Research on the Development of China's Quantitative Investment Strategy and Its Countermeasures

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Abstract: With the development of China's economy, more and more applications of quantitative investment have been used in the capital market and it has also attracted many scholars to study quantitative investment strategies. In order to improve the public's understanding of quantitative investment strategies, the development of investment strategy and its countermeasures are analyzed in this article. First, the theoretical support of quantitative investment strategy is introduced, then the five development stages of quantitative investment strategy are analyzed, then the advantages of quantitative investment strategy compared to traditional investment are explained, and then the analysis of the current status of development in China is made, and finally the development countermeasures of quantitative investment strategies from 7 aspects are discussed, which has certain significance for promoting the development of quantitative investment.

1. Introduction

Quantitative investment is an emerging investment method on Wall Street in recent decades. The investment effect is obvious and the market size continues to expand [1]. In China, quantitative investment has not been popularized and has huge potential. Related investment theories and investments strategy will be one of the hotspots for future research. Quantitative investment strategy is a general term for strategies and algorithms for financial markets to use quantitative methods for judgment, analysis, and trading. Quantitative strategies generally use knowledge in mathematics, finance, and computer science. The pre-programmed program uses a computer to capture the opportunities appearing in the market, and finally the computer issues instructions to trade the investment target [2].

2. Theoretical support for quantitative investment strategies

To study the use effect of investment strategies, the premise is that this investment strategy can play a role in the market, and it can be concluded that the theoretical premise for studying the quantitative use of investment strategy effects is the market effectiveness theory. Regarding the efficient market hypothesis, the most widely adopted is Eugene F. Fama's theory.

Eugene F. Fama divides efficiency markets into three types based on different information sets:

(1) Weak efficiency market

Vulnerable efficiency market refers to the fact that the current security price has fully reflected all the information that can be obtained from market transaction data, which includes historical information such as past prices and trading volumes. This means that technical analysis is invalid in a vulnerable efficiency market.

(2) Semi-Strong Efficiency Market

Semi-strong efficiency market means that the price of securities has fully reflected all public information. This means that analysis using public information is invalid.

(3) Strong efficiency market

A strong efficiency market is that the price of securities has fully reflected all the information, including public information and inside information. This means that analysis using any information is invalid.

If the market is weak and effective, then the market has fully reflected all historical information, and people can only obtain excess returns by analyzing all public information and using some investment strategy; if the market is semi-potential, then people cannot obtain excess returns through public information analysis. People can only analyze inside information to obtain excess returns. If the market is strong and efficient, then any information including historical information, public information and inside information cannot be used to obtain excess returns. [3]. Quantitative investment strategy, as an active investment management method, uses all public information, so it will lose its effectiveness when the market is strong and effective. The theoretical premise for studying the effect of quantitative timing strategy is that the market is an inefficient market or weak efficiency markets or semi-strong efficiency markets.

3. Development process of quantitative investment strategy

3.1 Multi-Factor Stock Selection

No matter domestic or foreign, multi-factor stock selection is the most important strategy. Meanwhile, most of the quantitative strategies and the most widely used quantization strategies are based on multi-factor stock selection. Therefore, multi-factor stock selection is also the most widely used model of quantitative stock selection. The factors commonly used in the multi-factor model can be classified into three major categories: fundamental, technical, and specific. With the development of the industry, the focus of factors has gradually shifted from fundamental to technical and specific [4].

3.2 Alpha Strategy

The concept of Alpha comes from the middle of the twentieth century. According to scholars' statistics, about 75% of the portfolios constructed by stock fund managers at the time could not outperform a simple combination or index constructed by market value. Many scholars attribute this phenomenon to the effectiveness of the market, that is, because the financial market has gathered a large number of investors, these investors always keep an eye on the market, and once the market appears arbitrage opportunities, they will act quickly to restore the market equilibrium. In an efficient financial market, any effort to find excess returns is futile and investors can only get Benchmark rate of return [5]. Alpha is higher than the β adjusted expected rate of return. Although some asset classes already have alpha, or the manager of this fund has excellent management capabilities, this ability can continue to generate alpha. Alpha strategy does not rely on the trend of stocks (portfolios) or the broader market Judgment, but to study its investment value relative to the index, which is also common in many hedge funds investment strategy. Some people in the industry believe that the alpha strategy is more accurate than the market-neutral strategy. Regardless of the name, its purpose is to hedge systemic risks in the market through a certain method to obtain stable excess returns.

