Journal of Economics, Finance and Accounting Studies
ISSN: 2709-0809
DOI: 10.32996/jefas
Journal Homepage: www.al-kindipublisher.com/index.php/jefas

JEFAS
AL-KINDI CENTER FOR RESEARCH AND DEVELOPMENT

| RESEARCH ARTICLE

Representative Stock Analysis in Chinese Medical Industry and Relevant Investment Recommendations

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| ABSTRACT

As one of the most significant pillar industries of China, the medical industry can improve the quality of our lives in many aspects; it is also beneficial to the development of the national economy. After the outbreak of COVID-19, the function of the medical industry was further displayed. This paper is aimed at analyzing some representative stocks in the Chinese medical industry by using fundamental analysis and making recommendations for investors based on the analysis results, and reach a conclusion that investing in stocks in the medical industry is a reasonable choice, and investors had better combine of the absolute valuation results with the relative valuation results while making investment decisions so that some cognitive biases could be avoided.

| KEYWORDS

DDM, DCF, P/E ratio, EV/EBITDA ratio

| ARTICLE INFORMATION

ACCEPTED: 11 April 2023 **PUBLISHED:** 18 April 2023 **DOI:** 10.32996/jefas.2023.5.2.11

1. Introduction

1.1 Stock Analysis of Representative Companies in the Chinese Medical Industry

1.1.1. Analysis of Chongqing Zhifei Biological Products Co., Ltd

Chongqing Zhifei Biological Products Co., Ltd, which was established in 1955, is one of the largest medical companies in China. During the pandemic of COVID-19, it has made a huge contribution to the research and development of a vaccine. Recently the vaccine products produced by Zhifei Co. have gradually been recognized by the WHO as well. In this section, I will discuss the valuation of stocks of Chongqing Zhifei Biological Products Co., Ltd with a combination of absolute valuation and relative valuation.

2. Absolute valuation of Chongqing Zhifei Biological Products Co., Ltd

2.1 Dividend Discount Model Valuation

The following table shows the value of the stock issued by Zhifei Biological Products calculated by the Gordon Growth model; the cost of equity capital is calculated by the CAPM model:

Dividend	0.6	Risk-free rate	3.44%
Cost of equity capital(r)	15.94%	Risk Premium	5.68%
Growth rate (g)	2.41%	Beta	2.2
Value of stock	4.436		

Table 2.1 DDM valuation & Gordon Growth model of Chongqing Zhifei Co.

(Data source: Risk premium, growth rate, and risk-free rate come from HTTP://www.market-risk-premia.com/cn.html, beta and dividend are from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta/)

Such a valuation result illustrates that the dividend of Zhifei Co. will grow at a constant rate for an infinite time. However, as I mentioned above, dividend growth could be affected by many factors, and it is easy to change over time. In this case, the valuation result would also change. Besides, it is still possible that an investor decides to hold a stock for only one year and sell the stock at the end of a year; under this situation, the cash flows received by this investor would consist of two parts: dividend and stock price. Suppose that an investor bought the stock issued by Zhifei Co. in 2022, and now he or she decides to sell it in 2023; the result would be like this:

Dividend	0.6	Risk-free rate	3.44%
Cost of equity capital(r)	15.94%	Risk Premium	5.68%
Stock price	89.97	Beta	2.2
Value of stock	78.121		

Table 2.2 DDM valuation of Chongqing Zhifei Co. For one year

(Data source: Risk premium and risk-free rate come from HTTP://www.market-risk-premia.com/cn.html, beta and dividend come from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta/, the stock price comes from https://finance.yahoo.com/quote/300122.SZ/cash-flow?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAEbjI4Nt4mVzLM9uut)

The other possibility is that the investor holds this stock for more than one period; therefore, at the end of every holding period, the dividend payments would come into being. Those dividend payments also constitute the expected future cash flow. Under this condition, I would like to assume two possibilities; one is that the investor bought the stock at the beginning of 2020 and sold it at the end of 2022. Then the total holding period would be 2 years, and the valuation result would be:

Dividend 2020	0.5	Dividend 2021	0.6
Dividend 2022	0.5	Cost of equity capital (r)	15.94%
Stock price	87.83	Value of stock	57.882

Table 2.3 DDM valuation of Chongqing Zhifei Co. For two years

（Data source: dividends come from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta/, stock price is from https://finance.yahoo.com/quote/300122.SZ/cash-flow?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAEbjI4Nt4mVzLM9uut）

This table shows us the value of the stock when holding it for three years, from 2020 to 2023, but here is the dividend in 2023; I will use the estimated value since the year 2023 has not finished yet:

Dividend 2020	0.5	Dividend 2021	0.6
Dividend 2022	0.5	Dividend 2023	1.1
Cost of equity capital(r)	15.94%	Stock price	86.35
Value of stock	50.212		

Table 2.4 DDM valuation of Chongqing Zhifei Co. For three years

(Data source: dividends come from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta/, stock price come from https://finance.yahoo.com/quote/300122.SZ/cashflow?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAEbjI4Nt4mVzLM9uut)

From the valuation results above, it is noticeable that the stock value could be affected by several factors, such as dividends and even holding periods. However, in some cases, the information contained in this model may also be limited. If investors hope to have a more comprehensive understanding of Zhifei Biological Products, the DCF model could provide investors with financial information about Zhifei Co. from another aspect so that investors can make more accurate investment decisions.

