Application of Using the Stock-Selecting Model in Quantitative Risk Management of Chinese Stock Market under the Epidemic

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Abstract：This paper aims to research the stock market's response to the epidemic. The differences between the results of the objective experiment and the surveyed people's subjective judgments will be compared. The researcher uses the back-testing model based on the data of the stock market in 2020 and applies a questionnaire survey on the target people. The researcher also pays attention to several stocks which have a higher trade volume in the back- testing model and do more tracking. Each industry's stock shows its characteristics apparently.

Under the epidemic in the stock market. The researcher mainly researches three industries:
medical and biology, food and beverage, transportation. The results show that the impact of epidemic situation on the first two industries is positive and negative for the latter. With the data from the survey about people's attitudes and the tracking data from the specific stock, the
researcher concludes that financial indicator is an important index in the situation of the
epidemic. Among the people who pay more attention to the financial indicators under the epidemic, more people gain profits. Also, the conclusion provides suggestions on an individual's stock investment strategy in the near future. Choose stocks with larger company scale and high liquidity is more assured.

Keywords: Chinese Stock Market; Industry; Back-Testing Model; Tracking; Financial Indicators

1. Introduction

The outbreak of the epidemic at the beginning of 2020 is a sudden event, which has a great effect on the economy and social life. The stock price is a leading indicator. Its changes convey a lot of information. Thus, this paper is to research the stock market's response to the epidemic.

The performance of the stocks in the different industries under the epidemic is completely different. From the subjective perspective, it may have high returns due to the correlation with the epidemic. The food industry and some industries with rigid demand may also be positively affected. Because these demands may be amplified under the epidemic due to the panic.

The traffic restrictions may negatively affect the stock in the transportation industry.

The rate of return in the previous three industries varies greatly, so another three industries which is generally considered with good performance are selected to compare the turnover rate.

They are medical and biology, food and beverage, agriculture, forestry, husbandry and fishery.

2. Industry gap and investment diversity

The covid-19 has great effects on the stock market and the Chinese stock market perform like other countries which are affected. Takahashi et al. (2020) has studied the Japanese stock market and found such negative returns are first observed for firms with China exposure and then for those with US exposure. This is related to the time when the COVID-19 took place. The COVID-19 at the beginning is discovered and spread in China and then the epidemic spread in the United States. In the

Chinese market, the impact on the industry may have similar performance. Narayan et al. (2021) has studied the Australian stock market and found that COVID-19 has had a heterogeneous effect on sectors of the market. Though health, information technology, and consumer staples gain profit, other sectors are either negatively affected or not at all. They point out that given the different effects of different sectors, portfolio diversification should be considered during a pandemic. This conclusion also can apply to the previous findings of the Japanese market on time heterogeneity. Because of the similarities of the market, when the researcher considers the variables that affect the Chinese market, they can also consider these things. For example, the difference among industries is crucial and the diversity of investment should be taken into consideration.

3. Discussion

3.1 Research question 1: What is the characteristic of the three industries (medical and biology, food and beverage, transportation/medical and biology, food and beverage, agriculture, forestry, husbandry, and fishery) in the stock market under the epidemic?

In the comparison of medical and biology, food and beverage, transportation, the last one gains the lowest rate of return while the first two are both with good performance. There are subjective biases in the comparison of medical and biological, food and beverage, agriculture, forestry, animal husbandry and fishery industries. Food and beverage are the highest, while medical and biology is the highest in subjectivity.

Among the three industries, the food industry has the highest rate of return. As for the reason, the supply of this industry is not adequate to the demand under the epidemic. However, the researcher observed that people in the medical industry have the highest turnover rate and the strongest liquidity. So there still exists uncertain changing factors in this industry. And the stocks in the transportation industry have a falling trend from the whole. The above are some direct conclusions and some inferred reasons (you can see from appendix A). In the latest published (2020 or 2021) literature or report, there are many specialists' opinions or findings about the impact on the industry in the stock market. For example, Narayan et al. (2021) find sectors such as health, major consumer goods, and information technology have been positively affected by the epidemic, while communications, energy, finance, and consumer discretion have been negatively affected (Narayan, Gong & aliahmed, 2021). Industries like transportation, mining, etc. have been adversely impacted by the pandemic while industries like manufacturing, information technology, etc. have been resilient to the pandemic. Some research results of these three industries can also be seen in this literature.

After excluding the transportation industry, the researcher chooses three industries with advantages for back-testing. They are medical and biology, food and beverage, agriculture, forestry, husbandry, and fishery. The supply of these three industries is not adequate to the demand under the epidemic. The result of the questionnaire shows that among the three industries people prefer the industry of medicine and biology. But it may also be people's subconscious choice, because a small part of people in the survey did not participate in the actual stock market investment, and others subconsciously think that in this special period, the prospect of the medical and biology industry is surely wonderful. In the actual operation, the researcher found that the returns of the three industries are all high, and the return of the industry of food and beverage even exceeds the medical and biology. This might be deviation due to people's subjective judgment. But in the actual operation, the researcher also found that people in the medical industry have the highest turnover rate and the strongest liquidity. So, people do pay a lot of attention to this industry.