At this stage, due to the long-term discount of futures, it is increasingly difficult for low-frequency alpha strategies to obtain stable excess returns, and high-frequency alpha strategies have emerged at the historic moment. Such strategies need to accumulate more high-frequency factors, use more complex algorithms and more specific factors, so the technical threshold is higher, and the situation of homogeneous competition has been improved. In the current market environment, there are still many quantitative investment institutions that have achieved good returns through high-frequency alpha strategies.

3.3 Arbitrage Strategy

Arbitrage strategies are divided into risk-free arbitrage and statistical arbitrage. However, the market capacity of arbitrage strategies is small and cannot bear the disadvantage of large-scale funds,

making it difficult for such strategies to become mainstream. With the expansion of China's quantitative investment market, most of arbitrage strategies are in the auxiliary and subordinate positions, and cooperate with other mainstream quantitative strategies to increase revenue.

3.4 CTA Strategy

The CTA strategy focuses on active and liquid futures varieties, including stock index futures, commodity futures, interest rate futures, exchange rate futures, etc. However, the CTA strategy mainly belongs to trend trading. Since the end of 2016, the irregular fluctuations of the domestic commodity futures market have increased. There has not been a good trend, which has led to the general poor performance of the CTA strategy. This effect has continued to the present, making it difficult to further develop the CTA strategy.

3.5 Multi-strategy Fusion Application

It can be seen that with the development of China's quantitative investment and changes in the market environment, it is difficult for a single quantitative investment strategy to obtain stable returns. The industry fully exploits the advantages of wide coverage of quantitative investment, integrates multiple complementary strategies and applies them in new. You can also get good returns under the circumstances. The most common are the fusion of quantitative equity strategies and arbitrage strategies, and the fusion of quantitative equity strategies and CTA strategies. In the future, this multi-strategy integration trend will become more and more obvious, and the scope of application will become wider and wider.

4. Advantages of quantifying investment strategies

Due to the continuous artificial analysis and judgment required in the traditional investment process, analysts will inevitably be affected by their own emotions, which will cause the real analysis results to deviate from the rational analysis results and cause misjudgment. With the existing data and the completion of judgments based on investment strategies, the negative impact of human emotion on analysis and judgment is avoided [6]. Therefore, one advantage of quantitative investment over traditional investment is that it can avoid the negative impact of human emotions on analysis and judgment.

In terms of the breadth of decision-making objects, due to the limitation on the number of traceable stocks and the limitation of analysis variables when artificially analyzing decisions, the breadth of decision-making objects of traditional investments is limited; while quantitative investment is performed by using computer programs to perform quantitative investment. The strategy is used to analyze and judge, so the number of traceable stocks is basically unlimited, and its analysis variables are also basically unlimited. Using computer programs can quickly analyze and judge a large number of research objects, and the breadth of its decision-making objects is infinite.

In terms of the depth of decision-making objects, using quantitative investment strategies for investment management requires constant updating of strategies to adapt to market changes and the need for computer programming, so its workload is very complex and huge, and its research depth is determined by existing investment strategies; In traditional investment, researchers can often carry out daily analysis of the information they have, so it has a deeper advantage.

In terms of return and risk control, traditional investment is more focused on individual stock selection rather than portfolio construction, and emphasizes return rather than risk control; while quantitative investment attaches great importance to risk control and pursues a trade-off between risk and return. Therefore, quantitative investment can effectively prevent investment managers from deviating from potential performance benchmarks, excessively seeking returns and ignoring risks.

In terms of analysis and judgment, traditional investment is constantly performed by human analysis and judgment, while quantitative investment is continuously analyzed and judged through existing quantitative investment strategies; in terms of transaction execution, traditional investment

is generally performed by specialized personnel, and quantitative investment uses computer programs to execute transactions.

