The Micro-level Drives for Reversal: Smart Money and Factor Slicing

August 31, 2024

Abstract

The reversal factors in the A-share market, such as the commonly used Ret20 factor, have shown significant long-term cumulative returns, but they often experience short-term drawdowns, making them a "thorny rose" in the hearts of quantitative researchers. In fact, if we can segment the reversal factors more precisely in Momentum and Reversal, we can take the best and leave the rest. This is the idea behind factor slicing. After this, we can have deeper insights into the market about the micro-level drives for Reversal, which turn out to be large-order Ask orders.

1 Introduction

1.1 Waht is Factor Slicing?

The reversal factors in the A-share market, such as the commonly used Ret20 factor, have shown significant long-term cumulative returns, but they often experience short-term drawdowns. It would best to find a way to take the Reversal and leave the Momentum.

Some papers have pointed to changing the windows of the Reversal factors. For example, *Momentum turning points* (2023) try to use a long-term return (e.g. 12 month return) as a SLOW signal, use a short-term return (e.g. 1 month return) as a FAST signal, and then by giving different weights to somehow differentiate between Momentum and Reversal.

However, these weights are frequently trained and could face Overfitting problem. Can we dig deeper and find out the micro drive behind Momentum and Reversal, so that we can make the whole segmentation clear and cut?

The first thing coming into mind is to use "Smart Money". They're likely to indicate the future trend. Therefore, we introduce Factor Slicing. The basic procedures for calculating Factor-Sliced Reversal factors are as follows:

1. For the selected stock S, retrieve its data for the past 20 days.
2. Calculate the **median** amount per trade for each day (this can also change to any **percentile**) for the stock.
3. Sum the daily price changes for the 10 days with the highest percentile transaction amount per trade, denoted as M_{High}.
4. Sum the daily price changes for the 10 days with the lowest percentile transaction amount per trade, denoted as M_{Low}.
5. Reversal factor after Factor Slicing $M = M_{High} - M_{Low}$.

1.2 The Idea Behind

The logic behind this is quite simple: the actions of major market players tend to reflect the market's overall sentiment and are likely to influence the market's direction in the near future.

How can one perceive Factor Slicing? For example, if we use the **median** amount per trade for each day as the threshold, what's the finance intuitive behind? We're actually comparing the different impact of majors. M_{High} could be seen as the price changes pushed by the market majors. (Here we define major as those whose amount is in the upper 50%. Note the definition might change to "in the upper 10%" later) M_{Low} could be seen as the price changes pushed by the market minors.

If my hypothesis is correct, that market majors are those behind Market Reversals, this Slicing would precisely separate Momentum and Reversal at the very basic source. The result, seems to confirm my hypothesis.

2 Factor Construction

I use the most common Ret20 as my basic factor. But I also need to add the everyday per-transaction amount percentiles. I chose 16th percentile here. The steps are as follows:

1. For the selected stock S, retrieve its data for the past 20 days.
2. Calculate the **i-16th percentiles** amount per trade for each day (i range from 1 to 15) for the stock.
3. Sum the daily price changes for the 10 days with the highest percentile transaction amount per trade, denoted as M_{High}.
4. Sum the daily price changes for the 10 days with the lowest percentile transaction amount per trade, denoted as M_{Low}.
5. Reversal factor after Factor Slicing $M = M_{High} - M_{Low}$.

3 The Results

3.1 Conclusions First

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1. The IC of M_{High} and M_{Low} are U-Shape, with 15-16th percentile's IC a little higher than 1-16th percentile. The IC of M_{High} are all negative, the IC of M_{Low} are all positive.
2. The IC of M of 15-16th percentile has reached over -6%, in contrast to almost 5% IC of just Ret20.
3. Factor Slicing is very efficient! The Micro-level Drives for Reversal is the very majors of the market: If the top 6.25% amount are pushing the prices high (or low) for this month, then it's very likely that the prices are going down next month.
4. There is different impact between Ask and Bid orders. For Ask orders, large orders might be most predictive. But for Bid orders, small orders would be more predictive.