2.1.1 Discounted Cash Flow Model Valuation

While using the discounted cash flow model, I have collected the financial data of Zhifei Biological Products' expected future cash flows from 2024 to 2025; all relevant data are from the market screener:

	2024	2025
Net Sales	47423	39496
EBITDA	13071	11760
Operating Profits	12810	11707
Pre-tax Profit	12805	13084
Net Income	10986	12112
Free Cash Flow	9387	10569

Table 2.5 Free cash flow of Chongqing Zhifei Co.

(Data source: https://www.marketscreener.com/quote/stock/CHONGQING-ZHIFEI-BIOLOGIC-9061134/financials/)

To discount those free cash flows, I have chosen the WACC formula to calculate the discount rate, followed by using the CAPM model to calculate the cost of equity and debt. Some relevant data are shown here:

E/V	0.896	Total Debt	1943.52
D/V	0.104	Total Equity	16744.03
Re	10.65%	Total Value	18687.55
Rd	5%	Tax rate	16%
rWACC	9.98%		

Table 2.6 WACC of Chongqing Zhifei Co.

(Data source: https://www.reuters.com/markets/companies/300122.sz/financials/balance-sheet-annual for total debt and equity, Re, Rd and tax rate come from https://valueinvesting.io/CBPO/valuation/wacc)

Based on the calculation result above, the following part is the result of the discounted cash flow:

	2024	2025
FCF	9387	10569
DCF	8535.291	8738.098
NPV	17273.39	

Table 2.7 Discounted cash flow of Chongqing Zhifei Co.

From the DCF analysis results, we can see that the expected free cash flows of these two years are both positive and illustrate an increasing trend. It is mainly because of the outbreak of the COVID-19 pandemic in 2020. After that, Zhifei Co. devoted itself to the production of vaccines. So far, many people in China have chosen to inject the vaccine produced by Zhifei Co.; some other countries also imported the vaccine products developed by Zhifei Co., which greatly increased the revenue of Zhifei Co. Also, from the forecast result of free cash flow, we can notice a good developing perspective of Zhifei Co.

2.2 Relative Valuation of Chongqing Zhifei Biological Products Co., Ltd

It is obvious that the DCF model gives us a valuation result from a different viewpoint from the DDM model. Having discussed the absolute valuation of stocks of Zhifei Co., this section will demonstrate the relative valuation result of stocks issued by Zhifei Co.

2.2.1 P/E Method

According to the definition of the P/E ratio, it denotes the amounts which investors are willing to pay per dollar of current earnings. A higher P/E could also be regarded as a signal of a significant prospect of future growth. To some extent, the analysis of the P/E ratio could also be regarded as the starting point for valuing stocks; this ratio can help investors understand whether a certain stock is overvalued or not. Besides, because of the difference in the EPS metric factor, the P/E ratio could be categorized by forward P/E and trailing P/E. And trailing P/E tends to be more objective and more popular as well.

To further investigate the stock issued by Zhifei Co., this section I would first compare the P/E ratio of Zhifei Co. with its historical ratio. And what I use is the trailing P/E ratio. All the data are from the guru focus and market screener:

	2018	2019	2020	2021	2022	2023
P/E ratio	42.73	33.58	71.70	19.53	18.64	15.20

Table 2.8 P/E ratio of Chongqing Zhifei Co. From 2018 to 2023

(Data source:

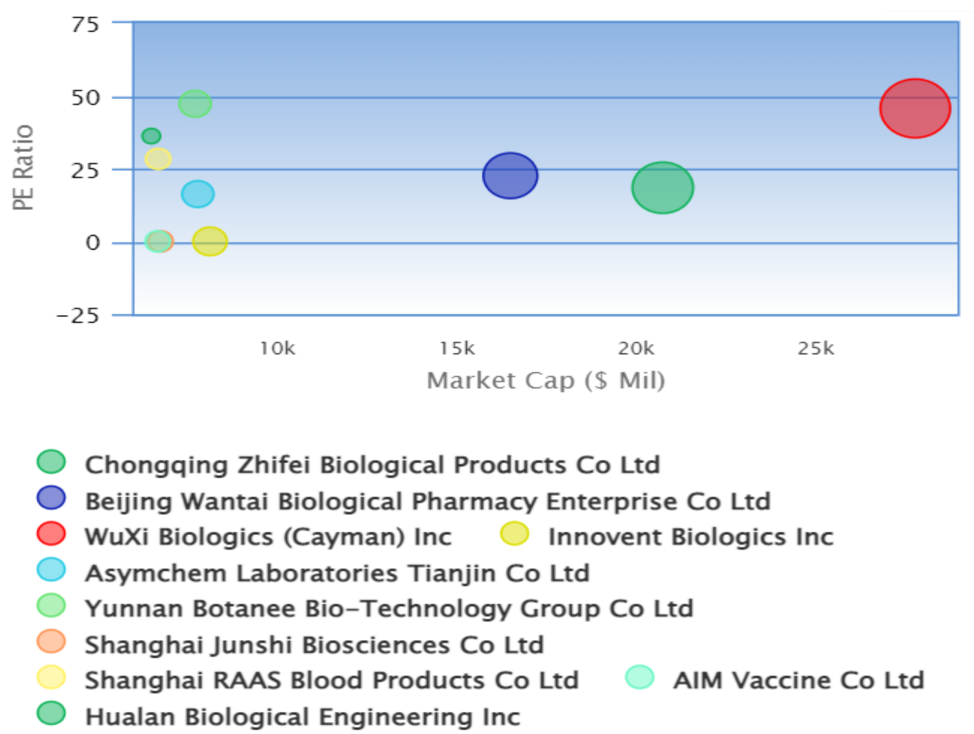
https://www.marketscreener.com/quote/stock/CHONGQING-ZHIFEI-BIOLOGIC-9061134/financials/ and https://www.gurufocus.com/term/pettm/SZSE:300122/PE-Ratio/Chongqing-Zhifei-Biological-Products-Co?&frequency=A)