To sum up, the advantage of quantitative investment over traditional investment is that it can avoid the negative impact of investment managers' emotions and cognitive biases on analysis and judgment, has a wider breadth of decision-making objects, and can better balance benefits and risk; the advantage of traditional investment is that it may be more advantageous in terms of the depth of the decision-making object.

5. Development status of quantitative investment in china

Quantitative investment in China is in the initial stage of development. Since the birth of the first quantified fund product in China in 2004, there have been many quantified funds in operation [7]. At present, investors who use quantitative investment strategies as investment strategies in China of are still represented by institutional investors. Since quantitative investment needs to process a large amount of high-frequency data and computer programs are required to complete the entire transaction process, the threshold for its use is high, and it is difficult for individual investors to invest using quantitative investment strategies. However, there are also some simple quantitative investment strategy procedures based on technical analysis that have been made public, and individual investors can refer to these to learn to use quantitative investment strategies. Institutional investors using quantitative investment strategies are represented by public funds, brokers and private equity institutions. The application scope of investment includes stock investment, financial futures and derivatives investment and commodity futures investment. The rapid development of China's securities market has promoted the rapid growth of the fund industry. With the increase in the number of funds, especially the increase in the size of active management funds, the role and status of the fund management team, especially stock-based open-end funds, have become important institutional investors in China's capital market and an important tool to promote market stability and healthy development. With the development of China's securities investment fund industry, the number of fund investors has also shown a rapid growth trend. Fund investors generally choose funds to invest based on historical evaluation indicators of funds. The premise of this investment strategy of fund investors is effective if the performance of the fund is significant and sustainable.

6. Development countermeasures of china's quantitative investment strategy

6.1 Actively Learn From Foreign Experience

The outstanding performance of foreign quantified funds has attracted everyone's attention, especially during the financial crisis in 2008. The outstanding performance of quantified funds has attracted more attention. At that time, most funds suffered heavy losses, but some funds that adopted quantified strategies received very good returns. The annual average net return of the medal fund managed by James Simmons is as high as 35%, which has become an enviable star among quantitative funds. Domestic fund companies are just capturing the interest of investors in quantitative funds to launch their respective quantitative fund products in a timely manner.

Since the outbreak of the financial tsunami, the U.S. economy has been in a very depressed state. In the early days of the first round of quantitative easing by the Federal Reserve, its year-on-year growth rate of GDP has shown a negative growth trend. In this case, the value of assets has shrunk sharply, the private sector has no confidence in the economic outlook, investment and consumer demand are severely inadequate, the credit mechanism has been damaged, and liquidity has been severely short. The entire market has been shrouded in pessimism, and the economic outlook is very worrying. Interest rates will be reduced to the lowest level ever, traditional monetary policy has failed, and this is just a superficial reason.

After the impact of the economic crisis, many domestic economic indicators in the United States are in a declining phase. At this time, the U.S. government first implemented loose fiscal policies and successively issued large-scale national debt to stimulate aggregate demand and boost the

economy. As a result, the economic situation has not improved, but the ratio of fiscal deficit to GDP has reached a state of alert. There is no doubt that continuing to issue a large number of national debt will not only make the economy out of the quagmire of recession, but also may cause fiscal outbreaks. Crisis, so this approach is not sustainable.

With the successive failure of several well-known investment banks in the United States, the Federal Reserve has lowered the federal benchmark interest rate to the lowest range of 0-0.25%, but the medium- and long-term interest rates in the U.S. financial market have continued to rise [8]. Investment expenditure is determined by long-term real interest rates which determined that the general long-term real interest rate is expressed by the spread between Baa-level corporate bonds and 10-year government bonds. Since the financial crisis was caused by problems within the financial system, the financial crisis are spreading outward, and the impact of transactional financial institutions is far greater than that of financial institutions that provide loans to the real economy. However, due to the close connection of financial institutions in financial services, the crisis has rapidly affected financial institutions spreading out. Investors even worry about the accuracy of the credit rating system and lose their original confidence in the market because of concerns about the assets they hold. This has virtually promoted the rise in Baa corporate bond interest rates. Therefore, when the Federal Reserve lowers the Federal Reserve Funds interest rate, the long-term real interest rates in the financial markets are actually constantly increasing.status.