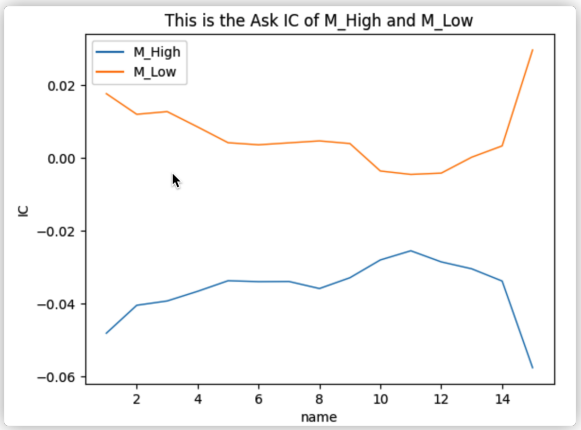

Figure 1: The Ask IC of M_{High} and M_{Low}

3.2 Analysis and Explanation

The IC of M_{High} and M_{Low} are U-Shape, with 15-16th percentile's IC a little higher than 1-16th percentile. This means, if the very major and the very minor are pushing, the Reversal effect would be very impressive. Still, the very majors have more power than the very minors. **What could be the reasons?** Leakage could account for the very minors' impact, fully-priced-in could account for the very majors' impact.

The IC of M_{High} are all negative, the IC of M_{Low} are all positive. This means we have separated Momentum and Reversal by Factor Slicing! if the majors are pushing, then it's mostly reversal effect. There is different impact between Ask and Bid orders. Large Ask orders have much stronger power compared to small Ask orders, while large Bid orders have just a little stronger power compared to small Bid orders. The M_{High} and M_{Low} of 15-16th Ask percentile has respectively about -6% IC and 3% IC. This is considerably greater than those of 1-16th Ask percentile. However, for Bid orders, the two are alomst the same. This points to the different drives of Ask and Bid: **Large Ask and small Bid orders pushes more behind the Reversal.**

The Micro-level Drives for Reversal is the very majors of the market. Factor Slicing is very efficient!

If the top 6.25% amount are pushing the prices high (or low) for this month, then it's very likely that the prices are going down next month.

How do we know the majors are "pushing"? Whether Ask or Bid, if the majors are participating, it's by intuitive that the amounts would be higher. Remember how we construct the M_{High} and M_{Low}. We sum the daily price changes for the 10 days with **the highest** percentile transaction amount per trade, denoted as M_{High}. So we can say M_{High} are the price changes "pushed" by "majors".

4 Heterogeneity Test

If we dig deeper, it's natural we would like to see if the Ask and Bid orders have different impact if the prices are going up or down? For example, it's by intuitive that Bid orders might be more predictive, that is, have higher IC, for going-down stocks. It's natural to believe if the market majors are buying