The next part gives us a comparison between Zhifei and other medical companies or the whole medical industry; all data are provided by guru focus and investing:

	Company	Industry
P/E ratio	18.41	69.15
Price to sales	3.63	9.38
Price to cash flow	69.78	206.6
Price to free cash flow	258.99	29.78
Price to book	5.73	5.08

Table 2.9 Comparison of P/E ratio between Chongqing Zhifei Co. And industry average P/E ratio

(Data source: https://www.gurufocus.com/term/pettm/SZSE:300122/PE-Ratio/Chongqing-Zhifei-Biological-Products-Co?&frequency=A and https://in.investing.com/equities/huadong-med-a-dividends)



By comparing the P/E ratio of Zhifei Co. with its competitors, we can find the location of Zhifei Co. as well:

(Data source: https://www.gurufocus.com/term/pettm/SZSE:300122/PE-Ratio/Chongqing-Zhifei-Biological-Products-Co?&frequency=A)

Table 2.10 Comparison of the P/E ratio of Chongqing Zhifei Co. And other companies within the same industry

2.2.3 EV/EBITDA Method

In addition to the P/E ratio, EV/EBITDA ratio is also an important ratio which could be used for relative valuation. Compared with the P/E ratio, EV/EBITDA contains more financial information about a company to a certain extent; it can also give investors recommendations from different aspects. The following table is about the EV/EBITDA value of Zhifei from 2020 to 2023 or a comparison between the current and historical data of Zhifei Co.:

	2020	2021	2022	2023
EV/EBITDA	59.12416	15.80265	15.4104	11.13765

Table 2.11 EVEBITDA ratio of Chongqing Zhifei Co. From 2020 to 2023

(Data source: https://www.marketscreener.com/quote/stock/CHONGQING-ZHIFEI-BIOLOGIC-9061134/financials/ , and https://www.gurufocus.com/term/ev2ebitda/SZSE:300122/EV-to-EBITDA/Chongqing-Zhifei-Biological-Products-Co)

The following table shows the comparison result between Zhifei Co. and other companies in the Chinese medical industry:

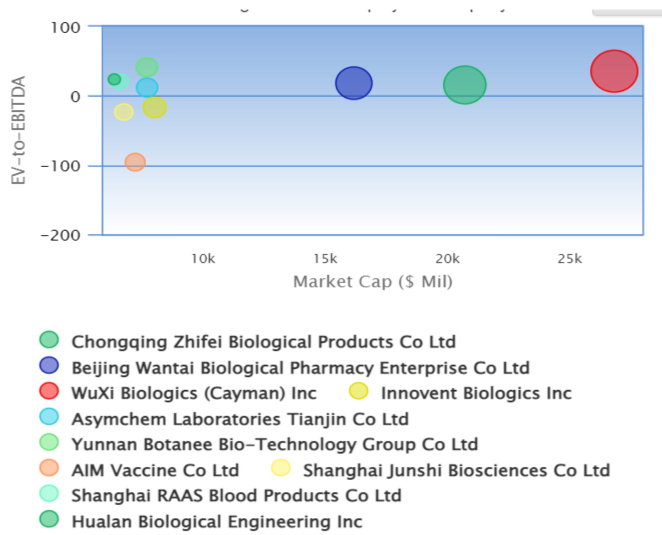
Ticker	Company	Market Cap (M)	EV-to-EBITDA
SZSE:300122	Chongqing Zhifei Biological Products Co Ltd	$ 20,209.54	15.68
SHSE:603392	Beijing Wantai Biological Pharmacy Enterprise Co Ltd	$ 15,671.44	18.29
HKSE:02269	WuXi Biologics (Cayman) Inc	$ 26,320.58	35.54
HKSE:01801	Innovent Biologics Inc	$ 7,525.07	-16.69
SZSE:002821	Asymchem Laboratories Tianjin Co Ltd	$ 7,213.10	11.86
SZSE:300957	Yunnan Botanee Bio-Technology Group Co Ltd	$ 7,205.10	41.21
HKSE:06660	AIM Vaccine Co Ltd	$ 6,726.45	-95.92
HKSE:01877	Shanghai Junshi Biosciences Co Ltd	$ 6,261.25	-23.36
SZSE:002252	Shanghai RAAS Blood Products Co Ltd	$ 6,114.57	20.74
SZSE:002007	Hualan Biological Engineering Inc	$ 5,873.11	23.77

Table 2.12 Comparison of EV/EBITDA ratio of Chongqing Zhifei Co. And other companies within the same industry

