a decrease in demand. On the other hand, the demand for complementary products, including vitamins, which are effective in preventing and improving the corona virus, increased

significantly, and companies that had a high position of complementary products in their product portfolio were able to benefit from this situation. Of course, it should be noted that the sharp increase in the exchange rate, which has resulted in a sharp increase in the price of foreign complementary products, and also the ban on the import of similar domestically produced products has also been effective in this situation. Also, some products that are effective in treating the corona virus have also seen an increase in sales. There are two theories about Corona. The first theory is that the increase in diseases and the increase in the drug budget will eventually cause pharmaceutical companies to have more production, and ultimately the increase in their sales will increase their profits. The second theory is that health care causes less people to get sick and therefore the demand for some drugs will decrease. Both theories agree on changes in the profits of pharmaceutical companies. The change in profit will affect the elements of the financial statements. Profit is one of the most important elements of financial statements, and its change will have an effect on the balance sheet, profit statement, and cash flow statement. It can be said that pharmaceutical companies have experienced the highest level of production during the Corona era. The relevant profit will change according to the risk tolerance of pharmaceutical industry managers, considering that it is possible that the same situation as the corona virus will be repeated, so this research is looking for the factors affecting the profitability of pharmaceutical companies in critical situations such as the corona virus. The reason for the importance of examining the research problem stems from the fact that the pharmaceutical industry will be one of the most important sources affecting the GDP by 2022, based on the data announced by reliable global sources. If this industry, considering the existing risks, can maintain its profitability in this era, it can be useful for the country and improve economic growth, and on the contrary, if it cannot manage the current situation, it will cause a crisis. Therefore, pharmaceutical companies should pay attention to the factors and factors affecting profitability in high-risk conditions so that they can finally turn existing threats into opportunities. The purpose of this research is to identify the factors affecting the profitability of pharmaceutical companies in critical situations such as the Corona virus. Given that various crises will always

occur, this research could be valuable and innovative for pharmaceutical companies.

2. Materials and Methods

In order to identify the factors affecting profitability in the conditions of the corona virus, a number of valid articles were first studied and some factors were identified as variables affecting profitability. After this stage, the relevant factors were given to the experts to reach a final consensus on the variables. At this stage, the opinions of 14 experts with high working experience in the pharmaceutical industry were used. Among the responding experts, 9 were female and 5 were male. 8 of the respondents had master's degrees, of which 6 were in accounting and 2 were in financial management. 2 were accounting PhD students. 4 were accounting PhDs. 8 people had master's degrees. The job titles of 7 people were in the field of auditing and academia, 1 person was in the field of senior management, and 6 people were in the field of finance and accounting. 5 people had work experience between 4 and 10 years. 7 people had work experience between 11 and 20 years, and 2 people had work experience over 20 years.

3. Finding

What factors affect the profitability of pharmaceutical companies in the conditions of the corona virus?

The method of answering the research question

First, related articles were studied. To determine the validity of the research tools that are the articles and texts studied, the critical assessment skills

program(CASP)is used. Using the critical assessment skills program or CASP method, each article should be evaluated in terms of quality with 10 quality conditions. A score between 1 and 5 is assigned to each of the articles based on each of these conditions. The articles with a total score of 25 and above will be confirmed in terms of quality and the rest of the articles will be deleted. The conditions considered for the CASP method in this study are:

Correlation of the goals of the article under review with the goals of the research, the up-to-dateness of the research of the article under review, the plan presented in the article under review, the sampling method in the article under review, the method and quality of data collection, the level of reflectivity, the possibility of expanding the results. The subject under investigation is the extent and manner of observing common ethical points in the field of writing research texts in the subject under investigation, the level of accuracy in the analysis and analysis of data in the subject under investigation, the clarity of expression in the presentation of the findings of the subject under investigation and the overall value of the subject. Since there are 10 features and the maximum score of each feature is 5, so the maximum score that each article can get based on the CASP scale is 50. The easiest way is to delete any article that has less than 25 points. The scores included poor (0 to 10), moderate (11 to 20), good (21 to 30), very good (31 to 40) and excellent (40 to 50). The average CASP score for the articles is 45. The review of articles provided the following variables for the proposed model:

