

Step 1 :

Based on the situation we might come across, there could be several computation methods for one factor, we will use Fama-Macbeth regression to find the best potential factors.

Step 2 :

Build portfolios based on selected factors. In this proposal we select the profitability factor RMW proposed by Guo, Zhang, Zhang, & Zhang (2017) who found that this factor improves the description of average return of the initial model and this model is proved to be robust through Gibbons et al. (1989)'s GRS tests. According to the Guo, Zhang, Zhang, & Zhang (2017) paper, the factor of profitability factor RMW would be set up as following:

$$\frac{1}{2}(SH + BH) - \frac{1}{2}(SL + BL)$$

ROE ←

The authors collected the data from the China Stock Market & Accounting Research (CSMAR) database which is accessible by us and hence there should be no constraint in obtaining the data to compute the additional model. Additionally, in the Guo, Zhang, Zhang, & Zhang (2017) they did not set exclude the smallest 30 percent companies in the model neither they compute the value affect using the Earnings-price ratio used in the original extension paper which is (Liu, Stambaugh, & Yuan, 2018). Hence, we argued that the results in Guo, Zhang, Zhang, & Zhang (2017) could be better if they subsumed the 3 factors model proposed by, Liu, Stambaugh, & Yuan (2018). The new model will be as following:

$$R_t = \alpha + \beta_{MKT}MKT_t + \beta_{SMB}SMB_t + \beta_{VMG}VMG_t + \beta_{RMW}RMW_t + \epsilon_t$$

Note: initially, the portfolio will be based on value- size combination, but there's possibility that the final portfolio may come from other combinations, e.g. a cubic combination from triplet sorting instead of a binary combination from double sorting.

Definitely, potential factors can come from other aspects, however, since we can only have access to Wind and CSMAR, we will focus more on factors that can be obtained from these 2 databases. The other possibilities include: volatility, momentum, trading activity, growth, earnings yield(profitability is one of them), earnings variability, leverage, currency sensitivity.

Step 3:

1. Compare with FF classic style models. it means that we will try to regress one factor from FF classic(CH-series) model against factors from CH-series(FF classic) model to examine whether one variable can be explained by others, i.e. to test whether a model can be explained by the other.

Note: this will be a multiple comparison, since more than 2 models will be discussed.

2. GRS test

Step 4 :

Test ability to explain other anomalies in China's market. The robustness test consist of regressing the model over two Chinese stock market. Shanghai Stock Exchange and Shenzhen Stock Exchange, the assumption is due to the nature of stocks traded perhaps running the model separately would show a different result.

Alternative extension

From our perspectives, the following extension is a very good idea, however, due to the constraints of data sources and data length, this idea cannot be executed this time. As it is known

to all that 2 major differences of China's market are: 1. The structure of participants, unlike other developed countries' markets, major players in China's market is individual investors; 2. The strong influence imposed by the government, which is also one reason for the existence of "shell value".

This alternative extension is based on the unique structure of participants in China, as what is mentioned in the original paper, they try to use PMO to describe the sentiment power within China's market, but the result was not reaching up to their expectations. Here, we are also trying to describe this sentiment factor, but from a different aspect.

There's a database provided by China scope, which gives a very detailed analysis of sentiment data of stocks by collecting text data from China's major financial media and forums. Based on the information, they provide a solution for marking market sentiment of each stock (that is mentioned in the news/forums). It is showed in the CSV factor in the equation below. But since their existing data period is much shorter than the data period tested in the paper and we don't have full access to their database, this extension cannot be executed.

$$R_t = \alpha + \beta_{MKT}MKT_t + \beta_{SMB}SMB_t + \beta_{VMG}VMG_t + \beta_{CSV}CSV_t + \epsilon_t$$

However, if the data is ready for us, we can test them against the whole market to see if this new sentiment measure will outperform the one mentioned in the paper and bring a strong explanation for our model. Moreover, if the sentiment factor is not a universal factor for the whole A share market in China, it may be an influential factor in either Shanghai's stock market or Shenzhen's stock market. In the meanwhile, this factor itself is very meaningful since it takes

people's reaction to information into account, which plays an important role in driving China's market movement.

References

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