We can see that the P/E ratio and the EV/EBITDA ratio of Chongqing Zhifei Co. in the past few years have a similarity; that is, they both reached the highest level in 2020. Especially the P/E ratio rose significantly from 2019 to 2020. This is mainly owing to the outbreak of COVID-19 in 2020. Facing such a pandemic, many investors may consider that Zhifei Co. would develop some vaccine products to fight against the virus; in other words, most investors considered that Zhifei Co. would generate a higher profit because of an increase in the production volume of vaccine, and then they felt optimistic about this company's operations, which could easily lead to an increase in the stock price, such a situation could also increase the P/E ratio if other things remain constant. However, after the year 2020, the P/E ratio of Chongqing Zhifei Co. shows us a declining trend, whereas the data on the market screener website tells us that the EPS of Chongqing Zhifei Co. illustrates an opposite trend. A continuous increase in EPS means that Chongqing Zhifei Co. has a good earning condition; in this case, a decrease in the P/E ratio could be partly attributed to the decrease in the stock price per share. In the real world, factors like the profitability of a company can all impact the stock price. For example, according to the annual report of Zhifei Co. shown in the market screener in 2022, the net profit went down by nearly 26% compared with 2021. This is because of the change in the demand for some vaccine products developed by Zhifei Co. To be specific, almost at the same time, some other companies like Beijing Kexing Co. also began to produce the vaccine; these companies' vaccines may decrease the market share of Zhifei Co. and then cut down its profits. After that, a decrease in net profit still causes the stock price of Zhifei Co. to decline to a certain extent.

The reduction of profitability could also be reflected by the value of EBITDA. As seen in the financial report of Zhifei Co. in 2022, the value of EBITDA dropped from 12394 to 9079, but the main reason why the EV/EBITDA ratio of Zhifei Co. continues to go down is the decrease of enterprise value, which can also be seen from the decrease of the value of capitalization shown in the market screener. Such a result can be owed to either the decline in stock price or the reduction of outstanding shares. If these two indicators are both going down, the enterprise value will also decrease.

If we compare the value of these two ratios with other companies in the medical industry, we will then find the location of Zhifei Co. in the whole industry. From the graph shown above, we can see that Zhifei Co.'s P/E ratio is lower than the industry level, which means that Zhifei Co. seems to be undervalued. But the comparison result of EV/EBITDA tells us that Zhifei Co. does not have too significant differences with most other companies in the medical industry in terms of the value of EV/EBITDA ratio; in this case, it looks like Zhifei Co. is neither undervalued nor overvalued.



(Data source: https://www.gurufocus.com/term/ev2ebitda/SZSE:300122/EV-to-EBITDA/Chongqing-Zhifei-Biological-Products-Co)

Table 2.12 Comparison of EV/EBITDA ratio of Chongqing Zhifei Co. And other companies within the same industry

2.3 Analysis of Huadong Medicine Co., Ltd

Huadong Medicine Co., in terms of the date of establishment, is 38 years later than Chongqing Zhifei Co. Its major businesses concentrate on the development, sales and distribution of both traditional Chinese medicine and Western medicine. Categories of medicines produced by Huadong Medicine Co. include antibiotic drugs, digestive system drugs and so forth. As for the stock valuation of Huadong Medicine Co., the first part would still be the absolute valuation.

2.3.1 Absolute Valuation of Huadong Medicine Co., Ltd

2.3.1.1 Dividend Discount Model Valuation

From the Gordon Growth model, we will obtain the result below. The cost of equity capital is still calculated by the CAPM model:

Dividend	0.29	Risk-free rate	3.44%
Cost of equity capital(r)	7.07%	Risk Premium	5.09%
Growth rate	2.41%	Beta	2.2
Value of stock	6.223		

Table 2.13 DDM valuation & Gordon Growth model of Huadong Medicine Co.

(Data source: Risk-free rate, risk premium and growth rate come from http://www.market-risk-premia.com/cn.html, beta and dividend come from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta)

This valuation result also reveals that the dividend will grow infinitely, and the investor will not sell the stock. If the investor holds this stock for one year and sells it in the end, at the end of this year, this investor would also receive two sources of cash flow: dividends payment and the selling price of this stock. We still assume that this investor bought the stock issued by Huadong Medicine in 2022 and sold it in 2023:

Dividend	0.29	Risk-free rate	3.44%
Cost of equity capital (r)	7.07%	Risk Premium	5.09%
Stock price	44.11	Beta	2.2
Value of stock	41.468		

Table 2.14 DDM valuation of Huadong Medicine Co. For one year

(Data source: Risk-free rate, risk premium come from http://www.market-risk-premia.com/cn.html, beta and dividend come from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta, the stock price comes from https://finance.yahoo.com/quote/000963.SZ/)

Accordingly, if this stock was bought in 2020 and held for more than one period, more dividends need to be considered, and the valuation results will also be changed. The following table illustrates the situation that the investor bought this company's stock in 2020 and sold it at the end of 2022:

Dividend 2020	0.23	Dividend 2021	0.29
Dividend 2022	0.31	Cost of equity capital(r)	7.07%
Stock Price	46.80	Value of stock	38.848

Table 2.15 DDM valuation of Huadong Medicine Co. For two years

(Data Source: Stock price comes from https://finance.yahoo.com/quote/000963.SZ/, dividend comes from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta)

Suppose that the investor chooses to hold it from 2020 to 2023; he or she will receive one more source of dividend income. The valuation result will also change like this:

Dividend 2020	0.23	Dividend 2021	0.29
Dividend 2022	0.31	Dividend 2023	0.38
Cost of equity capital(r)	7.07%	Stock Price	43.08
Value of stock	33.789		

Table 2.15 DDM valuation of Huadong Medicine Co. For three years

(Data source: Stock price comes from https://finance.yahoo.com/quote/000963.SZ/, dividend comes from https://www.tradingview.com/markets/stocks-china/market-movers-high-beta)

The value of stock also varies in terms of holding periods and stock prices. Besides, while valuing the stock of Huadong Medicine, the dividend in 2023 is predicted data. It is highly possible that such a valuation result will change because of the change in dividends in 2023.