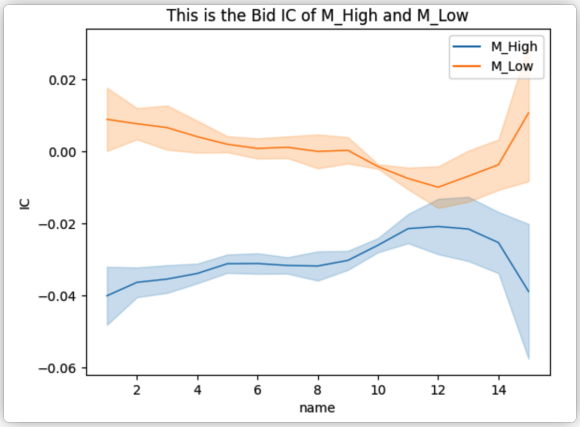

Figure 2: The Bid IC of M_{High} and M_{Low}

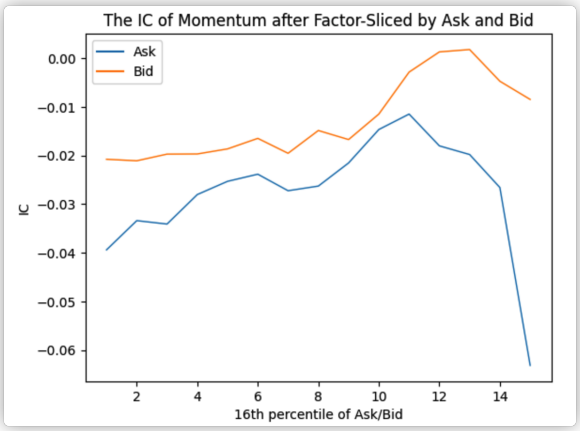

Figure 3: The Ask and Bid IC of Ret20 after Factor Slicing

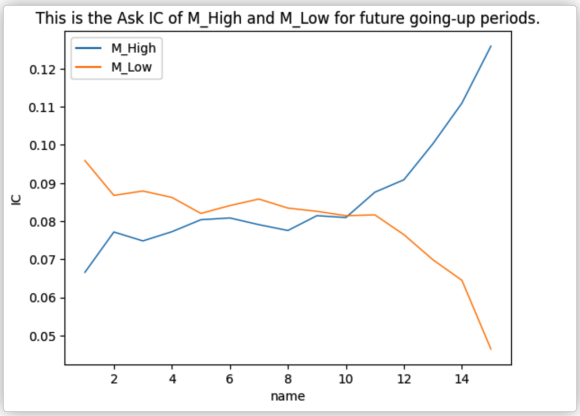

Figure 4: The Ask IC with future positive returns of Ret20 after Factor Slicing

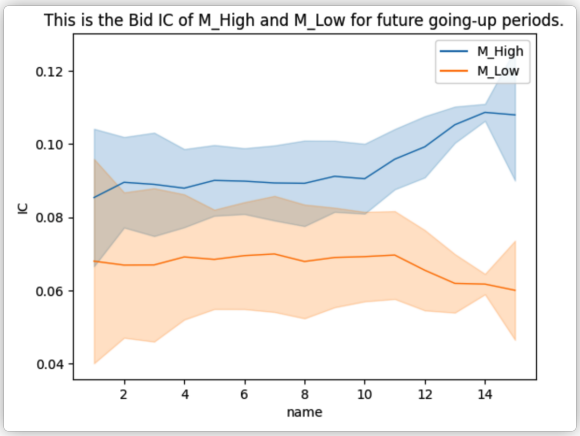

Figure 5: The Bid IC with future positive returns of Ret20 after Factor Slicing

too much, then a "bubble" is made, then the prices are more likely to go down soon. Or reversely, if the market majors are buying too much, investors might view this as a signal for a "bull period", ending up with higher prices in the next month.

The point is, Ask or Bid might be particularly powerful during going-up or going-down prices. So the basic idea is to analyze the predictability (IC) under different conditions.

4.1 Ask and Bid's predictability for next-month returns

Since IC can also been seen as a correlation, we can use IC to discover the relationship between Ask- or Bid-Sliced Reversal Factor and future positive or negative returns.

What's the finance intuitive behind? If Ask-Sliced M_{High} shows negative IC with future positive returns and negative IC with future negative returns, it shows Reversal effect of the large Ask orders. And, if Ask-Sliced M_{High} shows higher absolute IC with future positive returns than Bid-Sliced M_{High}, it means large Ask orders are the micro drives behind going up, rather than large Bid orders.