3.2 Research question 2: What will change in people's investment strategy (financial indicators, liquidity, and so on)?

Companies with low liquidity and trading volume are more seriously affected by the epidemic, and people pay more attention to stocks' financial indicators (such as P / E ratio, asset liability ratio) under the epidemic.

Amihud (2002, p. 31) concludes that stock returns are negatively related over time to contemporaneous unexpected illiquidity and illiquidity affects more strongly on small firm stocks. Take the three stocks in the medical and biological industry as an example, Kaipu Biology's gross value is 81.4 million, Aier Ophthalmology's gross value is 2526 million and Mairui Medicine's gross value is 5023 million. The gross value of the latter two stocks is much larger than that of the first one. And in the period from 2020/12/31 to 2021/04/08, Aier Ophthalmology rises by more than 19.21 percent and Mairui Medicine rises by about 18.74 percent while Kaipu Biology falls by about 23.74 percent.

The researcher examined several stocks with a relatively larger number of transactions in the trading details of our back-testing in 2020. In the medical and biology industry, they choose Kaipu biology, Aier ophthalmology, and Mairui medicine. In the transportation industry, they choose Xinning logistics. The stock's price of Aier ophthalmology rise by more than 19.21 percent (2021/1/1-2021/4/7) and the stock's price of Mairui medicine rise by more than 15.69 percent (2021/1/1-2021/4/7). The fall of Kaipu biology is 22.28%. In the food industry, the researcher chose three squirrels. The initial price is 52.97 and the latest price (2021/4/7) is 42.06. About 18% people's opinions on financial indicators have changed. They didn't pay much attention to them before the epidemic, but later they attach importance to them. The several financial indicators the researcher listed are asset-liability ratio, P / E ratio, and so on. It may indicate the affordability of enterprises under a crisis or as a measurement of whether the stock price is reasonable.31.82% of the people think the increase of their risk control degree is between 0% and 20%.28.79% people think the increase of their risk control level is between 20% to 50%. The one whose risk control level is between 0% and 20% may continue to stay in the stock market or withdraw some investments. The ones whose risk control level is between 20% and 50% are more likely to withdraw from the stock market or just take a wait-and-see attitude.

3.3 Research question 3: Is there a big difference between the result from the back-testing model and the strategy preferred by people through the subjective survey? Or professional analysis and non-professional analysis?

With respect to the impact of the epidemic on the stock market, professionals believe that it will only have a short-term impact or rebound, while non-professionals believe that the stock market is most likely to fall. And the subjective and objective results are basically consistent.

"Judgmental forecasts by professional analysts often embody valuable information that could be used to enhance the forecasts derived from purely mechanical procedures" (Jansen, Jin & Winter, 2016, p. 411). Here are two professional judgments. The strategy research team of CSCI said that the epidemic will not change the trend of the economy but may have a short-term impact on the market. At present, the technology industry of electronics, computers, and communication in the direction of economic transformation and upgrading, and it is also the leading industry of the market. It is suggested that investors could add some. Li Feng, vice president of China Finance Research Institute of Shanghai Jiao Tong University, said: based on the historical experience and behavioral economics, the researcher expects that the performance of the capital market during the epidemic will basically be consistent with the development trend of the epidemic and may have first restrained then accelerate influence.

As for the non-professional judgment, the researcher got data from the questionnaire. When public investors are incapable of judging future market and policy developments when making investments, they may withdraw from markets or

request high expected rates of return to subsidize investment risk (Tsai & I-Chun, 2017). The researcher analyse the result of the subjective question of the questionnaire. In our survey, half of the people have almost no profit and loss in 2021. Among the remaining people, about half got profit and half got the loss. This roughly reflects the profitability in the stock market of the people the researcher investigated. Except for those who didn't give their answer, most people hold negative opinions on the future stock market, only a small number of people hold positive opinions on the stock market or be positive about certain stocks. So, in the first quarter of this year, most people are still not optimistic about the future's market. Their result in 2021 has a lot in common compared to the result in 2020, so it may be predictive in a period in the near future.

4. Conclusions & Recommendations

The prospect of the medical industry, which is highly related to the epidemic situation, is generally good. But there is still one detail which should be paid attention to. There is high liquidity and together with uncertainty in this industry. The food industry and other industries which has an inelastic demand also may have a good future. And these industries' performance is stable in the back-testing. Because of the policies such as traffic restriction and other objective factors under the epidemic, the stock transportation, and other affected industries have been negatively impacted. For a wide summarization, combining with general opinions from some literature, sectors such as medicine, consumer goods, and technology have been positively affected by the epidemic, while power, finance, and transportation have been negatively affected.

Big companies will be more resistant to attacks resilience. Before the researcher invest, they can pay attention to its financial indicators, which suggest the company's operational capacity. Each industry has different degrees of risks in a different period, so risk diversification is a good choice. It is suggested that choose different industries in the investment strategy to allow a greater diversification of risk.

Invest in the recent situation of the stocks, this year's stock market has a certain continuity. Although the attitude of most experts towards the stock market is not so negative, people's opinions and the data from the experiment suggest that the recovery of the stock market will not be that quick. Thus, the researcher infers that the investment opportunities at the beginning of 2020 are not particularly good. It is not recommended to invest a large amount of money in the stock market for individual investors.

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