Discounted Cash Flow Model Valuation

For Huadong Medicine Co., the expected cash flows I picked are from 2023 to 2024. All their financial data are from the market screener:

	2023	2024
Net Sales	41973	46881
EBITA	4442	5323
Operating Profits	3838	4654
Pre-tax Profit	3816	4653
Net Income	3153	3854
Free Cash Flow	1999	2549

Table 2.16 Free cash flow of Huadong Medicine Co.

(Data source: https://www.marketscreener.com/quote/stock/HUADONG-MEDICINE-CO-LTD-6497912/financials/)

As for the WACC of Huadong Medicine Co., the following table shows all financial information of Huadong Medicine Co. and the value of rWACC:

E/V	0.851	Total Debt	2535.53
D/V	0.149	Total Equity	14502.89
Rd	10.65%	Total Value	17038.42
Re	5%	Tax rate	16%
rWACC	5.59%		

Table 2.17 WACC of Huadong Medicine Co.

(Data source: https://www.reuters.com/markets/companies/300122.sz/financials/balance-sheet-annual for total debt and equity, https://valueinvesting.io/CBPO/valuation/wacc for Rd, Re and tax rate)

After obtaining the value of rWACC, the table below gives us the value of discounted cash flow:

	2023	2024
FCF	1999	2549
DCF	1893.22	2286.37
NPV	4179.60	

Table 2.18 Discounted cash flow of Chongqing Zhifei Co.

From the DCF valuation result, we can reach a conclusion that Huadong Medicine Co.'s future profitability is favorable because the result produced by the DCF model is positive. However, the data of these cash flows are forecasting data; the actual value of cash flow can still be different from the data shown above because of some unpredicted factors; if the sign of its future cash flows becomes negative, then investors should also alter their investment strategies.

2.3.2 Relative Valuation of Huadong Medicine Co., Ltd
In terms of the relative valuation of Huadong Medicine Co., the starting point will also be the P/E ratio, and then the EV/EBITDA ratio analysis will be demonstrated.

2.3.2.1 P/E Method
To compare the historical data with Huadong Medicine Co.'s current data, I have chosen its P/E ratio between 2018 and 2023, which is the same as Chongqing Zhifei Co. mentioned above:

	2018	2019	2020	2021	2022	2023
P/E ratio	17.09	15.16	16.48	30.57	29.20	24.21

Table 2.19 P/E ratio of Huadong Medicine Co. From 2018 to 2023

(Data source: https://www.marketscreener.com/quote/stock/HUADONG-MEDICINE-CO-LTD-6497912/ and https://www.gurufocus.com/term/pettm/SZSE:000963/PE-Ratiottm/Huadong%20Medicine)

If we compare the P/E ratio of Huadong Medicine Co. with other companies, then we would obtain such results:

	Company	Industry		
P/E ratio	32.03	69.15		
Price to sales	2.1	9.38		
Price to cash flow	19.46	206.6		
Price to free cash flow	60.39	29.78		
Price to book	4.23	5.08		
SZSE:002603	Shijiazhuang Yiling Pharmaceutical Co Ltd		$ 6,828.25	30.54

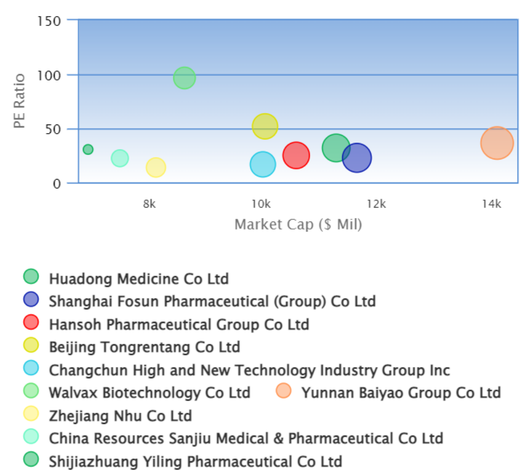
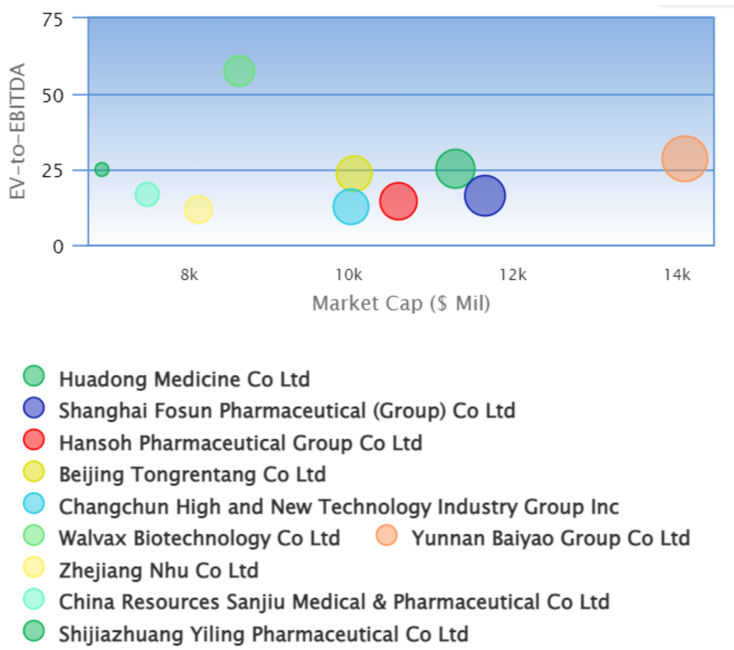