In developed market economy countries such as the United States, credit intermediaries such as banks play an irreplaceable role in providing financing to the physical sector. The US quantitative easing policy is essentially a quantitative monetary policy, which is different from traditional currency policy, whose operating indicator is the base currency changes in the base currency and the currency multiplier jointly determine the amount of money in circulation. That is to say, when the base currency increases significantly and the currency multiplier decreases, the money supply also may be reduced. Therefore, under the circumstances that the short-term nominal interest rate is extremely low, the long-term real interest rate is high, and the credit intermediation function of the banking system is seriously dysfunctional, it has emerged that after the Federal Reserve has injected huge amounts of funds into the banking system, various commercial banks are still willing to deposit this part of the funds in the Fed's account, unwilling to lend, and even depositing their original funds into the Fed. As a result, the base currency has increased significantly, but liquidity cannot be fully released to the real economy.

6.2 Promoting RMB Internationalization

Because the U.S. dollar is the denomination currency for international trade, the proliferation of the U.S. dollar has pushed up the prices of international commodities and energy, and China is a major importer of international commodities and energy. Therefore, the implementation of the US quantitative easing policy has caused China an importation inflation. Our currency is not an international settlement currency and can only be flowed domestically, so it will adversely affect the economy. Therefore, we must seize the opportunity to accelerate the pace of RMB internationalization. Accelerate the opening up of the financial industry and use products to improve construction of quality and sales channels to increase overseas customers' dependence on Chinese financial products while developing financial products denominated in RMB to promote the international pace of RMB. Actively participate in regional multilateral cooperation mechanisms and strive to form currency swap agreements with many countries, expand the scope of the use of the RMB in international trade, encourage exporting companies to use the RMB for settlement, so that the RMB gradually becomes a foreign exchange reserve of some countries, and when necessary, when the US dollar crisis occurs, the People's Bank of China promises that the RMB can be partially freely converted.

6.3 Improve Talent Quality

The accumulation of talents has provided the possibility for the launch of domestic quantitative funds. Quantitative funds are an imported product, and there is a shortage of talents familiar with the

management of quantitative funds in China. The reason why Everbright Prudential and Shanghai Investment Morgan were able to launch their quantitative funds earlier is the key. With the support of its foreign shareholders, its products used the quantitative investment method provided by its foreign shareholders [9]. At the time, domestic domestic funds lacked talents in this area and naturally did not have the ability to launch quantitative fund products. But the financial crisis gave the opportunity of the domestic fund industry, many foreign investment talents returned to the country after the crisis, and they also brought some advanced foreign quantitative investment knowledge and experience. At present, the vast majority of quantitative fund managers in the market have overseas backgrounds.

6.4 Expanding Domestic Demand and Accelerating Export Trade

Expanding domestic demand and reducing external dependence. China's economy has experienced a period of rapid growth in the 30 years of reform and opening up. To continue to maintain such a high economic growth rate, we must find a driving force that can sustain economic growth. Under the premise of integration, the economic situation is complex and changeable, and it affects the whole body. Therefore, opening the domestic market is the inexhaustible source of maintaining economic growth. At the same time, China's savings rate is high and there is room for expanding domestic demand, especially in rural areas. As long as there are suitable conditions in the market to mobilize household savings, household savings can become real purchasing power to promote the diversification of export regions and reduce external dependence. The idea of diversifying export markets should be established so that it can better avoid excessive reliance on concentrated export areas and prevent the impact of the crisis. Therefore, a balanced development strategy for the global trade market should be established, and new markets should be continuously expanded on the basis of consolidating the original market. In particular, attention should be paid to at the same time as trade, we must also actively expand markets in Asia and Africa.

6.5 Coordinating International Monetary Policy

In the process of closer global economic ties, there is interdependence among open economies. The economic policies of one country will inevitably have spillover effects in another country, and the other country will also take corresponding measures to actively respond. If both choose the policy that maximizes their national returns, the economies of the two countries will suffer different damages and reduce the social welfare levels of the countries. This shows to a certain extent that countries can improve the efficiency of policy implementation through international coordination of monetary policies. Under the conditions of an open economy, strengthening international cooperation in monetary policy is a fundamental way to avoid the reduction in the implementation efficiency of monetary policy due to the transmission of policy spillovers.