Table 2: Variables in domestic and foreign articles

Raw	predictor variables	The dependent variable	Source
1	Fixed asset and cash and industry and Leverage and growth(sale)	profitability	[5]
2	Size and Leverage	profitability	[6]
3	financial risk-taking	profitability	[7]
4	Size	profitability	[8]
5	financial risk-taking and industry and Size and Leverage	profitability	[3]
6	Leverage	profitability	[9]
7	corporate governance and Leverage and growth(sale)	profitability	[10]
8	Size and Leverage and growth(sale)	profitability	[11]
9	corporate governance and Leverage and growth(sale)	profitability	[12]
10	Currency and inflation and GDP	profitability	[13]
11	Currency and inflation rate	profitability	[14]
12	Size and growth(sale)	profitability	[15]
13	Size and Leverage and growth(sale)	profitability	[16]

Raw	predictor variables	The dependent variable	Source
14	corporate governance and Leverage and growth(sale)	profitability	[17]
15	Leverage and growth(sale)	profitability	[18]
16	Size and Leverage	profitability	[19]
17	Size and Leverage and growth(sale)	profitability	[20]
18	Size and Leverage	profitability	[21]
19	growth(sale)	profitability	[22]
20	Size and Leverage	profitability	[23]

Fuzzy numbers are used for the final confirmation of the identified components in the Delphi method: at this stage, the experts are asked to express the importance of each item in a 7-degree fuzzy Delphi format, until finally the level of consensus on each of the components To be determined. The triangular fuzzy spectrum for the seven-point Likert scale in expressing

the importance of the indicators is in the form of fuzzy numbers in the following table:

First, the experts' answers are specified in the form of fuzzy numbers as described in the following table:

After this step, fuzzy calculations are performed and the agreed items are determined as described in the following table:

Table 3- Triangular fuzzy numbers equivalent to 7-degree Likert spectrum

Totally unimportant			very unimportant			unimportant			medium			Important			very important			Absolutely important		
0	0	0.1	0	0.1	0.3	0.1	0.3	0.5	0.3	0.5	0.75	0.5	0.75	0.9	0.75	0.9	1	0.9	1	1

Table 4- Quantification of experts' opinions in the form of fuzzy numbers

Expert opinion 20			Expert opinion ...			Expert opinion 1			factors
N	M	L	N	M	L	N	M	L	
1	1	0.9	...	...	...	1	1	0.9	Size
1	1	0.9	...	...	...	1	1	0.9	financial risk-taking
1	0.9	0.75	...	...	...	1	1	0.9	Leverage
1	0.9	0.75	...	...	...	1	0.9	0.75	cash
1	0.9	0.75	...	...	...	1	1	0.9	fixed asset
1	0.9	0.75	...	...	...	1	1	0.9	growth(sale(
1	0.9	0.75	...	...	...	1	0.9	0.75	industry
1	0.9	0.75	...	...	...	1	1	0.9	corporate governance
1	1	0.9	...	...	...	1	1	0.9	gdp
1	1	0.9	...	...	...	1	1	0.9	inflation
1	0.9	0.75	...	...	...	1	0.9	0.75	currency
1	0.9	0.75	...	...	...	1	0.9	0.75	working capital

Table 4- Fuzzy calculations of experts' opinions on the variables affecting profitability in Corona virus

if final Average>0.7=Accept	final Average	fuzzy Average			factors	Variable Type
	($\sum L + \sum M + \sum N$)/3	$\sum N/20$	$\sum M/20$	$\sum L/20$		
Accept	0.895	0.975	0.927	0.78	Size	Modifier variable
Accept	0.945	0.995	0.977	0.86	financial risk-taking	independent variable
Accept	0.787	0.895	0.807	0.66	Leverage	Control variable
Accept	0.741	0.855	0.752	0.61	cash	Control variable
Accept	0.830	0.945	0.847	0.70	fixed asset	Control variable
Accept	0.830	0.945	0.847	0.70	growth(sale(	Control variable
Accept	0.721	0.815	0.732	0.61	industry	Modifier variable
Accept	0.904	0.995	0.927	0.79	corporate governance	Modifier variable
Accept	0.945	0.995	0.977	0.86	gdp	Control variable
Accept	0.929	0.995	0.957	0.83	inflation	Control variable

if final Average>0.7=Accept	final Average	fuzzy Average			factors	Variable Type
	$(\sum L+\sum M+\sum N)/3$	$\sum N/20$	$\sum M/20$	$\sum L/20$		
Accept	0.818	0.945	0.832	0.67	currency	Control variable
Accept	0.858	0.975	0.882	0.71	working capital	Control variable