Table 2.20 Comparison of P/E ratio between Huadong Medicine Co. And P/E ratio of other companies in the same industry

(Data source: https://www.gurufocus.com/term/pettm/SZSE:000963/PE-Ratiottm/Huadong%20Medicine)

2.3.2.2 EV/EBITA Method



In terms of the EV/EBITA ratio of Huadong Medicine Co., I also calculated the value of EV/EBITA from 2020 to 2023:

	2020	2021	2022	2023
EV/EBITA	11.55	19.58	19.48	16.41

Table 2.21 EVEBITDA ratio of Huadong Medicine Co. From 2020 to 2023
(Data source: https://www.gurufocus.com/term/ev2ebitda/SZSE:000963/EV-to-EBITDA/Huadong-Medicine-Co and https://www.marketscreener.com/quote/stock/HUADONG-MEDICINE-CO-LTD-6497912/)

This is the comparison between the current data and the historical data of Huadong Medicine Co. In the following diagram, we will see the comparison result among different companies in the medical industry:

Ticker	Company	Market Cap (M)	EV-to-EBITDA
SZSE:000963	Huadong Medicine Co Ltd	$ 11,134.79	25.20
SHSE:600196	Shanghai Fosun Pharmaceutical (Group) Co Ltd	$ 11,494.50	16.28
HKSE:03692	Hansoh Pharmaceutical Group Co Ltd	$ 10,441.51	14.44
SHSE:600085	Beijing Tongrentang Co Ltd	$ 9,900.56	23.56
SZSE:000661	Changchun High and New Technology Industry Group Inc	$ 9,862.53	12.62
SZSE:300142	Walvax Biotechnology Co Ltd	$ 8,501.89	57.56
SZSE:000538	Yunnan Baiyao Group Co Ltd	$ 13,929.00	28.52
SZSE:002001	Zhejiang Nhu Co Ltd	$ 8,006.25	11.68
SZSE:000999	China Resources Sanjiu Medical & Pharmaceutical Co Ltd	$ 7,380.89	16.72
SZSE:002603	Shijiazhuang Yiling Pharmaceutical Co Ltd	$ 6,828.25	24.95

In terms of the P/E ratio, we can see that Huadong Medicine Co. has some similarities with Zhifei Co. Both companies' P/E ratios reached the highest level in 2020, followed by a decrease in the next years. Such a situation also reflects that most of the medical companies in China benefited from COVID-19, and their earnings per share also increased. However, if we further look at the change in the P/E ratio of Huadong Medicine Co. in the past few years, we can see that the value of the P/E ratio dropped significantly from 29.20 to 24.21 between 2022 and 2023. According to the information reflected in Market Screener, the P/E ratio of Huadong Medicine Co. in 2023 is a predicted value and based on the information shown on the website of the National Medical Products Administration (NMPA), on 7th March 2023, two medicine produced by Huadong Medicine Co. were disused because these two medicines have a certain level of risk if using them in an unscientific way. Facing such an event, some investors may be suspect the company's productivity or even profitability, their susception would then force them to buy fewer stocks issued by Huadong Medicine Co., and the stock price of Huadong Medicine would decrease when more and more investors feel suspicious of the productivity of Huadong Medicine Co.

Regarding the EV/EBITDA ratio, Huadong Medicine Co. reached the highest level in 2021, which is different from Zhifei Co. From my point of view, this is because the pandemic of COVID-19 had not totally disappeared in 2021 under this situation, people had a strong willingness to store as much medicine as possible. As a medicine production company, Huadong Medicine Co. would then try its best to produce medicine to satisfy the market demand, and they paid attention to developing new medicine as well. All these factors greatly promoted the increase of its EBITDA. However, it is also likely that the value of Huadong Medicine is overvalued while using EV/EBITDA ratio to estimate its value in this case.

In comparison to other companies in the same industry, Huadong Medicine Co. is undervalued since it is also lower than the industry level when it comes to the P/E ratio. But in terms of the EV/EBITDA ratio, Huadong Medicine Co. does not have a too apparent difference compared with its competitors, which also means that these medicine production companies do not have too apparent differences in terms of EV / EBITDA ratio. Besides, such a result demonstrates that the Chinese medical industry is highly competitive, and it would be difficult for a medicine-production company to be a monopoly in the Chinese medical market.

3. Investment Recommendations

Based on the valuation results and relevant theories mentioned above, I would like to offer investment recommendations from the following aspects, followed by the analysis of COVID-19 on the Chinese stock market:

3.1 Recommendations from Macroeconomic and social aspects

To be specific, macroeconomic factors include economic growth rate, inflation rate, money supply and interest rates and so on. In terms of the impact of macroeconomic factors on the stock price, we can find lots of related previous studies, some of them are even empirical studies. Among these various macroeconomic variables, I would like to take four of them as examples.