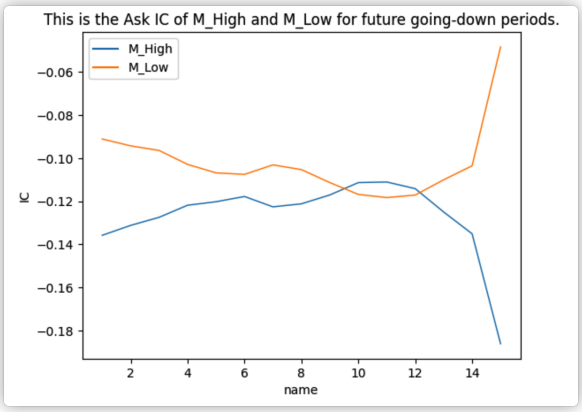

Figure 6: The Ask IC with future negative returns of Ret20 after Factor Slicing

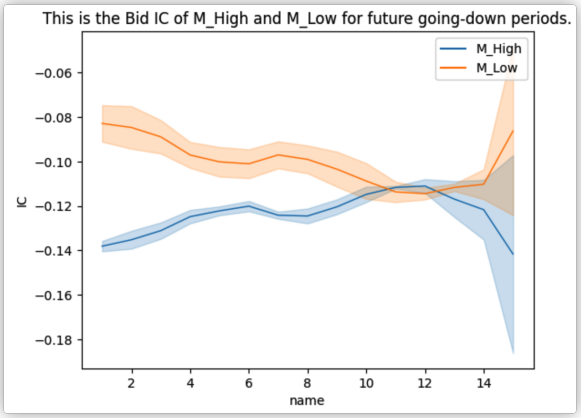

Figure 7: The Bid IC with future negative returns of Ret20 after Factor Slicing

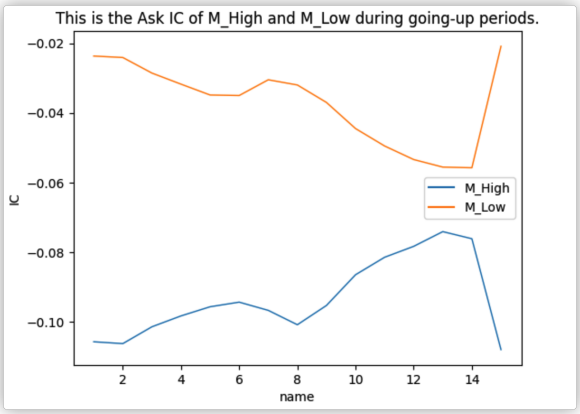

Figure 8: The Ask IC with past positive returns of Ret20 after Factor Slicing

The results show the following:

1. **For future positive returns:** The Momentum effect of Ask orders keeps going up for future rising returns, and Momentum effect of Bid orders go slightly higher for Bid orders. Since for both, IC is positive, it shows Momentum effect. **The financial intuitive is, the institutions (large orders) won't throw good money after bad.** From another perspective, the "future positive return" might itself be made by all these Asks.

2. **For future negative returns:** The Reversal effect of Ask and Bid orders show "U-Shape", with the 15-16th percentile large orders remarkably high negative IC. **The financial intuitive: Too much cash leads to a dash!**

4.2 Ask and Bid's predictability during going-up or going-down periods

This part is a little different from the last. **Now we're closer to constructing a strategy.** The purpose is to find out which is better to use, given this month's return, Ask or Bid? And, if it's Ask, what amount percentile is the best? If it's Bid, what amount percentile is the best?

The results show the following:

1. **If this month the price is going up, the prices will go down whatever the large orders do.** Momentum and Reversal effect aren't separated. Therefore, factor-slice Reversal factor during up periods makes no improvement. However, M_{High} could be a more efficient factor than before. We can test this later. The very large Ask orders are more predictive than large Bid orders.

2. **If this month the price is going down, the large Ask orders drives Reversal.** Momentum and Reversal effect are clearly separated, with 15-16th percentile separates to the most. Bid orders doesn't predict as well.

2. **The financial intuitive behind:** Institutions (Smart Money/ Large Orders) will rush to buy, but sell with caution in case of a market crash.. So asymmetry exists between Ask and Bid.

5 Strategy

Therefore, we construct the following 4 strategies.