The following table shows the rank of each variable:

The following diagram also shows the comparative status of acceptance of variables:

Table 5: Ranking of influencing variables on profitability forecasting model

rank	Score	factors
1	0.945833	financial risk-taking
2	0.945833	gdp
3	0.929167	inflation
4	0.904167	corporate governance
5	0.895833	Size
6	0.858333	working capital
7	0.830833	fixed asset
8	0.830833	growth(sale(
9	0.818333	currency
10	0.78750	Leverage
11	0.741667	cash
12	0.721667	industry

The following diagram also shows the comparative status of acceptance of variables:

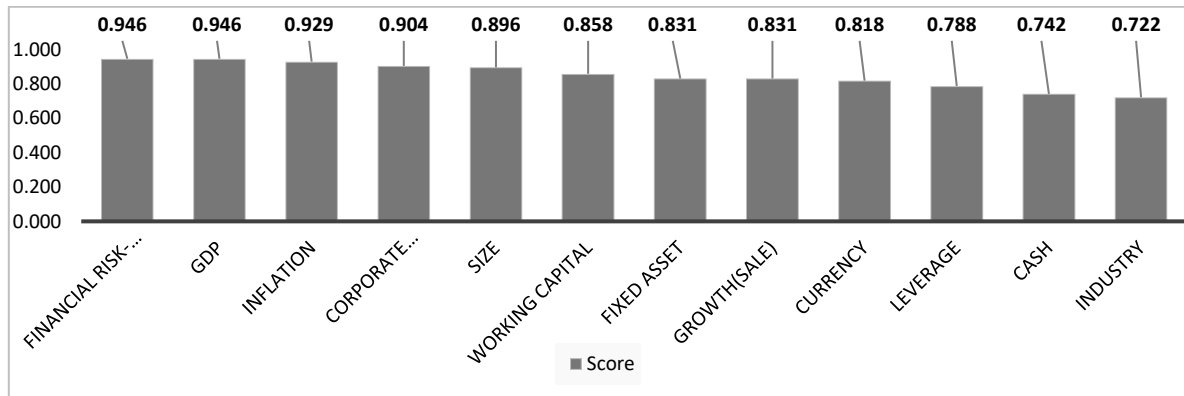


Diagram 1: comparative status of acceptance of variables

4. Conclusion

The discussion of profitability is very important in the pharmaceutical industry. Among different industries in the world, the pharmaceutical industry is the second most profitable industry after the oil, gas and petrochemical industries. The higher the profitability in any industry, the higher the risk. After the outbreak of the corona virus crisis, all companies, especially pharmaceutical companies, faced many ups and

downs. In the meantime, companies that had more flexibility were able to manage risks better and increase their profits significantly. The purpose of this research was to explain the factors affecting the profitability of pharmaceutical companies with an emphasis on critical conditions such as the corona virus so that pharmaceutical companies can take optimal measures in these conditions. The findings showed that financial risk tolerance was considered as the most important variable affecting profitability as

an independent variable and the variables of sales (growth), fixed assets, cash, financial leverage, exchange rate, inflation, gross domestic product and capital were accepted as control variables in circulation. Three variables of size and industry and corporate governance were considered as moderating variables. Considering that the conditions of our country are critical most of the time and therefore pharmaceutical companies in critical conditions such as Corona should form a risk management committee to predict possible risks and consider ways to deal with them. can increase their profitability. The more precise and flexible pharmaceutical companies are during crises, the less risk they will face. Future researchers are suggested to investigate the relationship of factors affecting profitability in different industries and compare with the results of this research.

Ethical Considerations

Compliance with ethical guidelines

There was no ethical consideration to be considered in this research.

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Authors' contributions

Conceptualization and Supervision:

Conflict of interest

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