Money supply: As one of the most important macroeconomic variables, the money supply has a significant status in the implementation of monetary policy and the regulation of the macroeconomic environment. If our country faces a credit expansion, then the money supply in the market will also increase, and sufficient funds could also enhance investors' willingness to invest in the stock market, which will finally push the stock price to go up. Besides, an investigator named Hosseini mentioned that "innovations in the money supply may also positively affect the stock market index through its effect on economic activity" (Hosseini et al., 2011). For this viewpoint, Hosseini further pointed out that "a positive relationship between the stock market index and money supply exists since it relates a rise in the money supply to a portfolio change from noninterest bearing money to financial assets including equities" (Hosseini et al., 2011).

Interest rate: Like the money supply, interest rate plays a vital role in the implementation of fiscal policy and macro control. However, the relationship between stock price and interest rate tends to be negative. That is, when the interest rate goes up, the stock price will go down. This is mainly because the required rate of return used by investors to value stocks will also increase when the interest rate increases, which would lower the value of the stock. For enterprises, the increase in interest rate can also raise the costs of investing.

Economic growth rate: This indicator directly reflects a country's macroeconomic status. Under most circumstances, when the whole macroeconomic environment is in good condition, citizens' income level would also go up, followed by an increase in consumer confidence as well. Besides, the operations of corporates also have a close relationship with macroeconomic conditions. According to Sokang and some other scholars, "the economic performance of corporations is usually reflected by their stock prices and corporate managers try to increase the shareholder wealth" (Sokang, 2018). In other words, under a prosperous economic situation, corporates could be able to generate more profits, and the stock price will also rise with the increase in corporate profitability.

Taxes: While taking trading activities, our government will usually tax investors in terms of stock trading. In this case, investors' willingness to purchase stocks would be cut down. This phenomenon eventually manifests itself as a decrease in stock price. Also, for those listed companies, more taxes will decrease their profits, which may also cause a decrease in stock price.

In summary, fast economic growth and a huge amount of money supply can both raise the stock price; it seems that investing in stocks could be a good choice in this situation. However, if the economy grows too fast and the money supply is too high, it is easy to cause inflation. Facing this situation, my first recommendation is to purchase stocks and buy some securities like "inflation-plus" CDs at the same time. Then investors could suffer less from losses caused by inflation. Also, in terms of taxes, it would be better for investors to invest in both stocks and some tax-free securities, such as municipal bonds. This recommendation is aimed at reducing losses caused by taxes.

3.2 Recommendation from stock valuation aspects and industry analysis

In this section, I would like to discuss investment recommendations in detail by combining the absolute and relative valuation results above with the PEST analysis of the Chinese medical industry.

Based on the previous absolute valuation result, we can see that both Zhifei Co. and Huadong Medicine Co. have a positive future cash flow stream, which illustrates that these two companies have a relatively good developing prospect in the future. From this aspect, stocks issued by these two companies are worth investing in. However, for some startup companies, if we cannot understand their future operating status, we could rely on some other models to make an investment decision, for example, the dividend discount model. Here for what the DDM model reflects, if an investor held the stock issued by Zhifei Co. for only one year, he or she could obtain the highest stock value. After that, instead, the stock value started to decline, which is like the valuation result of Huadong Medicine Co. as well. Facing this situation, suppose that an investor purchased one share of stock issued by Zhifei Co. in 2020, it would be better for him or her to hold it rather than sell it recently. Besides, since both two companies' stock value decreases as the holding period increases, those risk-averse investors had better not buy stocks issued by these two companies at the margin. Even though the stock price of Zhifei Co. decreases from 2022 to 2023, investors can still make profits by short selling the stock if the short selling activity is not banned and investors are willing to do so.

In terms of the relative valuation result, we found that the P/E ratio and EV/EBITDA ratio give us different valuation results. For the P/E ratio, it tells us that both Zhifei Co. and Huadong Medicine Co. are lower than the industry average level; it seems that these two companies are both undervalued from the aspect of the P/E ratio. In this case, if an investor does not have liquidity needs in a short time, he or she can choose to purchase these two companies' stock. However, if combined with the absolute valuation results, my investment recommendation would be to buy and hold. What's more, when using relative valuation to determine which stocks to invest in, it could be helpful for investors to use more than one ratio. For instance, to decide whether the stock of Huadong Medicine Co. is worth investing in or not, in addition, to using the P/E ratio to compare the stock price with its earnings, investors could combine the P/E ratio with some other ratios like ROE or EV/EBITDA, since ratios like EV/EBITDA or ROE, ROA shows investors a company's profitability and the capital structure. With the help of these ratios, investors can further identify which company is more deserved to be invested. In other words, combining different ratios with each other can help investors get access to a more comprehensive understanding of a company.

Besides, factors within the medical industry can also affect the stock price and then impact our investment decisions. For analyzing the industrial factors, I would like to focus on four aspects: political, economic, social, and technological factors.

Political factors: Most common political factors include government policy, legislation changes and so on. In 2017, the National Development and Reform Commission implemented a policy which was about the reformation of the production and circulation of medicine. The implementation of this policy is mainly aimed at promoting the transformation and upgrading of the medical industry, improving the quality of medicines, reforming the medicine circulating system and adjusting the pharmaceutical industry structure. From this policy, we can see that our country paid much attention to the development of the medical industry, and those medical companies could also benefit from this policy. Later, the National Development and Reform Commission still implemented lots of beneficial policies in the Chinese medical industry, including the regulation of the medical industry, the order of the market of drugs and so on. With the support of related policies, companies in the medical industry would usher in a new spring of development, and investing in the medical industry could also become a sensible choice.