6.6 Weak Inflation

As China is a major importer of international commodities, it lacks pricing power in the international market. Under the background of the United States' quantitative easing policy, the prices of international commodities have risen a lot due to the pricing of international commodities in US dollars. The formation of imported inflation will not be conducive to the development of China's economy. Therefore, China must strive for the pricing power of international commodities as much as possible to vigorously improve our futures market. Vigorously improve our futures market should do the following: First, the futures trading variety is diversified, so that when the futures market is opened to the outside world, more international futures traders can be attracted; second, the futures trading market is opened to the outside world and more traders are invited to participate, so that market pricing can be more accepted by the people; Third, the centralized guidance of the government can strengthen the bargaining power to reserve a diversified strategic resources of an appropriate size. By establishing a strategic resource reserve of an appropriate size, a sharp rise in international commodity prices can occur. At the same time, domestic reserves are used to satisfy imports, reduce imports, and prevent the occurrence of imported inflation. Speeding up the pace of

industrial upgrading will not only improve the quality of economic development, but also improve the efficiency of energy use, indirectly reduce the demand for energy, and then reduce dependence on commodities.

6.7 Strengthen Supervision of Liquid Capital

After the implementation of the quantitative easing monetary policy in the United States, on the one hand, due to factors such as the appreciation of the RMB and the inversion of the U.S. interest rate, and on the other hand, China was not greatly damaged in the economic crisis, and the economic recovery was relatively rapid, coupled with global liquidity flooding, so there is a large amount of international funds flowing into our country. Once the economy of developed countries such as the United States improves and capital flight will occur, it will have a great impact on our country. Therefore, supervision of capital should be strengthened [10].

7. Conclusion

As the market environment changes, the quantitative investment strategy also changes. It is foreseeable that China's quantitative investment strategy will continue to develop in the following aspects:

First, differentiation and integration are in parallel. Each strategy will develop its own advantages to the extreme. At the same time, various strategies will be further integrated to adapt to different market environments, making the overall investment strategy more robust.

Second, machine learning, artificial intelligence and other methods have continued to penetrate. After 2015, quantitative investment managers with large scale and performance, especially private equity quantitative investment managers, have more or less applied machine learning and artificial intelligence methods in its own strategy model. With the demonstration of industry leaders and the outstanding performance of actual performance, in the future, these methods will continue to penetrate all corners of the industry and produce more strategies.

Thirdly, the quantitative long strategy will grow stronger. With the increase of China's quantitative investment market share and the increase in scale, only the quantitative long strategy can carry such a large amount of money, so this strategy has a broad market space. The quantitative bull strategy represented by multi-factor stock selection will definitely attract more industry resources to enter and grow stronger.

References

[1] Tian Hanqing. Quantitative investment and programmatic trading [J]. Tsinghua Financial Review. 2016 (02): 78-81.

[2] Zhang Xin. Development trend of quantitative investment and its implications for China [J]. China Business Review. 2018 (01): 256-259.

[3] He Yali. On the impact of quantitative investment on China's capital market [J]. Modern Business Industry. 2016 (19): 423-425.

[4] Guo Xicai. Development of quantitative investment and its supervision [J]. Jiangxi Social Sciences. 2014 (03): 108-111.

[5] Wang Bing, Li Xiang. On the development of quantitative investment in the domestic market [J]. Economic Perspective (Part Two). 2011 (03): 99-102.

[6] Chen Jian, Song Wenda. Quantitative investment characteristics, strategies and development research [J]. Times Finance. 2016 (29): 56-59.

[7] Peng Zhi. Quantitative investment and high-frequency trading: risks, challenges and regulation [J]. Southern Finance. 2016 (10): 167-168.

[8] Cai Qingfeng, Guo Chunsong, Chen Yizhi. Application of big data thinking in finance research [J]. Economic Developments. 2015 (03): 298-300.

[9] Zhang Xin. Does Alpha exist in China's stock market? —— an empirical study based on small and medium-cap stocks in 2014 [J]. Shang. 2015 (14): 453-455.

[10] Dong Xiaofan. Hedge fund transferable alpha strategy overview [J]. Modern Business. 2016 (19): 55-57.