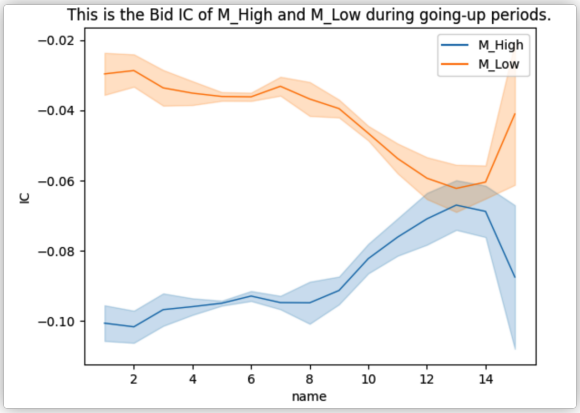

Figure 9: The Bid IC with past positive returns of Ret20 after Factor Slicing

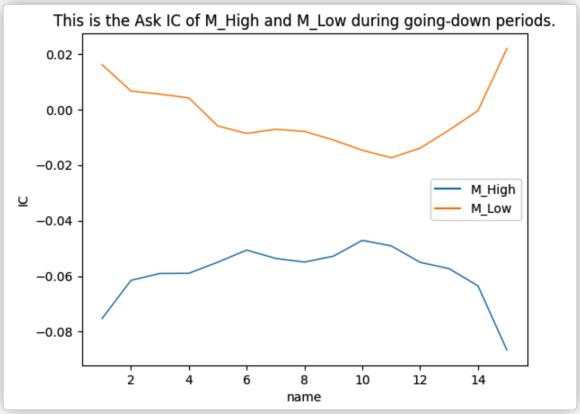

Figure 10: The Ask IC with past negative returns of Ret20 after Factor Slicing

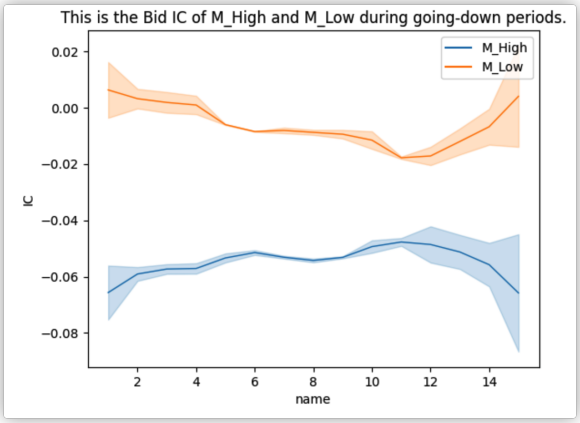

Figure 11: The Bid IC with past negative returns of Ret20 after Factor Slicing

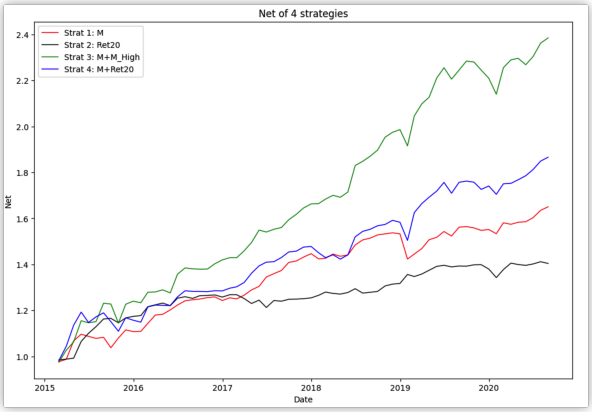

Figure 12: The Net of the Four Strategies

1. **Strategy 1: M.** Improve the common Reversal factor Ret20 with factor-slicing for all times. That is, using $M = M_{High} - M_{Low}$ as the factor to do stock-selection and long-short.

2. **Strategy 2: Ret20.** Just use Ret20 as Reversal factor. That is, using the past 20 days' returns as the factor to do stock-selection and long-short.

3. **Strategy 3: M+M_High.** Use $M = M_{High} - M_{Low}$ as the factor to do stock-selection for going-down stocks since the factor performs well here. Use M_{High} as the factor for going-up stocks. That is, at the end of each month, divide the stocks into 2 types: I.going-up, II.going-down. For type I stocks, use $M = M_{High} - M_{Low}$ to sort them in ascending order, and sell the top 20% and buy the bottom 20% stocks. For type II stocks, use **M_High** and do the rest the same.

4. **Strategy 4: M+Ret20.** Use $M = M_{High} - M_{Low}$ as the factor to do stock-selection for going-down stocks since the factor performs well here. Use the past 20 days' returns as the factor for going-up stocks. That is, at the end of each month, divide the stocks into 2 types: I.going-up, II.going-down. For type I stocks, use $M = M_{High} - M_{Low}$ to sort them in ascending order, and sell the top 20% and buy the bottom 20% stocks. For type II stocks, use **Ret20** and do the rest the same.

The results show that **Strategy 3: M+M_High** works the best. All 3 methods applying Factor Slicing works better than just Ret20. There is significant improvement regarding win rate, IC, and drawdown.

5.1 Conclusions

This points to the micro drives of the market: large orders participation drives the Reversal. But for specific periods, that is, during going-up or going-down periods, **different ways to construct the "best" Reversal factor might vary.** During going-up periods, both M_High and M_Low are Reversal, but M_High is more efficient. During going down periods, M_Low is Momentum, M_High is Reversal, so $M = M_{High} - M_{Low}$ works as the best way to separate Momentum and Reversal, thus constructing a more efficient factor.

During the backtest period, **the strategy achieved a monthly win rate of 72.0%, an IC of -8%, and a rank IC of -0.087.** Notably, the strategy not only retains the long-term return characteristics of

the ideal reversal factor but also successfully avoids the significant drawdown similar to that in February 2019.