Economic factors: For the analysis of economic factors, recently Niu Xiaotong and her partners first mentioned that "China's accession to the World Trade Organization in 2001 made it become one of the major economies in the world" (Niu et al., 2021). As one of the pillar industries of the Chinese economy, the medical industry also contributed a lot to the total Chinese economy. In 2018, the size of the pharmaceutical market was about 2.1 trillion CN¥, equivalent to 270 billion €, and Chinese companies lead the world market as suppliers of active pharmaceutical ingredients (API), vaccines, and antibiotics (Schmid & Xiong, 2021), which greatly promotes the increase of profitability of Chinese medical industry. Additionally, under the background of globalization, more and more drugs produced by Chinese medical companies are imported from other countries around the world; our government also encourages the import of medicine produced by foreign companies. In this case, the import and export of drugs could also become a source of income for the Chinese medicine industry.

Social factors: Social factors refer to factors like popular media and consumer opinions that can affect the medical industry in a different way from political and economic factors. And in terms of popular media, its influence strength would be more important, especially during the epidemic of COVID-19. Based on what Wang Shuling and Shi Ping investigated before, the influence of popular media could be reflected by "radio, television and paper media" (Shi & Wang), and "medical health information is scheduled to be carried to paper media and transmitted to the users through the circulation paper media" (Shi & Wang). That is, different types of popular media could propagandize the importance of health in different ways; they can also advertise the effects of some medicines and the importance of storing medicine for colds in time. After great propaganda of the function of medicine storage, the market demand for different drugs would also increase, and the whole medical industry would have lots of opportunities to generate more profits and then enhance its influence in the stock market. To some extent, the propaganda of popular media could help the medical industry attract lots of consumers as well as investors.

Technological factors: For technological factors, recently a new term named "Internet+ traditional Chinese medicine" came into being. According to the study made by Hongmei Liang and her partners, the integration and development of Chinese medicine with the Internet will help promote the development of Chinese medicine in the post-epidemic era and promote the inheritance and innovation of Chinese medicine (Liang et al., 2020). With the help of the Internet, not only can traditional Chinese medicine obtain more developing opportunities, but also the further development of the medical industry can use such an "Internet+" model for reference. It is obvious that the use of this model can bring the Chinese medical industry lots of benefits, like the reduction of the cost of production, the improvement of efficiency and so on. Also, "Internet + traditional Chinese Medicine" could be combined with social media to create a new type of advertisement for traditional Chinese medicine.

To sum up, the medical industry is an industry which receives lots of support from all these four aspects, and investing in stocks in the medical industry could be profitable in most cases, but investors could invest more in those companies which can be regarded as leaders in the sub-divided field, for example, Kehua Biological Engineering Co. These companies usually have a special background in the industry; therefore, they would be more easily to benefits from some policies, and our government would also pay more attention to their future development. Besides, sometimes our government may put some limitations in terms of investment activity in the medical industry because of some external factors; in this case, investors should pay close attention to these relevant regulations in addition to value stocks so that they can avoid some rule-breaking operations.

3.3 Recommendations from behavior finance aspects

While making investment decisions, sometimes cognitive biases may cause investors to make incorrect decisions. For example, forecasting errors. Taking Zhifei Co. as an example. According to the financial report of Zhifei Co., the free cash flow of Zhifei Co. continued going up from 2018 to 2021. It is undeniable that such a trend shows good profitability of Zhifei Co. at that time; under this situation, some investors may consider that the future performance of Zhifei Co. would be as good as the performance in the past, in other words, they just put too much weight on recent experiences. However, the actual situation is that the free cash flow of Zhifei Co. went down greatly in 2022. Thus, suppose that investors make investment decisions merely based on historical information; it is possible to lead to a forecasting error.

Another common cognitive bias is called representativeness. To be specific, investors make judgements from a small number of observations. It could be after observing only one or two companies' financial conditions and then reaching a conclusion that this industry's stock is worth investing in or using one stock's price changing pattern to identify other stocks. But if the data set is too small, it will be easy for investors to reach a biased conclusion and invest their money in a false way.

Therefore, for cognitive bias, my first recommendation is to use historical data, which is reliable and high quality, to predict a stock's future performance while valuing a certain stock. If a stock is issued by a company whose future profitability is hard to predict, investors could choose to invest only a little to avoid suffering from huge potential losses. Regarding representativeness, my second recommendation is to choose more companies to identify whether a particular industry is worth investing in or not. If many companies in a certain industry illustrate that investors will benefit from investing in this industry, then investors could consider purchasing stocks in this industry. Under this condition, biases related to sample size could be reduced to some extent.

4. Conclusion

In summary, the outbreak of COVID-19 or other epidemics could bring the medical industry lots of profits, then investing in stocks in the medical industry tends to be a reasonable investment decision. But investors still need to consider some personal factors and external factors, such as political and social factors. Additionally, if investors obtain different results by using different models, it is better to combine two or more different results to reach an appropriate investment decision. Besides, to further optimize investors' stock investment choices, I still need to take more investigations.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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